

Vision	MISSION
<p>We envision the Department as one of the best in the region with a stimulating environment to make an impact on and lead in the field through its Education and Research.</p>	<p>The mission of the Department is to provide an excellent and comprehensive education in the field of Electrical & Electronics Engineering which in turn moulds the students for a wide range of careers and to exhibit a high level of professionalism, ethical behavior and social responsibility.</p>

ARTICLE

1. Electrical Vehicles -Dr.P.Gopi

India’s first electric bus was launched in Bangalore in 2014. Ashok Leyland launched its electric bus in October 2016. Tata Motors launched its pure electric bus ‘Starbus Electric 9m’ and hybrid ‘Star Bus Electric 12m’ in January 2017. Goldstone Infratech supplied Himachal Pradesh Transport Corporation with 25 electric buses in September 2017. 25 Tata Starbus Hybrid electric buses were delivered in Maharashtra in March 2018. India’s 1st intercity electric bus is inaugurated on 5th September which is operated between Mumbai and Pune by MSRTC.

History of Electric Vehicle:

Indian Railways has a long history of electric locomotives, with their first use in 1925. On 31st March 2017, government announced that the entire rail network in the country will be electrified by 2022. Indian Railways has successfully tested solar-panel mounted trains. Power generated from these solar panels will be used for the lights and fans inside the train.

India unveiled the ‘National Electric Mobility Mission Plan (NEMMP) 2020’ in 2013 to address the issues of National energy security, vehicular pollution and growth of domestic manufacturing capabilities. Reiterating its commitment to the Paris Agreement, the Government of India has plans to make a major shift to electric vehicles by 2030. E-commerce companies, Indian car manufacturers like Reva Electric Car Company (RECC), and Indian app-based transportation network companies like Ola are working on making electric cars more common over the next two decades. Apart from this, start-ups like Oculus Auto are working on making electric three wheelers more common over the coming years. Energy Efficiency Services Limited (EESL), a joint venture of PSU’s of Ministry of Power, Govt. of India is leading the procurement and sale of Electric Vehicles in India.

A Motor Vehicles (Amendment) Bill was passed by the Parliament in 2015, which established battery-powered e-rickshaws as a valid form of commercial transport in India. With their small size and small turning radius, E-rickshaw is

already a popular mode of transport in Delhi-NCR, particularly in small lanes and congested areas. The companies like Oculus Auto, Mahindra have launched electric auto rickshaws in India. Hybrid cars are available in various types depending upon its combination of power supply form battery and petrol. In 2015, Bangalore based Lithium Technologies launched a fully electric taxi service for corporates. In June 2017, Bangalore based logistic group Baghirathi Travel Solutions is one of the EV fleet Transport company. In January 2019, Blu-Smart mobility launched all-electric cab service in Delhi-NCR with a fleet of 70 Mahindra eVerito cars.

It has plans of expansion to 400 cars by March 2019. Also, it has planned to set up a massive charging infrastructure comprising 65 stations. Each station will have the capacity to charge up to 20 vehicles at a time, with 20 charging points. The company has also ensured there will be a charging station within every five kilometer of radius. The company also has plans for Tata Tigor electric, Nissan Leaf, BMW i3 and Tesla 3 in their fleet. So far the company is running only 10 cars in Delhi NCR and not a single charging station has been installed.

The promoters do not intent to increase number of fleets post automobile industry’s massive losses that has hit market as well as production values.

The charging infrastructure for electric vehicles in India has not been fully developed yet. There have been initiatives to set up community charging stations, as in the case of Plugin India facilitated charging stations. News reports have indicated about plans to provide solar-powered charging points at the existing fuel stations of the country.

Charging infrastructure, mainly setting up of level 2 charging at public level shall be the toughest challenge in terms of service integration for India. For normal charging, the charging time poses a serious problem as it ranges from 6 to 8 hours whereas for fast DC charging; cost and high renewable energy are the biggest factors which could pose a problem.

On 22th May 2018 Ather Energy launched its charging infrastructure service in Bangalore called Ather Grid, with each charging station called 'Point'. The service is open to all electric vehicles but has been deployed where Ather plans to launch its own electric scooter. The cost of EVs is very high mainly due to the cost of Li-ion cells. The battery packs are imported and cost a lot,

Lack of renewable energy and grid infrastructure: In India electricity is mainly produced by burning coal, which produces a great amount of greenhouse emissions. With the introduction of EVs and charging infrastructure, the electricity demand will go up a lot and the whole point of introducing EVs to reduce GHG emissions would be ineffective, if all this electricity was produced by burning coal. Moreover, India's Distribution companies hold debts and are unable to suffice the energy requirement of the whole country adequately. If EVs were to enter this equation, the sudden increase in electricity requirement would put extra load on these companies. Moreover, there are a lot of factors that would go into deciding pricing of the electricity as well the demand on the grid.

Reasons for the shift to clean mobility: Air quality indices related to India indicate that the air in many cities of India is no longer healthy. Automobile related pollution has been one of the causes for this.

Aspects related to global warming needs a shift to automobile solutions that reduce / do not produce greenhouse gas emissions.

The need to reduce dependency on a fossil-fuel based economy. India's crude oil imports for 2014-15 was 112 billion dollars (approximately 7,00,000 crore rupees). For comparison, the allocation for the Mahatma Gandhi National Rural Employment Guarantee Scheme, in budget 2017-18, is 48,000 crore rupees.

India can become a global provider for clean mobility solutions and processes that are affordable and scalable.

People living in some Indian cities are being affected by noise pollution. Some of the Indian cities have the worst noise pollution levels in the world. Electric vehicles may contribute to a reduction in noise pollution levels in the cities. Energy efficiency and emission reduction has improved in automobiles. Yet, the growth in total number of vehicles on road, and the resulting total pollution and total energy consumption removed all gains made by betterment in energy efficiency and emission reduction by automobiles.

Energy efficiency measures and pollution control measures did not keep pace with the sales growth in vehicles. The total number of vehicles registered in India has been 5.4 million, 11 million, 33 million, 40 million and 210 million in the years 1981, 1986, 1996, 2000 and 2015. This indicates a 3500+ percentage growth in the total number of vehicles between 1981 and 2015. The total number of vehicles sold in India increased between 1,54,81,381 in 2010-11 and 2,04,69,385

in 2015-16 indicating a 30+ percentage growth in this five year period.

