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INDEX

9	**2010**	**DISTUBUTION SIDE SAG/SWELL PROBLEMS DIMINUTION BY USING A FUZZY BASED DVR**	A. Bhaskararao, P. Raju, U. Anjaneyulu	68-77	View
10	**2015**	**SCRUB TYPHUS IN INDIA**	Abhishek Kumar Yadav, Gaurav Sharma, Dr. Govind Pandey	78-82	View
11	**2016**	**An Advanced Seven Level Multilevel Inverter Technique for Grid-Connected System Applications with Reduced Switching Devices**	B Laxmi Srikanya , Venkata Ramana G	83-94	View
12	**2017**	**Analysis and Design of Permanent Magnet Synchronous Motor (PMSM) Control with Advanced Vector Control Technique**	VenkataRamana G, Dr. K Suneeta	95-106	View
13	**2018**	**A NOVEL DESIGN FOR HIGH DATA RATE WIRELESS LAN IN 5 GHz BAND USING OFDM STANDARD**	Dr. G.A.E. SATISH KUMAR	107-115	View
14	**2021**	**COAL BENEFICIATION**	M.Saibaba, G.Sireesh Kumar, B.Krishan Jayanth	116-124	View
15	**2022**	**CFD ANALYSIS OF CENTRIFUGAL IMPELLER AT DIFFERENT SPPEDS AND MASS FLOW RATES**	S.MANIKANTA, G.ROJA, H.VASU DEVA RAO	125-133	View
16	**2023**	**BIO BRIQUETTES AS ALTERNATE FUEL**	M.YUGANDHAR, P.DILIP KUMAR, B.KRISHNA JAYANTH	134-141	View
17	**2024**	**State Estimation of Permanent Magnet Synchronous Motor Drive Using Non-linear Full Order Observer**	Jallu hareesh kumar, Adavipalli Chandana, Janardhan	142-153	View
18	**2026**	**A GENERALIZED GAMMA DISTRIBUTION FOR RETRIEVING MEDICAL IMAGE**	M. Priscilla Dinkar, S.Ambika, A.Uday Kumar	154-164	View
19	**2027**	**Power Quality Improvement using Dynamic Voltage Restorer (DVR)**	Ms. Siba H. Sheikh , Ms. Snehal M. Deshmukh, Ms. Tejashree S. Sahu	165-169	View
20	**2028**	**Control of PMSM by using SMC based ANFIS Controller**	Barla Anitha , Adavipalli Chandana	170-178	View
21	**2029**	**IMPROVING THE PERFORMANCE OF SOLAR PV SYSTEM WITH SEPIC**	Rajesh Babu Kanchana , Gummadi Venkatesh	179-189	View
22	**2030**	**MODELLING OF PHOTO VOLTAIC MODULE UNDER PARTIAL SHADED CONDITIONS USING MPPT**	Krishna Mohan Tatikonda , Mekala Rama Krishna	190-200	View

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IMPROVING THE PERFORMANCE OF SOLAR PV SYSTEM WITH SEPIC

Rajesh Babu Kanchana [1], Gummadi Venkatesh [2]

[1,2]Asst. Professor, Electrical Department,

Andhra Loyola Institute of Engineering and Tech, Vijayawada, (India)

ABSTRACT

Solar module is considered as fundamental power transformation unit of Photovoltaic (PV) generation system. The performance of a PV array strongly depends on operating environmental conditions such as operating temperature, solar insolation, shading array configuration. Often PV arrays get shadowed fully or partially by passing cloud, building, poles, trees, etc. Under such partial shading conditions, the operation of PV arrays get more complicated with more than one peak and it is very important to predict the characteristics to obtain possible maximum power. In this paper a modified DC-DC converter is presented for maximum power point tracking (MPPT) with PI controller to improve the performance of PV system. The MATLAB/SIMULINK power system tool box will be used to stimulate the proposed system.

Keywords: Matlab/Simulink, Photovoltaic arrays, Shading effect, DC-DC Converter.

I.INTRODUCTION

Solar energy is the one of the best renewable energy for future applications .So the use of photo voltaic (PV) systems increased with reduced costs and increased efficiency. But the generation of electricity from photo voltaic (PV) system is more expensive than the other non- renewable energy sources. We know that non-conventional sources which are also known as renewable energy resources are becoming more popular now a days as they are available nature free. Renewable energy sources are defined as the sources which can be reproduced from nature again and again once even they used.

There are many advantages with renewable energy resources comparing to non-renewable energy source. Some of the advantages are renewable energy sources are cost free and also pollution free compared to non-renewable resources. Some of the main examples for this renewable resources are solar, wind, tidal etc. Here in this project work we are considering solar as the source and obtaining maximum power from the sun by using maximum power point tracking algorithms (MPPT's). There are many algorithms are used for extracting maximum power such as perturb and observe, incremental conductance, fuzzy control etc. In our daily life, power electronic converters have been widely used, not only for industry applications but also in many electronic products, such

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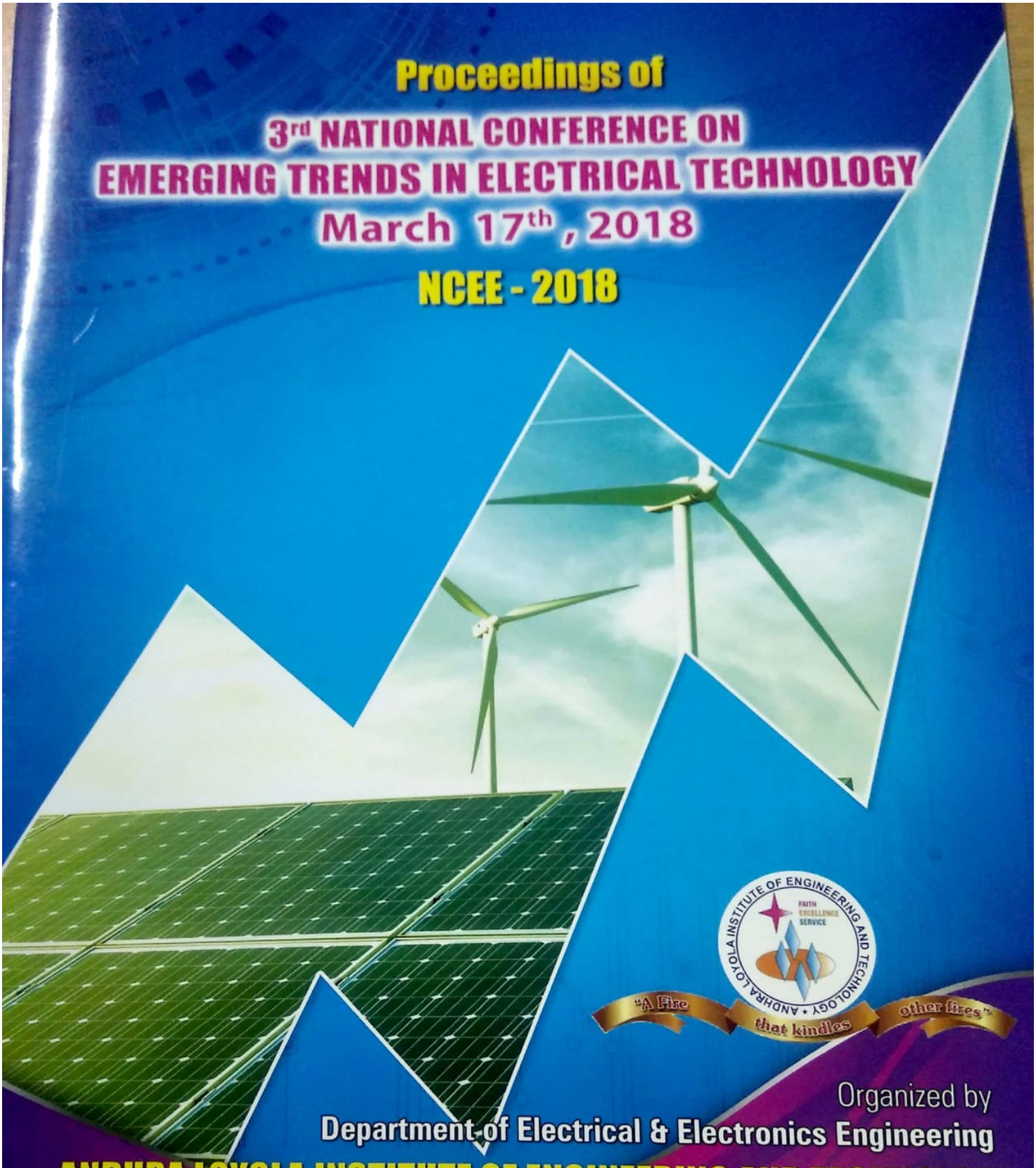

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CONTENTS		
Message from the Director		iii
Message from the Assistant Director		iv
Message from the Assistant Director		v
Message from the Principal		vi
Message from the Convener		vii
Committees		viii
1	**Fully Automatic Solar Grass Cutter Using Arduino.** *P. Abhinav Deep, Ch. Akash Babu and M. Siva Kumar*	1
2	**SVPWM Based Open Loop And Closed Loop V/f Control of Induction Motor** *K.Rajesh Babu, G.Anvesh Kumar, M.Naresh and B.Praveen kumar*	2
3	**Outline OF Energy Framework STABILIZER Utilizing ANFIS** *M. Vinod Kumar, B.M.V.Gowtham, N.Venkat Reddy and M.Ramakrishna*	3
4	**Stability Enhancement of Wind Power System with UPFC and Energy storage system** *B.Manohar, M.Hari Prasad and K.Mahesh*	4
5	**Under Ground Cable Fault Detection By Using Arduino** *V.Pranay Chowdary, CH.T.V.N.Manikanta, G.Anil Kumar and L.Karunakar*	5
6	**DFIG Wind Turbines With Super Capacitor Energy Storage for Constant Power Control** *L.Naresh, K.Avinash, P.Satya sravan and M.M.Karunakar*	6
7	**Power TransformerProtection using Fuzzy Logic based Differential Relay** *K.Shiney, N.Manaswini, V.Lakshmi keerthi, K.Nalini prasannaand A.Sai Sunil*	7
8	**Low frequency Oscillations Damping in SMIB System using Fuzzy based SSSC Controller** *S.Ramarao, K.Parasuram, M.Venkata vinay, G.Anjibabu and T.Krishna Mohan*	8
9	**Three Phase Boost Converter for Solar Battery Charging System by Using MPPT Technique** *Y.C.Ashok Kumar, A,Naga Phaneendra Kumar, P.malli Krishna Reddy and R.Anjaneyulu*	9
10	**Development of DC-DC Buck Converter Using Arduino** *A Sekhar Sai Sunil, R Naga Surya Teja, M AnjaneyaReddy and P V N D Sumanth*	10
11	**Arduino Based Sophisticated Home Automation System for Electrical Appliances Using GSM** *K Ganesh, M Ravi Chandra, P Raj Kamal, Y Leela Venkatesh and K Rajesh Babu*	11
12	**Grid Interconnection of Distributed Generation System with Power-Quality Improvement by using STATCOM** *Greeshma.Lanke, Revathi.Maddirala and Brahma Teja.Saketi*	12
13	**Distributed Power Flow Controller Based Stabilizer To Damp Power System Oscillations** *S.Siva Kumari, M.Shekinah and G.Sirisha*	13
14	**Control of Hybrid Micro Grid In Grid Tied Mode Using Z-Source Converter** *P.Jhansi, S.Jayasree, B.Ramya, J.Lakshimi Triveni and P.Swathi Mastan*	14
15	**Line Follower Based Smart Car** *K.L.N.Satish, T.TejaSai, S.K.Sai Krishna, G,Naveen Kumar, L.Karunakar*	15

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Three Phase Boost Converter for Solar Battery Charging System by Using MPPT Technique

Y.C.Ashok kumar[1] | A.Naga Phaneendra Kumar[2] | P.Malli Krishna Reddy[3] | R. Anjaneyulu[4]

[1]Head of the Department of Electrical and Electronics Engineering, Andhra Loyola Institute of Engineering and Technology, Vijayawada, Andhra Pradesh, India.
[2,3,4] Department of Electrical and Electronics Engineering, Andhra Loyola Institute of Engineering and Technology, Vijayawada, Andhra Pradesh, India.

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ABSTRACT

Dc-dc converter control has major important role in solar or Photovoltaic systems with maximum power point tracking (MPPT). In this analysis of three phase boost converter for PV battery charging system is presented. Modeling of PV array and three phase boost converter is described and the simulation results are presented for PV array based battery charging system. Input voltage of the boost converter is controlled to regulate the maximum power point of the PV array. Input voltage control provides the advantage of easy functioning of MPPT algorithm. With the use of multiphase topology for the converter, the stress on power semiconductor switches reduces and additional benefit of reduced ripple current on PV array is obtained. Perturbation and observation conductance algorithm is taken for the tracking of maximum power point (MPP).

KEYWORDS: *solar cell 1,three phase 2, Boost converter 3, Ripple4, maximum power tracking, 5Perturb and Observe conductance 6, Battery7.*

I. INTRODUCTION

Photovoltaic power generation has experienced rapid growth over the last few decades as the Sun is an abundant source of clean and free energy. PV array is a series and parallel combination of photovoltaic cells to get a specific current and voltage rating. PV cell is basically a p-n junction which generates current when exposed to solar radiation. The array has nonlinear characteristics and has an operating point corresponding to maximum power at a given temperature and radiation level. To draw maximum power from the PV array, suitable dc-dc converter has to be used and operated with appropriate duty ratio. To track the maximum power operating point of PV array, many MPPT algorithm. In a battery charger, the solar panel is interfaced to the battery by a dc-dc converter to attain the maximum power point. The parameter to be regulated is either the PV current or PV voltage. Both the variables are functions of irradiation and temperature. The PV current has a strong dependence on the irradiance level whereas the PV voltage dependency is not as strong as current. On the other hand temperature changes have less effect on PV current but affect PV voltage. The temperature changes have slow dynamics compared to irradiation changes and so the PV voltage variation with atmospheric conditions is slow. Hence regulation of PV voltage is the most preferred method to extract the maximum power from PV array. The choice of dc-dc converter depends on the array and the load specifications. Buck or Boost converters are the best available

choices. The effectiveness of MPPT algorithm will depend on converter performance. For input voltage regulation, boost topology has better dynamic response and less expensive implementation compared to the buck converter. For panels with large power output, converter power stages have to be paralleled. The current gets divided in the paralleled power stages and thermal stress in each stage is reduced. The gate signals of the switches are phase shifted which helps in current ripple reduction in the converter input and output. Multiphase topology is used since it offers benefit of reduced ripple currents in input and output, reduced switch stress and improved load transient.

II. CIRCUIT DIAGRAM

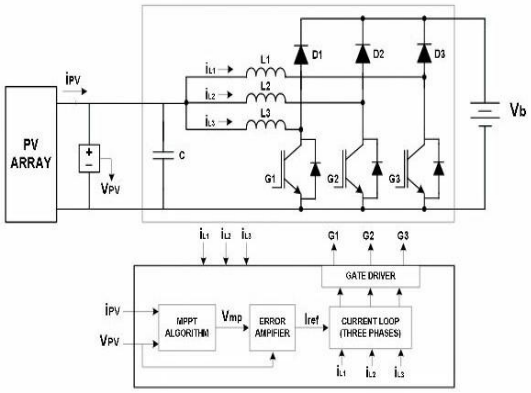


Fig.1. Block diagram of PV array interface to 3 phase boost converter.

III. DESCRIPTION

BLOCKS IN THE CIRCUIT

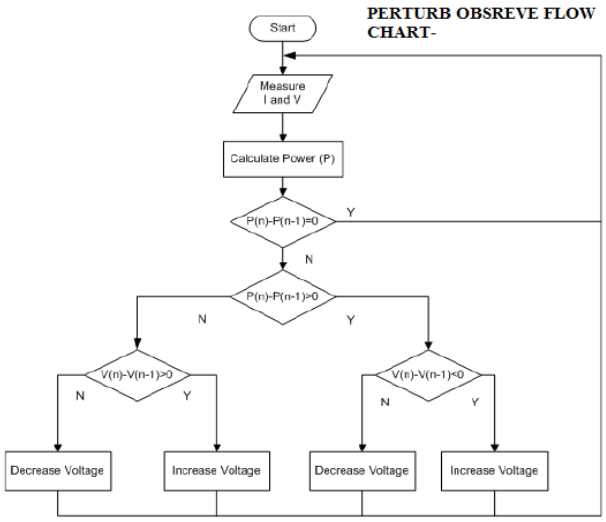
1. Solar cell
2. MPPT Technique
3. Multiphase Converter
4. Boost Converter

SOLAR CELL:

PV cell is an electrical device that converts the energy of light directly into electricity by the photovoltaic effect. Photoelectric cell, defined as a device whose electrical characteristics, such as current and voltage vary when exposed to light. Individual solar cell devices can be combined to form modules, otherwise known as solar panels.

MPPT Technique:

MPPT is the automatic control algorithm. To adjust the power interfaces and achieve the greatest possible power harvest, during moment to moment variations of light level, shading, temperature, and PV module characteristics. MPPT is used to adjust the solar operating voltage very close to the MPP under changing atmospheric conditions. To evaluate the design performance of PV power system



Multiphase Converter:

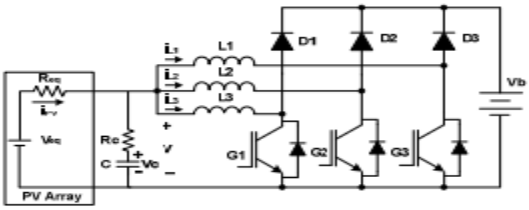
The battery voltage variation is slow compared to the switching frequency of the converter and hence the converter output voltage is considered as constant. Input capacitor ESR (Equivalent Series Resistance) RC place plays a major role in dynamic behavior of the system. The inductor in each phase is identical and inductor DC resistance is assumed to be negligible. The gate signals of the three phases are phase shifted by 120 degrees.

Boost converter: Step-up converter or DC-to-DC power converter .step up the voltage from its input to output.

IV. PV ARRAY MODELING

A PV cell consists of a p-n junction fabricated on a thin wafer or layer of semiconductor. In the dark, the I-V output characteristic of solar cell has an exponential characteristic similar to that of a diode. When exposed to sunlight, photons with energy greater than the band gap energy of the semiconductor are absorbed and create an electron-hole pair. The generated carriers are swept apart under the influence of the internal electric field of the p-n junction and create a current proportional to the incident radiation. When the cell is short circuited, this current flows in the external circuit. When kept unconnected or open circuited, this current is shunted internally by the intrinsic p-n junction diode. The characteristics of the intrinsic diode set the open circuit voltage characteristics of the cell. The equivalent circuit of a PV cell is a current source in parallel with a diode. PV cells are connected in series and/or parallel to get a PV array of desired

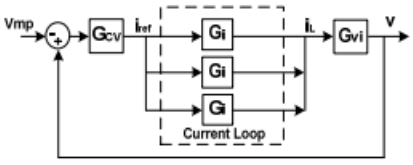
rating.



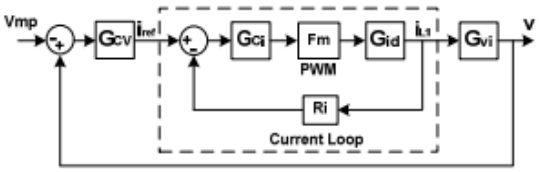
. PV array with three phase boost converter

V. CLOSED LOOP CONTROL OF BOOST CONVERTER

Average current mode control method is used for three phase boost converter control. With current mode control, equal current sharing is ensured in all the three phases. The control mechanism for one phase. The reference voltage for voltage loop -r< is obtained from the MPPT algorithm. The reference value is compared with the PV array voltage and the error is amplified by the voltage compensator GCV. The compensator output is the reference for inner current loop. For the current loop, Ri denotes current sensor gain. The current reference from voltage compensator (iref) is compared with inductor current and the error is amplified by the current compensator GCi. The output of GCi is the control signal for comparator. The gate pulses are generated by comparison of control voltage and a sawtooth ramp as in a conventional voltage mode control. The ramp has a period TS and peak to peak voltage of VP. The gate pulses are applied to IGBT through a gate drive circuit. For other phases, the current reference is same whereas sawtooth ramp is phase shifted by 120 degrees.

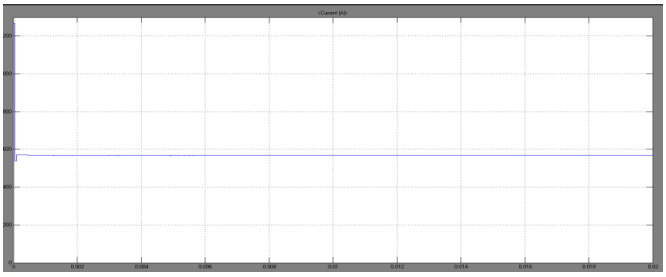


Equivalent control block diagram of three phase boost converter

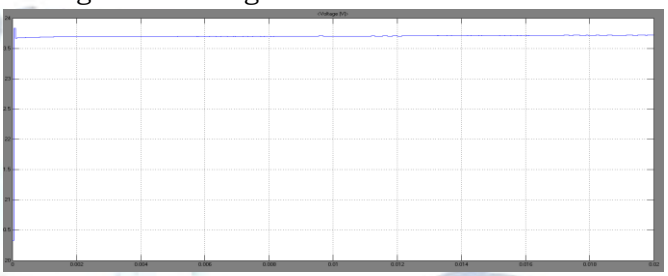


Control loop block diagram of one phase

VI. SIMULATION RESULTS



PV Regulated voltage and current wave forms



VII. CONCLUSION

A three phase boost converter for input voltage control is modeled and simulated for PV application. The use of multiphase topology in the boost converter reduces the current ripple in the input and output of the system. Current sharing has significant benefit on thermal behavior of the semiconductor switches. With the current mode control it is possible to balance current in all the phases and to obtain better dynamic behavior of the system. Improved dynamic behavior helps in faster tracking of maximum power point and to get better throughput from the PV array.

REFERENCES

[1] Eftichios Koutroulis, Kostas Kalaitzakis, "Development of a Microcontroller based photovoltaic maximum power point tracking control system", IEEE transactions on Power Electronics, Vol.16, No.1, January 2001

[2] Trishan Esram, Patrick L Chapman, "Comparison of photovoltaic array maximum power point tracking techniques", IEEE Transactions on Energy Conversion, Vol.22, No.2, June 2007.

[3] Weidong Xiao, William G Dunoford, "Topology study of photovoltaic interface for maximum power point tracking", IEEE transactions on Industrial Electronics, Vol.54 No.3, June 2007.

[4] I.H Atlas, A.M Sharaf, "A photovoltaic array simulation model for matlab-simulink gui environment", International Conference on Clean Electrical Power, May 2007.

[5] Kinal Kachhiya, Makarand Lokhande, Mukesh Patel, "MATLAB/Simulink model of solar pv module and MPPT algorithm", National Conference on Recent Trends in Engineering and Technology, May 2011.

[6] S.Gomathy, S.Saravanan, Dr.S Thangavel, "Design and implementation of maximum power point tracking algorithm for a standalone PV system", International Journal of Scientific and Engineering Research, Vol.3, Issue 3, March-2012

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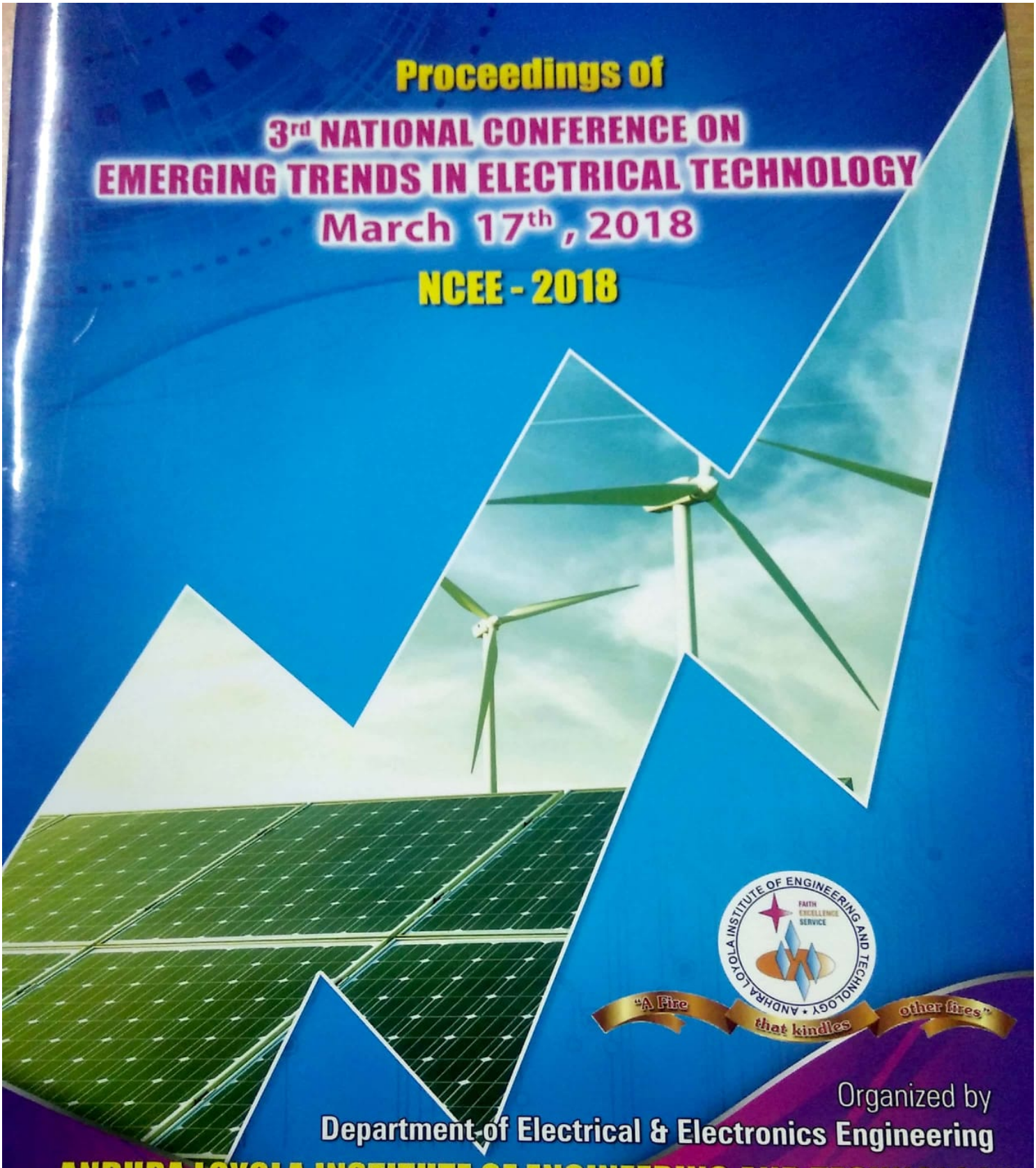

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Under Ground Cable Fault Detection by Using Arduino

V. Pranay Chowdary[1] | Ch T V N Manikanta[2] | G. Anil Kumar[3] | L. Karunakar[4]

1,2,3 Department of EEE, Andhra Loyola Institute Of Engineering And Technology, Vijayawada, Andhra Pradesh, India.
4 AssistantProfessor, Department of EEE, Andhra Loyola institute Of Engineering And Technology, Vijayawada, Andhra Pradesh, India.

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ABSTRACT

In this paper, a way for sleuthing underground cable fault distance locator is done by using microcontroller. The aim of this project is to determine the distance of underground cable fault from base station in kilometers. This project uses the simple concept of ohm's law. When any fault like short circuit occurs, voltage drop will vary depending on the length of fault in cable, since the current varies. A set of resistors are therefore used to represent the cable and a dc voltage is fed at oneend and the fault is detected by detecting the change in voltage using a analog to voltage converter and a microcontroller is used to make the necessary calculations so that the fault distance is displayed on the wireless(Mobile) display.