Initiatives of Government of India: The Government started Faster Adoption and Manufacturing of Hybrid and Electric vehicles (FAME) scheme which provides incentives for purchasing electric vehicles. Government is releasing tenders to increase charging infrastructure in the country. Karnataka approved Electric Vehicle and Energy Storage Policy 2017. The vehicle is covered under Government of India's FAME-India (Faster Adoption and Manufacturing of (Hybrid /) Electric Vehicles) scheme that offers incentives to the electric and hybrid vehicles ranging from Rs.1,800 to Rs.29,000 for scooters and motorcycles and Rs.1.38 Lac for cars. FAME is a part of National Electric Mobility Mission Plan by Government of India. Recently,

On 14th December 2018, the government also released a document which outlines the standard and guidelines for EV Charging infrastructure. Beyond the specifications of the charging infrastructure, the guidelines also required a charging station to be present every 25 km along a road/highway.

Future Planning on EVs in India: The government has now decided to focus on the segment below cars: two-wheelers, where sales are much higher, and three-wheelers (largely auto-rickshaws). In the financial year that ended in March, about 3.4 million passenger cars were sold in the country against 21.2 million two-wheelers, according to data released by Indian automobile manufacturers. The number of three-wheelers sold totalled 0.7 million. The new proposal is to have only electric three-wheelers operating in the country by 2023, and only electric two-wheelers by 2025. The government seems to have two dominant objectives - to control pollution and take the lead in an emerging industry.

India wants to become a "global hub of manufacturing of electric vehicles", Finance Minister Nirmala Sitharaman said in her budget speech earlier this month. The Economic Survey, a government forecast, released a day before the budget envisaged an Indian city possibly emerging as the "Detroit of electric vehicles" in the future. But it will be a challenge to create a competitive advantage in electric vehicle manufacturing, or even a market for them, given that India does not have the infrastructure or deep pockets that the world's current leader in electric mobility, China, has. China is the world's largest electric vehicle market. It has the world's largest network of charging stations for such vehicles and is also the world's largest manufacturer of batteries. And according to recent figures, sales of New Energy Vehicles (NEVs) - including electric and hybrid models - increased substantially in 2018 in China.

Project
2.Spy Robot with Arduino for Multi-Purpose Applications -Mr. K. Hari-nath Reddy, C. Hemanth, D. Jayanthi, S. Mamatha

Abstract: The project is designed to develop a surveillance robotic vehicle using Internet of Things (IoT) technology for remote operation attached with wireless camera for monitoring purpose. The fundamental goal behind building up this robot is for the observation of human exercises in the war field or fringe areas so as to decrease invasions from the adversary side. The robot will fill in as a suitable machine for the safeguard segment to decrease the loss of human life and will likewise counteract illicit exercises. In this project work, Arduino IDE based spy robot platform with monitoring and control algorithm through Internet of Things (IoT) has been developed which will reduce man power. The spy robot comprises the Arduino, camera, Wi-Fi module, Gas Sensor and Temperature sensor. The web server and camera capture the moving object which is posted simultaneously. It also sends the information which is sensed by the sensor. It can receive the formation in both Digital and Analog. The user in control room able to access the robot with control buttons on the mobile app. The surveillance system using spy robot can be customized for various fields like industries, banks, and shopping malls.

INTRODUCTION :

The task will be engaged for the advancement of aeronautical administration robots whose fundamental advances can be adjusted with insignificant endeavors to help people in a wide cluster of utilizations requiring the ability to interface with condition. To prove the viability of the concept, the specific end-user applications will be addressed and prototypes of aerial service robots able to meet the end-user expectations will be developed.

It can be used in many ways in many applications. For example, we can use this robot in industrial purpose. Whenever any harmful gases are released in the industries, it is harm to send the human being to get the information. So we can send this robot to that harmful place to get the information about temperature, gases released and we can also monitor the situation. The realize above standards some technical improvement along with the need of high performance robot is required to create a faster, reliable, accurate and more intelligent robot which can be devised by advanced control algorithm, we can control devices and motor drivers.

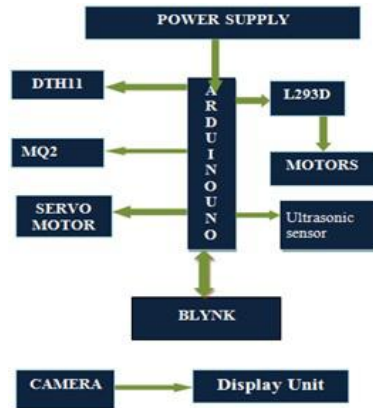
Prior the robots were controlled through wired systems however at this point to make robot more clients well disposed, they are surrounded to make client instructed work. Hence to accomplish the prerequisites we can utilize android as a mixed media to control the easy to understand robot. Apply autonomy is the part of mechanical building, electrical building and software engineering that manages the plan, development, task and use of apply autonomy, just as PC frameworks for their control, tactile input and data handling.

The point of building up an innovative innovation achieves fast innovation, propelled ability to control the robots and to gadget new strategies for control hypothesis. The acknowledgment of above guidelines some specialized improvement

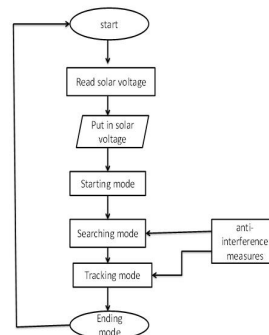
alongside the need of elite robot is required to make a quicker, solid, exact and progressively astute robot which can be formulated by cutting edge control calculation, robot control gadgets and new drivers.

Existing system: In past innovations different structured brilliant homes make utilization of Wi-Fi empowered robot for different applications. Generally they are utilized for home security reason. Subsequently one can watch out for the general population coming inside home just by the robot vehicle just by bringing a camera into it. Different other application are additionally done by this robot vehicle like doing different chips away at the order ex-exchanging on the lights when the robot is given direction by the Wi-Fi empowered gadget.

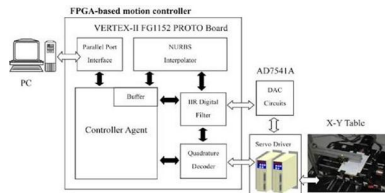
Proposed Systems: The rover can be easily moved from one place to another just by a single device. Rover can be used for security purpose with the installation of a camera. We can make the Robot to perform different task like moving the robot from one place to another without applying any physical force. And we can also get the information of temperature and gas leakages in industries by connecting the rover to temperature and gas sensor. And we can also connect may other sensors and according to the required application.