KEYWORDS: *Underground Cable, Underground Cable Fault, Arduino, Wireless Fault Detection*

I. INTRODUCTION

Most of the transmission lines are laid using overhead line method but transmission line by underground method also finds its use and application over a large area. In areas like hospitals or colleges, underground cable is widely preferred to ensure safety. Underground cable installations are costly as compared to overhead cable but are more reliable and also the life of underground cable are more as compared to overhead lines.

Although underground cables are unaffected by adverse conditions like a storm, rainfall and the chances for fault in underground cables are less than that of overhead cables but when the fault happens at undergrounds cables its detection becomes difficult. So it becomes essential to calculate the distance of fault for an efficient way to employ underground cable method.

Fault in cable can be classified in two groups:

1)Open Circuit Fault:

Open circuit faults are better than short circuit fault, because when these fault occurs current flows through cable becomes zero. This type of fault is caused by break in conducting path. Such faults occur when one or more phase conductors break.

2)Short Circuit Fault:

When conductors of different phases get connected with each other than such fault comes under short circuit fault. In this type of fault the value of current increases so it becomes harmful at the load ends.

There are basically 2 types of short circuit fault:-

i. Symmetrical Fault
ii. Unsymmetrical Fault

Symmetrical Fault:

The 3-phase fault is called a symmetrical fault. In this, all 3-phases are short-circuited. In this fault the phase angles are unchanged but the magnitude of the current can vary.

Unsymmetrical Fault:

In this fault magnitude of the current is not equal and also not displaced by 120-degree angle. The different phases are short-circuited with each other.

Fault location methods can be classified as:

1) Online method:

This method utilize & process the sampled voltages& current to determine the fault points. Online method for underground cable are less than overhead lines.

2) Offline method:

In this method special instrument is used to test out service of cable in the field.

There are two offline methods as Following:-

1) Tracer method:

In this method fault point is detected by walking on the cable lines. Fault point is indicated from audible signal or electromagnetic signal. It is used to pinpoint fault location very accurately.

Example:

1) Tracing current method
2) Sheath coil method

2) Terminal method:

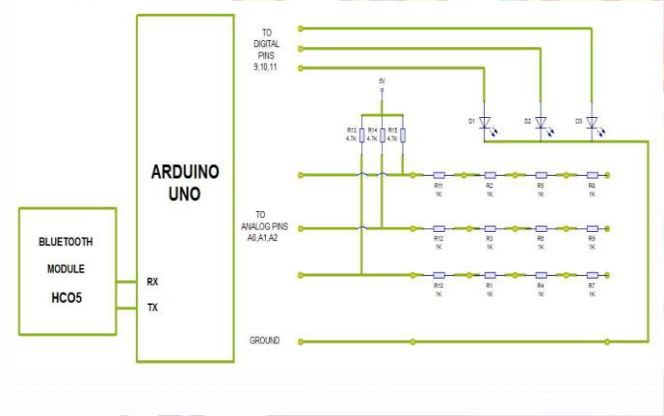
It is a technique used to detect fault location of cable from one or both ends without tracing. This method use to locate general area of fault, to expedite tracing on buried cable.

Example:

1) Murray loop method
2) Impulse current method

We are using terminal method to find out the fault in the underground cable.

II. CIRCUIT DIAGRAM



UNDERGROUND CABLE FAULT DETECTION BY USING ARDUINO

The project uses the simple concept of OHMs law where a low DC voltage is applied at the feeder end through a series resistor. The current would vary depending upon the length of fault of the cable in case there is a short circuit of LL or 3L or LG etc. The series resistor voltage drop changes accordingly which is then fed to an ADC to develop precise digital data which the programmed microcontroller would display the same in Kilo meters.The project is assembled with a set of resistors representing cable length in KMs and fault creation is made by a set of switches at every known KM to cross check the accuracy of the same This is proposed model of underground cable fault distance locator using microcontroller. It is classified in four parts – power supply part ,cablepart, controlling part, display part. Power supply part consist of ac supply of 230v is converted into 5volts,The cable part is denoted by set of resistors along with Terminals. Current sensing part of cable represented as set of resistors &Terminals points are used as fault creators to indicate the fault at each location. This part senses the change in current by sensing the voltage drop. converts this voltage into digital signal and feeds the microcontroller with the signal. The microcontroller also forms part of the controlling unit and makes necessary calculations regarding the distance of the fault. The display part consists of the Wireless display interfaced to the microcontroller which shows the status(Red-light indicator) of the cable of each phase and the distance of the cable at the particular phase, in case of there is no fault then there will be no light indication will be displayed.

III. HARDWARE REQUIREMENT

a. *Arduino:*

Arduino is the type of microcontroller. The purpose of microcontroller is to control the position of motor. so At mega 328p microcontroller is used. Arduino consist of 6 analog inputs and 14 digital i/o ports out of them 6 acts as pwm signals. In addition to this it consist of 16 MHZ crystaloscillator, a USB cable through which program is dumped. And Arduino get powerd by the power jack. Advantages of arduino is low cost, roubst construction and platform independent

b. *Bluetooth:*

HC - 05 module is an easy to use Bluetooth SPP

(Serial Port Protocol) module, designed for transparent wireless serial connection set up. The HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication.

The HC-05 Bluetooth Module has 6pins. They are as follows:

ENABLE:

When enable is pulled LOW, the module is disabled which means the module will not turn on and it fails to communicate. When enable is left open or connected to 3.3V, the module is enabled i.e the module remains onand communication also takes place.

Vcc:

Supply Voltage 3.3V to 5V

GND:

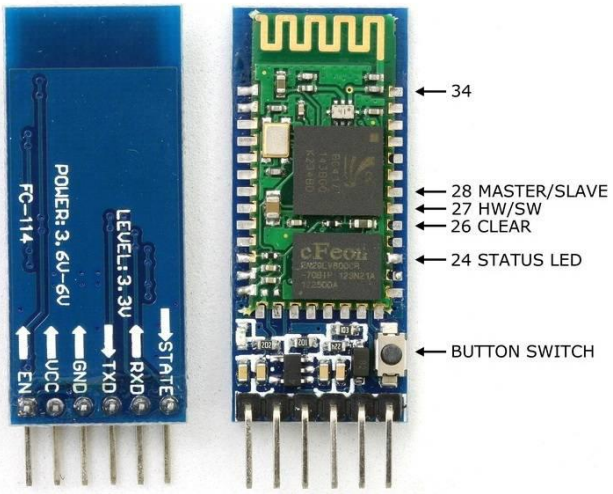
Ground pin

TXD & RXD:

These two pins acts as an UART interface for communication

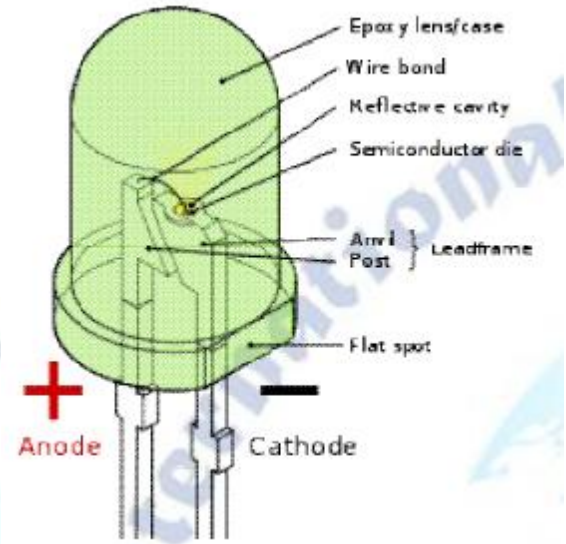
STATE:

It acts as a status indicator. When the module is not connected to / paired with any other Bluetooth device, signal goes Low. At this low state, the led flashes continuously which denotes that the module is not paired with other device. When this module is connected to/paired with any other Bluetooth device , the signal goes High. At this high state, the led blinks with a constant delay say for example 2s delay which indicates that the module is paired.



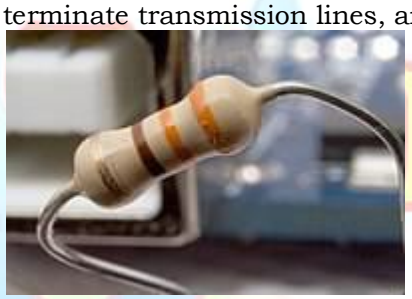
c.LED:-

A light-emitting diode (LED) is a two-lead semiconductor light source. It is a p–n junction diode that emits light when activated. When a suitable current is applied to theleads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons. This effect is called electroluminescence, and the color of the light (corresponding to the energy of the photon) is determined by the energy band gap of the semiconductor.



d. Resistors:-

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses.

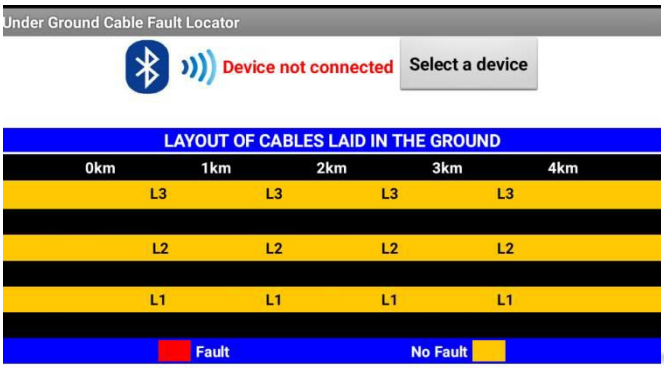


e. Power supply:-

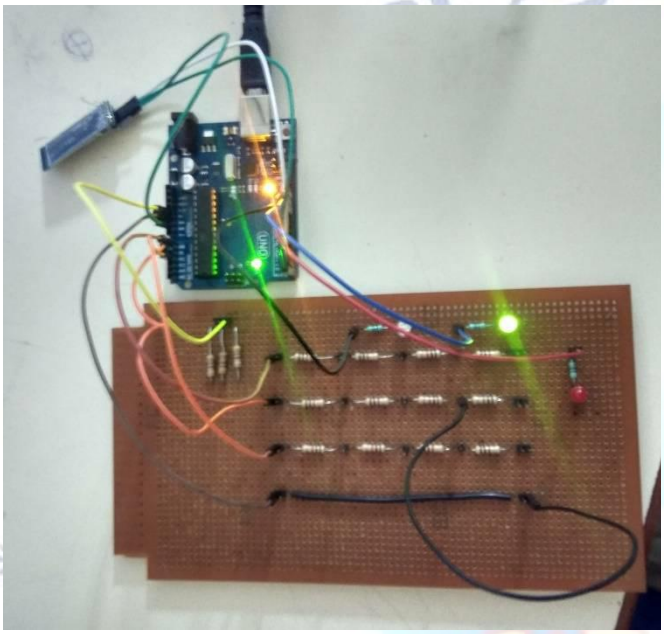
A power supply is a component that supplies power to at least one electric load. Typically, it converts one type of electrical power to another, but it may also convert aa different form of energy – such as solar, mechanical, or chemical - into electrical energy. A power supply provides components with electric power.

f. Mobile Phone:

Mobile phone is a revolutionary invention of the century. It was primarily designed for making and receiving calls & text messages, but it has become the whole world after the Smart phone comes into the picture. In this project we are building a home automation system, where one can control the home appliances, using the simple GSM based phone, just by sending SMS through his phone. In this project, no Smart phone is needed, just the old GSM phone will work to switch ON and OFF any home electronic appliances, from anywhere.



IV. EXPERIMENTAL KIT



V. CONCLUSION

In this paper we detect the exact location of short circuit fault in the underground cable from feeder end in km by using Arduino Uno(Atmega328P).For this we use simple concept of OHM's law so fault can be easily detected and repaired.

REFERENCES

[1] B. Clegg, Underground Cable Fault Location. New York: McGraw- Hill, 1993.

[2] Raghu Raja Kalia, PreetiAbrol, 'Design and implementation of wireless live wire fault detector and protection in remote areas', IEEE,(2014),vol. 97,No.17

[3] Dhekale P.M., Prof. Suryawanshi R.R., "Underground Cable Fault Distance Locator", IJIERT, vol-2, April2015

[4] M.-S. Choi, D.-S. Lee, and X. Yang, "A line to ground fault location algorithm for underground cable system," KIEE Trans. Power Eng., pp. 267–273, Jun. 2005.

[5] J. Densley, "Ageing mechanisms and diagnostics for power cables—an overview," IEEE Electroni Insulation Mag., vol. 17, no. 1, pp. 14–22, Jan./Feb. 2001.

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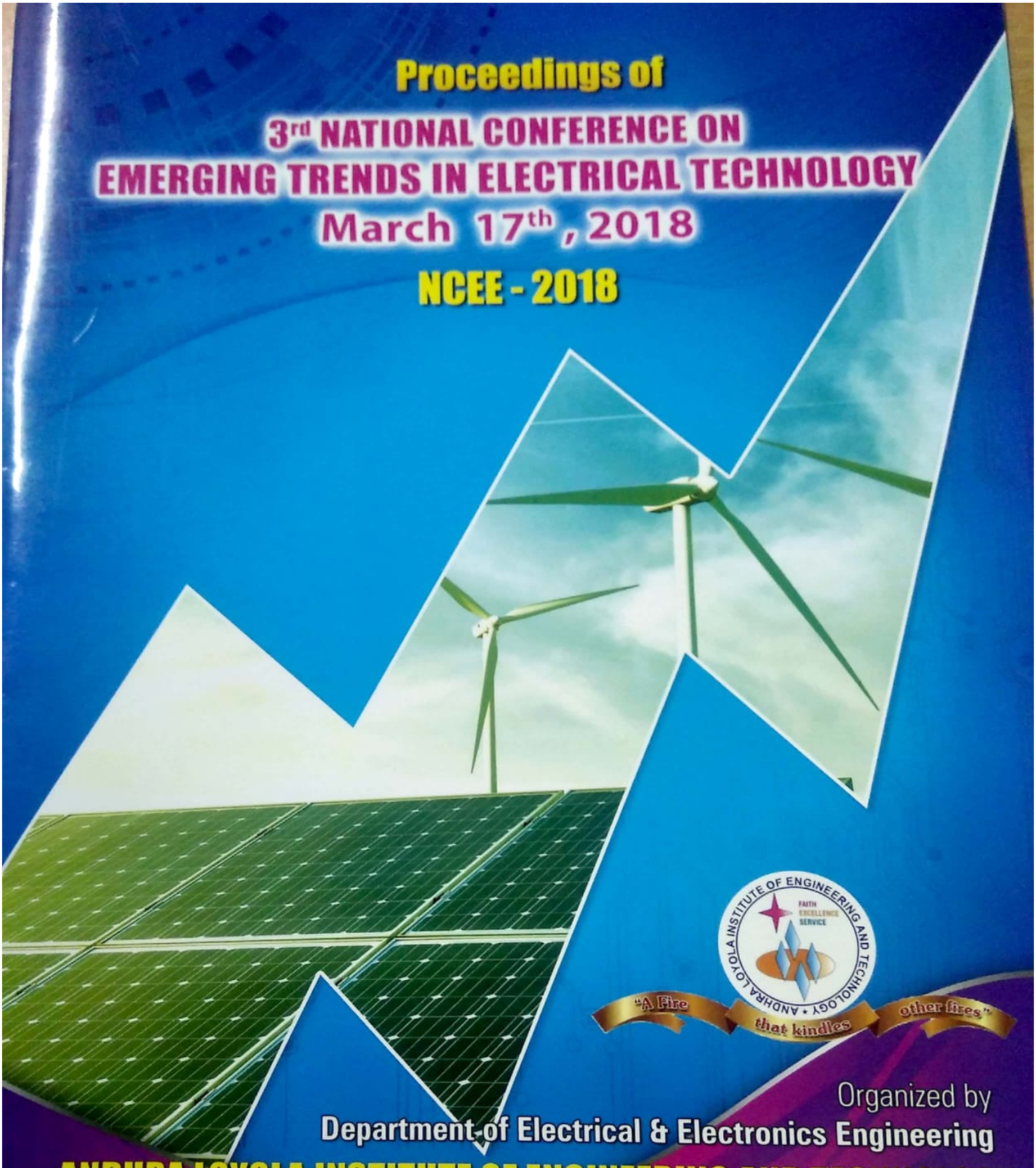

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CONTENTS		
Message from the Director		iii
Message from the Assistant Director		iv
Message from the Assistant Director		v
Message from the Principal		vi
Message from the Convener		vii
Committees		viii
1	**Fully Automatic Solar Grass Cutter Using Arduino.** *P. Abhinav Deep, Ch. Akash Babu and M. Siva Kumar*	1
2	**SVPWM Based Open Loop And Closed Loop V/f Control of Induction Motor** *K.Rajesh Babu, G.Anvesh Kumar, M.Naresh and B.Praveen kumar*	2
3	**Outline OF Energy Framework STABILIZER Utilizing ANFIS** *M. Vinod Kumar, B.M.V.Gowtham, N.Venkat Reddy and M.Ramakrishna*	3
4	**Stability Enhancement of Wind Power System with UPFC and Energy storage system** *B.Manohar, M.Hari Prasad and K.Mahesh*	4
5	**Under Ground Cable Fault Detection By Using Arduino** *V.Pranay Chowdary, CH.T.V.N.Manikanta, G.Anil Kumar and L.Karunakar*	5
6	**DFIG Wind Turbines With Super Capacitor Energy Storage for Constant Power Control** *L.Naresh, K.Avinash, P.Satya sravan and M.M.Karunakar*	6
7	**Power TransformerProtection using Fuzzy Logic based Differential Relay** *K.Shiney, N.Manaswini, V.Lakshmi keerthi, K.Nalini prasannaand A.Sai Sunil*	7
8	**Low frequency Oscillations Damping in SMIB System using Fuzzy based SSSC Controller** *S.Ramarao, K.Parasuram, M.Venkata vinay, G.Anjibabu and T.Krishna Mohan*	8
9	**Three Phase Boost Converter for Solar Battery Charging System by Using MPPT Technique** *Y.C.Ashok Kumar, A,Naga Phaneendra Kumar, P.malli Krishna Reddy and R.Anjaneyulu*	9
10	**Development of DC-DC Buck Converter Using Arduino** *A Sekhar Sai Sunil, R Naga Surya Teja, M AnjaneyaReddy and P V N D Sumanth*	10
11	**Arduino Based Sophisticated Home Automation System for Electrical Appliances Using GSM** *K Ganesh, M Ravi Chandra, P Raj Kamal, Y Leela Venkatesh and K Rajesh Babu*	11
12	**Grid Interconnection of Distributed Generation System with Power-Quality Improvement by using STATCOM** *Greeshma.Lanke, Revathi.Maddirala and Brahma Teja.Saketi*	12
13	**Distributed Power Flow Controller Based Stabilizer To Damp Power System Oscillations** *S.Siva Kumari, M.Shekinah and G.Sirisha*	13
14	**Control of Hybrid Micro Grid In Grid Tied Mode Using Z-Source Converter** *P.Jhansi, S.Jayasree, B.Ramya, J.Lakshimi Triveni and P.Swathi Mastan*	14
15	**Line Follower Based Smart Car** *K.L.N.Satish, T.TejaSai, S.K.Sai Krishna, G,Naveen Kumar, L.Karunakar*	15

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Arduino Based Sophisticated Home Automation System for Electrical Appliances Using GSM

K Ganesh1 | M Ravi Chandra2 | P Raj Kamal3 | Y Leela Venkatesh4 | K Rajesh Babu5

[1,2,3,4]UG Scholar, Department of EEE, Andhra Loyola Institute Of Engineering And Technology , Vijayawada ,Andhra Pradesh ,India
[5] Assistant Professor, Department of EEE, Andhra Loyola Institute Of Engineering And Technology , Vijayawada, Andhra Pradesh ,India

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ABSTRACT

Automation systems are gaining lot of popularity now a days and are being used at various places such as Commercial, household, hospitals, shopping malls, toll gates, airports, etc. This paper represents a reliable, compact, fast and low cost smart home automation system, based on Arduino (Microcontroller) and GSM. GSM Module has been used with Arduino Uno, thus eliminating the use of personal computers (PCs).Various devices such as lights, Fans, TV's, Air Conditioners e.t.c., have been incorporated in the designed system to demonstrate the feasibility, reliability and quick operation of the proposed smart home automation. This system is based on Arduino Uno ATMEGA328 microcontroller board. Arduino Integrated Development Environment (IDE) is used for developing the necessary software. The GSM technology for controlling the devices even when we are not at home. It uses a SIM800L GSM Module to send messages to control the electrical appliances for switching ON or OFF the Electrical Appliances .Relays and CFL Lights are used as a load to demonstrate the working of the system. This prototype design can be extended for several applications including surveillances, power monitoring, Fault monitoring, power control and security.

KEYWORDS: *Interactive Home automation, Arduino Uno, C++language, GSM Module, Relays, BasicPhone*

I. INTRODUCTION

With the recent development of mobile devices (Basic and smart phones), its demand is increasing day by day and because of its multi-dimensional functionalities and most enhanced technology, the demand for advance mobile application in daily life has also increased as today's generation is very busy, individuals sometimes may forget to switch off various home appliances or not sure about the device is ON or OFF. Sometimes it is also desirable for individuals to turn on few devices such as air conditioners, few lights etc. Most of the home automation systems make use of different wireless communication standards such as Bluetooth, ZigBee, Wi-Fi, and the Global Systems for Mobile communications (GSM) to exchange data and signaling between various components. Wireless home automations have the advantage of better system flexibility and scalability.With the advent of basic & smart phone, related technologies, it is known possible to practically implement all the desirable functions in a home automation system.

II. SYSTEM DESIGN

The above figure shows and Arduino UNO microcontroller. It has 14 digital input/output pins

(out of which, 6 pins are PWM outputs).The SIM800L GSM Module has been used for wireless communication. The SIM800L GSM Module has 4 pins- Vcc, GND, TX and RX, the GSM module.

After the establishment of connection, the GSM module can transmit and receive data regardless of the mode selected. Phone is a simple tool to control Arduino UNO through GSM module. This GSM module works on "AT" commands, i.e., to send and receive messages. The greatest advantage of arduino microcontroller is its ready to use feature .As arduino comes in a complete package with the 5V Regulator, a software burner, a micro controller, an oscillator, a serial communication interface, many LED's and headers for the connections; the designer do not have to worry about connections for the programming or any other interfaces[3].The designer just need to plug the arduino into USB port of the computer and that will sever the purpose of making a connection in between the computer and arduino to write program and upload or store it inside arduino. Another advantage of arduino is its automatic unit conversion capability. That's why, it can said that during debugging we do not have to worry about the units conversions. Designer is therefore, capable of using his/her all force on the main parts of the project without worrying about the side problems.

Fig: 1 Arduino Model

Therefore, it can be concluded about the advantage of Arduino that, the designer needs to concentrate about his/her innovative idea only and the remaining part will be taken care.

Fig: 2 GSM Modules

The SIM800L module supports Quad-band GSM/GPRS network, available for GPRS and SMS message data remote transmission. The SIM800L communicates with micro-controller via UART port, supports command including 3GPP TS 27.007, 27.005 and SIMCOM enhanced AT commands. It also has built-in level translation, so it can work with micro-controller of higher voltage than 2.8 V default. Besides, the board also supports A-GPS technique which is called mobile positioning and gets position by mobile network. This features make it can also be a tracker mobile. This GPRS/GSM module based on the SIMCOM SIM800L, which it a GSM/GPRS Quad-Band module. You can add voice, text, SMS and data to your project with this module. SIM800L is an ideal solution for M-M applications, suitable for automotive, industrial and PDA, personal tracking, electricity environment detection, wireless POS, and smart metering and other M-M applications, to provide comprehensive GSM/GPRS text messaging, voice and data transmission services.Fig: 2 represents the figure of the GSMmodule utilized in this project.

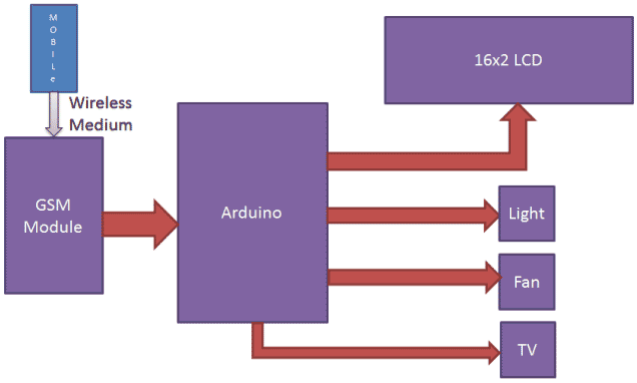

Fig: 3 Block Diagram for Implemented system

Fig.3 given above represents the block diagram of the implemented system. A CFL bulb along with one Fan and a TV are connected to the output ports of the microcontroller board. These components can be accessed and controlled via smart phone with fast response. Various signals can be generated by arduino and the intensity of the CFL bulb, Fan and the TV can be controlled by pulse width modulation (PWM) technique.

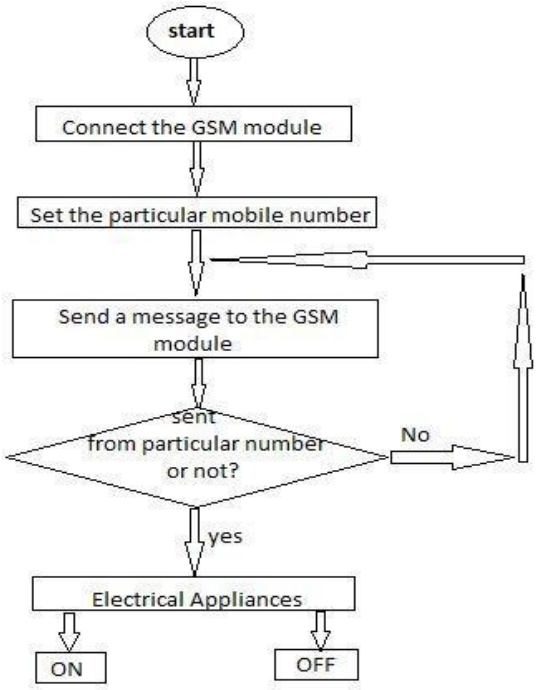

Fig: 4 Flowchart for the Operating system

III. OPERATION

First of all, we are dumping a program to the Arduino UNO board that is stored in Micro-Controller, which is the brain of Arduino UNO. Then we have connected a GSM module to the circuit. When the GSM module is connected, it will blink the LED for every second until the connection is established. If once the connection is established, LED will blinks for every 3 seconds. After the connection is established, we can send a message, from which we have specified in the program. It will receive the message from any number, but responds to the only particular number that we have assigned in the program. First, we are sending a message to the SIM number that we have kept in the GSM module.

Fig: 5 Output of the system

Then, it will encode the data that we have sent to the GSM module and sends to the Arduino UNO board through TX pin. Then the Arduino UNO Will checks the encoded data according to the pre-stored code that we have dumped to the board. Now, Arduino UNO board will decode the encoded data and sends the signal to the relay which is to be operated. Then the relay will be tripped and the electrical appliances (such as light, fan, T.V, A.C etc.,) will be operated. They will be operated as on and off.

Fig: 6 Different Hardware Components

IV. CONCLUSION

It can be concluded that Home Automation system using Arduino was a success. This system consists of an Arduino UNO board, a GSM module, power sockets, home appliances and a basic phone. It is user-friendly and it is cost effective. Also it can be concluded that the objectives of this project has been successfully met and they are as constructed a wireless Home automation system controlled by a basic phone. Designed and implement cost effective home automation yet an efficient one. Designed a user-friendly and a safe system to control home appliances especially aimed to aid the elders and handicapped.

REFERENCES

[1] A.R.Al-Ali and M. Al-Rousan, "Java-based home automation system," IEEE Transactions on Consumer Electronics, vol. 50, no. 2, pp.498-504, May 2004.

[2] N. Sriskanthan and Tan Karand, "Bluetooth Based Home Automation System", Journal of Microprocessors and Microsystems, Vol. 26, pp.281- 289, 2002.