II. COMPONENTS REQUIRED: 1. Arduino 2. Temperature and Humidity Sensor 3. Gas Sensor 4. Ultra sonic Sensor 5. IC Driver board- [1] 6. Gear motors- [2] 7. Servo motor 8. Batteries 12v- [2] 9. USB Camera 10. Connecting



wires



IV. RESULT: By this robot, we can get the visuals through camera. With the help of wireless camera we are able to view the things that are happening in the area where the robot is hidden. Not only camera, we can also get the temperature and gas values. For the safety of the robot we have also placed the Ultra sonic Sensor. While motion, if the robot goes near to any kind of object, then the sensor gives the distance values in centi meters. There is an servo motor to change the directions of the ultra sonic sensor, so that we can get the information of the objects around the robot. We can send voice messages to it and we can also receive the voice messages through the camera. The robot will move based on the motor direction depending upon the input we give through command. By keeping the circuit simple, most users will be able to use it easily.

CONCLUSION The surveillance is always has been a quite sensitive task. And it includes so many risks. So it's better to use robot for this job instead of people. And if you are able to control the robots with efficiency and accuracy then you can guarantee yourself with good results and success.

This system is a good step for secure surveillance using robots. Wireless control is one of the most important basic needs for all the people all over the world. With the help of the camera we are able to view the things that are happening in the surrounding area where the robot is hidden. By keeping the circuit easy and simple, most users will be able to use it easily. Thus we should be able to manipulate its path when necessary, to create the robot safely.

By using these signals encoding is done and signal is sent through the transmitter. At the receiver end these decoded signal are given as input to drive the motor.

Article

3.Assessment of power quality issues in real time distribution feeder-Mr. P. Suresh Babu

Abstract: Power quality issues are measured in a real time distribution feeder through power quality analyzer. Demonstrate the effects of Power quality issues at normal and abnormal load condition for the sudden heavy current changing loads Assessment has been done for PQ issues with the help of several suitable mitigating methods. Neutral current reduction from unbalance to balance load sharing and power factor improvement, are done by installing automatic power factor

correction (APFC). The PQ issues owing to current varying load are mitigated by custom power devices. And finally, improved distribution static compensator (D-STATCOM) are installed in distribution feeder to minimize all PQ issues. The output results are validated with the PQ analyzer measured values as well as in MATLAB/Simulink platform.

1. Introduction The power quality (PQ) issues are induced either on the load or supply side of the distribution system. Loads based power quality issues owing to electric arc furnaces, resistance welding etc. Adjustable Speed Drive (ASD) alters the load current consisting of harmonics, reactive power component of current, neutral current, unbalanced currents, DC offset. These power quality issues affect the performance of other connected loads and equipment such as transformers, protection and control devices in the distribution system which are mitigated by selecting a suitable compensation scheme.

The various parameters are measured in selective locations for analyzing the power quality issues in the feeder using power quality analyzer. The effects of PQ issues such as in-rush current and transients occurs, when a high capacity motor or a non-linear load come into operation and voltage disturbances have an effect of rapid change in active and reactive powers. It disturbs the production process with considerable financial loss.

A load that has sudden and significant variation causes voltage fluctuation and harmonics in the distribution system. Load such as arc welding, arc furnace, variable speed drives and steel and paper plant rolling mill produces significant load current variation which results in severity of voltage flicker.

Single phase ac-resistance welding machine is utilized to measurement the severity of flicker and current unbalances. During welding, the voltage across arc varies as the length of the arc varies with a randomness. It induces instantaneous fluctuations with rapid and large variations in amplitude of active and reactive powers causes the phenomenon of voltage flicker.

Resistance welding currents have low frequency oscillations with a wide band of harmonic spectrum with the presence of inter harmonics and causes disturbance in the low voltage distribution system.

To limit the effects of these fluctuation loads, custom power devices have to connected at the point of common coupling (PCC). Flicker mitigating devices can be connected in shunt, series or in the combination of both.

The distributed static compensator has the ability to compensate the reactive power and power quality control in distributing systems.

The D-STATCOM is a voltage source converter (VSC) based custom power devices used for the enhancement of power

quality because of its quick response, high reliability and economical cost.

In this research, measurements of various power quality issues are realized, using the power quality analyzer and they are accessed by using D-STATCOM. Numerous topologies for D-STATCOM are presented as a comprehensive study. Several control techniques and topology of D-STATCOM were presented for power quality enhancement in the three phase, three-wire and four-wire distribution networks. Different inverter topologies for D-STATCOM have been demonstrated and compared on the performance basics. The proposed D-STATCOM can compensate voltage sags and voltage flicker, during voltage disturbances.

2. Real time power quality measurement in practical distribution feeder Power system parameters are measured from distribution feeder through PQ analyzer by connecting the voltage and current probes at selected location. Current connections are realized by taking into account the direction of the current passing through the conductor and by connecting it in a way that current sensors encircle the conductor. The current sensor probes can be easily installed in the network, without making any damage in the circuit. RMS deviations have been measured separately for the three-phase voltage and current signals at the measurement locations. Frequency measurements have been obtained from each phase of the voltage quantity. PQ disturbances that occur in voltage have been determined for three phase voltages. For harmonics measurements, upto 50th harmonic components have been measured for each phase along with voltage and currents. For the measurements of power components, active power variations, reactive power variations and power factor variations on each phase are measured. The real-time measurement data has been recorded in a 10-minute time interval as per the standards.

Thus, a more productive usage of the data has been achieved. The measurement results illustrate the various PQ issues obtained in Pondicherry Engineering College(PEC) distribution system which are presented in the following sections.

3. Conclusion This chapter presents the real-time power measurement of the Indian distribution system based on the data collected from the feeder. The collected data was utilized to find the occurrences of various power quality issues in the distribution system. Unbalance loading condition, underground cable leakage and improper grounding are identified and rectified. The excessive neutral current magnitude is mitigated from 49Amps to 0.9Amps by balance load sharing, proper grounding and replacing of aged power cables. As a special case, the welding load was considered as main source of the flickering in the system. By proposing a control algorithm, it is possible to exchange the mode of operation from CCM to VCM. A novel D-STATCOM with proposed controller will effectively mitigate all PQ related

issues. The output results validate the significant of proposed D-STATCOM in MATLAB/Simulink platform

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Article

4. Solutions for Today's Energy Needs

Overview : Solar energy is the cleanest, most abundant renewable energy source available. The U.S. has some of the world's richest solar resources. Today's technology allows us to harness this resource in several ways, giving the public and commercial entities flexible ways to employ both the light and heat of the sun. There are three primary technologies by which solar energy is commonly harnessed: photovoltaics (PV), which directly convert light to electricity; concentrating solar power (CSP), which uses heat from the sun (thermal energy) to drive utility-scale, electric turbines; and heating and cooling systems, which collect thermal energy to provide hot water and air conditioning. Solar energy can be deployed through distributed generation, whereby the equipment is located on rooftops or ground-mounted arrays close to where the energy is used. Some technologies can be further expanded into utility-scale applications to produce energy as a central power plant. Each of the various PV technologies have unique cost and performance characteristics that drive competition within the industry. Cost and performance can be further affected by the PV application and specific configuration of a PV system.



CONCENTRATING SOLAR POWER Concentrating solar power (CSP) plants use mirrors to concentrate the sun's thermal energy to drive a conventional steam turbine to make

electricity. The thermal energy concentrated in a CSP plant can be stored and used to produce electricity when it is needed, day or night. Today, over 1,400 MW of CSP plants operate in the U.S., and another 340 MW of CSP projects will be placed in service within the next year. The two commercialized CSP technologies are Power Towers and Parabolic Troughs. Other CSP technologies include Compact Linear Fresnel Reflector (CLFR) and Dish Engine. CSP specific conditions to produce power, such as areas where direct sunlight is most intense (e.g., the U.S. Southwest) and contiguous parcels of dry, flat land.



SOLAR HEATING AND COOLING

Solar heating and cooling technologies collect thermal energy from the sun and use this heat to provide hot water and space heating and cooling for residential, commercial and industrial applications. There are several types of collectors: flat plate, evacuated tube, Integral Collector Storage (ICS), thermosiphon and concentrating.

These technologies provide a return on investment in 3-6 years. Water heating, space heating and space cooling accounted for 69 percent of the energy used in an average U.S. household in 2005 – representing significant market potential for solar heating and cooling technologies. For example, solar water heating systems can be installed on every home in the U.S., and a properly designed and installed system can provide 40 to 80 percent of a building's hot water needs. Similarly, solar space heating and cooling systems circulate conditioned air or liquid throughout a building using existing HVAC systems, without using electricity.

Project

5. IOT Based Smart Circular System Using Voice Recognition S. S. Deekshit, Navya Sree, poorna Sai

Abstract :

This Work focuses on design of smart circular system (SCS) using internet of things (IoT), which is used for digital displaying. The digital notice boards have more advantages than conventional one such as paperless, printer less and less manpower. SCS is capable of recognizing the voice as well as text given at sending end and displaying it on the notice board. Here the data is transmitted through wireless medium and displayed it on the corresponding places like

classroom, lecturer hall and some other places. This system is very useful and more accurate information communicating systems in today's busy world.

Keywords: Smart circular systems, IoT, digital notice board, analog notice board, microcontroller

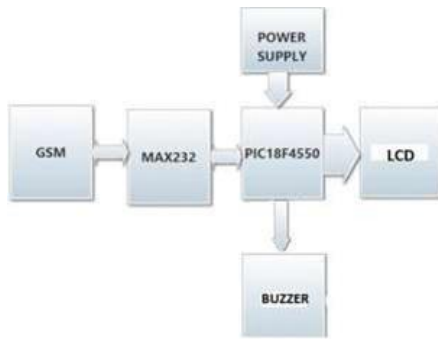
I. Introduction Notice boards are commonly used in variety of institutions which we come across in a daily basis. In the present generation the advertisement notice boards are being managed manually. This process is difficult to involve in order to putting a notices on the notice board. This waste a lot of things like paper printer ink, manpower and also brings the loss of time. Educational institutions, and other organization use circulars and notice boards for conveying information to the employers and students.

This methodology takes additional time. The problems faced by the wooden or conventional type notice boards are resolved by the implementation of our digital notice board. It will bring an advanced means of passing notices around the world in a much easier and efficient way. Due to the popularity of internet, we choose internet as a medium for transferring information. In conventional analog type notice boards, paper is the main medium for information exchange.

The information displayed on notice boards due to non-eye catching notices. educational institutions, the organization use circulars and notice boards for conveying information to the students. This methodology takes additional time for updating also many students may not be aware.recognition. The messages to be displayed are sent over android phone based voice recognition app to microcontroller[viii,ix,x]. Microcontroller decodes the message and sends over IoT (WiFi) network to two receiver modules that are kept 100meters apart. We have options of sending messages simultaneously or selectively to individual receivers. Upon receiving the message it will be scrolled on LCD displays connected to receivers.

The main controlling device of the whole system is a Microcontroller. WiFi and Bluetooth modem and buzzer are interfaced to Microcontroller. The message sent through predefined application from user Android mobile phone is received by the Bluetooth modem. Bluetooth modem feeds this information to microcontroller which process it and displays it on the LCD display. Also, the Microcontroller horns a buzzer for every new message. To perform this intelligent task, Microcontroller is loaded with an intelligent program written using embedded 'C' language[xi,xii].

I. Smart Circular System The main function of the proposed system is to develop a Digital notice board that display message sent from the user through internet and to design a simple, user friendly system, which can receive and display notice in a particular manner with respect to date and time which will help the user to easily keep the track of notice board every day and each time he uses the system. The block diagram of SCS was shown in fig.1.



The problems faced by the wooden or conventional type notice boards are resolved by the implementation of our digital notice board[i-iv]. It will bring an advanced means of passing notices around in the world in a much easier and efficient way. Due to the popularity of internet, we choose internet as a medium for transferring information. In conventional analog type notice boards paper is the main medium for information exchange. We know that information counts are endless. So there is a usage of huge amount of paper for displaying those endless counts of information. Designing a LCD based scrolling message display controlled from an Android mobile phone over IoT and Bluetooth voice recognition[v-vii]. The proposed system makes use of IoT and Bluetooth technology to communicate from Android phone to LCD display board with voice System consist of two section called as sender and receiver, which shown in the figure Sender is responsible for sending valuable information through the wireless network.

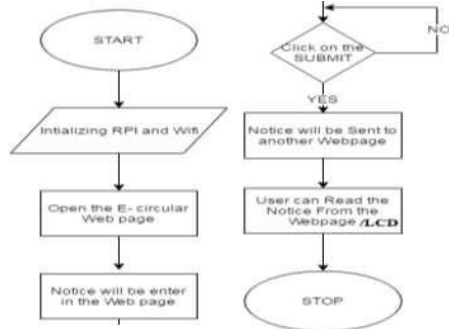
In order to access Digital notice board the sender must enter into the corresponding web address. For preventing unauthorized access web address we provide security authentications like username and password. If the username and password entered are invalid then the user can't access the digital notice board. When the user enter correct password and user name web address will opened and get space for the information transmission. User can access this web address either using personal computer or mobile phone.

To make the proposed system more user friendly we make an android application. By using this application sender can directly enter into the web address. In addition to this android application contain voice to speech converter. So the sender can send text message through his own voice without typing messages. These messages including text file, image file and pdf file will send to the cloud. In the simplest terms, cloud means storing and accessing data and programs over the Internet instead of our computer's hard drive. The cloud is just a metaphor for the Internet.