[3] Kho T.K., Besar R., Tan Y.S. Tee K.H. and Ong K.C., "Bluetooth-enabled ECG Monitoring System" IEEE TENCON 2005, pp. 1-5.

[4] Piyare, R.; Tazil, M., "Bluetooth based home Automation System using Cell Phone", IEEE 15th International Symposium on Consumer Electronics, pp. 192-195, 2011.

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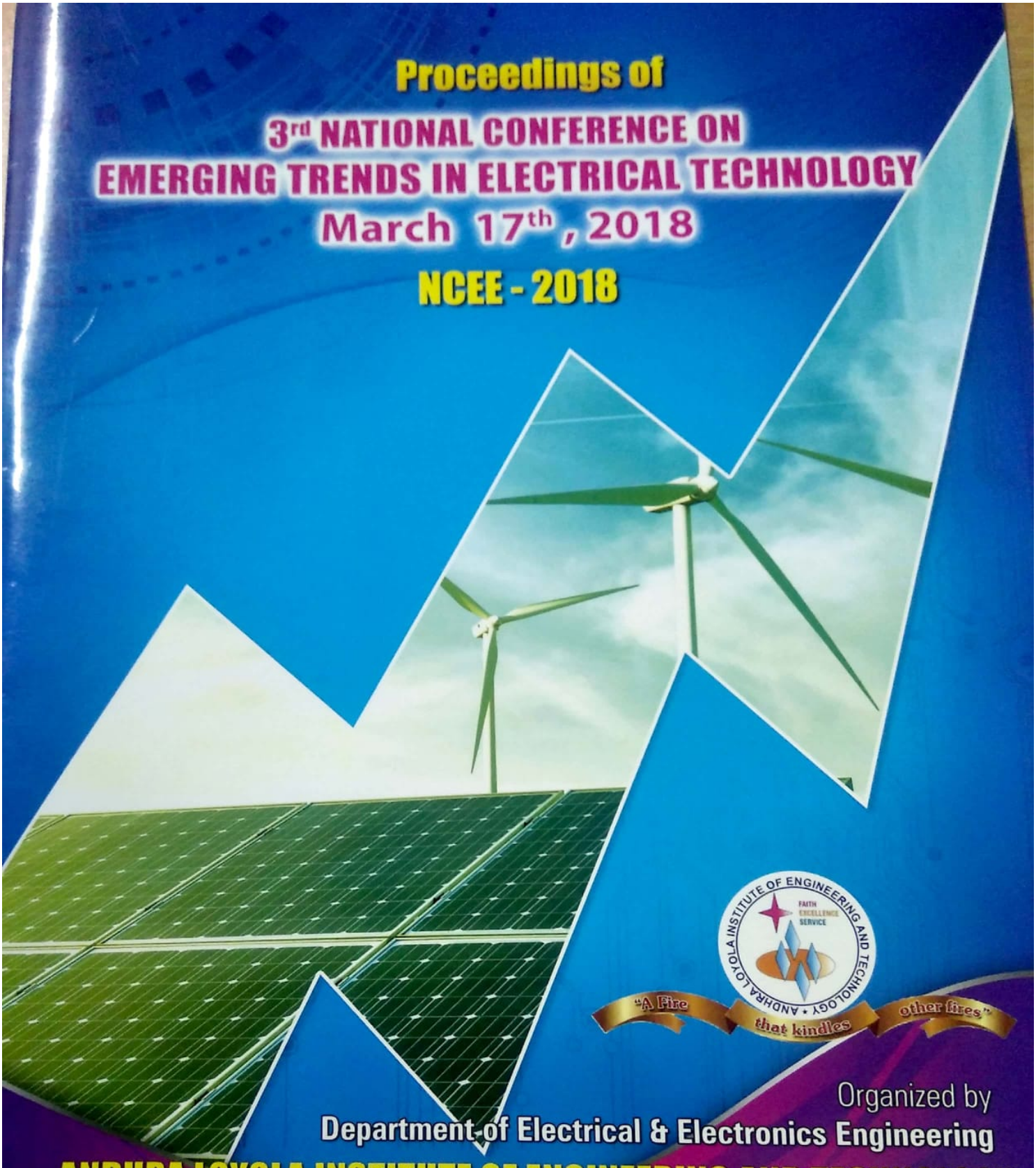

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CONTENTS		
Message from the Director		iii
Message from the Assistant Director		iv
Message from the Assistant Director		v
Message from the Principal		vi
Message from the Convener		vii
Committees		viii
1	**Fully Automatic Solar Grass Cutter Using Arduino.** *P. Abhinav Deep, Ch. Akash Babu and M. Siva Kumar*	1
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11	**Arduino Based Sophisticated Home Automation System for Electrical Appliances Using GSM** *K Ganesh, M Ravi Chandra, P Raj Kamal, Y Leela Venkatesh and K Rajesh Babu*	11
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13	**Distributed Power Flow Controller Based Stabilizer To Damp Power System Oscillations** *S.Siva Kumari, M.Shekinah and G.Sirisha*	13
14	**Control of Hybrid Micro Grid In Grid Tied Mode Using Z-Source Converter** *P.Jhansi, S.Jayasree, B.Ramya, J.Lakshimi Triveni and P.Swathi Mastan*	14
15	**Line Follower Based Smart Car** *K.L.N.Satish, T.TejaSai, S.K.Sai Krishna, G,Naveen Kumar, L.Karunakar*	15

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SVPWM Based Open Loop and Closed Loop V/f Control of Induction Motor

K.Rajesh Babu[1] | G. Anvesh Kumar[2] | M.Naresh[3] | B. Praveen Kumar[4]

[1]Assistant Professor, Department of EEE, Andhra Loyola Institute of Engineering & Technology, Vijayawada, Andhra Pradesh, India.
[2,3,4]Department of EEE, Andhra Loyola Institute of Engineering & Technology, Vijayawada, Andhra Pradesh, India.

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ABSTRACT

The main objective of this paper is speed control of the induction motor by 3 level inverter using SVPWM technique. In induction motor (IM) ,the stator field lags the rotor field to induce current ,this lag changes with load and speed. so motors are inherently difficult to control accurately. The torque of the machine is dependent on air-gap flux which is to be kept constant to achieve good torque performance at all speeds. The V/f ratio effects the air-gap flux, so it is necessary to vary voltage in accordance to change in frequency. The V/f control is used because of its simplicity and good response. The switching frequency of VSI controls the electromagnetic torque of the induction motor. Voltage and frequency of inverters can be easily controlled by PWM techniques. Among all PWM techniques, the space vector modulation has high modulation index region. The simulation of open loop and closed loop speed control is done by SVPWM technique using V/f method with the help of MATLAB/Simulink.

KEYWORDS: *SVPWM, Three level inverter, V/f control*

I. INTRODUCTION

Pulse-width modulation (PWM) is a technique where the duty ratio of a pulsating waveform is controlled by another input waveform. The output frequency and voltage is controlled electronically by controlling the width of the pulses of voltage of motor. PWM is commonly used in applications like motor speed control, converters, audio amplifiers etc. there are different PWM techniques, among all Sinusoidal PWM is most popular which appropriate for, linear modulation index up to 0.785. Above this, the SPWM produces more harmonic distortions. Space Vector PWM enhances the modulation index up to 0.907.

There are three different speed control techniques are present for an induction motor. They are scalar control, vector control and direct torque control. In this paper V/f scalar control is used is the simplest controller, it is the largely used in industrial applications. It imposes constant relation between voltage and frequency to give constant flux for different speeds.

II. V/f CONTROL

The base speed of induction motor is directly proportional to the supply frequency and the number of poles of the motor. Since the number of poles is fixed by design, the best way to vary the speed of the induction motor is by varying the supply frequency. The torque developed by the induction motor is directly proportional to the

ratio of the applied voltage and the frequency of supply. By varying the voltage and the frequency, but keeping their ratio constant, the torque developed can be kept constant throughout the speed range. This is what V/f control tries to achieve.

A wide variety of induction motors are available and are currently in use throughout a range of industrial applications. Single phase induction motors are widely used, due to their simplicity, strength and high performance. They are used in household appliances, such as refrigerators, air conditioners, hermetic compressors, washing machines, pumps, fans, as well as in some industrial applications

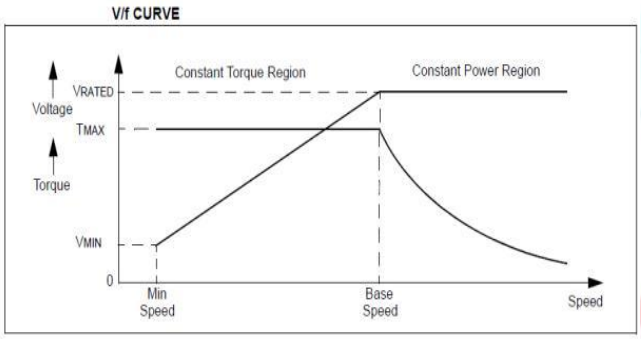


FIG.1 V/f curve

III. INDUCTION MOTOR MATHMATICAL MODEL

For studying the performance of machine in steady state, The steady-state model and equivalent circuit are useful. This implies that all electrical transients are neglected during load changes and stator frequency variations. With the use of two-phase motor in direct and quadrature axes, the dynamic model of IM is derived. This approach is desirable because of the conceptual simplicity obtained with the two sets of the windings, one on the stator and the other on the rotor. The equivalence between the three-phase and two-phase machine models is derived from the simple observation. The space-pharos model is derived from the dynamic model in direct and quadrature axes.

D-Q MODEL THEORY:

The assumptions are made to derive the dynamic model as uniform air gap, balanced rotor and stator windings, with sinusoidal distributed mmf, inductance vs. rotor position in sinusoidal, and Saturation and parameter changes are neglected.

Basically, it can be looked on as a transformer with a moving secondary, where the coupling coefficient between the stator and rotor phase changes continuously with the change of rotor position. The machine modal can be described by differential equation with time-varying mutual inductance, but such a model tend to be very complex, note that a three phase machine can be represented by an equivalent two-phase machine in which dr-qr correspond to stator direct and quadrature axes, and ds-qs correspond to rotor direct and quadrature axes.

The problem has been for mutated with change of variable which, in effect, replaced the variable(voltage, current, and flux linkage) associated with the stator winding of a synchronous machine with variable associated with fictitious winding rotating with the rotor at synchronous speed. Then essentially, transformed, or referred the stator variable to a synchronously rotating reference frame fixed in the rotor. With such a transformation (called park's transformation), all the time varying inductances can be eliminated.

Later, H. C. Stanley showed that time-varying inductances in the voltage equation of machine due to electric circuit in relative motion can be eliminated by transforming the rotor variable to variable associated with fictitious stationary winding. In this case, the rotor variable are transformed to a stationary reference frame fixed on the stator.Later, G. Kron proposed a transformation of a both stator and rotor variable to a synchronously rotating reference frame that move with the rotating magnetic field.

D.S. Brereton proposed a transformation of stator variables to a rotating reference frame that is fixed rotor. In fact, it was shown later by Krause and Thomas that time-varying inductance can be eliminated by referring the stator and rotor variable to a common reference frame which may rotate any speed (arbitrary reference frame). Without going deep into the rigor of machine analysis, it will try to develop a dynamic machine model in synchronously rotating and stationary reference frame.

AXES TRANSFORMATION

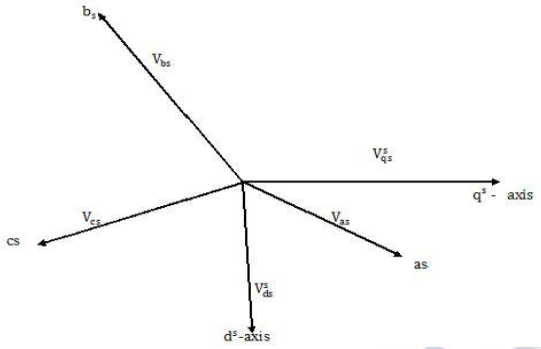


Fig 2.Axes transformation motion.

Consider a symmetrical three- phase induction machine with stationary b-c- a axes at 2π/3 angle apart, as shown in Figure. The main goal is to transform the three phase stationary reference frame (a_s-b_s-c_s) variables into two phase stationary reference frame (d^s-q^s) variables and then transform these to synchronously rotating reference frame(d^e-q^e), and vice versa. Assume that the axes d^s-q^s are oriented at 'O' angle shown in Figure. The voltage v_{ds}^s and can v_{qs}^s be resolved into as-bs-cs components can be represented in the matrix for m as:

$$\begin{bmatrix} Vas \\ Vbs \\ Vcs \end{bmatrix} = \begin{bmatrix} Cos\,\theta & Sin & 1 \\ Cos\,(\theta - 120^0) & Sin\,(\theta - 120^0) & 1 \\ Cos\,(\theta + 120^0) & Sin\,(\theta + 120^0) & 1 \end{bmatrix} \begin{bmatrix} V_{qs}^s \\ V_{ds}^s \\ V_{as}^s \end{bmatrix}$$

Fig 2.1

The corresponding inverse relation is

$$\begin{bmatrix} V_{qs}^s \\ V_{ds}^s \\ V_{as}^s \end{bmatrix} = \frac{2}{3} \begin{bmatrix} Cos\theta & Cos(\theta - 120^0) & Cos(\theta + 120^0) \\ Sin\theta & Sin(\theta + 120^0) & Sin(\theta + 120^0) \\ 0.5 & 0.5 & 0.5 \end{bmatrix} \begin{bmatrix} Vas \\ Vbs \\ Vcs \end{bmatrix}$$

Fig 2.2

Where, V_{ds}^s is added as the zero sequence components. The voltage had been considered as the variable. The current and flux linkage can be transformed by similar equations. It is convenient to set (1) = 0, so that the axis is aligned with the as-axis. Ignoring the zero sequence components, the transformation relations can be simplified with the help of equations (2.1) and (2.2) by assuming (θ) = 0 in these respective equations as:

$V_{as} = V_{as}$ (2.3)

$V_{bs} = -1/2\, V_{qs}^s - \sqrt{3}/2\, V_{ds}^s$ (2.4)

$V_{cs} = -1/2\, V_{qs}^s + \sqrt{3}/2\, V_{ds}^s$ (2.5)

and inverse equations are expressed as:

$V_{qs}^s = 2/3V_{as} - 1/3V_{bs} - 1/3V_{cs}$ (2.6)

$V_{ds}^s = -\frac{1}{\sqrt{3}} V_{bs} + \frac{1}{\sqrt{3}} V_{cs}$ (2.7).

IV. SPACE VECTOR PULSE WIDTH MODULATION (SVPWM):

The space vector pulse width modulation method is an advanced, computation intensive PWM method, which is possibly the best among all the PWM techniques for variable frequency drive applications. It has been found wide spread application in, because of its superior performance characteristics.

Advantages of SVPWM

Space vector PWM is considered a better technique of PWM implementation owing to its associated advantages mentioned below:

- Better fundamental output voltage.
- Improved harmonic spectrum.
- Easier implementation in Digital Signal Processor and Microcontrollers.

SVPWM for Three-Level Inverter:

The main circuit NPC Three-level inverter circuit is as shown in below figure. In three-phase three-level inverter, for each phase there are three output levels (1, 0, and -1) having three values, they are terminal voltage(+Ed/2), negative voltage(-Ed/2), and the zero-voltage(0).

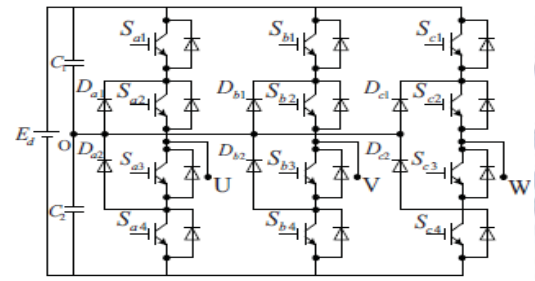


Fig 3.Three level inverter

The salient features of the proposed scheme are:

A new 3-level voltage source inverter, obtained by Cascading two 2-level inverters. DC link capacitors of individual inverters carry only the ripple currents and not the load current. Hence the voltage fluctuations of the neutral point are avoided. However, three switches in the proposed scheme three switches must be rated to block the entire DC bus voltage.

Three-level topology has advantages over two-level topology, which are

1. The voltage of switching device is half of the DC voltage; it improves waveform quality and reduces switching frequency.

2. With increase in the number of output levels, 3 level inverters have smaller output voltage steps that diminish motor issues.
3.with the low output voltage, 2-level inversion can be achieved by switching only one inverter and therefore the switching losses are lower.

Three-level Inverter Topology and Switching state

Each phase of three level inverter consists of two clamping diodes, four IGBTs and four freewheeling diodes. Since three kinds of switching states and terminal voltages exist in each phase, the three-level inverter has 27(3^3) switching states which produce voltage vectors. Inverter's switching states and space vector graph can be drawn, according to their phase and amplitude.

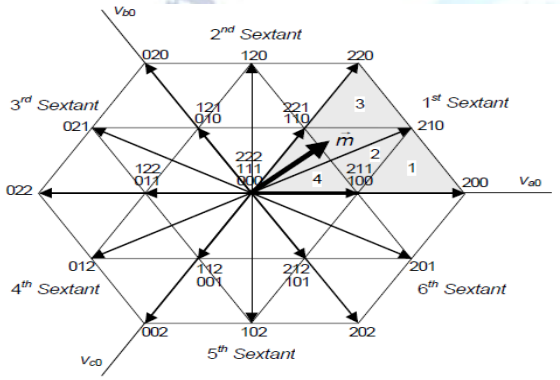


Fig.4. space vectors of Three level inverter

There are 24 non-zero vectors and 3 null length vectors. These space vectors can be divided in to 4 groups according to the size of vectors, large vector, medium vector, short vectors and zero vectors. Suitable vectors from the SV diagram should be chosen for every modulation cycle to generate the reference vector (mr). The vectors nearest to mr are appropriate selections to reduce the switching frequencies of the inverter, and quality of the output voltage. Each short-vector represents to two switching states Switching states which contain 0 and 1 as positive short-vector, which only contain 0 and -1 as negative, this pair of short-vectors has the same function for the output voltage, but has the opposite function for the mid point current.

Classification of Space Voltage vectors

GROUP	STATE VECTORS
Large Vector	200, 220, 020, 022, 002, 202
Mediam Vector	210, 120, 021, 012, 102 ,201
Short Vector	100-211, 110-221, 010-121, 011-122, 001-112,101-212
Zero Vector	000, 111, 222

The traditional SVPWM algorithm is based on the sector and sextant of the reference vector, the basic vectors are selected by the principle of the recent three vectors, used to produce the reference voltage vector, and Volt-second balance method is used to calculate the effective time of the basic vector. Seventh stage modulation method generates the required PWM waveform.

Switching symbols	Switching condition				Output voltage
P	ON	ON	OFF	OFF	Vdc/2
O	OFF	ON	ON	OFF	0
N	OFF	OFF	ON	ON	Vdc/2

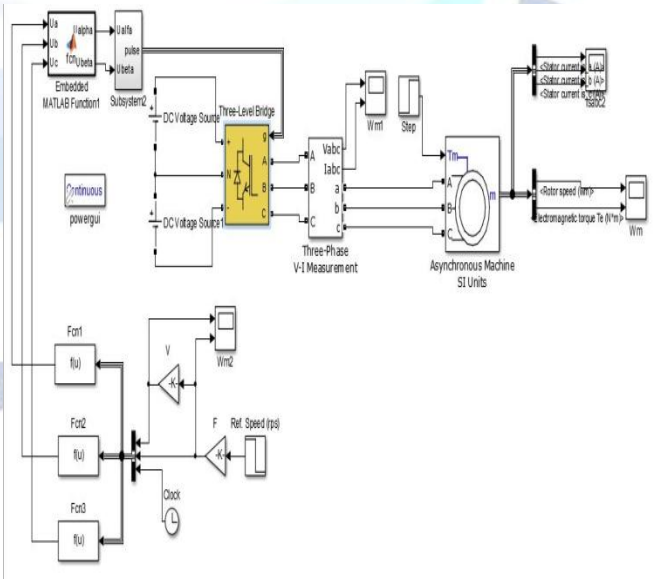
Open loop speed control

In this strategy, the stator voltage and the supply frequency are same time differed such that the V/f ratio stayed steady. This kept the flux consistent and thus the maximum torque at the time of varying speed.

Close loop speed control

The speed of the rotor is measured and compared with reference speed. The difference is given to a PI controller which tries to minimize error to zero. According to PI output frequency and voltage is define for SVPWM based inverter.

V. SIMULINK RESULTS



The V/f control of induction motor using above algorithm has been successfully simulated using

MatLab/ Simulink Software. the above figure shows the open loop V/f Control of induction motor using 3 level SVPWM based inverter.

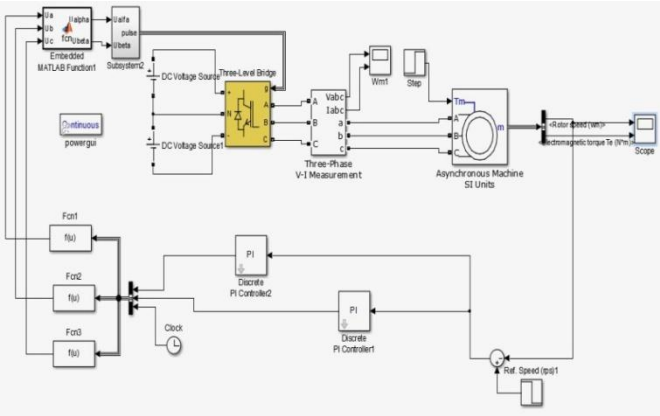
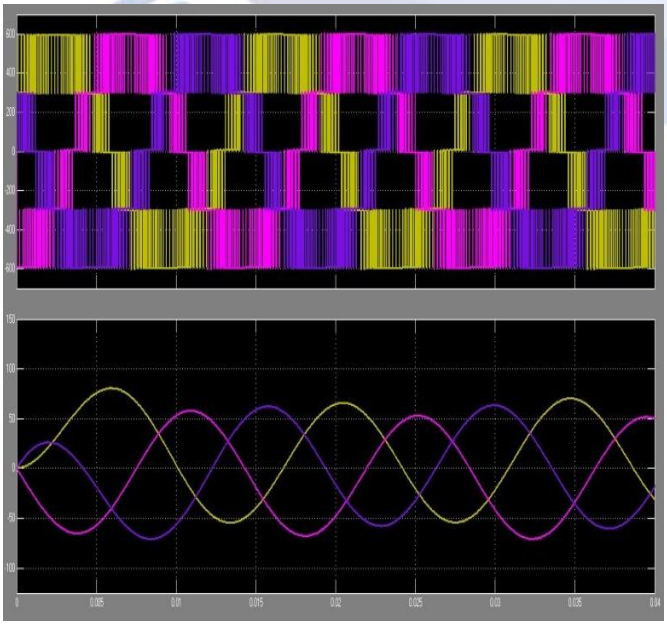


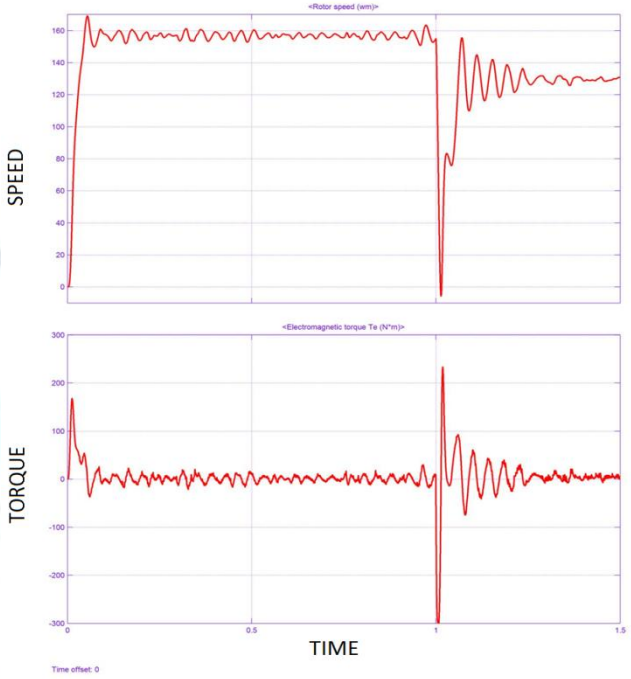
Fig .6. closed loop V/f control of induction motor using 3 level inverter.

The above figure shows the closed loop speed control of induction motor by V/f method using space vector pulse width modulation (SVPWM) technique. The rotor speed is compared with the reference speed. The speed difference is given to a PI controller, which minimizes the error in the speed.

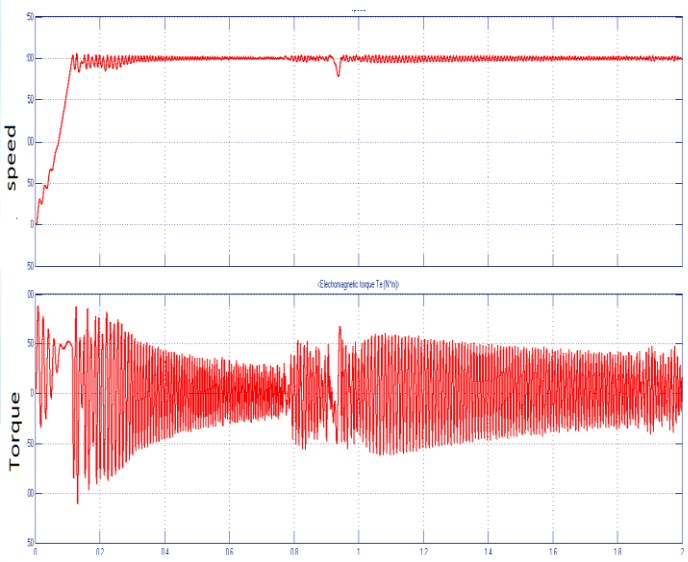
In this paper open loop control and close loop control analyzed by varying load torque and reference speed .It can be analyzed from Fig 6 and 7 when Reference speed is changing from 200 to 175 rps, Torque is varying to gain that speed and with V/f control it is achieved within 0.1 Sec. In below figures output of inverter is shown. It can be seen from the figure that inverter will not give pure sinusoidal voltage.



Voltage and current waveforms from the inverter



Speed and torque of the open loop speed control using V/f method.



Speed and torque of the closed loop speed control of induction motor using V/f method.

VI. CONCLUSION

SVPWM gives linear control of output voltage up to MI=0.906 for sinusoidal input without having loss of reference voltage. When MI is more then 0.906, it enters in over modulation region, in this region some part of basic voltage is lost.. SVPWM provide

efficient control of induction motor in linear as well as over modulation region.

The main advantage in this proposed method is incorporated V/F based induction motor control with SVPWM based 3-level inverter. So that the advantages in 3-level with SVPWM as increased the performance and life time of drive.

V/f control open loop and close loop control gives good control of induction motor for higher speed. Motor is controlled effectively using 3 level space vector PWM(SVPWM) in both mode without crossing current and torque limit.3 level SVPWM increases performances as well as drives life time when compared to 2 level.

REFERENCES

[1] Kwasinski, A., Krein, P. T., and Chapman, P. L., "Time domain comparison of pulse-width modulation schemes," IEEE Trans. Power Electron., Vol. 1, No. 3, pp. 64–68, September 2003.

[2] Narayanan, G., Ranganathan, V. T, Zhao, D., and Krishnamurthy, Harish K., "Space vector based hybrid PWM techniques for reduced current ripple," IEEE Trans. Ind. Electron., Vol. 55, No. 4, pp. 1614–1627, April 2008.

[3] Patil, U. V., Suryawanshi, H. M., and Renge, M. M., "Torque ripple minimization in direct torque control induction motor drive using space vector controlled diodeclamped multi-level inverter," Elect. Power Compon. Syst., Vol. 40, pp. 1060–1076, August 2011.

[4] Takahashi, I., and Noguchi, T., "A new quick-response and highefficiency control strategy of an induction motor," IEEE Trans. Ind. Appl., Vol. 22, No. 5, pp. 820–827, September 1986..