In receiver section, Microcontroller is connected on Wi-Fi for accessing internet. The Microcontroller is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It's capable

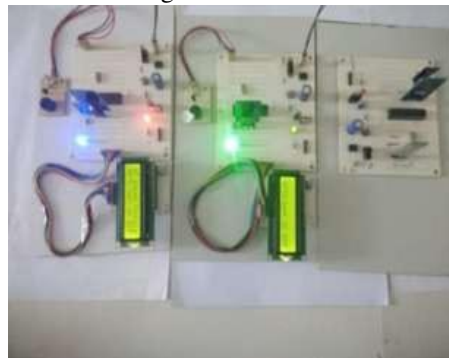
of doing everything you'd expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spreadsheets, word processing.

II. Algorithm Flowchart Algorithm: Step – 1: Initialize Raspberry Pi, WIFI. Step – 2: open the E- circular webpage and Enter the Notice and click the submit option. Step – 3: notice can be display class room monitor on a webpage using a WIFI and also diplay on LCD also. Step – 4: System operates until it goes power off.



Flowchart: The flowchart of this paper is shown in below Fig.

III. Results A. Results: Smart circular system makes use of IOT and Bluetooth technology to communicate from android phone to LCD display board with voice recognition using the Wi-Fi module. The hardware kit of this system is as shown in Fig .



B. Smart Circular System Using Text Message: The messages can be displayed on the LCD with the help of WIFI module and connected through Bluetooth with some secure pattern. The below figure shows the message on LCD using text.

C. Smart Circular System Using Voice Recognition: The messages can be displayed on the LCD with the help of voice and connected through Bluetooth with some secure pattern. The below figure shows the message on LCD with the help of AMR voice control.





IV. Advantages Because of the usage of internet for the transmission of messages have lot of advantages. It includes high data transmission rate, better message quality, less waiting time etc. Username and password authentication system make the system more secure. Here raspberry pi can act as a central processing unit. So we can send not only texted messages but also can send image files in the form of Jpg, jpeg, png and pdf files with better quality. By providing deleting option it makes the newly proposed system become user friendly. This facilitates deleting any previously send data at any time.

This system provide first step to achieve paperless community. Due to the reduced usage of paper in a community which make the community environmental friendly. By utilizing the advantages of Raspberry pi we can add graphics on displays. When add graphics it will get more attention from peoples. Main aims of all type of notice boards are to pass information on peoples as much as possible. So this system can pass information's on more peoples than conventional wooden type notice boards. Due to the inbuilt memory in Raspberry pi data from the cloud is stored .This will make the system non volatile. Any failure in the power supply does not effect on the stored data. Due to these advantages the proposed system can extended to live telecasting of information's around the world.

V. Conclusion The smart circular system for displaying information remotely is developed on a embedded platform. The information need to be displayed is changed on a web server page at sending end principal's room and the same information is modified remotely on a digital notice board kept at various locations for access. This technology helps in reducing the manpower, paper cost, ink and printer etc. Hence the smart circular system can be very useful for organizations to pass the information to their employees and students etc.

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Student Article

6. Facial Recognition-K Someswar Reddy

The information age is quickly revolutionizing the way transactions are completed. Everyday actions are increasingly being handled electronically, instead of with pencil and paper or face to face. This growth in electronic transactions has resulted in a greater demand for fast and accurate user identification and authentication. Access codes for buildings, banks accounts and computer systems often use PIN's for identification and security clearances.

Using the proper PIN gains access, but the user of the PIN is not verified. When credit and ATM cards are lost or stolen, an unauthorized user can often come up with the correct personal codes. Despite warning, many people continue to choose easily guessed PINs and passwords: birthdays, phone numbers and social security numbers. Recent cases of identity theft have heighten the need for methods to prove that someone is truly who he/she claims to be.

Face recognition technology may solve this problem since a face is undeniably connected to its owner expect in the case of identical twins. Its nontransferable. The system can then compare scans to records stored in a central or local database or even on a smart card.

1.1 Biometrics

A biometric is a unique, measurable characteristic of a human being that can be used to automatically recognize an individual or verify an individuals identity. Biometrics can measure both physiological and behavioral characteristics. Physiological biometrics (based on measurements and data derived from direct measurement of a part of the human body) include:

- a. Finger-scan
- b. Facial Recognition
- c. Iris-scan
- d. Retina-scan
- e. Hand-scan

Behavioral biometrics (based on measurements and data derived from an action) include:

- a. Voice-scan
- b. Keystroke-scan

A "biometric system" refers to the integrated hardware and software used to conduct biometric identification or verification.

1.2 Why we choose face recognition over other biometric There are number reasons to choose face recognition. This includes the following

- a. It requires no physical interaction on behalf of the user.
- b. It is accurate and allows for high enrolment and verification rates.
- c. It does not require an expert to interpret the comparison result.
- d. It can use your existing hardware infrastructure, existing cameras and image capture Devices will work with no prob-

lems

e. It is the only biometric that allow you to perform passive identification in a one to. Many environments (e.g.: identifying a terrorist in a busy Airport terminal.

2. FACE RECOGNITION

The face is an important part of who you are and how people identify you. Except in the case of identical twins, the face is arguably a person's most unique physical characteristics. While humans have the innate ability to recognize and distinguish different faces for millions of years, computers are just now catching up.

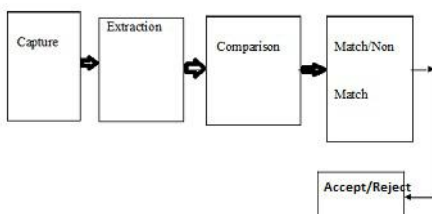
For face recognition there are two types of comparison. the first is verification. This is where the system compares the given individual with who that individual says they are and gives a yes or no decision. The second is identification. This is where the system compares the given individual to all the Other individuals in the database and gives a ranked list of matches. All identification or authentication technologies operate using the following four stages:

- a. Capture: A physical or behavioural sample is captured by the system during Enrollment and also in identification or verification process.
- b. Extraction: unique data is extracted from the sample and a template is created.
- c. Comparison: the template is then compared with a new sample.
- d. Match/non match: the system decides if the features extracted from the new Samples are a match or a non match.

Face recognition technology analyze the unique shape, pattern and positioning of the facial features. Face recognition is very complex technology and is largely software based. This Biometric Methodology establishes the analysis framework with tailored algorithms for each type of biometric device. Face recognition starts with a picture, attempting to find a person in the image. This can be accomplished using several methods including movement, skin tones, or blurred human shapes.

The face recognition system locates the head and finally the eyes of the individual. A matrix is then developed based on the characteristics of the Individuals face. The method of defining the matrix varies according to the algorithm (the mathematical process used by the computer to perform the comparison). This matrix is then compared to matrices that are in a database and a similarity score is generated for each comparison.

Artificial intelligence is used to simulate human interpretation of faces. In order to increase the accuracy and adaptability, some kind of machine learning has to be implemented.



There are essentially two methods of capture. One is video imaging and the other is thermal imaging. Video imaging is

more common as standard video cameras can be used. The precise position and the angle of the head and the surrounding lighting conditions may affect the system performance. The complete facial image is usually captured and a number of points on the face can then be mapped, position of the eyes, mouth and the nostrils as a example. More advanced technologies make 3-D map of the face which multiplies the possible measurements that can be made. Thermal imaging has better accuracy as it uses facial temperature variations caused by vein structure as the distinguishing traits. As the heat pattern is emitted from the face itself without source of external radiation these systems can capture images despite the lighting condition, even in the dark. The drawback is high cost. They are more expensive than standard video cameras.

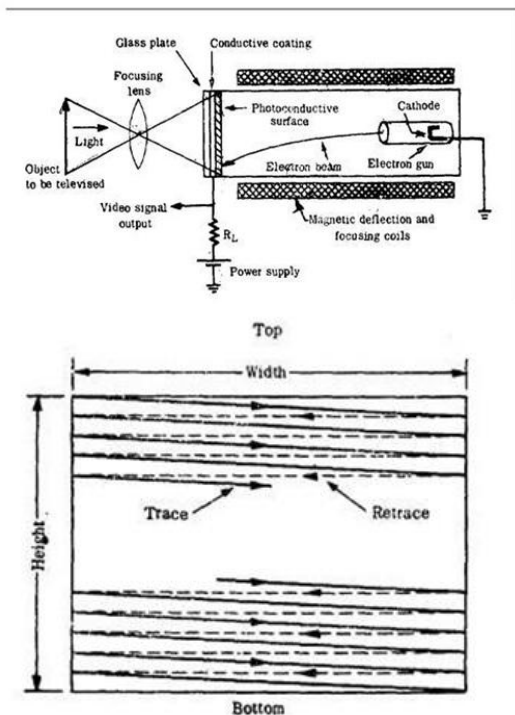
3. CAPTURING OF IMAGE BY STANDARD VIDEO CAMERAS

The image is optical in characteristics and may be thought of as a collection of a large number of bright and dark areas representing the picture details. At an instant there will be large number of picture details existing simultaneously each representing the level of brightness of the scene to be reproduced. In other words, the picture information is a function of two variables: time and space. Therefore, it would require infinite number of channels to transmit optical information corresponding to picture elements simultaneously. There is practical difficulty in transmitting all information simultaneously so we use a method called scanning.

Here the conversion of optical information to electrical form and its transmission is carried out element by element one at a time in a sequential manner to cover the entire image. A TV camera converts optical information into electrical information, the amplitude of which varies in accordance with variation of brightness.

An optical image of the scene to be transmitted is focused by lens assembly on the rectangular glass plate of the camera tube. The inner side of this has a transparent coating on which is laid a very thin layer of photo conductive material. The photo layer has very high resistance when no light is falling on it but decreases depending on the intensity of light falling on it. An electron beam is formed by an electron gun in the TV camera tube. This beam is used to pick up the picture information now available on the target plate of varying resistance at each point.

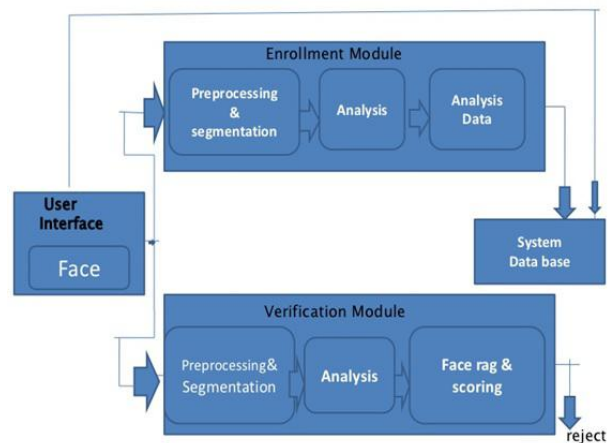
The electron beam is deflected by a pair of deflecting coils mounted on the glass envelope and kept mutually perpendicular to each other to achieve scanning of the entire target area. The deflecting coils are fed separately from two sweep oscillators, each operating at different frequencies. The magnetic deflection caused by current in one coil gives horizontal motion to the beam from left to right at a uniform rate and brings it back to the left side to commence the trace of the next line. The other coil is used to deflect the beam from top to bottom.



As the beam moves from element to element it encounters different resistance across the target plate depending on the resistance of the photo conductive coating. The result is flow of current which varies in magnitude as elements are scanned. The current passes through the load resistance R_L connected to conductive coating on one side of the DC supply source on the other. Depending on the magnitude of current a varying voltage appears across the resistance R_L and this corresponds to the optical information of the picture.

4. COMPONENTS OF FACE RECOGNITION SYSTEMS

- An automated mechanism that scans and captures a digital or an analog image of a living personal characteristics. (enrollment module)
- Another entity which handles compression, processing, storage and compression of the captured data with stored data (database)
- The third interfaces with the application system (identification module) User interface captures the analog or digital image of the person's face. In the enrollment module the obtained sample is pre-processed and analyzed. This analyzed data is stored in the database for the purpose of future comparison.



The database compresses the obtained sample and stores it. It should have retrieval property also that is it compares all the stored sample with the newly obtained sample and retrieves the matched sample for the purpose of verification by the user and determine whether the match declared is right or wrong.

The verification module also consists of a pre-processing system. Verification means the system checks as to who the person says he or she is and gives a yes or no decision. In this module the newly obtained sample is pre-processed and compared with the sample stored in the database. The decision is taken depending on the match obtained from the database. Correspondingly the sample is accepted or rejected.

Instead of verification module we can make use of identification module. In this the sample is compared with all the other samples stored in the database. For each comparison made a match score is given. The decision to accept or reject the sample depends on this match score falling above or below a predetermined threshold.

5. Performance
False acceptance rate (FAR) The probability that a system will incorrectly identify an individual or will fail to reject an imposter. It is also called as 2 types error rate.