[5] Busquets-Monge,S., Bordonau,J.,Boroyevi -ch,D., et al. The nearest three virtual space vector PWM - a modulation for the comprehensive neutral -point balancing in the three-level NPC inverter [J]. IEEE Power Electronics Society. 2004,2(1): 11-15..

[6] Y. Yorozu, M. Hirano, K. Oka, and Y. Tagawa, "Electron spectroscopy studies on magneto-optical media and plastic substrate interface," IEEE Transl. J. Magn. Japan, vol. 2, pp. 740-741, August 1987 [Digests 9th Annual Conf. Magnetics Japan, p. 301, 1982.

[7] Aparna Sharma, Abhijeet Singh, P. Yadav , "Analysis of 3 Level SVPWM based Open Loop and Closed Loop V/F Control of Induction Motor", International Journal of Engineering Research & Technology (IJERT) ISSN: 2278-0181,Vol. 4 Issue 04, April-2015.

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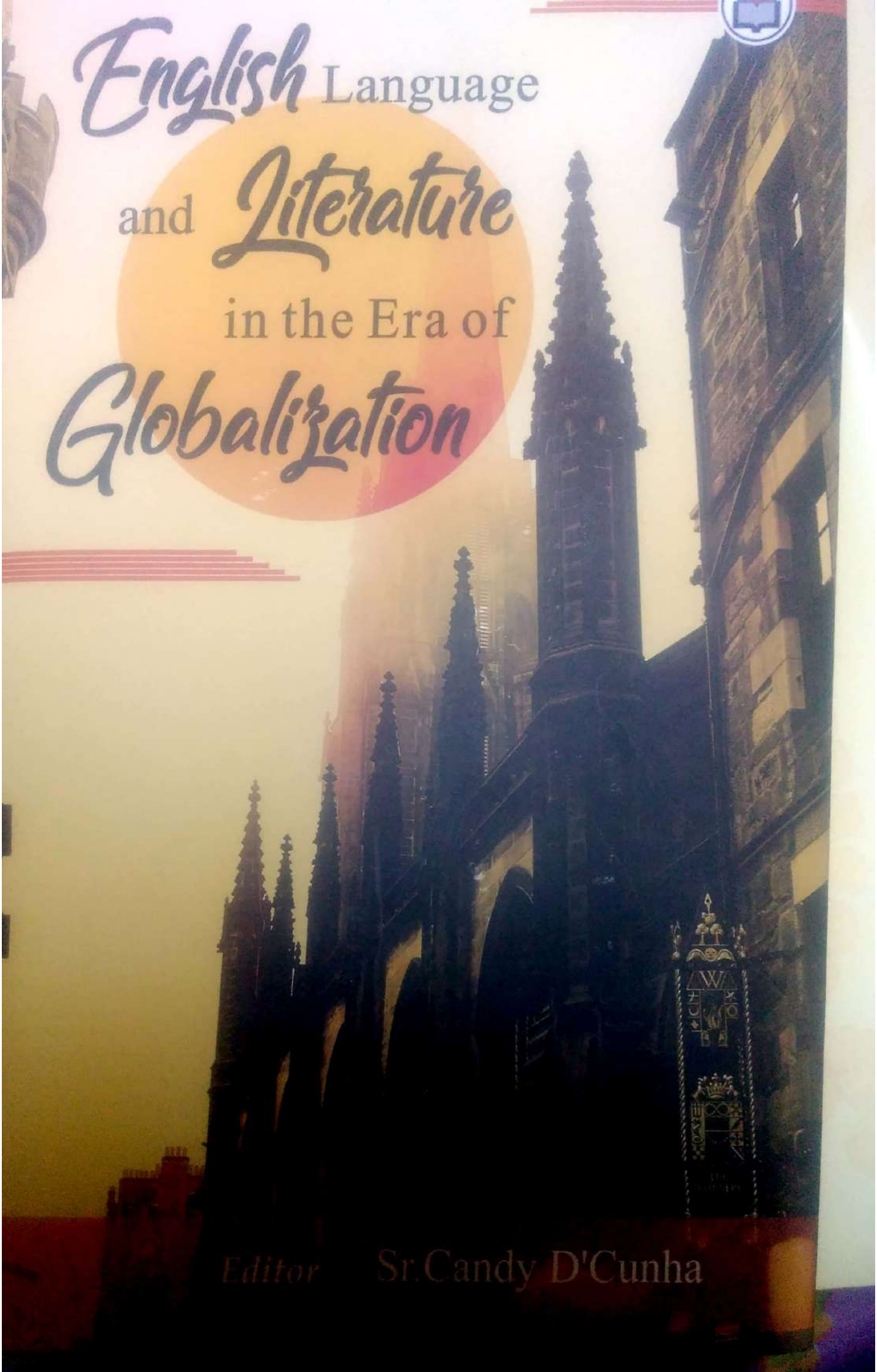

Editor Sr. Candy D'Cunha

New Literatures in English – The Voice of the Colonised

N. Dyva Krupa

Colonial rule in the world was a stark reality and has left an undying mark on the minds of the colonized. The people who experienced this have lost their hope in the future. They could not withstand the social discrimination, white oppression and slavery, physical and psychological abuse that was done to them. They did not have courage to raise their voice against the deadly life they were leading. As days passed by, some people started to emphasize their suffering through the powerful weapon called 'writing'. Though the themes of this literature are common, the intensity and the style of expressing those themes were purely original. Each writer and each genre in this literature has its own uniqueness. For Instance, Chinua Achebe, the Nigerian novelist portrayed the cultural clash during colonial rule in his famous novel *Things Fall Apart* (1958), Margaret Atwood – the famous Canadian writer, highlighted themes on Nationalism, alienation and marginalisation of women in society in her novel *Surfacing* (1972), Salman Rushdie, a well-known British-English novelist let the voice of the colonised go louder with his novel *Midnight's Children* (1981). *New York Times* Book review reads about the book: "*.....Midnight's Children* sounds like a continent finding its voice." A.D. Hope, an Australian poet and essayist, contributed so much to the voice of the colonised by describing the geographical exploitation done to the land of *Australia* by the colonizers.

THE CULTURAL SEMIOTICS OF ENGLISH LANGUAGE AND LITERATURE

G Kalvikkarasi
S Sridevi

Department of English
Dharmamurthi Rao Bahadur Calavala Cunnan Chetty's Hindu College

The Theme of Godlore in Toni Morrison's *Song of Solomon*

N. Dyva Krupa
Assistant Professor of English
Andhra Loyola Institute of Engineering & Technology
Vijayawada

Godlore or Mythology is a term that refers to the collected beliefs of a group of people living in a society which explores the culture, history and customs. Though a significant feature of every culture, it is more deeply rooted in the African culture. A Culture's Godlore depicts one's belongingness to the race, one's shared experiences like behavioral patterns, religious knowledge and moral values. Myths originate from the accounts of historical events. Myths can be projected through allegories which are philosophical or spiritual and also through personification of objects and forces. A Living Nobel Laureate and an iconic figure in American Literature; Toni Morrison in her long and inspiring career as a writer, used mythological aspects in her novels to project African culture to the world. An author of eleven novels, Morrison made each novel unique in its theme. Her third novel *Song of Solomon* (1977) which won National Book Critics Circle Award showcases abundance of Godlore (Christian, Greek and African Mythologies) to educate the readers about its significance in African culture. This study focuses on the predominant theme of Godlore present in the novel *Song of Solomon*.

Morrison was born in 1931 in the town of Lorain, Ohio and named as Chole Wafford. In her childhood, she began to read the works of great authors like Jane Austen (1775–1817), Leo Tolstoy (1828–1910), and the nineteenth-century French writer Gustave Flaubert (1821–1880). She was stunned by the specific way these writers portrayed the things that they were familiar with. Their talents stimulated her to write about things she was most familiar with, particularly her African-American culture. Toni Morrison's eleven novels that include the Pulitzer Prize-winning Beloved

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Contents

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Split and Non Split Edge Dominations in Fuzzy Graphs

A.MUNEERA
Department of Mathematics, Andhra Loyola Institute of Engineering and Technology, Vijayawada, Andhra Pradesh, India.
E-mail: munny.aliet@gmail.com

Dr. R.V.N. SRINIVAS RAO
Department of Mathematics, K.L. University, Vaddeswaraam, Andhra Pradesh, India
rvnrepalle@kluniversity.in

Abstract

In this paper we discuss the concepts of connected edge domination, split edge domination and Non-split edge domination in fuzzy graph. An edge dominating set D of a fuzzy graph G = (σ, μ) is a split edge dominating set if the induced fuzzy sub graph H = (<E-D>,σ', μ') is disconnected and a fuzzy graph G = (σ, μ) is a non-split edge dominating set if the induced fuzzy sub graph H = (<E-D> , σ', μ') is connected. We discuss the properties of minimum fuzzy cardinality of a split edge dominating set γ_s' (G) and minimum fuzzy cardinality of a non-split edge dominating set γ_{ns}'(G) with other known parameter of G.

Keywords: Fuzzy graphs, fuzzy domination, fuzzy edge domination, fuzzy split edge domination number, fuzzy non split edge domination number.

1. INTRODUCTION

One of the notable mathematical inventions of the 20th century is that of Fuzzy sets by Lotfi. A. Zadeh in 1965. His aim was to develop a mathematical theory to deal with uncertainty and imprecision. The advantage of replacing the classical sets by Zadeh's fuzzy sets is that it gives more accuracy and precision in theory and more efficiency and system compatibility in applications [1]. The distinction between the set and fuzzy set is that the set divide the universal set into two subsets, namely members and non-members while fuzzy set assigns a sequence of membership values to elements of the universal set ranging from 0 to 1. Fuzzy graphs are useful to represent relationships which deal with uncertainty and it differs greatly from classical graph. The first definition of Fuzzy graph by Kaufman(1973) was based on Zadeh's fuzzy relations (1971). After that Rosenfeld (1975) who considered fuzzy relation on fuzzy sets and developed the theory of fuzzy graphs.

Several works on fuzzy graphs are also done by Akram, Samanta, Dudek, Dayyaz, Sunitha [2,4,5,7,12]. It was during 1850's a study of dominating sets in graphs started purely as a problem in the game of chess. Chess enthusiasts in Europe considered the problem of determining the minimum number of queens that can be placed on a chess board so that all the squares are either attacked by a queen or occupied by a queen. The study of domination set in graphs was begun by Ore and Berge. A. Somasundram and S. Somasundram [7] discussed domination in Fuzzy graphs. The edge domination was introduced by Mitchell and Hedetniemi. V.R. Kulli and D.K. Patwari[4] discussed the total edge domination number of graph. They defined domination using effective edges in fuzzy graph. The concept of Perfect domination was introduced by CoCkayne et al. Perfect edge domination in graphs was studied in [3]. Perfect k-domination in graphs was studied in [4]. Edge domination in fuzzy graphs was defined in [7]. A work on Fuzzy Multiple domination was done in [8]. The concept of equitable domination [11] in graphs was introduced by Venkata Subramanian Swaminathan and Kuppusamy Markandan Dharmalingam.

2. PRELIMINARIES

It is known that graphs are simply models of relations. A graph is a convenient way of representing information involving relationship between objects. The objects are represented by vertices and relations, by edges. When there is vagueness in the description of the objects or in its relationships or in both, it is natural that we need to design a 'fuzzy graph model'. Here we summarize some basic definitions of dominations in fuzzy graph.

Definition 2.1. Let V be a finite non empty set and E be the collection of two element subsets of V. A fuzzy graph G = (σ, μ) is a set with two functions σ : V → [0, 1] and μ : E → [0 1] such that μ (x, y) ≤ min { σ(x) , σ (y)} for all x, y ∈ V. The order p and size q of a fuzzy graph G = (σ, μ) are defined to be $p = \sum_{x \in V} \sigma(x)$ and $q = \sum_{xy \in E} \mu(xy)$.

Definition 2.2: Let G = (σ , μ) be a fuzzy graph on V and S ⊆ V. Then the fuzzy cardinality of S is defined to be

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STUDY OF VARIOUS DOMINATIONS IN REGULAR FUZZY GRAPHS

MUNEERA [1], Dr. R.V.N. SRINIVAS RAO [2]
[1] Department of Mathematics, Andhra Loyola Institute of Engineering and Technology Vijayawada, Andhra Pradesh, India,munny.aliet @gmail.com

[2] Department of Mathematics ,K L UNIVERSITY, Vaddeswaram, Andhra Pradesh, India rvnrepalle@rediffmail.com

ABSTRACT

In this paper we study about dominations in regular fuzzy graphs. A set $D \subseteq V$ is said to be fuzzy dominating set of G, if every $v \in V - D$ there exist $u \in D$ such that u dominates v. In this paper we discuss the concept of regular split and non split domination in fuzzy graphs, regular connected domination in fuzzy graph, totally regular domination in fuzzy graphs and discuss their properties. In this paper we extended our study to inverse regular connected domination number and derived some results. Prompt some applications on them like as computer communication network, social network theory.

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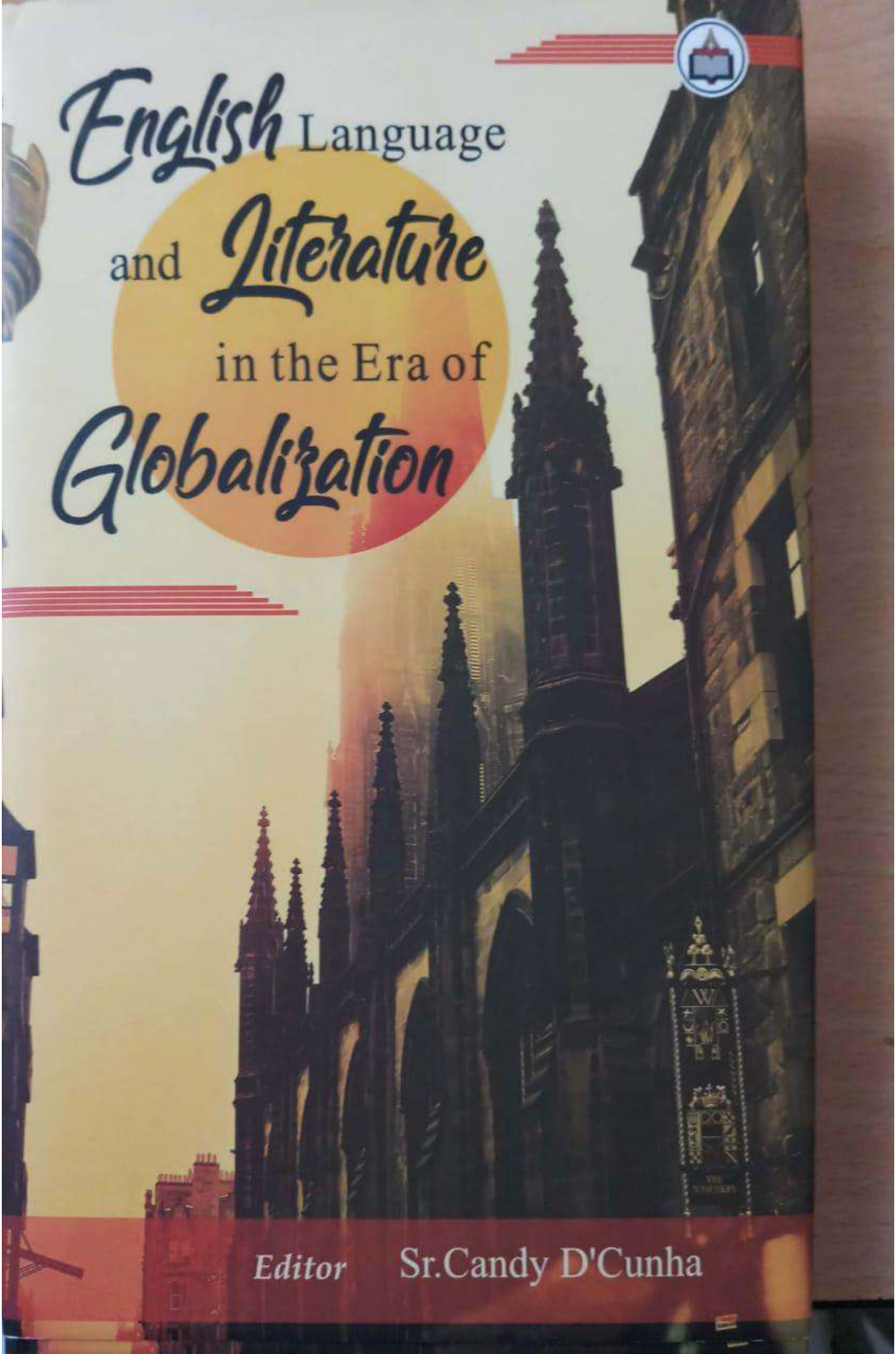

Editor Sr.Candy D'Cunha

14

Eco-spirituality in Margaret Atwood's *Oryx and Crake*

Sr. Candy D'Cunha & Dr. N. Usha

> If there is no spirituality on the earth, then there is no spirituality in ourselves.
>
> – Thomas Berry

Eco-spirituality is a refined or a higher state of mind that helps one understand the manifestation of the transcendent in nature. In other words, eco-spirituality is a personal experience of an individual regarding nature, through which he realizes that he is intimately connected to the unified web of creation. This inner experience connects the human with the whole reality, encompassing the facts and principles of life that deepen his solidarity with nature.

Eco-spirituality can be described as a way of living which challenges the human to turn his convictions into action to promote peace and harmony between the human and the non-human world. Eco-spiritual realization enables a human to develop virtues like compassion, reverence and love for nature. Gradually, a human's outlook on life changes his way of living and he enters into a state of spiritual communion with nature.

John Stanley and David Loy, in their essay on "At the Edge of the Roof: The Evolutionary Crisis of the Human Spirit", try to express some of the concerns of eco-spirituality, by saying:

> There is a link between a love for nature, deep spiritual experience and our moral sense. It is a part of the human spirit.

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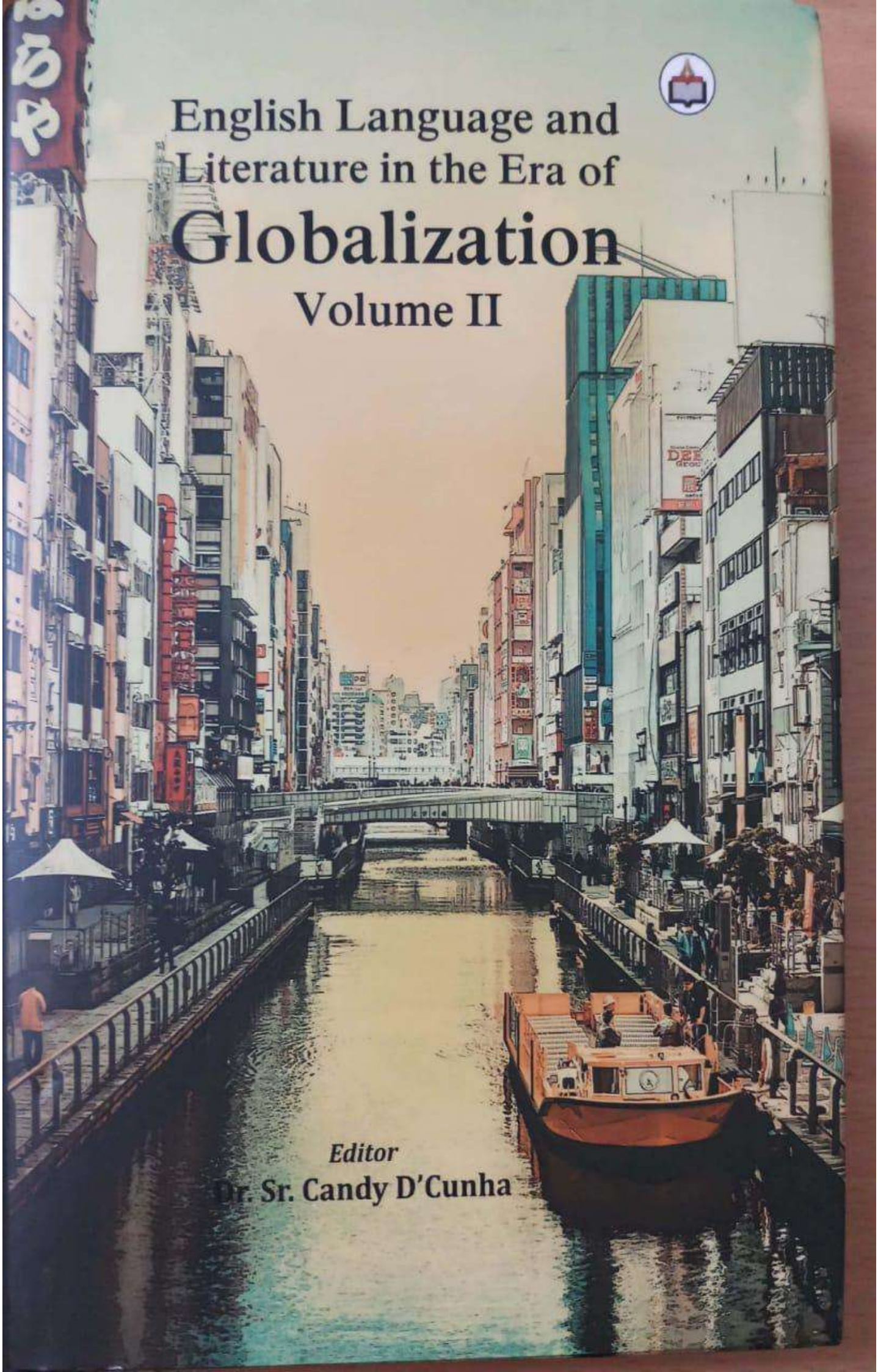
Volume II



Editor

Dr. Sr. Candy D'Cunha

Contents

4

Ecosophy in Margaret Atwood's *Surfacing*

Dr. Sr. Candy D' Cunha and **Dr. G. Suvarna Lakshmi**

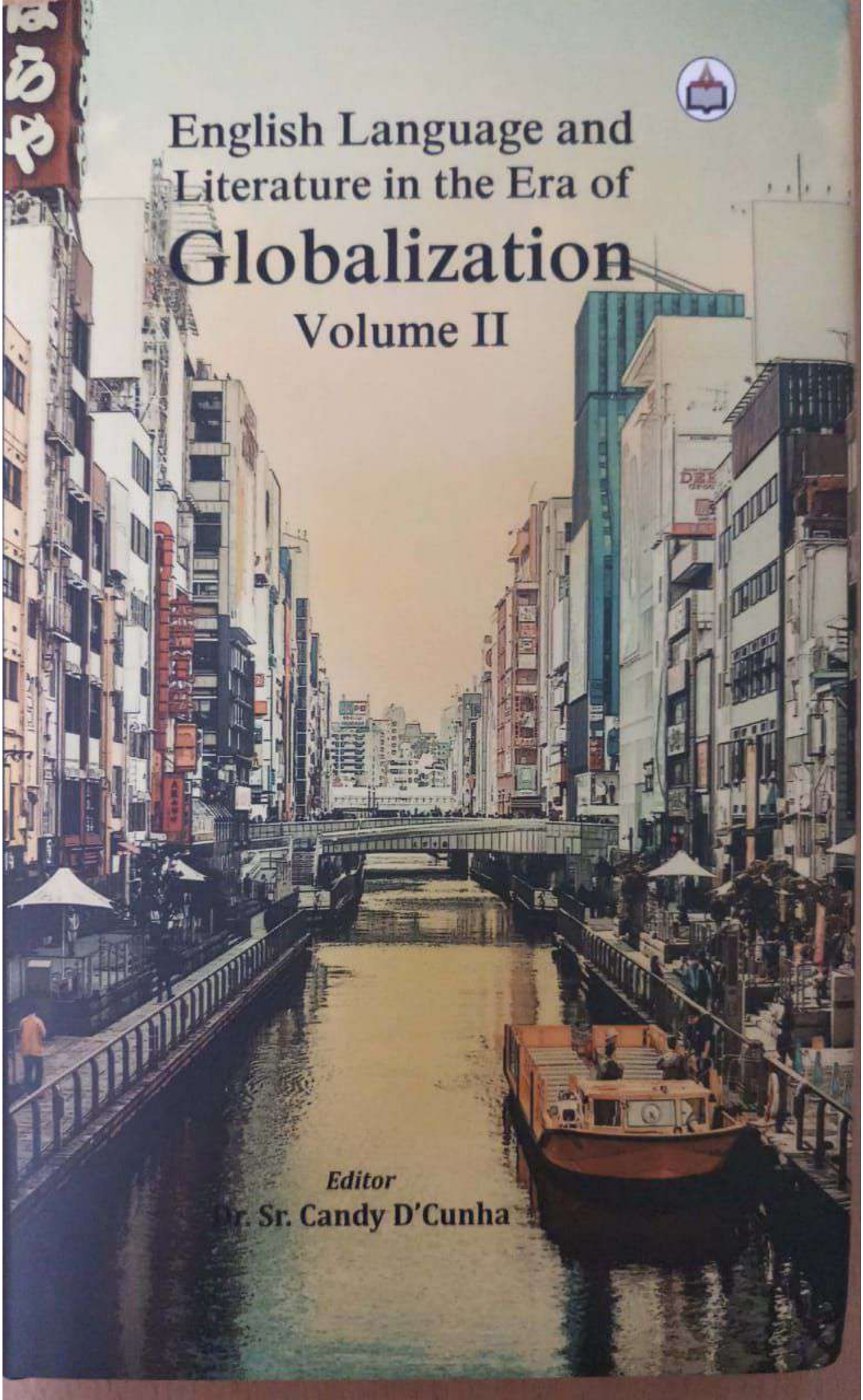
> The threat to the planet is us. It's actually not a threat to the planet – it's a threat to us.
>
> (Margaret Atwood, Postconsumer Content Team)

Trailblazing from her native Canada to save the earth, Margaret Eleanor Atwood is considered the most distinguished and versatile genius of Canada's literary elite. Atwood has been conferred with various titles such as a "prophet of her own country", the "undisputed queen of Canada's letters", "and a cult heroine" etc. Atwood is not only a popular and bestselling author in her own country Canada, but she has also drawn worldwide attention through her prolific art of writing.

Margaret Atwood has written more than 40 books which include poetry, literary criticism, non-fiction, children literature, stage plays and novels. She was born in Ottawa, Ontario in 1939. Her father was an expert in the field of zoology, and later engaged himself in entomological research. During most of her childhood days, Atwood had seen and witnessed her father visiting forests as an entomologist, especially in the North Quebec regions. Her mother Dorothy Killiam was a former nutritionist and dietician. She was the second of three children. At a very young age, she began her educational journey and in 1961 she received her B.A. from Victoria College, University of Toronto and later, her M.A. from Radcliffe, Harvard University, in 1962.

English Language and Literature in the Era of Globalization

Volume II



Editor

Dr. Sr. Candy D'Cunha

Contents

5

Importance of English Language Teaching in the Globalized Era

Kalpana Williams

English has truly become an International language. The recent trends and innovative practices in teaching language need an analysis and upgrading in a rapid changing society, like the present times. The background, exposure, and the frequency to communicate effectively is a matter of great concern and interest in the globalised context.

In the transitional era, the significance of English can be viewed from different perspectives. In countries especially where English is the second language or the foreign language, motivation can be the key factor for its development. The famous proverb goes: "don't give your students fish, but teach them how to fish." It explains the notion of motivating a student and also indirectly conveys a great message to the teacher. In 1972, Gardner and Lambert introduced the idea of instrumental motivation which focuses a learner's desire for utilitarian purpose. On the other hand, one should learn a language not for selfish motives but for multi-functional use.