$FAR = NFA / NIIA$ where, FAR = false acceptance rate
NFA = number of false acceptance

NIIA = number of imposter identification attempts

False rejection rate (FRR) The probability that a system will fail to identify an enrollee. It is also called type 1 error rate.

$FRR = NFR / NEIA$ Where, FRR = false rejection rates
NFR = number of false rejection rates

NEIA = number of enrollee identification attempt

time: The time period required by a biometric system to return a decision on identification of a sample. Threshold/ decision Threshold:

The acceptance or rejection of a data is dependent on the match score falling above or below the threshold. The threshold is adjustable so that the system can be made more or less strict; depending on the requirements of any given application. time:

The time period a person must spend to have his/her facial reference template successfully created. Equal error rate:

When the decision threshold of a system is set so that the proportion of false rejection will be approximately equal to the proportion of false acceptance. This synonym is 'crossover rate'. The facial verification process involves computing the distance between the stored pattern and the live sample. The decision to accept or reject is dependent on a predetermined threshold. (Decision threshold)

7.IMPLEMENTATION OF FACE RECOGNITION TECHNOLOGY The implementation of face recognition technology includes the following four stages:

i.Data acquisition

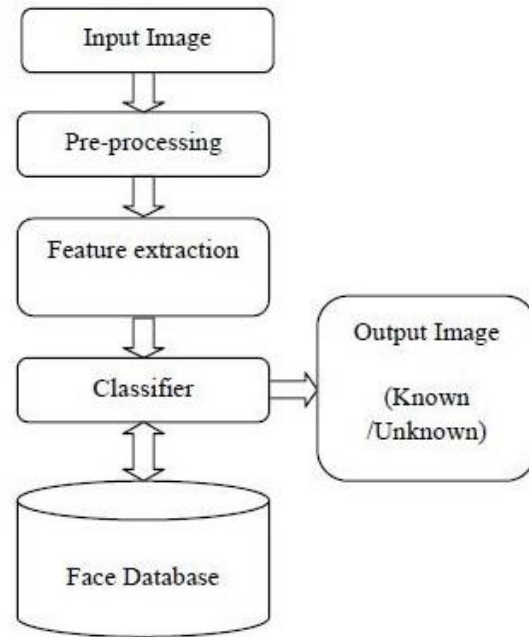
ii.Input processing

iii.Face image classification and decision making

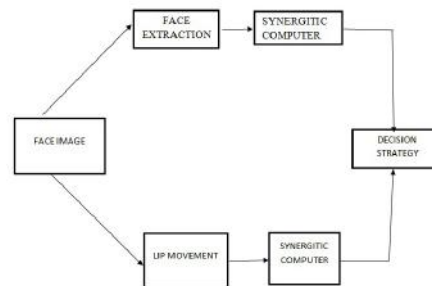
6.1 Data acquisition: The input can be recorded video of the speaker or a still image. A sample of 1 sec duration consists of a 25-frame video sequence. More than one camera can be used to produce a 3D representation of the face and to protect against the usage of photographs to gain unauthorized access.

6.2 Input processing: A pre-processing module locates the eye position and takes care of the surrounding lighting condition and color variance. First the presence of faces or face in a scene must be detected. Once the face is detected, it must be localized and Normalization process may be required to bring the dimensions of the live facial sample in alignment with the one on the template.

Some facial recognition approaches use the whole face while others concentrate on facial components and/ or regions (such as lips, eyes etc.)The appearance of the face can change considerably during speech and due to facial expressions. In particular the mouth is subjected to fundamental changes but is also very important source for discriminating faces. So an approach to person's recognition is developed based on spatio-temporal modeling of features extracted from talking face. Models are trained specific to a person's speech articulate and the way that the person speaks. Person identification is performed by tracking mouth movements of the talking face and by estimating the likelihood of each model of having generated the observed sequence of features. The model with the highest likelihood is chosen as the recognized person. Block diagram:



Synergetic computer is used to classify optical and audio features, respectively. A synergetic computer is a set of algorithms that simulate synergetic phenomena. In training phase, the BIOID creates a prototype called faceprint for each person. A newly recorded pattern is preprocessed and compared with each faceprint stored in the database. As comparisons are made, the system assigns a value to the comparison using a scale of one to ten. If a score is above a predetermined threshold, a match is declared .



From the image of the face, a particular trait is extracted. It may measure various nodal points of the face like the distance between the eyes, width of nose etc. it is fed to a synergetic computer which consists of algorithm to capture, process, compare the sample with the one stored in the database. We can also track the lip movement which is also fed to the synergetic computer. Observing the likelihood each of the samples with the one stored in the database we can accept or reject the sample.

Project

7. IMPLEMENTATION OF AGRICULTURAL ROBOT USING IOT N. Sreeramula Reddy1, Y. Haritha2, M. Lakshmi kala3, P. Kartheek Reddy

1. INTRODUCTION

Farmers today spend a great deal of cash on machines that

assistance them decline work and increment yield of harvests. There are diverse machines that are available for drilling, sprinkling pesticides, etc., in any case these machines must be physically attempted to play out the required assignments what's more discrete machines are used for every limit. The arrival and advantage returns from using this apparatus are less when stood out from the speculation. Another issue is the developing requests of the total populace. The World Health Organization evaluates that Earth's populace will contact 9 billion out of 35 years which will prompt a stunning interest in increment of development of sustenance crops.

Automation is the perfect answer for all the previously mentioned inadequacies by making machines that perform more than one activity and mechanizing those tasks to build yield on a huge scale.

The goals of this paper are:

- To enable the farmer to sow the seeds in large areas of land in minimum amount of time.
- To perform automated drilling and simultaneous seeding process using At mega microcontroller.
- To provide manual control with the help of internet.

2. Existing system:

In the current framework, peasants utilize physically worked machines for drilling and seed sowing. For this reason peasants need talented and inspired workers and to keep the generation costs low. The return and benefit comes back from utilizing the current framework is less when contrasted with the speculation. High labor and vitality is required

3. Proposed System The motivation behind actualizing the agricultural robot is to robotize the agronomics segment. The present inclination in agrarian robot improvement is to manufacture progressively shrewd proficient machines that diminish the cost of the rancher yet giving more administrations of higher quality. Advancement of a robot that can accomplish robotized drilling and seeding activity can be selfishly explored by the

Arduino UNO is used to regulate exercises like entering and seeding. It conjointly controls wheels through L293D. The square outline of programmed boring and seeding mechanical framework in farming framework is appeared in figure.