Proficiency in the English language requires a mastery over its skills in order to be able to apply it to everyday life. Global mobility of students and academicians has helped in accepting the English language across the globe. Looking from a wider point of view, one will be able to understand the tremendous advantage that the

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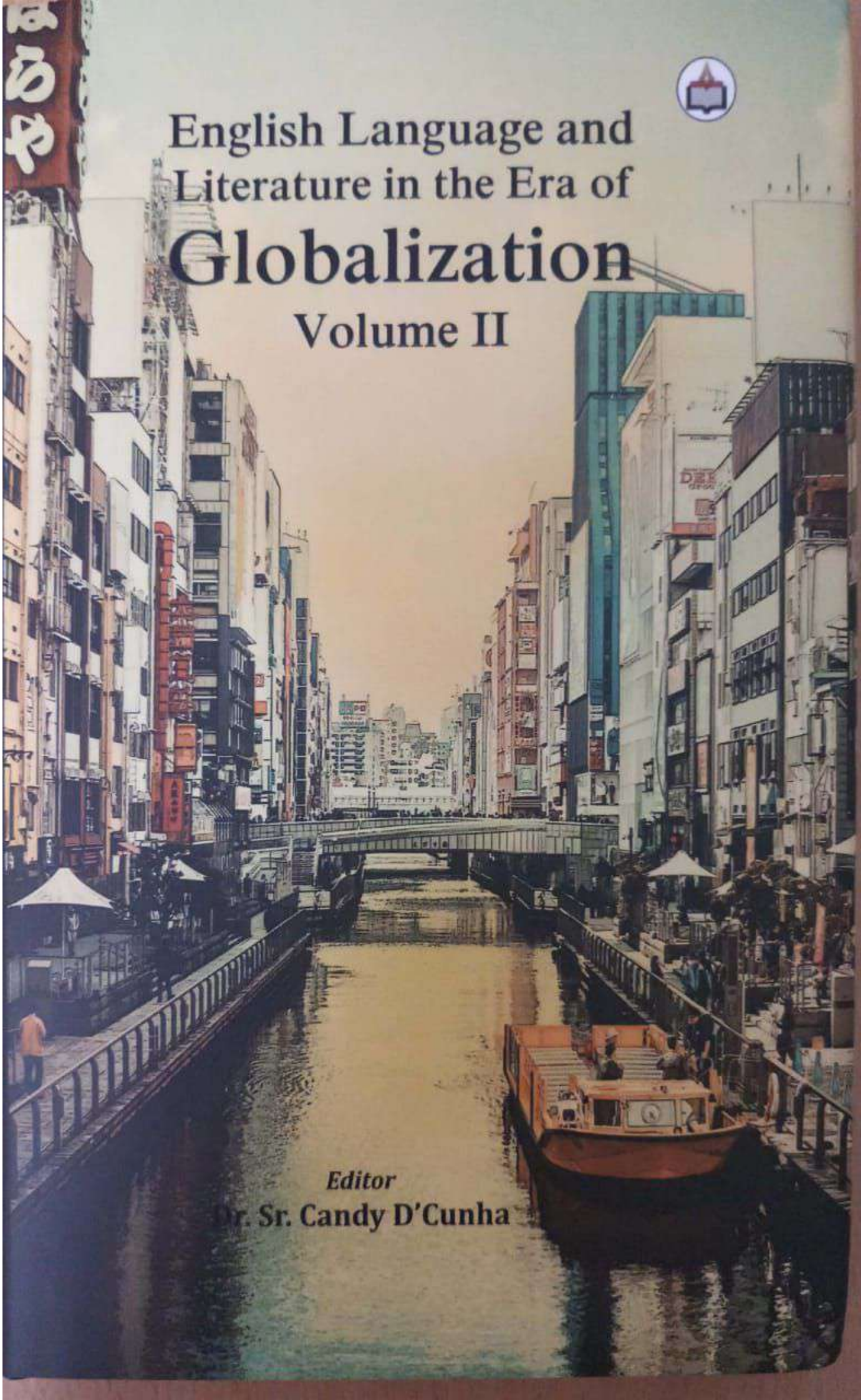

Editor

Dr. Sr. Candy D'Cunha

19

Society Mirrored by Katherine Mansfield in *An Ideal Family*

G.Vijaya Swapna

Introduction

Literature covers the major genres of poetry, drama and novel. Literature reflects society in all its aspects. It is generally called the mirror of the society. It reflects virtues and ills of the society. Therefore, it is true to believe that literature is an imitation of human action. It aims to present a picture of what people think, say and do in the society. Many writers have mirrored the ills of the society with a view to making the society realize its flaws and make amends. They also projected the virtues or good values in the society for people to emulate. In literature, we find well designed plots that depict human life through characters who, by their words, ambitions, action and reaction, convey certain messages for the purpose of enlightenment and entertainment. It is impossible to find a literary genre that excludes the culture, attitudes, morale and values of the society, since no writer has been brought up completely unexposed to the world around him/her. The writers of literature aim at transporting the real-life events in their society into creative writing and present it to the society as a mirror. Thus, literature is not only a reflection of the society but also serves as a corrective mirror in which members of the society can look at themselves, their way of life, and find the need for positive change.

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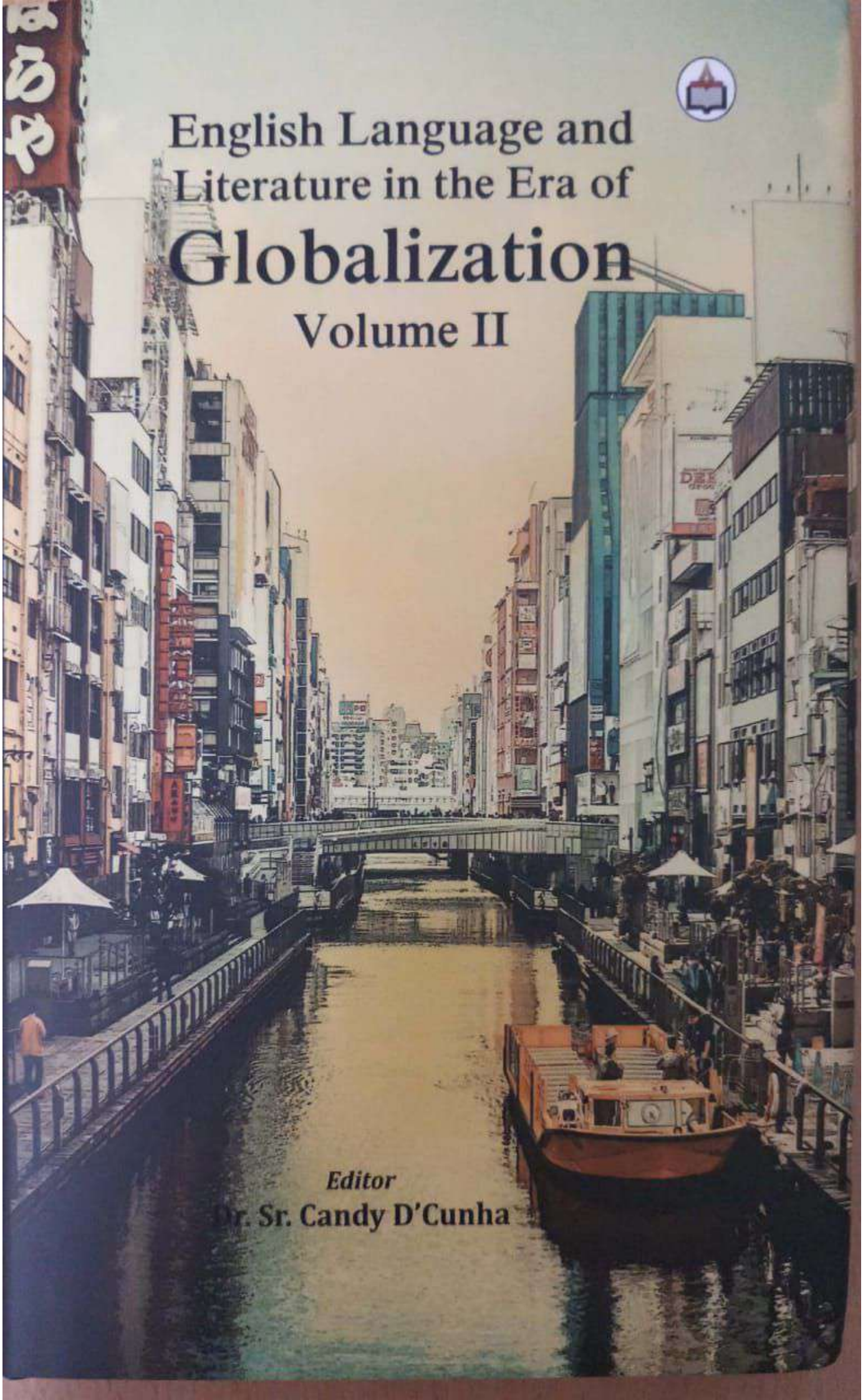


Editor

Dr. Sr. Candy D'Cunha

15

Violence and Domination in Vijay Tendulkar's *Kanyadaan*

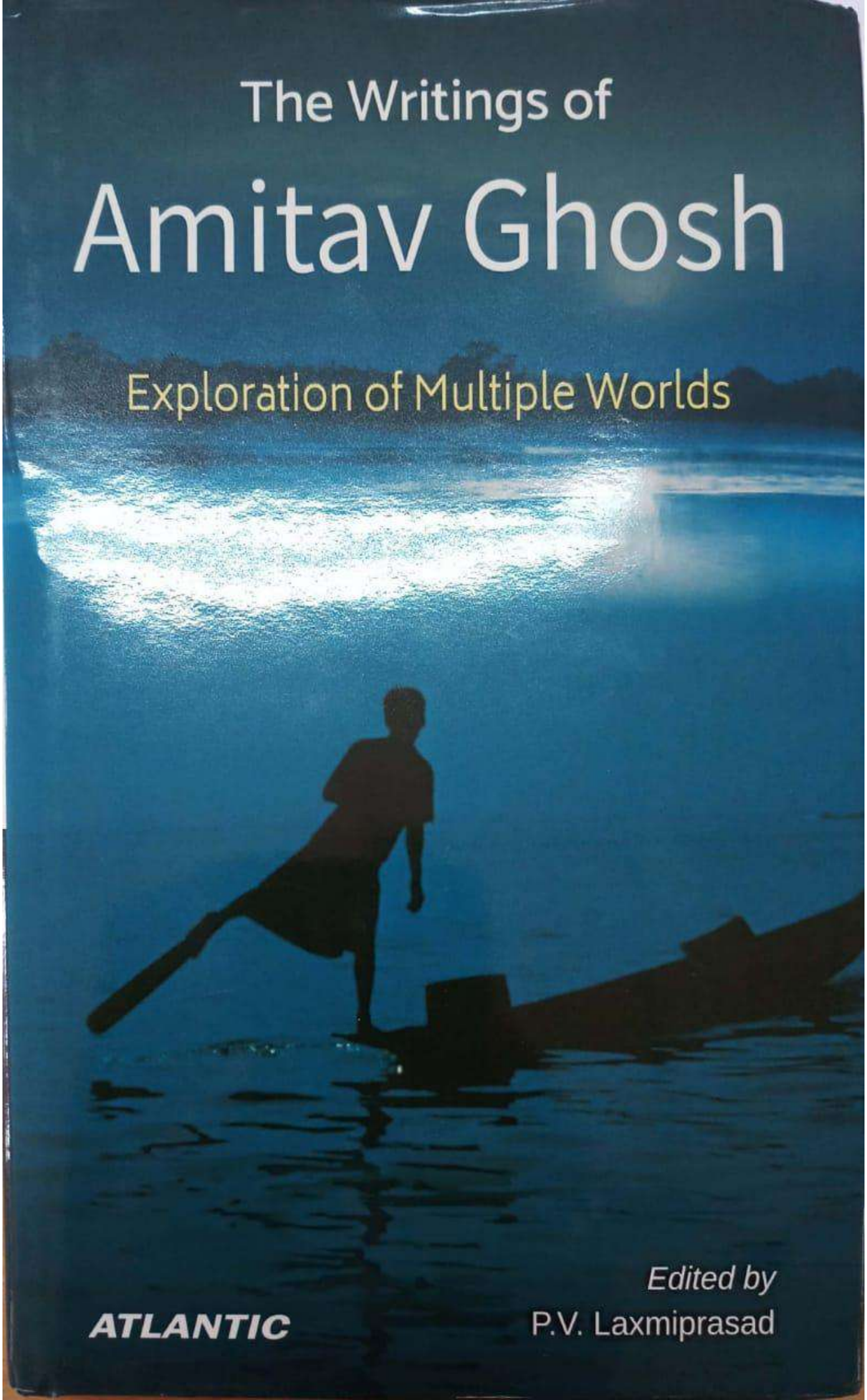
Kasa Janardhan Reddy & Gandhi Babu Shanampoodi

Vijay Tendulkar is a leading Indian playwright, movie and television writer, literary essayist, political journalist, and social commentator primarily in Marathi. He has received both bouquets and brickbats in a playwriting career that has spanned five decades. He is internationally known as a path-breaking theatre writer and plays a vital role in the modernization of Indian Theatre. He was primarily traditional until his plays appeared on the stage. He brings many changes to Marathi drama without deviating from the stage completely and combines facts and fiction in his drama very nicely and paints the reality of the world in sharp colours. We can see vivid picture of the present-day society in his plays. Being concerned with journalism, he automatically came across various types of persons. His requirements are fulfilled due to the newspaper reports or incidents narrated to him. Tendulkar gradually rebelled against tradition and became a dramatist of the new age.

He also writes his plays to portray the disillusion and aggressive violent reaction of young educated generation against society. He is associated with the Marathi Experimental Theatre which presents his plays on the lives of educated lower class graduates, who become misfits in society due to unemployment. Their disillusionment reminds them of their traditional suppression by the upper caste and react violently to avenge the trouble makers.

The Writings of
Amitav Ghosh

Exploration of Multiple Worlds



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ATLANTIC

22

Ecological Degradation in Amitav Ghosh's *The Great Derangement: Climate Change and the Unthinkable*

Candy D'Cunha

Abstract

The present century has been witnessing the environmental degradation and destruction in the ecosystem throughout the world. The lack of seriousness in dealing with the contemporary ecological crisis is prototypical of the approach of mainstream society. Responding to environmental crisis requires a complete rethinking and reorienting in our way of being and behaving. Fundamentally, a renewed approach of the imagination and looking for other possible ways of being and interacting with human and non-human can, to a certain extent, contribute to the solution of the environmental crisis.

Amitav Ghosh is one of the greatest writers of the present era. He is well known for his grandeur and style of narrative technique, coupled with thematic adaptability, knowledge, education and an acute anthropologist's sagacity, which captures all through the reader's interest. His work, *The Great Derangement: Climate Change and the Unthinkable* is an informative work, which enthrals the minds of the readers to understand the destiny of human, if he doesn't change for the better. He tries to draw the minds of the readers to heed to the cry of the earth. Ghosh shares his personal experience about his ancestors, who were ecological refugees. His personal experience tries to sketch out the various situation and hazards of climate changes he had been observing from years.

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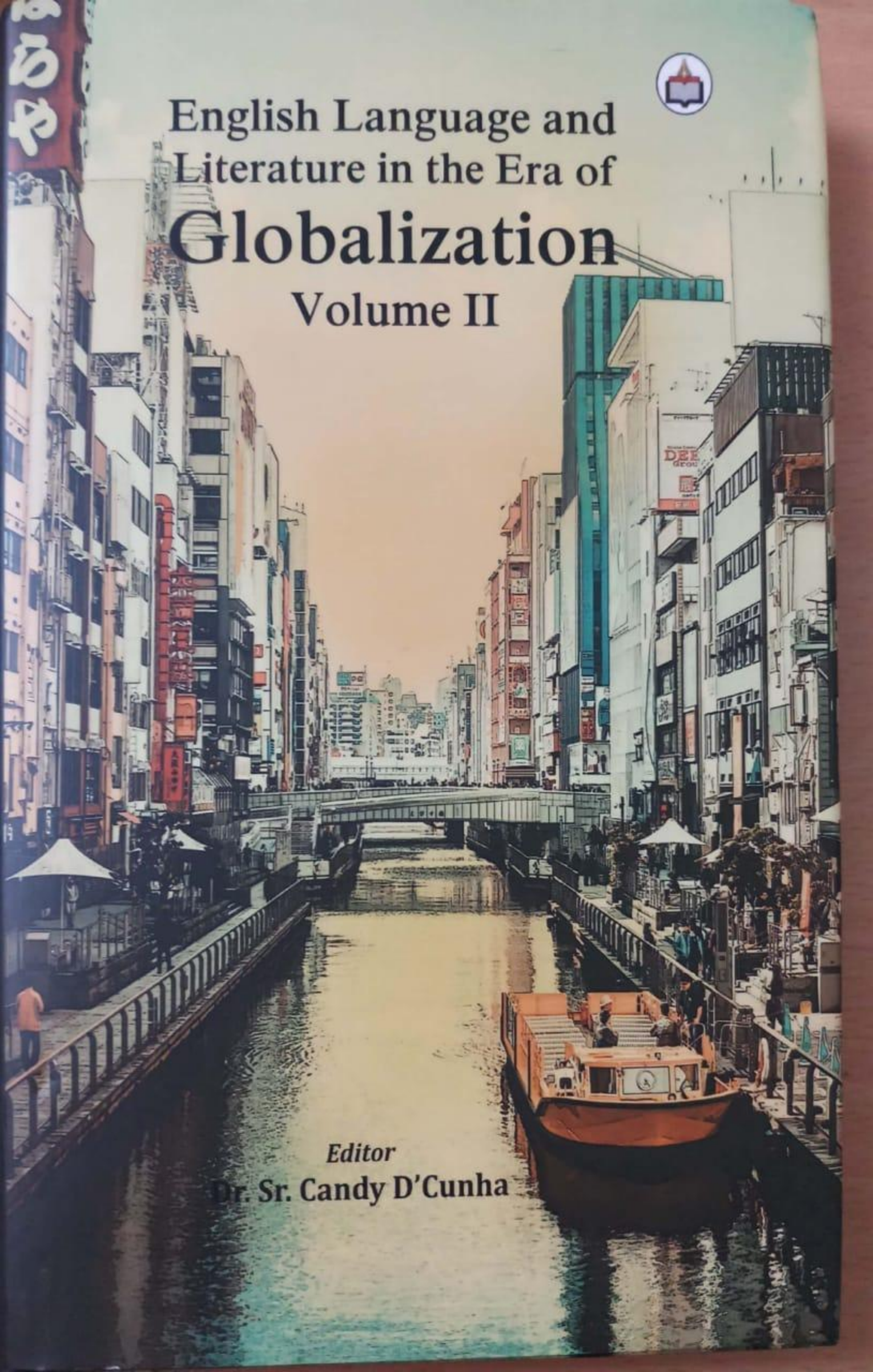

Editor

Dr. Sr. Candy D'Cunha

Contents

4

Ecosophy in Margaret Atwood's *Surfacing*

Dr. Sr. Candy D' Cunha and **Dr. G. Suvarna Lakshmi**

> The threat to the planet is us. It's actually not a threat to the planet – it's a threat to us.
>
> (Margaret Atwood, Postconsumer Content Team)

Trailblazing from her native Canada to save the earth, Margaret Eleanor Atwood is considered the most distinguished and versatile genius of Canada's literary elite. Atwood has been conferred with various titles such as a "prophet of her own country", the "undisputed queen of Canada's letters", "and a cult heroine" etc. Atwood is not only a popular and bestselling author in her own country Canada, but she has also drawn worldwide attention through her prolific art of writing.

Margaret Atwood has written more than 40 books which include poetry, literary criticism, non-fiction, children literature, stage plays and novels. She was born in Ottawa, Ontario in 1939. Her father was an expert in the field of zoology, and later engaged himself in entomological research. During most of her childhood days, Atwood had seen and witnessed her father visiting forests as an entomologist, especially in the North Quebec regions. Her mother Dorothy Killiam was a former nutritionist and dietician. She was the second of three children. At a very young age, she began her educational journey and in 1961 she received her B.A. from Victoria College, University of Toronto and later, her M.A. from Radcliffe, Harvard University, in 1962.

Nabendu Chaki · Agostino Cortesi
Nagaraju Devarakonda
Editors

Proceedings of International Conference on Computational Intelligence and Data Engineering

ICCIDE 2017

Springer

Parallel Computing Algorithms for Big Data Frequent Pattern Mining

Subhani Shaik, Shaik Subhani, Nagaraju Devarakonda and Ch. Nagamani

Abstract Frequent Pattern Mining (FPM) is a focused research area with a goal of identifying the patterns that appear in the dataset most frequently. Due to huge increase in data volume and large search space, it is necessary to study the parallel computing algorithms for mining the frequent patterns. In the last two decades, many sequential algorithms have been implemented for solving FPM problem. Yet no more efficient algorithm erect for today's large data volumes called big data. In this paper, we presented a scalable parallel algorithm for big data frequent patterns mining. Three key challenges are identified to parallel algorithmic design: load balancing, work partitioning, and memory scalability. The experimental results are carried out using different datasets such as chess, census, mush room, Kosarak, pumsb, connect and a comparison is made with existing parallel approaches. The experimental results show scalable performance and yield significant gains over different machines.

Keywords Big data · Parallel frequent pattern · Map reduce · Pattern growth IDD · Hybrid models

1 Introduction

Frequent pattern mining is a focused research area in data mining, with a goal of finding the patterns that appear in a dataset most frequently. The large volumes of data in present time required streaming frameworks for big data frequent pattern

S. Shaik (✉)
Acharya Nagarjuna University, Guntur, Andhra Pradesh, India
e-mail: subhanicse@gmail.com

S. Subhani
St. Mary's Women's Engineering College, Guntur, Andhra Pradesh, India

N. Devarakonda
Lakireddy Bali Reddy College of Engineering, Mylavaram, Andhra Pradesh, India

Ch. Nagamani
Andhra Loyola Institute of Engineering & Technology, Vijayawada, India

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NETWORK INTRUSION DETECTION MECHANISMS USING OUTLIER DETECTION

Ch.Nagamani[1],

[1]Research Scholar, Acharya Nagarjuna University, Guntur. & Asst.Professor, Department of Computer Science and Engineering, Andhra Loyola Institute of Engg &Tech, Vijayawada.
[1]nagamani502@gmail.com

Dr. Suneetha Chittineni[2]

[2]Associate Professor, Department of Computer Applications, RVR & JC College of Engg & Tech, Chowdavaram, Guntur-522019.
Email: [1]nagamani502@gmail.com,
[2]suneethachittineni@gmail.com

Abstract:

The recognition of intrusions has increased impressive enthusiasm for information mining with the acknowledgment that anomalies can be the key disclosure to be produced using extensive network databases. Intrusions emerge because of different reasons, for example, mechanical deficiencies, changes in framework conduct, fake conduct, human blunder and instrument mistake. Surely, for some applications the revelation of Intrusions prompts more intriguing and helpful outcomes than the disclosure of inliers. Discovery of anomalies can prompt recognizable proof of framework blames with the goal that executives can take preventive measures previously they heighten. A network database framework comprises of a sorted out posting of pages alongside programming to control the network information. This database framework has been intended to empower network operations, oversee accumulations of information, show scientific outcomes and to get to these information utilizing networks. It likewise empowers network clients to gather limitless measure of information on unbounded territories of utilization, break down it and return it into helpful data. Network databases are ordinarily used to help information control utilizing dynamic capacities on sites or for putting away area subordinate data. This database holds a surrogate for each network route. The formation of these surrogates is called ordering and each network database does this errand in an unexpected way. In this paper, a structure for compelling access control and Intrusion Detection using outliers has been proposed and used to give viable Security to network databases. The design of this framework comprises of two noteworthy subsystems to be specific, Access Control Subsystem and Intrusion Detection Subsystem. In this paper preprocessing module is considered which clarifies the preparing of preprocessing the accessible information. And rain forest method is discussed which is used for intrusion detection.

Keywords: Outlier detection; Intrusion; security; network Intrusion;

1. INTRODUCTION

Intrusion discovery alludes to the issue of discovering designs in information that are altogether different from whatever remains of the information in view of proper measurements. Such an example regularly contains valuable data with respect to unusual conduct of the framework depicted by the information. These bizarre examples are typically called Intrusions, commotion, inconsistencies, exemptions, shortcomings, absconds, blunders, harm, shock, curiosity or eccentricities in various application spaces[5].Intrusion location is a broadly explored issue and finds tremendous use in application spaces, for example, Visa extortion identification, deceitful utilization[9] of cell phones, unapproved access in PC systems, irregular running conditions in air ship motor revolution, anomalous

Exploring New Horizons

Myriad Dimensions in the Poetry of Manas Bakshi

EDITED BY

Dr. P.V. Laxmiprasad

22

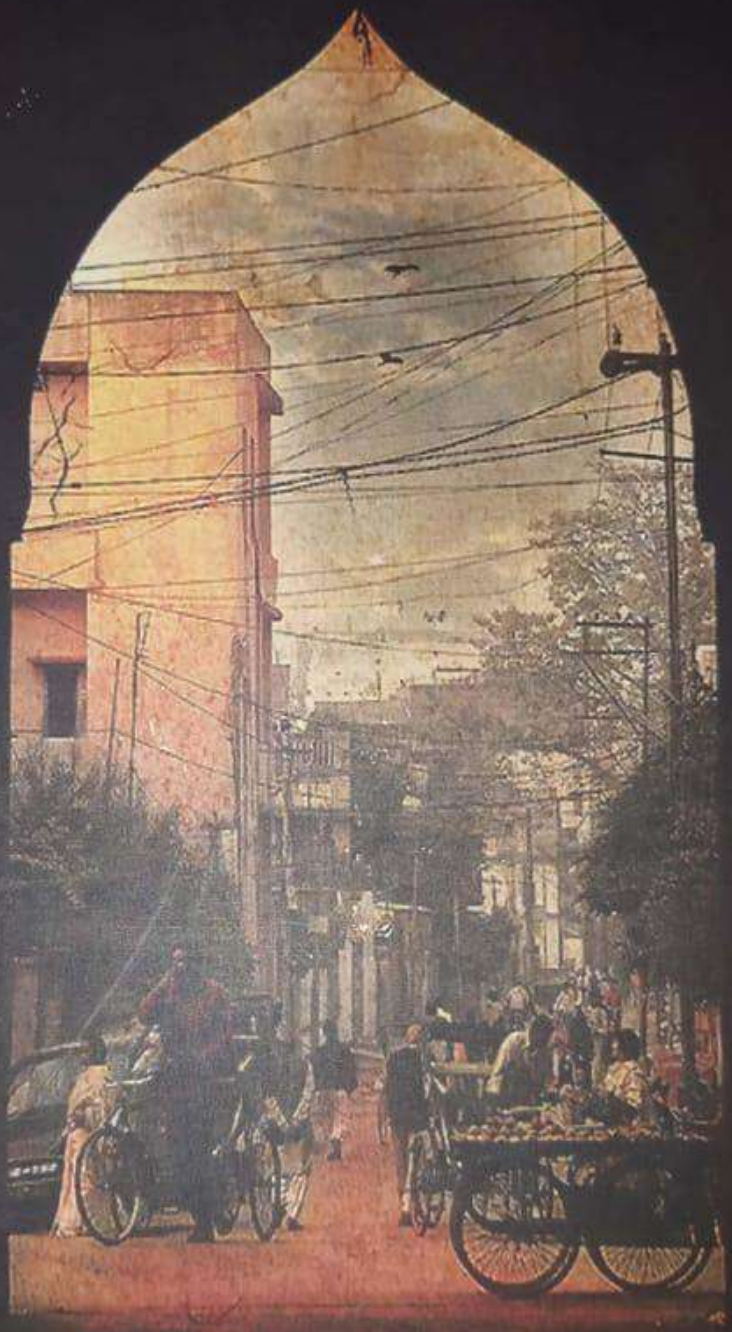
Confessional Voice in Manas Bakshi's *In the Age of Living Death*

Sr. Candy D. Cunha

Manas Bakshi is a well-known contemporary Indian poet, writer, critic and philosopher. His famous anthology, *In the Age of Living Death* is a powerful reflection of confessional insights fabricated around the odds of life. Most of his poems in the anthology mirror his inner conflicts which appear to be a sincere confession to his readers.

Bakshi's vision evokes the beauty of truth expressed through the poetic verses using a rhythmic style. The poet explores his deep memories and ideas recollected in the tranquility of the various situations of his life. The poet is very transparent as he speaks about the diverse realities of life. Through his very experiences, he tries to encounter meaningfully the different aspects of reality. In a calm and serene manner, he pours out his inner feelings about the time and the circumstances of his experiences. It is easy to note that his poetry centers on various themes, such as the paradoxical aspects of life, the identical crises; confessional voice etc. This paper is an attempt to bring out the confessional note in Manas Bakshi's anthology *In the Age of Living Death.*

The Nativist Vision of Life in the Works of Basavaraj Naikar



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Contents

5

The Concept of Realism in Basavaraj Naikar's *Bird in the Sky*

Sr. Candy D. Cunha

Literary realism is an art movement that began in the mid nineteenth-century in France and spread to the entire world. The main aim of this movement was to shun the fantasy and romantic ideology and bring to light the realistic aspects of life. In other words, realism paved the way for the faithful depiction of the realities of human life.

Looking back at the annals of the nineteenth-century, in many European countries it can be noticed that the century made some astounding achievements in various realms such as politics, industry, science, philosophy and literature. This age was extraordinarily crowned with an unsurpassed flowering of the human spirit.

The hagiographical literatures of various Christian saints who were beatified and canonised are very well documented in Church history. This literature is respected and followed in the Church even today. Certain days and dates are allotted to different saints and the festive tradition of commemorating their miracles and mysteries are observed by the Anglican Church.

On the other hand, India being the land of unity in diversity with several major religions like Jainism, Buddhism, Sikhism, Vaidicism, Saivism, Virasaivism and Indian Christianity, the country has seldom recorded the hagiographies and hagiographical

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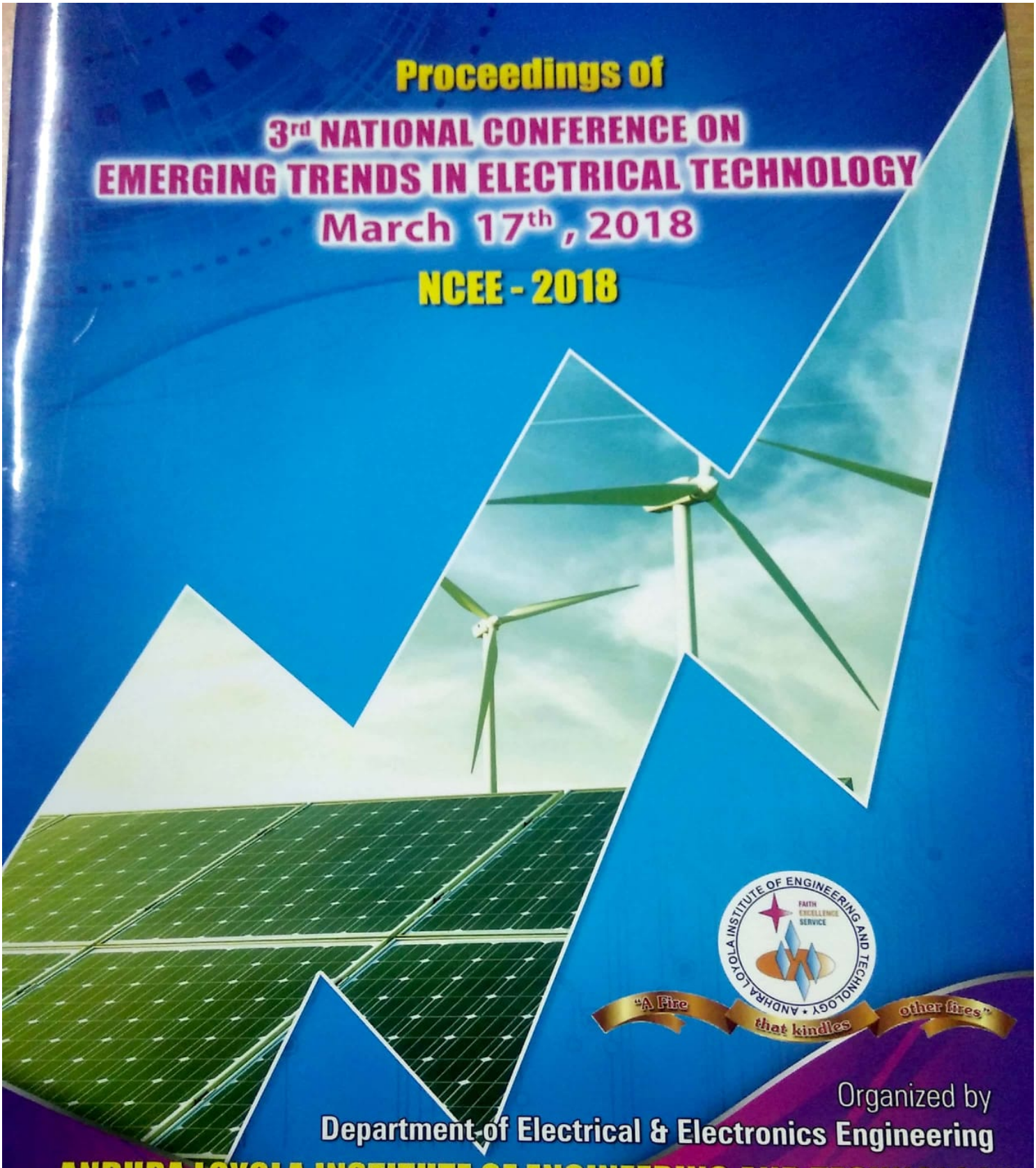

"A Fire that kindles other fires"

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CONTENTS		
Message from the Director		iii
Message from the Assistant Director		iv
Message from the Assistant Director		v
Message from the Principal		vi
Message from the Convener		vii
Committees		viii
1	**Fully Automatic Solar Grass Cutter Using Arduino.** *P. Abhinav Deep, Ch. Akash Babu and M. Siva Kumar*	1
2	**SVPWM Based Open Loop And Closed Loop V/f Control of Induction Motor** *K.Rajesh Babu, G.Anvesh Kumar, M.Naresh and B.Praveen kumar*	2
3	**Outline OF Energy Framework STABILIZER Utilizing ANFIS** *M. Vinod Kumar, B.M.V.Gowtham, N.Venkat Reddy and M.Ramakrishna*	3
4	**Stability Enhancement of Wind Power System with UPFC and Energy storage system** *B.Manohar, M.Hari Prasad and K.Mahesh*	4
5	**Under Ground Cable Fault Detection By Using Arduino** *V.Pranay Chowdary, CH.T.V.N.Manikanta, G.Anil Kumar and L.Karunakar*	5
6	**DFIG Wind Turbines With Super Capacitor Energy Storage for Constant Power Control** *L.Naresh, K.Avinash, P.Satya sravan and M.M.Karunakar*	6
7	**Power TransformerProtection using Fuzzy Logic based Differential Relay** *K.Shiney, N.Manaswini, V.Lakshmi keerthi, K.Nalini prasannaand A.Sai Sunil*	7
8	**Low frequency Oscillations Damping in SMIB System using Fuzzy based SSSC Controller** *S.Ramarao, K.Parasuram, M.Venkata vinay, G.Anjibabu and T.Krishna Mohan*	8
9	**Three Phase Boost Converter for Solar Battery Charging System by Using MPPT Technique** *Y.C.Ashok Kumar, A,Naga Phaneendra Kumar, P.malli Krishna Reddy and R.Anjaneyulu*	9
10	**Development of DC-DC Buck Converter Using Arduino** *A Sekhar Sai Sunil, R Naga Surya Teja, M AnjaneyaReddy and P V N D Sumanth*	10
11	**Arduino Based Sophisticated Home Automation System for Electrical Appliances Using GSM** *K Ganesh, M Ravi Chandra, P Raj Kamal, Y Leela Venkatesh and K Rajesh Babu*	11
12	**Grid Interconnection of Distributed Generation System with Power-Quality Improvement by using STATCOM** *Greeshma.Lanke, Revathi.Maddirala and Brahma Teja.Saketi*	12
13	**Distributed Power Flow Controller Based Stabilizer To Damp Power System Oscillations** *S.Siva Kumari, M.Shekinah and G.Sirisha*	13
14	**Control of Hybrid Micro Grid In Grid Tied Mode Using Z-Source Converter** *P.Jhansi, S.Jayasree, B.Ramya, J.Lakshimi Triveni and P.Swathi Mastan*	14
15	**Line Follower Based Smart Car** *K.L.N.Satish, T.TejaSai, S.K.Sai Krishna, G,Naveen Kumar, L.Karunakar*	15

Available online at: http://www.ijmtst.com/ncee2018.html
Special Issue from 3rd National Conference on Emerging Trends in Electrical Technology, 17th March 2018, Vijayawada, Andhra Pradesh, India
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Arduino Based Obstacle Avoiding Robot controlled by Bluetooth

Y. Chiranjeevi Ashok Kumar1 | K.Pavan Kumar2 | K.P.M.Y.V. Dathu3 | M.Revanth Babu4

1M.Tech (EEE, CSE), Andhra Loyola Institute of Engneering & Technology, Vijayawada , Andhra Pradesh -India 520010
2,3,4 B.Tech Student in Dept. of EEE Andhra Loyola Institute of Engineering & Technology, Vijayawada, Andhra Pradesh -India 520010.

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ABSTRACT

A robot is a machine desingned, reprogrammable, multifunctional device used to execute one or more tasks automatically with speed and precision. Which decreases the gap between human and technology to ease the standard of living. This paper deals with the design and control of automated wheeled vehicle type robot which can move in desired direction and prevents the occurring of accidents. Not only that but it can also be used for GPRS location of the vechicle, capturing of pictures and videos in various locations. An android app has developed using MIT App inverter and a Bluetooth communication is made with robot which interlinks with the microcontroller to controls its direction and obstacle avoiding.

The main intention of this work is to design a robot prototype for avoiding from accidents by the help of Arduino Uno, Motor driver L298N, HC-05 Bluetooth module for wireless serial communication, HCSR-05 Ultrasonic sensor to attain the goal of this work, reconcilable software and controlled motor circuit need to be determined. The prototype will have several characteristics like controlling the direction of the motor with an app, immediately handling of the obstacle rather than any remote controller.

KEYWORDS:- *Smart phones, microcontroller (Arduino Uno), Bluetooth, UltrasonicSensor.*

I. INTRODUCTION

A robot is an electromechanical machine that is controlled by computer program to perform various operations. Industrial robots have designed to reduce human effort and time to improve productivity and to reduce manufacturing cost. Today human-machine interaction is moving away from mouse and pen and becoming much more pervasive and much more compatible with the physical world. Android app can control the robot motion from a long distance using Bluetooth communication to interface controller and android. Microcontroller ATMEGA328P-PU can be interfaced to the Bluetooth module though UART protocol and code is written in embedded C language. As per the commands received from android app the robot motion can be controlled. The output motion of a robotic vehicle is accurate and repeatable. Pick and Place robots can be reprogrammable and tool can be interchanged to provide for multiple applications. The purpose of this work is to design and implement an Android Controlled Bluetooth Robot which is used for Surveillance, home automation, wheelchairs, military and hostages Rescue applications.

II. PURPOSE

In the recent trends, Microcontroller is widely accepted as an open source platform.

In this paper, we are overcoming the problem of traditional robots, which are usually handled with any remote controller. Reducing the remote work we are making the robot move by just a click on the cell phone with android operating system. As per the commands received from smart phone the robot motion can be controlled. The output motion of a robotic vehicle is accurate and repeatable. And here we can discuss about the avoidance of obstacle, which are occurred by naturally or artificially and avoiding it by moving back some distance from the obstacle automatically. Apart from this we can also use it for Surveillance, wheelchairs, military and hostages Rescue applications.

III. SYSTEM DESIGN AND ARCHITECTURE

3.1. ARDUINO UNO

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.

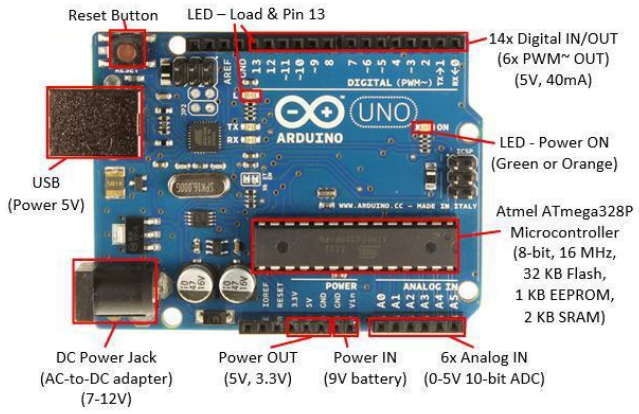

Fig. -1: Arduino Uno

3.2. MOTOR DRIVER IC(L298N)

The L298N is an integrated monolithic circuit in a 15-lead Multi watt and PowerSO20 packages. It is a high voltage, high current dual full-bridge driver designed to accept standard TTL logic levels and drive inductive loads such as relays, solenoids, DC and stepping motors.

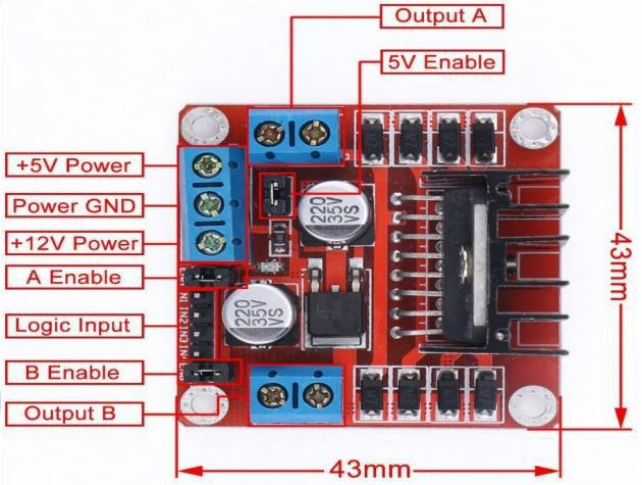

Fig. -2: L298N motor drive

Two enable inputs are provided to enable or disable the device independently of the input signals. The emitters of the lower transistors of each bridge are connected together and the corresponding external terminal can be used for the connection of an external sensing resistor. An additional Supply input is provided so that the logic works at a lower voltage

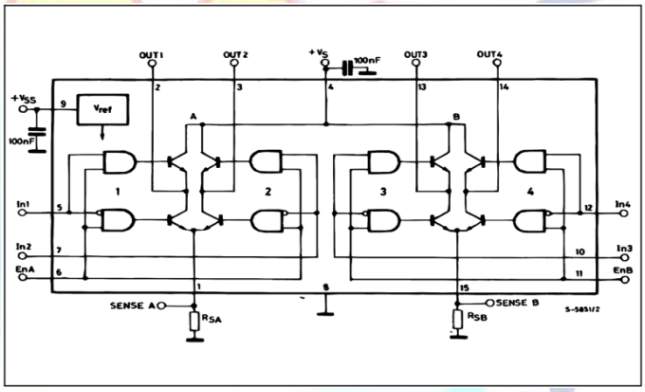

Fig. -3: *Internal diagram of L298N*

3.3 ULTRASONIC SENSOR HC-SR04

The Ultrasonic sound waves has an extremely high pitch that humans cannot hear and is also free from external noises from passive or active sources. This particular sensor transmits an ultrasonic sound that has a frequency of about 40 kHz.

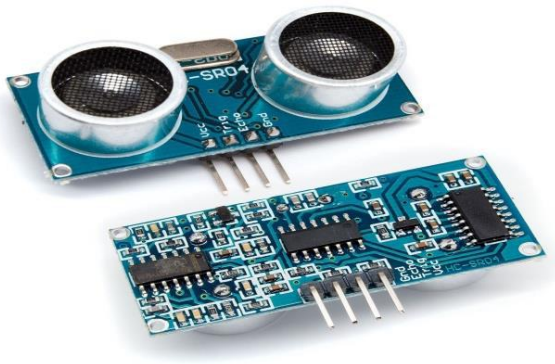

Fig. -4: Ultrasonic sensosr HC-SR 04

The sensor has two main parts- transducer that creates an **ultrasonic sound wave** while the other part listens to its echo. Basically, it's being used in robotic applications for object escaping awareness and prevention from falling or crashing. It's not specific to robotics moreover it is also used for water level sensing, as a parking sensor and also for interactive display on computer screens.

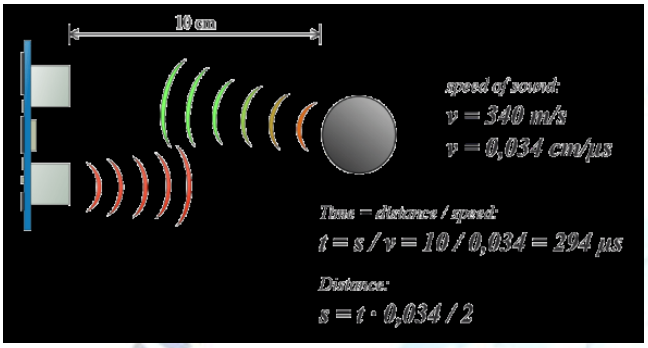

Fig. -5: Working of Ultrasonic sensor

3.4 BLUETOOTH MODULE HC-05

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. The HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication. This serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Blue core 04-External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature).

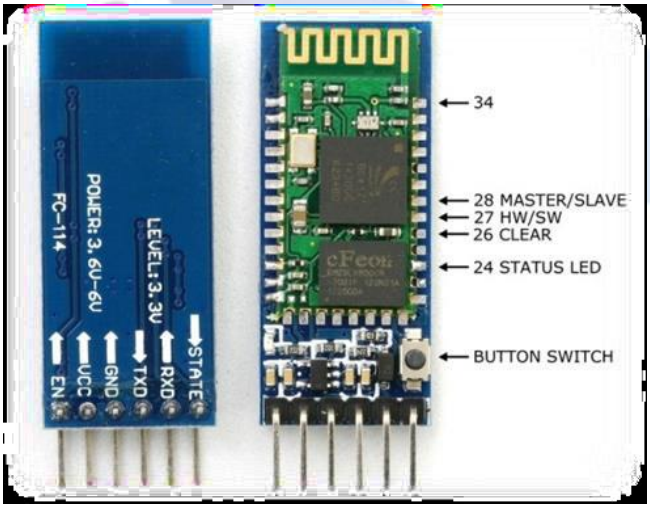

Fig. -6: HC-05 Bluetooth module

It works underpin master and slave concept, and if the master and slave are paired then red and blue LEDs on the module blinks at 1 time per 2 seconds in interval and if disconnected blue LED blinks for 2 times per second. Its auto pairing pin code is "1234" as default and it automatically reconnect in 30 min when disconnected because of exciding the range of connection.

3.5 UART

Universal asynchronous receiver/ transmitter is usually an individual integrated circuit used for serial communications for computer or peripheral device serial port. UART are now commonly used in microcontrollers. A dual UART combines two UARTS into a single chip. Many modern ICs come with a UART that can also communicate synchronously; these devices are called UART. UARTs are commonly used in conjunction with communication standards such as TIA (formerly EIA) RS-232, RS-422 or RS-485. The universal designation indicates that the data format and transmission speeds are configurable.

The electric signaling levels and methods (such as differential signaling etc.) are handled by a driver circuit external to the UART. The UART takes bytes of data and transmits the individual bits in a sequence. At the destination, a second UART re-assembles the bits into complete bytes. Each UART contains a shift register, which is the fundamental method of conversion between serial and parallel forms. Serial transmission of digital information (bits) through a single wire or other medium is less costly than parallel transmission through multiple wires.

3.6 Power adaptor

This is used to give appropriate DC power supply (9v) to microcontroller, Driver IC sensors and other passive components of the Robot.

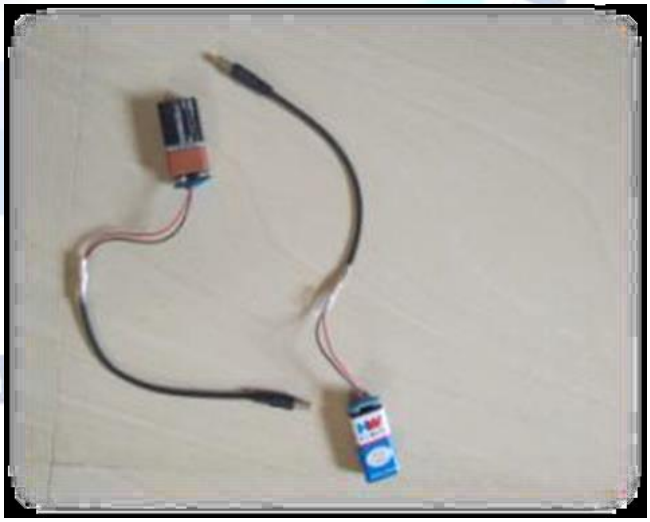

Fig. -7: Power adapter with 9V battery

3.7 .SYSTEM ARCHITECTURE

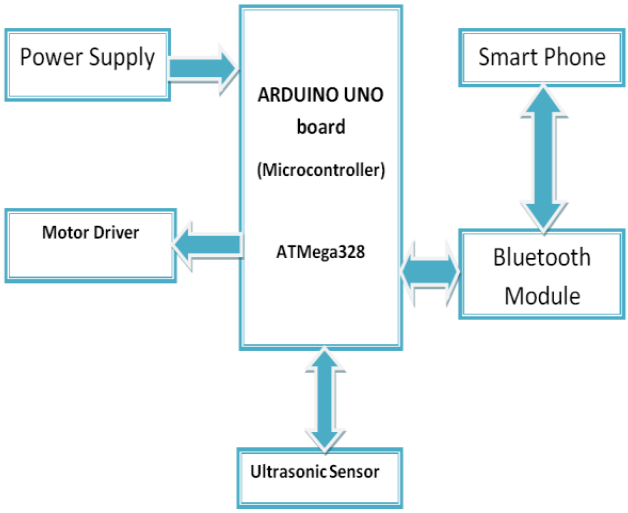

Fig. -8: System Architecture of proposed system

A robot can be controlled using Bluetooth module HC-05 and ATMEGA328P-PU microcontroller with android Smartphone device. The controlling devices of the whole system are a microcontroller. Bluetooth module, DC motors are interfaced to the microcontroller.

The data receive by the Bluetooth module from android smart phone is fed input to the controller. The controller acts accordingly on the DC motor of the robot. The robot can move to move in all the four directions using the android phone. The direction of the robot is indicators using LED indicators of the Robot system. In achieving the task the controller is loaded with program written using Embedded 'C' Languages. Android smart phone controller Bluetooth

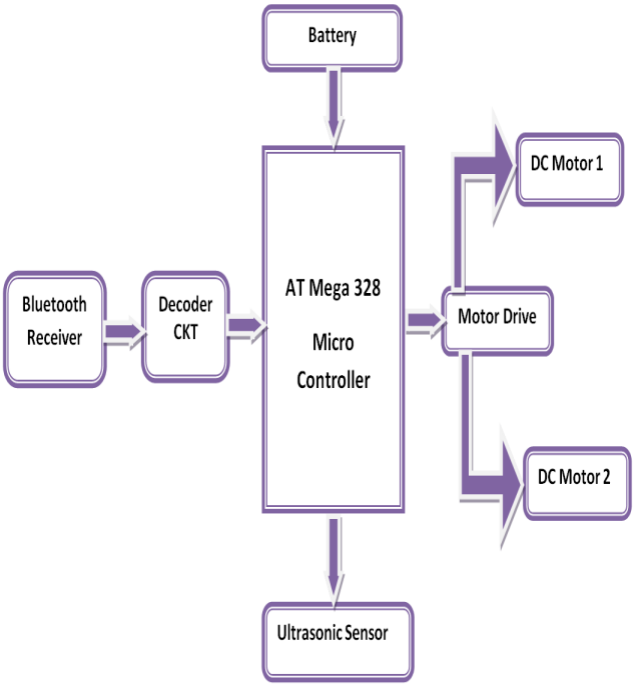

Fig. -9: Block diagram of proposed system

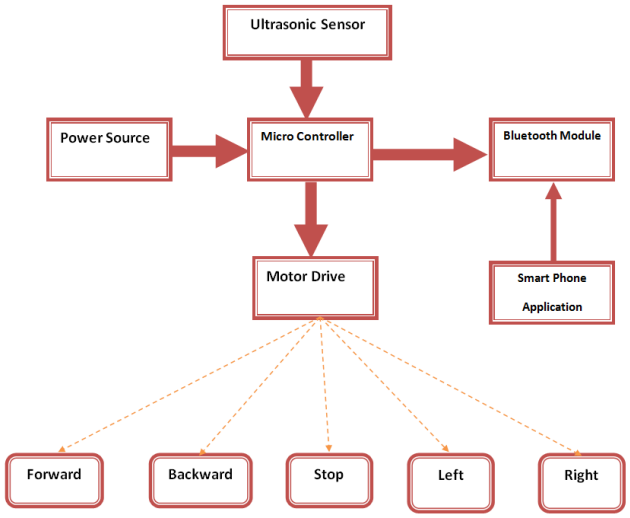

Fig. -10: Component Diagram

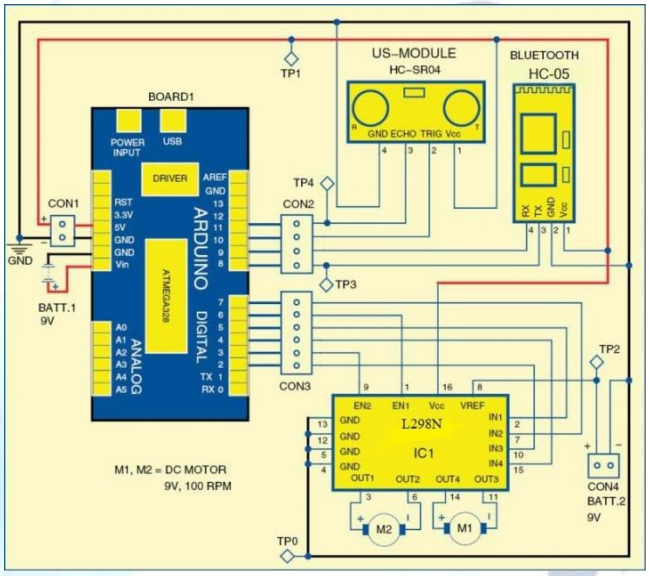

Fig. -11: Circuit diagram of proposed system

3.8 APPLICATIONS

➢ In Domestic Use: This project can be used at homes for many purposes like picking up and placing some objectsfrom one to other.

➢ In Spying Operations: This robot can help in spying operations. The object recognition and android control makes it Hi-Fi.

➢ For Handicapped People: This project can help the handicapped people especially those who had lost their feet unfortunately.

➢ Military Application and Hostage Rescue

IV. CONCLUSIONS

The operating system of smart phone is android which can develop effective remote control program. At the same time , this program uses bluetooth connection to communicate with robot and also for obstacle detection. The purpose of writing this paper is to introduce a hardware

system which can transfer small requirements from a one communicating device to another by just tapping on one's mobile screen. The hardware here introduced is a compound robot which is handled by an android application, the connectivity between the robot and the app is done by HC-05 Bluetooth module, which provides 10 meters range from its current position. Further to avoid crashing of robot with any other hardware is done by Ultrasonic sensor HC-SR04. Completion of this project will bring a new product to the world to increase speed and efficiency but also from the avoiding of obstacle. The element which differentiates this research from other researches is introduction of the Ultrasonic sensor to detect the distance of the obstacle from the robot, by this one can change the movement of the robot before it wreck with any other thing. Thus it is concluded as by introduction of any such robot will enhance smart work and one can control their task remotely and wirelessly.

Wireless control is one of the most important basic needs for all the people all over the world. But unfortunately the technology is not fully utilized due to a huge amount of data and communication overheads. Generally many of the wireless-controlled robots use RF modules. But our project for robotic control make use of Android mobile phone. By the use of this technology we can have more available commands which are more than RF modules. For the giving of the commands the user should install a designed application on her/his mobile.

As by using of the Navigation hardware we make robot automated to travel to any destination without any objections also by using IR sensor etc.

FUTURE ENHANCEMENT

Range of connectivity can be increased by using Wi-Fi. As of now we are using Bluetooth module which can be replaced by Wi-Fi module. And can extend range by installing routers on short distances. As if we fixed an GPRS to it we can send the location of ncident place to emergency contacts of phonebook which are selected when ever an accident is occured. Camera can be attached and robot can be utilized in arder to be used like a spy.

REFERENCES

1. Rahul Kumar1, Ushapreethi P2, Pravin R. Kubade3, Hrushikesh B. Kulkarni4, "Android Phone controlled Bluetooth Robot" International Research Journal of Engneering and Technology Volume : 03 Issue: 04 pp.104-114.

2. Arvind Kumar Saini1,Garima Sharma2, Kamal Kishor Choure3, "BluBO: Bluetooth Controlled Robot," International Journal of Science and Research (IJSR) National Conference on Knowledge, Innovation in Technology and Engineering (NCKITE), 10-11 April 2015, pp. 325-328S.

3. Phone Controlled Robot Using https://electronicsforu.com/electronics-projects/hardware-diy/arduino-android-phone-controlled-robot .

4. Arita Dey1,Yakub Ansari,Saquib Gadkari,Aarti Gokul, "Android AppBasedRobot",IJCSIT,vol.6(2),2015,pp.1598-1600.

5. Androidtutorial,tutorialspoint.com.

6. Piyare, R. and Tazil, M. (2011) "Bluetooth based home automation system using Android phones". IEEE 15TH International symposium on consumer electronics (ISCE), 14-17 June 2011, Singapore.

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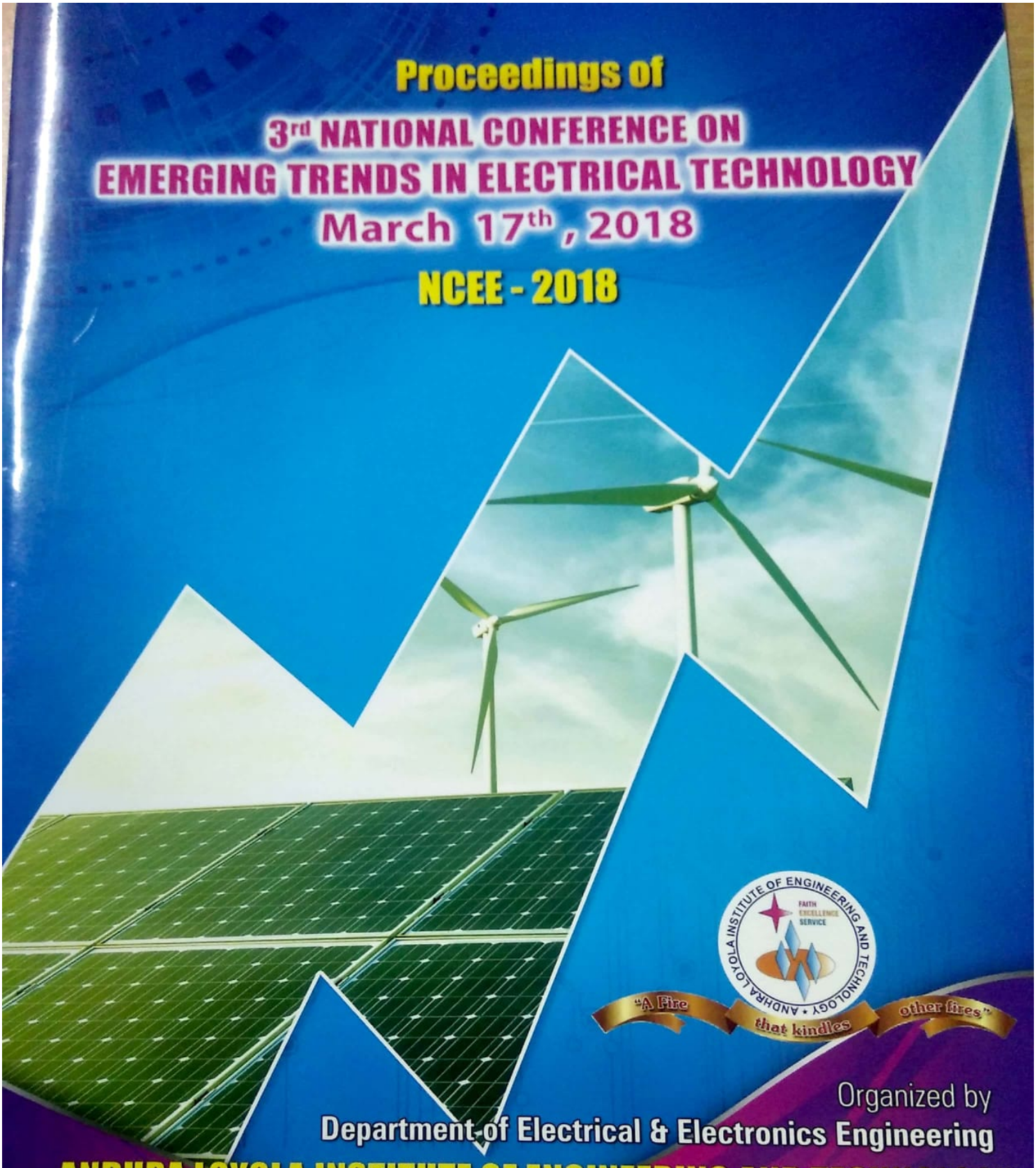

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CONTENTS		
Message from the Director		iii
Message from the Assistant Director		iv
Message from the Assistant Director		v
Message from the Principal		vi
Message from the Convener		vii
Committees		viii
1	**Fully Automatic Solar Grass Cutter Using Arduino.** *P. Abhinav Deep, Ch. Akash Babu and M. Siva Kumar*	1
2	**SVPWM Based Open Loop And Closed Loop V/f Control of Induction Motor** *K.Rajesh Babu, G.Anvesh Kumar, M.Naresh and B.Praveen kumar*	2
3	**Outline OF Energy Framework STABILIZER Utilizing ANFIS** *M. Vinod Kumar, B.M.V.Gowtham, N.Venkat Reddy and M.Ramakrishna*	3
4	**Stability Enhancement of Wind Power System with UPFC and Energy storage system** *B.Manohar, M.Hari Prasad and K.Mahesh*	4
5	**Under Ground Cable Fault Detection By Using Arduino** *V.Pranay Chowdary, CH.T.V.N.Manikanta, G.Anil Kumar and L.Karunakar*	5
6	**DFIG Wind Turbines With Super Capacitor Energy Storage for Constant Power Control** *L.Naresh, K.Avinash, P.Satya sravan and M.M.Karunakar*	6
7	**Power TransformerProtection using Fuzzy Logic based Differential Relay** *K.Shiney, N.Manaswini, V.Lakshmi keerthi, K.Nalini prasannaand A.Sai Sunil*	7
8	**Low frequency Oscillations Damping in SMIB System using Fuzzy based SSSC Controller** *S.Ramarao, K.Parasuram, M.Venkata vinay, G.Anjibabu and T.Krishna Mohan*	8
9	**Three Phase Boost Converter for Solar Battery Charging System by Using MPPT Technique** *Y.C.Ashok Kumar, A,Naga Phaneendra Kumar, P.malli Krishna Reddy and R.Anjaneyulu*	9
10	**Development of DC-DC Buck Converter Using Arduino** *A Sekhar Sai Sunil, R Naga Surya Teja, M AnjaneyaReddy and P V N D Sumanth*	10
11	**Arduino Based Sophisticated Home Automation System for Electrical Appliances Using GSM** *K Ganesh, M Ravi Chandra, P Raj Kamal, Y Leela Venkatesh and K Rajesh Babu*	11
12	**Grid Interconnection of Distributed Generation System with Power-Quality Improvement by using STATCOM** *Greeshma.Lanke, Revathi.Maddirala and Brahma Teja.Saketi*	12
13	**Distributed Power Flow Controller Based Stabilizer To Damp Power System Oscillations** *S.Siva Kumari, M.Shekinah and G.Sirisha*	13
14	**Control of Hybrid Micro Grid In Grid Tied Mode Using Z-Source Converter** *P.Jhansi, S.Jayasree, B.Ramya, J.Lakshimi Triveni and P.Swathi Mastan*	14
15	**Line Follower Based Smart Car** *K.L.N.Satish, T.TejaSai, S.K.Sai Krishna, G,Naveen Kumar, L.Karunakar*	15

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Grid Interconnection of Distributed Generation System with Power-Quality Improvement by using STATCOM

Greeshma.Lanke[1] | Revathi.Maddirala[2] | Brahma Teja.Saketi[3] | Y C Ashok Kumar[4]

[1,2,3] Department of EEE, Andhra Loyola Institute of Engineering & Technology, Vijayawada, Andhra Pradesh, India.

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ABSTRACT

This paper presents the modeling and control of hybrid system with grid interfaced inverter technique. The output of the DG is given to the DC side of the voltage Source Inverter for interfacing to the Grid (UG) . In the presented work, the features of Active Power Filter have been incorporated in the inverter. Thus the same inverter is utilized to inject power generated from DG source to the Grid and also to act as Shunt Active Power Filter to compensate for load current harmonics and reactive power demand. Thus, after compensation, the Grid current is sinusoidal and in-phase with Grid voltage and total load (linear/ non linear) at PCC connected to grid act as balanced load to the grid. The entire system is modeled in MATLAB/ SIMULINK environment and simulations carried out to verify the operation and the control principle. Various simulation results are presented for the proposed Grid interfaced DG system.

KEYWORDS: *Active and Reactive Power, Distributed Generation, Utility Grid, Pulse Width Modulated Voltage Source Inverter, Power control centre*

I. INTRODUCTION

In present scenario the modern technologies are being increasing and also cause to a highly usage of electricity. this leads to increase fossil fuels cost and which are the primary sources of electric power cause serious environment pollution and moreover these fossil fuels are on the verge of extinction. Hence, the transition from conventional energy systems to more cleaner and secure energy is necessity to distribution generation(DG) are rapidly increasing across the globe because they can meet the increasing power while complying with the environmental regulations of low emissions.

Interfacing the DG to the grid presents a quite different and challenging process because unlike the conventional system, the DG cannot be directly connected to the grid. A power conditioning interface between the DG and grid is required to match the characteristics of DG and the requirements of the grid connections such as voltage, frequency, active and reactive power control harmonic minimization etc..

The increased use of non-linear devices results in many power quality problems in the power system network. These non-linear devices not only increase the reactive current but also generate significant current and voltages waveforms at the power control center (PCC). The increased reactive power and non-sinusoidal supply voltage and current result in many adverse effect such as over-heating of distribution transformers, poor system

efficiency, instability, disturbance to other power quality of the DG systems is affected by the harmonic content of the current injected to grid by the inverter and also by the harmonic currents produced by non-linear loads produce harmonics in DG system and affect the quality of electric power.

Generally, current controlled voltage source inverters are used to interface the intermittent RES in distributed system. Recently, a few control strategies for grid connected inverters incorporating PQ solution have been proposed. In [3] an inverter operates as active inductor at a certain frequency to absorb the harmonic current. But the exact calculation of network inductance in real-time is difficult and may deteriorate the control performance. A similar approach in which a shunt active filter acts as active conductance to damp out the harmonics in distribution network is proposed in a control strategy for renewable interfacing inverter based on - theory is proposed. In this strategy both load and inverter current sensing is required to compensate the load current harmonics.

The non-linear load current harmonics may result in voltage harmonics and can create a serious PQ problem in the power system network. Active power filters (APF) are extensively used to compensate the load current harmonics and load unbalance at distribution level. This results in an additional hardware cost. However, in this paper authors have incorporated the features of APF in the, conventional inverter interfacing renewable with the grid, without any additional hardware cost. Here, the main idea is the maximum utilization of inverter rating which is most of the time underutilized due to intermittent nature of RES. It is shown in this paper that the grid-interfacing inverter can effectively be utilized to perform following important functions: 1) transfer of active power harvested from the renewable resources (wind, solar, etc.); 2) load reactive power demand support; 3) current harmonics compensation at PCC; and 4) current unbalance and neutral current compensation in case of 3-phase 4-wire system. Moreover, with adequate control of grid-interfacing inverter, all the four objectives can be accomplished either individually or simultaneously. The PQ constraints at the PCC can therefore be strictly maintained within the utility standards without additional cost.

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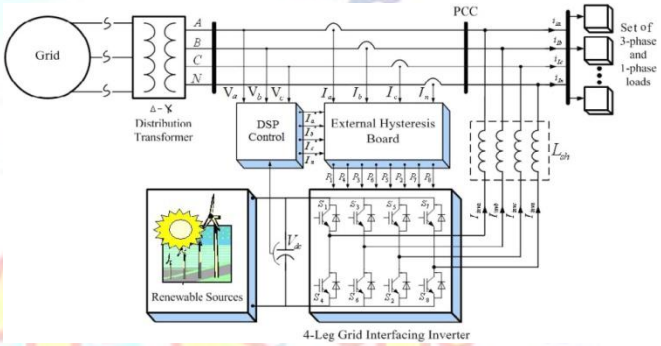

Fig.1(a) Schematic of proposed renewable based distributed generation system.

II. SYSTEM DESCRIPTION

The proposed system consists of RES connected to the dc-link of a grid-interfacing inverter as shown in Fig. The voltage source inverter is a key element of a DG system as it interfaces the renewable energy source to the grid and delivers the generated power. The RES may be a DC source or an AC source with rectifier coupled to dc-link. Usually, the fuel cell and photovoltaic energy sources generate power at variable low dc voltage, while the variable speed wind turbines generate power at variable ac voltage. Thus, the power generated from these renewable sources needs power conditioning (i.e., dc/dc or ac/dc) before connecting on dc-link. The dc-capacitor decouples the RES from grid and also allows independent control of converters on either side of dc-link.

A. DC-Link Voltage and Power Control Operation

Due to the intermittent nature of RES, the generated power is of variable nature. The dc-link plays an important role in transferring this variable power from renewable energy source to the grid. RES are represented as current sources connected to the dc-link of a grid-interfacing inverter. Fig. 1(c) shows the systematic representation of power

transfer from the renewable energy resources to the grid via the dc-link. The current injected by renewable into dc-link at voltage level V_{dc} can be given as

$$I_{dc1} = \frac{P_{RES}}{V_{dc}} \quad (1)$$

where P_{RES} is the power generated from RES

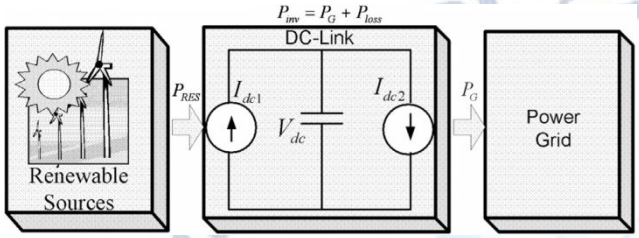

Fig.1(b) DC-Link equivalent diagram

The current flow on the other side of dc-link can be repre- sented as,

$$I_{dc2} = \frac{P_{inv}}{V_{dc}} = \frac{P_G + P_{Loss}}{V_{dc}}$$

where P_{inv}, P_G and P_{Loss} are total power available at grid-interfacing inverter side, active power supplied to the grid and inverter losses, respectively. If inverter losses are negligible then $P_{RES} = P_G$.

B. *Control of Grid Interfacing Inverter*

The control diagram of grid- interfacing inverter for a 3-phase 4-wire system is shown in Fig. The fourth leg of inverter is used to compensate the neutral current of load. The main aim of proposed approach is to regulate the power at PCC during: 1) $P_{RES} = 0$; 2) $P_{RES} <$ total load power (P_L) ; and 3) $P_{RES} > P_L$ While performing the power management operation, the inverter is actively controlled in such a way that it always draws/ supplies fundamental active power from/ to the grid. If the load connected to the PCC is non-linear or unbalanced or the combination of both, the given control approach also compensates the harmonics, unbalance, and neutral current. The duty ratio of inverter switches are varied in a power cycle such that the combination of load and inverter injected power

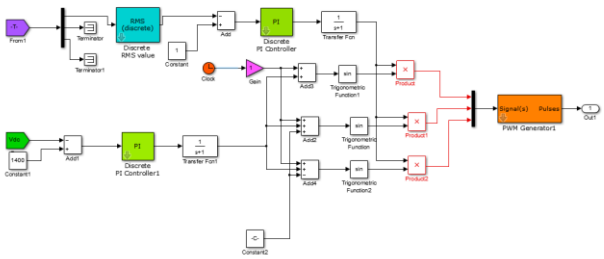

Fig.1(c) Block diagram representation of grid interfacing inverter control

appears as balanced resistive load to the grid. The regulation of dc-link voltage carries the information regarding the exchange of active power in between renewable source and grid. Thus the output of dc-link voltage regulator results in an active current (I_m). The multiplication of active current component (I_m) with unity grid voltage vector templates $(U_a, U_b, \text{and } U_c)$ generates the reference grid currents $(I_a^*, I_b^*, \text{and } I_c^*)$. The reference grid neutral current (I_n^*) is set to zero, being the instantaneous sum of balanced grid currents. The grid synchronizing angle (θ) obtained from phase locked loop (PLL) is used to generate unity vector template as

$$U_a = \text{Sin}(\theta)$$
$$U_b = \text{Sin}(\theta - \frac{2\pi}{3})$$
$$U_c = \text{Sin}(\theta + \frac{2\pi}{3}).$$

The actual dc-link voltage (V_{dc}) is sensed and passed through a first-order *low pass filter* (LPF) to eliminate the presence of switching ripples on the dc-link voltage and in the generated reference current signals. The difference of this filtered dc-link voltage and reference dc-link voltage (V_{dc}^*). is given to a discrete-PI regulator to maintain a constant dc-link voltage under varying generation and load conditions. The dc-link voltage error $(V_{dcerr(n)})$ at th sampling instant is given as:

$$V_{dcerr(n)} = V_{dc(n)}^* - V_{dc(n)}.$$

The output of discrete-PI regulator at th sampling instant is expressed as

$$I_{m(n)} = I_{m(n-1)} + K_{PV_{dc}}(V_{dcerr(n)} - V_{dcerr(n-1)}) + K_{IV_{dc}} V_{dcerr(n)}$$

where $K_{PVdc} = 10$ and $K_{IVdc} = 0.05$ are proportional and integral gains of dc-voltage regulator. The instantaneous values of reference three phase grid currents are computed as

$$I_a^* = I_m \cdot U_a$$
$$I_b^* = I_m \cdot U_b$$
$$I_c^* = I_m \cdot U_c.$$

The neutral current, present if any, due to the loads connected to the neutral conductor should be compensated by forth leg of grid-interfacing inverter and thus should not be drawn from the grid. In other words, the reference current for the grid neutral current is considered as zero and can be expressed as

$$I_n^* = 0.$$

The reference grid currents $(I_a^*, I_b^*, I_c^* \text{ and } I_n^*)$ are compared with actual grid currents $(I_a, I_b, I_c \text{ and } I_n)$ to compute the current errors as

$$I_{aerr} = I_a^* - I_a$$
$$I_{berr} = I_b^* - I_b$$
$$I_{cerr} = I_c^* - I_c$$
$$I_{nerr} = I_n^* - I_n.$$

These current errors are given to hysteresis current controller. The hysteresis controller then generates the switching pulses $(P_1 \text{ to } P_8)$ for the gate drives of grid-interfacing inverter.

The average model of 4-leg inverter can be obtained by the following state space equations

$$\frac{dI_{Inva}}{dt} = \frac{(V_{Inva} - V_a)}{L_{sh}}$$
$$\frac{dI_{Invb}}{dt} = \frac{(V_{Invb} - V_b)}{L_{sh}}$$
$$\frac{dI_{Invc}}{dt} = \frac{(V_{Invc} - V_c)}{L_{sh}}$$
$$\frac{dI_{Invn}}{dt} = \frac{(V_{Invn} - V_n)}{L_{sh}}$$
$$\frac{dV_{dc}}{dt} = \frac{(I_{Invad} + I_{Invbd} + I_{Invcd} + I_{Invnd})}{C_{dc}}$$

where $V_{Inva}, V_{Invb}, V_{Invc}$, and V_{Invn} are the three-phase ac switching voltages generated on the output terminal of inverter. These inverter output voltages can be modeled in terms of instantaneous dc bus voltage and switching pulses of the inverter as

$$V_{Inva} = \frac{(P_1 - P_4)}{2} V_{dc}$$
$$V_{Inva} = \frac{(P_3 - P_6)}{2} V_{dc}$$
$$V_{Inva} = \frac{(P_5 - P_2)}{2} V_{dc}$$
$$V_{Inva} = \frac{(P_7 - P_8)}{2} V_{dc}.$$

Similarly the charging currents $I_{Invad}, I_{Invbd}, I_{Invcd}$, and I_{Invnd} on dc bus due to the each leg of inverter can be expressed as

$$I_{Invad} = I_{Inva}(P_1 - P_4)$$
$$I_{Invbd} = I_{Invb}(P_3 - P_6)$$
$$I_{Invcd} = I_{Invc}(P_5 - P_2)$$
$$I_{Invad} = I_{Inva}(P_7 - P_8).$$

The switching pattern of each IGBT inside inverter can be formulated on the basis of error between actual and reference current of inverter, which can be explained as:

If $I_{Inva} < (I_{Inva}^* - h_b)$, then upper switch S_1 will be OFF $(P_1 = 0)$ and lower switch S_4 will be ON $(P_4 = 1)$ in the phase "a" leg of inverter.

If , $I_{Inva} > (I_{Inva}^* - h_b)$, then upper switch S_1 will be ON $(P_1 = 1)$ and lower switch S_4 will be OFF $(P_4 = 0)$ in the phase "a" leg of inverter.

where h_b is the width of hysteresis band. On the same principle, the switching pulses for the other remaining three legs can be derived.

III. Simulation Results

In order to verify the proposed control approach to achieve multi-objectives for grid interfaced DG systems connected to a 3-phase 4-wire network, an extensive simulation study is carried out using MATLAB/Simulink. A 4-leg current controlled voltage source inverter is actively controlled to achieve balanced sinusoidal grid currents at unity power factor (UPF) despite of highly unbalanced nonlinear load at PCC under varying renewable generating conditions. A RES with variable output power is connected on the dc-link of grid-interfacing inverter. An unbalanced 3-phase 4-wire nonlinear load, whose unbalance, harmonics, and reactive power need to be compensated, is connected on PCC. The waveforms

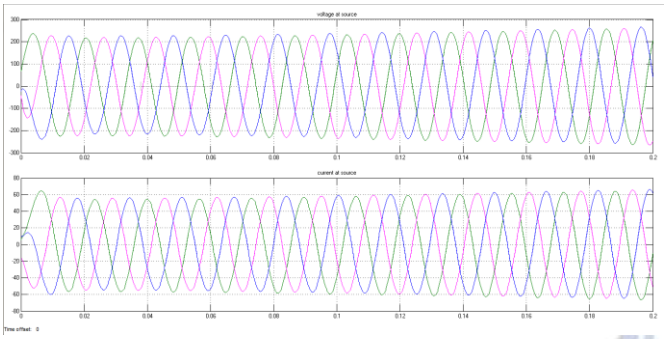

Fig.2(a). Grid voltage &current

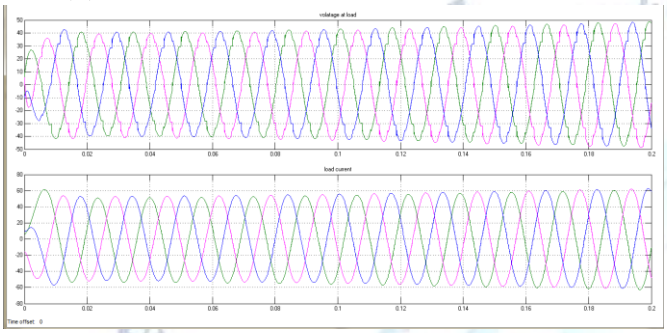

Fig.2(b). Unbalanced load voltage &current

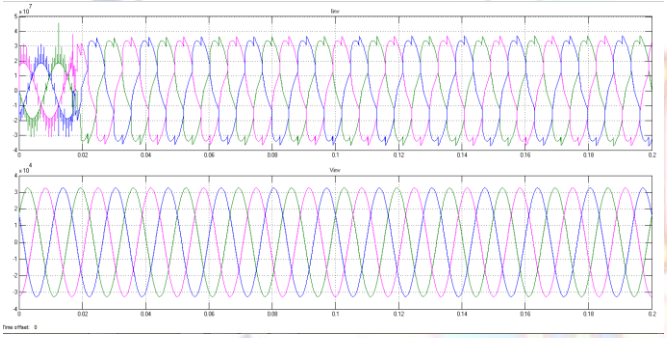

Fig.(c). Inverter voltage & current

of grid voltage (V_a, V_b, V_c), grid currents (I_a, I_b, I_c, I_n), unbalanced $(I_{la}, I_{lb} I_{lc}, I_{ln})$ load current and inverter currents are shown in Fig.2&3 The corresponding active-reactive powers of grid $(\bar{P}_{grid}, Q_{grid})$, load (P_{load}, Q_{load}) and inverter (P_{inv}, Q_{inv}) are shown in Fig.(1),(2)and(3) Positive values of grid active-reactive powers and inverter active-reactive powers imply that these powers flow from grid side towards PCC and from inverter towards PCC, respectively. The active and reactive powers absorbed by the load are denoted by positive signs.

Initially, the grid-interfacing inverter is not connected to the network (i.e., the load power demand is totally supplied by the grid alone). Therefore, before time $t = 0.72$ s, the grid current profile in Fig.(1).is identical to the load current profile of Fig. At $t = 0.72$ s, the grid-interfacing inverter is connected to the network. At this instant the inverter starts injecting the current in such a way that the profile of grid current starts changing from unbalanced non linear to balanced sinusoidal current as shown in Fig.(4)

As the inverter also supplies the load neutral current (I_n) demand, the grid neutral current becomes zero after t=0.02s

At t=0.02s the inverter starts injecting active power generated from RES P_{grid}. Since the generated power is more than the load power demand the additional power is fed back to the grid. The negative sign of P_{grid}, after time 0.02 s suggests that the grid is now receiving power from RES. Moreover, the grid-interfacing inverter also supplies the load reactive power demand locally. Thus, once the inverter is in operation the grid only supplies/receives fundamental active power.

At s, the active power from RES is increased to evaluate the performance of system under variable power generation from RES. This results in increased magnitude of inverter current. As the load power demand is considered as constant, this additional power generated from RES flows towards grid, which can be noticed from the increased magnitude of grid current as indicated by its profile. At s, the power available from RES is reduced. The corresponding change in the inverter and grid currents can be seen from Fig(1) The active and reactive power flows between the inverter, load and grid during increase and decrease of energy generation from RES can be noticed from Fig. The dc-link voltage across the grid- interfacing inverter during different operating condition is maintained at constant level in order to facilitate the active and reactive power flow. Thus from the simulation results, it is evident that the grid-interfacing inverter can be effectively used to compensate the load reactive power, current unbalance and current harmonics in addition to active power injection from RES. This enables the grid to supply/ receive sinusoidal and balanced power at UPF.

IV. EXPERIMENTAL VALIDATION

The performance of the proposed control approach is validated with the help of a scaled laboratory prototype that has system parameters as given in Table I. The RES is emulated

3-phase supply(rms)	: V_g=230v,60Hz.
3-phase non-linear load	: R=1KΩ,C=1μF
3-phase linear load	: nominal V=1000v, P_L=10KW
DC-link capacitor& voltage	: 1μF& V_{dc}=300v

using an auxiliary controlled converter, which injects varying active power at the dc-link of an insulated gate bipolar transistor (IGBT) based 4-leg voltage source inverter connected to grid. A 3-phase 4-wire nonlinear load, composed of 3-phase non-linear balanced load, 1-phase R-L load between phase a, b and c neutral and 1-phase non-linear load between phase and neutral, is connected to the grid. The total harmonics distortions (THDs) of phase a,b and c load currents are noticed as 14.21%, 22.93%, and 16.21%, respectively. The Pulse Width Modulation(PWM) is utilized to generate the reference grid current signals in real-time. The difference of reference and actual grid current signals is applied to external hysteresis board to generate the gate pulses for IGBT's. The proposed control approach requires a sampling time of 1s to execute the MATLAB/Simulink generated C-codes in real-time.

The experimental results are divided into three different modes of operation in order to highlight the validity of proposed controller. First mode of operation considers a situation when there is no power generation from RES. Under such condition, the grid-interfacing inverter is utilized as shunt APF to enhance the quality of power at PCC. While in second mode of operation, the inverter injects RES active power into grid and also incorporates the active power filtering functionality. In the third mode, the dynamic operation of proposed controller is examined. The experimental results are given in Figs. All the voltage and current waveforms are captured utilizing an oscilloscope, whereas, the active and reactive powers are captured in real-time using *Control Desk Developer* environment.

A. Mode of Operation—PQ Enhancement $(P_{RES} = 0)$

Fig. shows the experimental results for active power filtering mode of operation when there is no power generation from RES. All the current waveforms are shown with respective to grid side phase a voltage(V_a) . Fig.(4).shows the profile of the unbalance non-linear load currents. The grid current profile, when grid-interfacing inverter controlled as shunt APF, I shown in Fig. It can be noticed that the highly unbalanced load currents, after compensation, appear as pure sinusoidal balanced set of currents on grid side. The grid current THD's are reduced to 2.36%, 1.68%, 3.65% for a, b and c phases, respectively. In Fig. the compensating inverter currents are shown for each phase along with dc-link voltage. For the experimental study, the dc-link voltage is maintained at 300 V. . The load neutral current due to single-phase loads is effectively compensated by the inverter such that the current in grid side neutral conductor is reduced to zero.

A. Mode of Operation—PQ Enhancement $(P_{RES} = 0)$

Fig shows the experimental results for active power filtering mode of operation when there is no power generation from RES. All the current waveforms are shown with respective to grid side phase voltage . Fig. shows the profile of the unbalance non-linear load currents. The grid current profile, when grid-interfacing inverter controlled as shunt APF, is shown in Fig. It can be noticed that the

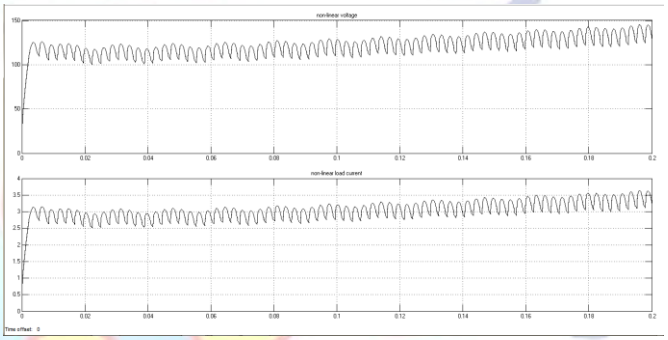

Fig.3. Non-linear load voltage & current

highly unbalanced load currents, after compensation, appear as pure sinusoidal balanced set of currents on grid side. The grid current THD's are reduced to 2.36%, 1.68%, 3.65% for and phases, respectively. In Fig. the compensating inverter currents are shown for each phase along with dc-link voltage. For the experimental study, the dc-link voltage is maintained at 100 V. Fig. shows the traces for neutral current of grid, load and inverter. The load neutral current due to single-phase loads is effectively compensated by the 4th leg of inverter such that the current in grid side neutral conductor is reduced to zero.

B. Mode of Operation—Simultaneous PQ Enhancement and $P_{RES} > P_L$

RES Power Injection The experimental results for simultaneous active power filtering and RES power injection mode are shown in Fig. In this case study it is considered that the generated power at grid-interfacing inverter is more than the total load power demand. Therefore, after meeting the load power demand, the additional RES power flows towards grid. The profiles of grid, load and inverter currents for individual phases are shown in Figs.

for phase a, b and c , respectively. As noticed from Fig. the inverter currents consist of two components: 1) steady-state load current component and 2) grid active

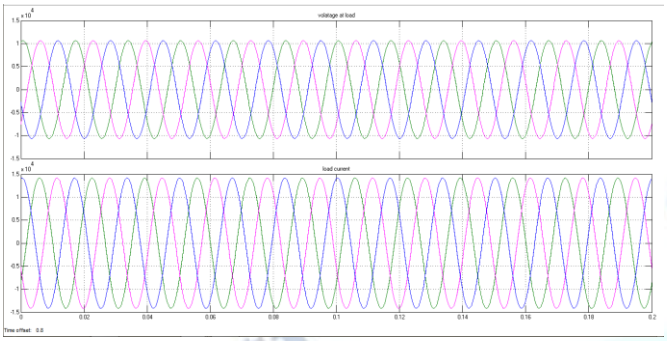

Fig.4(a). Balanced linear load

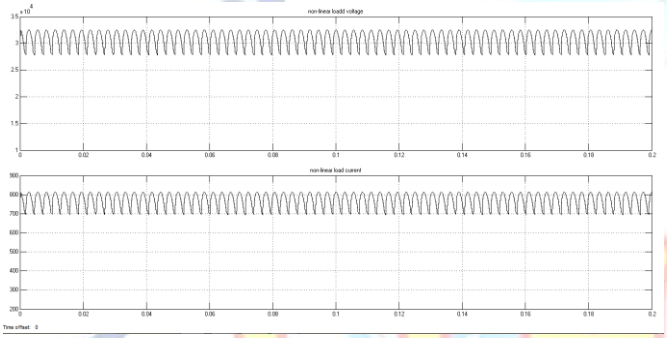

Fig.4(b). Balanced non-linear load

power injection component. Thus the grid-interfacing inverter now provides the entire load power demand(active, reactive and harmonics) locally and feeds the additional active power (sinusoidal and balanced) to the grid. The exact out-of phase relationship between phase— grid voltage and phase— grid current suggests that this additional power is fed to the grid at UPF. The three-phase grid currents (Fig. (1) suggest that the injected active power from RES to the grid is supplied as balanced active power even the load on the system is unbalanced in nature. During both mode of operation, as the load on the system is considered constant, the load neutral current profile and its compensation is identical to the one already discussed in previous subsection and can also be noticed from Figs.(4),(5)and(6).

The exchange of total active and reactive powers between grid, load and inverter are shown in Fig. The negative sign of total grid side active power demonstrates that the excess power generated by RES flows towards grid side. Thus, this case study demonstrates that the grid-interfacing inverter can simultaneously be utilized to inject power generated from RES to PCC and to improve the quality of power (current unbalance compensation, current harmonics compensation, load reactive power support, neutral current compensation) at PCC.

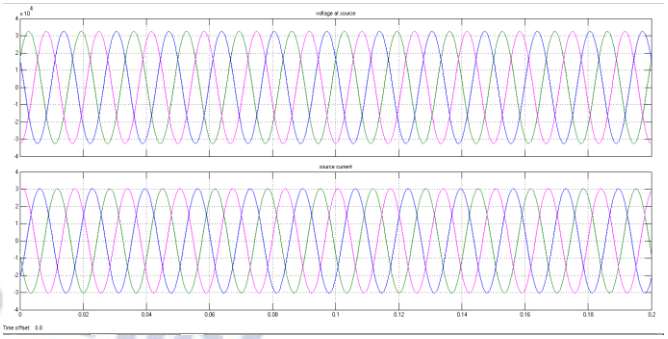

Fig.5(a).Balanced grid voltage &currents

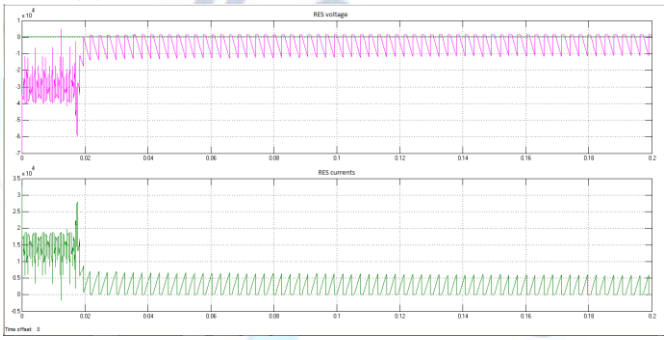

Fig.5(b).RES generated voltage &current

C. Dynamic Performance of Proposed Control Approach

Fig.8 shows the experimental results to validate the dynamic performance of proposed control approach under different modes of operation. Initially, it is considered that the system is working under mode-A operating condition (i.e., non-linear load current harmonics and reactive power compensation). After few cycles, the power at dc-link is initially increased and then decreased, which can be noticed from the amplitude of injected inverter current profile. The corresponding decrease (for increased power level at dc-link) and increase (for decreased power level at dc-link) in grid current magnitude can also be noticed from Fig, under constant load conditions. Thus, the proposed controller precisely manages any variation in real power at dc-link and effectively feeds it to the main grid. A smooth changeover from mode-A operating condition to the mode-B can be noticed from Fig.

V. CONCLUSION

This paper has presented a novel control of an existing grid interfacing inverter to improve the quality of power at PCC for a 3-phase 4-wireDGsystem. It has been shown that the grid-interfacing inverter can be effectively utilized

for power conditioning without affecting its normal operation of real power transfer. The grid-interfacing inverter with the proposed approach can be utilized to:

i) inject real power generated from RES to the grid, and/or,

ii) operate as a shunt Active Power Filter (APF).

This approach thus eliminates the need for additional power conditioning equipment to improve the quality of power at PCC. Extensive MATLAB/Simulink simulation as well as the DSP based experimental results have validated the proposed approach and have shown that the grid-interfacing inverter can be utilized as a multi-function device.

It is further demonstrated that the PQ enhancement can be achieved under three different scenarios: 1) $P_{RES} = 0$, 2) $P_{RES} < P_{Load}$, and 3) $(P_{RES} > P_L)$. The current unbalance, current harmonics and load reactive power, due to unbalanced and non-linear load connected to the PCC, are compensated effectively such that the grid side currents are always maintained as balanced and sinusoidal at unity power factor. Moreover, the load neutral current is prevented from flowing into the grid side by compensating it locally from the fourth leg of inverter. When the power generated from RES is more than the total load power demand, the grid-interfacing inverter with the proposed control approach not only fulfills the total load active and reactive power demand (with harmonic compensation) but also delivers the excess generated sinusoidal active power to the grid at unity power factor.

REFERENCES

[1] J. M. Guerrero, L. G. de Vicuna, J. Matas, M. Castilla, and J. Miret, "A wireless controller to enhance dynamic performance of parallel inverters in distributed generation systems," *IEEE Trans. Power Electron.*, vol. 19, no. 5, pp. 1205–1213, Sep. 2004.

[2] J. H. R. Enslin and P. J. M. Heskes, "Harmonic interaction between a large number of distributed power inverters and the distribution network," *IEEE Trans. Power Electron.*, vol. 19, no. 6, pp. 1586–1593, Nov. 2004.

[3] U. Borup, F. Blaabjerg, and P. N. Enjeti, "Sharing of nonlinear load in parallel-connected three-phase converters," *IEEE Trans. Ind. Appl.*, vol. 37, no. 6, pp. 1817–1823, Nov./Dec. 2001.

[4] P. Jintakosonwit, H. Fujita, H. Akagi, and S. Ogasawara, "Implementationand performance of cooperative control of shunt active filters for harmonic damping throughout a power distribution system," *IEEETrans. Ind. Appl.*, vol. 39, no. 2, pp. 556–564, Mar./Apr. 2003.

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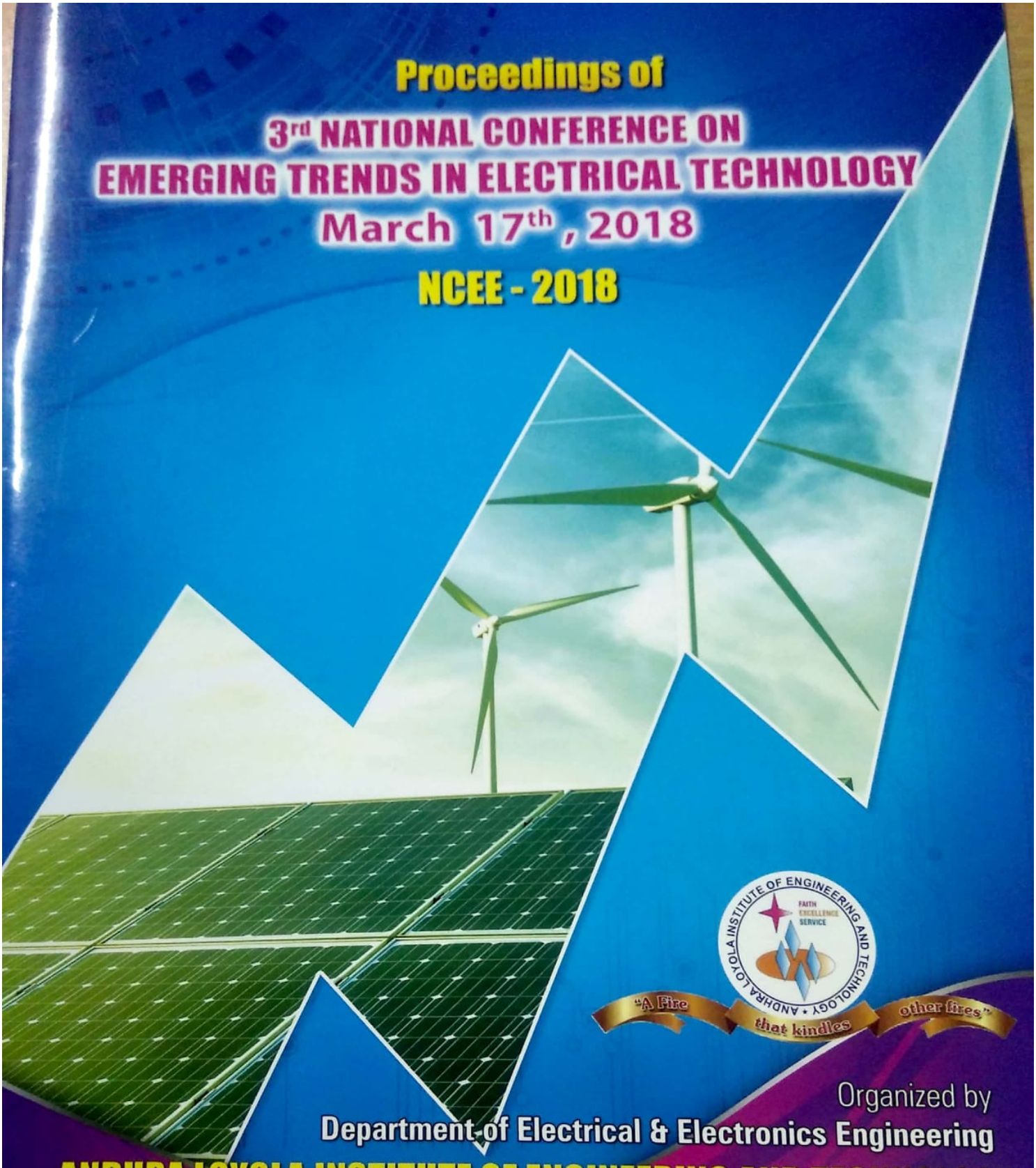

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CONTENTS		
Message from the Director		iii
Message from the Assistant Director		iv
Message from the Assistant Director		v
Message from the Principal		vi
Message from the Convener		vii
Committees		viii
1	**Fully Automatic Solar Grass Cutter Using Arduino.** *P. Abhinav Deep, Ch. Akash Babu and M. Siva Kumar*	1
2	**SVPWM Based Open Loop And Closed Loop V/f Control of Induction Motor** *K.Rajesh Babu, G.Anvesh Kumar, M.Naresh and B.Praveen kumar*	2
3	**Outline OF Energy Framework STABILIZER Utilizing ANFIS** *M. Vinod Kumar, B.M.V.Gowtham, N.Venkat Reddy and M.Ramakrishna*	3
4	**Stability Enhancement of Wind Power System with UPFC and Energy storage system** *B.Manohar, M.Hari Prasad and K.Mahesh*	4
5	**Under Ground Cable Fault Detection By Using Arduino** *V.Pranay Chowdary, CH.T.V.N.Manikanta, G.Anil Kumar and L.Karunakar*	5
6	**DFIG Wind Turbines With Super Capacitor Energy Storage for Constant Power Control** *L.Naresh, K.Avinash, P.Satya sravan and M.M.Karunakar*	6
7	**Power TransformerProtection using Fuzzy Logic based Differential Relay** *K.Shiney, N.Manaswini, V.Lakshmi keerthi, K.Nalini prasannaand A.Sai Sunil*	7
8	**Low frequency Oscillations Damping in SMIB System using Fuzzy based SSSC Controller** *S.Ramarao, K.Parasuram, M.Venkata vinay, G.Anjibabu and T.Krishna Mohan*	8
9	**Three Phase Boost Converter for Solar Battery Charging System by Using MPPT Technique** *Y.C.Ashok Kumar, A,Naga Phaneendra Kumar, P.malli Krishna Reddy and R.Anjaneyulu*	9
10	**Development of DC-DC Buck Converter Using Arduino** *A Sekhar Sai Sunil, R Naga Surya Teja, M AnjaneyaReddy and P V N D Sumanth*	10
11	**Arduino Based Sophisticated Home Automation System for Electrical Appliances Using GSM** *K Ganesh, M Ravi Chandra, P Raj Kamal, Y Leela Venkatesh and K Rajesh Babu*	11
12	**Grid Interconnection of Distributed Generation System with Power-Quality Improvement by using STATCOM** *Greeshma.Lanke, Revathi.Maddirala and Brahma Teja.Saketi*	12
13	**Distributed Power Flow Controller Based Stabilizer To Damp Power System Oscillations** *S.Siva Kumari, M.Shekinah and G.Sirisha*	13
14	**Control of Hybrid Micro Grid In Grid Tied Mode Using Z-Source Converter** *P.Jhansi, S.Jayasree, B.Ramya, J.Lakshimi Triveni and P.Swathi Mastan*	14
15	**Line Follower Based Smart Car** *K.L.N.Satish, T.TejaSai, S.K.Sai Krishna, G,Naveen Kumar, L.Karunakar*	15

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Line Follower Based Smart Car

K.L.N.SATISH[1] | T.TEJA SAI[2] | S.KARTIK SAI KRISHNA [3] | G.NAVEEN KUMAR[4] | L.KARUNAKAR[5]

[1,2,3,4]UG Scholar, Department of EEE, Andhra Loyola Institute Of Engineering And Technology , Vijayawada ,Andhra Pradesh ,India
[5] Assistant Professor, Department of EEE, Andhra Loyola Institute Of Engineering And Technology , Vijayawada, Andhra Pradesh ,India

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ABSTRACT

The main aim of this project is to transport human beings without any need of driver and to travel quickly. The line follower robot is a mobile machine that can detect and follow the line drawn on the floor. And the opposite vehicles are sensed by obstacle sensor. Charging for this vehicle is Witricity concept. this robo can charge without any electrical contact which works on induction principle well known as wireless charging .As well as this vehicle is also controlled by mobile platform through Blue tooth by using android application in that we can control the car over a range of 100 meters by switching on the Blue tooth in mobile by simply giving the commands in app

KEYWORDS: *Arduino UNO,Infra Red Sensor, Ultra Sonic Sensor, Blue tooth module ,Witricity.*

I. INTRODUCTION

The smart car has 2 modes

They are

1 Automatic mode

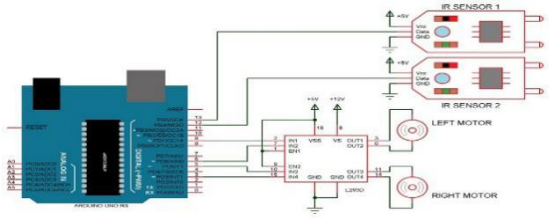
{ line follower robot}

2 Manual mode

{App controlled smart car through Blue tooth}

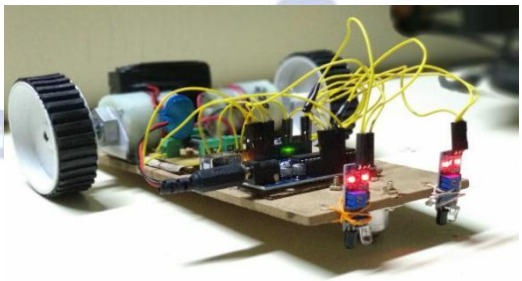
1AUTOMATIC MODE:

A Line Following Obstacle Avoiding Robot is a Robot (usually a vehicle) which have both the characteristics of LFR and OAR i.e., it follows a programmed path (usually a black line) and avoids any obstacle on the way.



Line Following Robot:

LFR is a robot (usually a vehicle) which follows a distinguished coloured path (usually a black lined path). It consists of several electronic components which makes it follow (usually with tires) a programmed path. The main component of such robot is a micro controller which is the brain of the robot.



. OBSTACLE AVOIDING ROBOT

OAR is a robot (usually a vehicle) which follows a straight path but if any obstruction is

present/introduced in its path then the robot avoids its collision with the obstruction (usually by stopping before the obstruction or by changing path).

It consists of several electronic components which makes it follow (usually with tires) a programmed path and avoid collision.

The main component of such robot is a micro controller which is the brain of the robot.

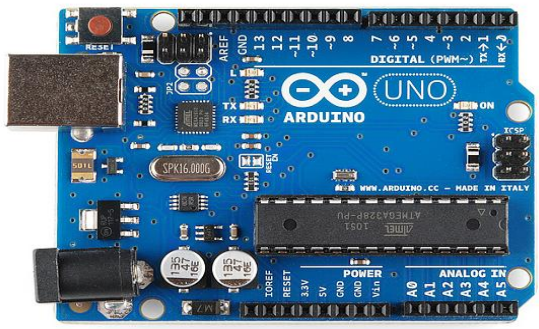
II. COMPONENTS

- Arduino uno
- Infra red Sensor Module
- Ultrasonic Sensor
- Motor Driver Module L293d
- Geared Motor 150 RPM

ARDUINO UNO

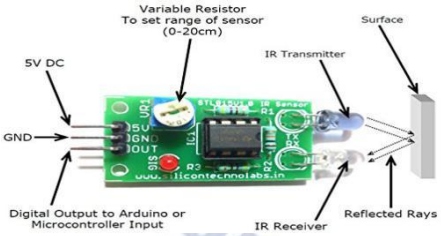
Arduino is an open-source prototyping platform based on easy-to-use hardware and software. Arduino Boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online.

You can tell your board what to do by sending a set of instructions to the micro controller on the board. To do so you use the Arduino Programming Language (based on Wiring), and the Arduino Software (IDE), based on Processing.



IR SENSOR:

- An IR sensor is a device which detects IR radiation falling on it.
- There are numerous types of IR sensors that are built and can be built depending on the application.
- An IR sensor is basically a device which consists of a pair of an IR LED and a photo diode which are collectively called a photo-coupler or an opto-coupler.
- The IR emitter LED emits IR radiation and IR detector receives it after the radiation is reflected from a surface.
- The radiation will not reflect from dark surface as dark surface absorbs the radiation and this concept is used in line following robot.



ULTRA SONIC SENSOR:

Ultrasonic transducers are transducers that convert ultrasound waves to electrical signals or vice versa. Those that both transmit and receive may also be called ultrasound transceiver.

Active ultrasonic sensors generate high-frequency sound waves and evaluate the echo which is received back by the sensor, measuring the time interval between sending the signal and receiving the echo to determine the distance to an object.

Passive ultrasonic sensors are basically microphones that detect ultrasonic noise that is present under certain conditions, convert it to an electrical signal, and report it to a computer

The sonic waves emitted by the transducer are reflected by an object and received back in the transducer.

After having emitted the sound waves, the ultrasonic sensor will switch to receive mode. The time elapsed between emitting and receiving is proportional to the distance of the object from the sensor.

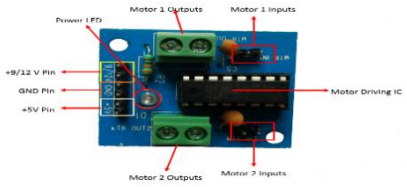
This concept is used in obstacle avoiding robot, when ultrasonic sensor detects any obstruction in the programming specified range then the robot stops moving.

MOTOR DRIVER MODULE:

L293D is a typical Motor driver or Motor Driver

IC (used to build the module) which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC.

The L293D works on the concept of typical H bridge, a circuit which allows the high voltage to be flown in either direction. In a single L293D IC there are two H-bridge circuits which can rotate two DC motors independently.



The module consists two pair of pins for connecting the two motors, a Vcc to supply high current, a GND for negative terminal and also 4 pins for controlling the two motor. The motor driver consists of 4 pins p1, p2, p3 & p4 (which is input to module & output from arduino). If pin p1 is active (having value 1 and other pins having value 0) motor M1 rotates clockwise, if p2 then motor M1 rotates anticlockwise, if p3 then motor M2 rotates clockwise, if p4 then motor M2 rotates anticlockwise.

MANUAL MODE:

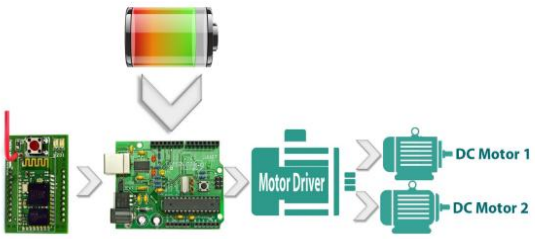
Android controlled arduino robot car make use of an Android mobile phone for robotic control with the help of HC-05 Bluetooth technology. In this mode of project is a bluetooth controlled robot. For this the android mobile user has to install an application on her/his mobile. Then user needs to turn on the bluetooth in the mobile. The wireless communication techniques used to control the robot is bluetooth technology

User can use various commands like move forward, reverse, stop, move left, move right.

These commands are sent from the Android mobile to the bluetooth receiver which is interfaced with the Arduino robot.

Android based robot has a HC-05 Bluetooth receiver unit which receives the commands and give it to the micro controller circuit to control the motors.

The micro controller then transmits the signal to the motor driver IC's to operate the motors.



COMPONENTS:

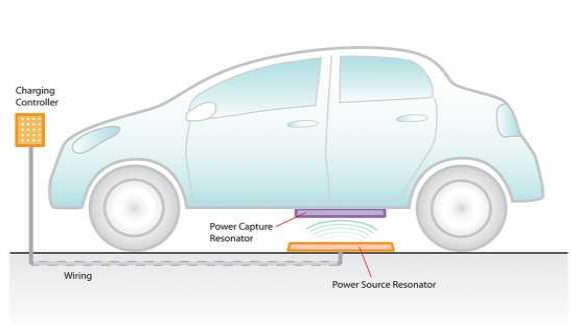
Arduino uno
Blue tooth module HC 05
Android mobile phone
Motor driver L293d
Motors 150 rpm DC

BLUETOOTH MODULE:

- HC-05 module is an easy to use Blue tooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection set up.

WITRICITY CHARGING:

- This smart car is charged through the witricity concept



- Witricity is wireless power transmission system,used to transfer the power from the transmitting coil to receiving coil through mutual induction principle

III. CONCLUSION

This car can transport humans safely without a driver in automatic mode and quickly . easy to operate in manual mode and their is no risk of electric shock while charging through witricity

REFERENCES

1.M. Zafri Baharuddin, "Analyst of Line Sensor Configuration for Advanced Line Follower Robot", *University Tenaga Nasional.*
2.http://developer.android.com/guide/topics/wireless/bluetooth.html
3.Andre Kurs, Aristeidis Karalis, Robert Moffatt, J. D. Joannopoulos, Peter Fisher, Marin Soljacic, "Wireless Power Transfer via Strongly Coupled Magnetic Resonances", *Science Express on*, vol. 317, no. 5834, pp. 83-86, June 2007.
4.www.instructables.com