Components Required:

1. Arduino UNO
2. Wi-Fi module
3. L2932D
4. DC motor
5. Servomotor
6. Battery – 12V

Software Required:

1. Arduino IDE
 2. Basic C language
- ### 3.1 Arduino UNO:

The Arduino Uno is a microcontroller board subject to the ATmega328. It has 14 electronic data/yield pins (of which 6 can be used as PWM yields), 6 basic wellsprings of information, a 16 MHz ceramic resonator, USB affiliation, a power jack, an ICSP header, and a reset gets.



It contains everything expected to help the microcontroller; basically interface it to a PC with a USB connection or power it with an AC-to-DC connector or battery to start. The Uno contrasts from each and every going before board in that it doesn't use the FTDI USB-to-successive driver chip. Or maybe, it incorporates the Atmega16U2 tweaked as a USB-to-successive converter. "Uno" implies one in Italian and is named to check the expected landing of Arduino 1.0. The Uno and interpretation 1.0 will be the reference types of Arduino, pushing ahead.

The Uno is the latest in a movement of USB Arduino sheet.

Summary

Microcontroller ATmega328

Operating Voltage 5V

Input Voltage 7-12V

Input Voltage 6-20V

Digital I/O Pins 14

Analog Input Pins 6

DC Current 3.3V

Flash Memory 32 KB

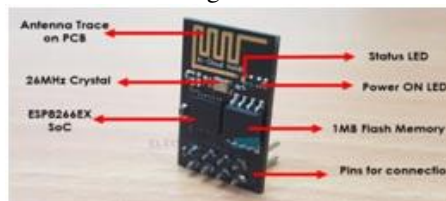
SRAM 2 KB (ATmega328)

EEPROM 1 KB (ATmega328)

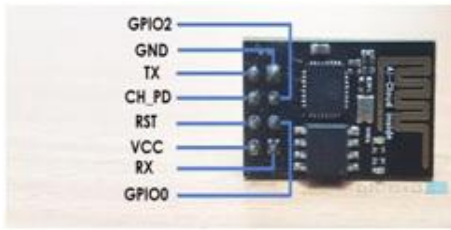
Clock Speed 16 MHz

Wi-Fi module:

ESP8266 (actually ESP8266EX) is a Wi-Fi Module dependent on Cadence Tensilica L106 32-bit MCU produced by Espressif Systems. The ESP8266 SoC contains a completely practical Wi-Fi Stack and TCP/IP Stack that enables any Microcontroller to get associated with Wi-Fi Network.



Going to the pin design, as referenced over, the ESP-01 module comprises of 8 pins and these pins are Vcc, GND, TX, RX, RST, CHPD, GPIO0 and GPIO2. The accompanying picture demonstrates the pin graph of the ESP-01 Module.



Pin Description of ESP8266 ESP-01 Module:

VCC: It is the power stick through which 3.3V is provided.
GND: It is the ground stick. **TX:** This pin is utilized to transmit sequential information to different gadgets.

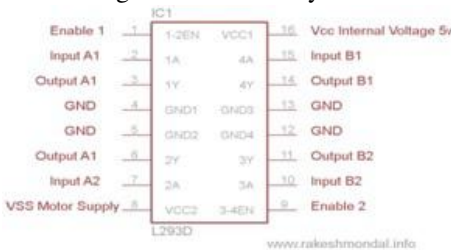
RX: The RX stick is utilized to get sequential information from different gadgets.

RST: It is the Reset Pin and it is a functioning LOW Pin.

CHPD: This is the chip empower stick and it is a functioning HIGH Pin. It is normally associated with 3.3V.

GPIO0: The GPIO0 (General Purpose I/O) Pin has double capacities – one for ordinary GPIO Operation and other for empowering the Programming Mode of ESP8266.

GPIO2: This is GPIO Pin. The ESP8266 isn't good with 5V and the ESP-01 Module does not have any voltage controllers ready. Ensure that the power supply to the ESP8266 is 3.3V, ideally from a committed power supply instead of taking it from the 3.3V Pin of the Arduino. **L293D Motor driver:** L293D is an ordinary Motor driver or Motor Driver IC which permits DC engine to drive on either heading. L293D is a 16-pin IC which can control a lot of two DC engines at the same time toward any path. It implies that you can control two DC engine with a solitary L293D IC.



In a solitary L293D chip there are two h-Bridge circuit inside the IC which can turn two dc engines autonomously. Due to its size, it is particularly utilized in automated application for controlling DC engines. Given underneath is the pin chart of a L293D engine controller.

The engines are pivoted based on the information sources gave over the information pins as LOGIC 0 or LOGIC 1. In straightforward you have to give Logic 0 or 1 over the info pins for pivoting the engine.

L293D Logic table. Let's consider a motor associated on left side yield pins (pin 3, 6). For turning the engine clockwise way the information pins must be given Logic 1 and Logic 0.

Pin 2 = Logic 1 and Pin 7 = Logic 0 | Clockwise control
 Pin 2 = Logic 0 and Pin 7 = Logic 1 | Anticlockwise control
 Pin 2 = Logic 0 and Pin 7 = Logic 0 | Idle [No movement]
 Pin 2 = Logic 1 and Pin 7 = Logic 1 | Idle [No movement]

In the same way the engine can likewise work crosswise over info pin 15, 10 for engine on the correct hand side.

Voltage specification:

Vcc is the voltage that it requirements for its very own

interior task 5v; L293D won't utilize this voltage for driving the engine. For driving the engines it has a different arrangement to give engine supply. L293D will utilize this to drive the engine. It implies on the off chance that you need to work an engine at 9V; at that point you have to give a supply of 9V crosswise over Vss motor supply. The most extraordinary voltage for Vss motor supply is 36V. It can supply a most extreme current of 600mA per channel. Since it can drive motors up to 36V therefore you can drive extremely tremendous motors with this L293D. Vcc pin 16 is the voltage for its very own internal Operation. The most outrageous voltage ranges from 5V and up to 36v. Make an effort not to surpass the Vmax Voltage of 36 volts or it will cause hurt. DC Motor

DC engines are the most basic engines to utilize. They can achieve a high rotational speed that is subject to the info voltage. It cannot deal with the situation as one would with a servomotor or a stepper engine. At last, to change the torque of a DC engine, it is important that to utilize gearbox.

Servomotor

Servo infers a mistake detecting input control which is used to address the execution of a framework. It additionally requires a for the most part modern controller, frequently a devoted module structured especially for use with servomotors. Servo engines are DC engines that consider exact control of precise position. They are really DC engines whose speed is gradually brought down by the riggings. The servo engines generally have an upheaval cutoff from 90° to 180°. A couple of servo engines additionally have insurgency cutoff of 360° or more. Be that as it may, servo engines don't turn continually. Their pivot is restricted in the middle of the fixed edges. The picture of servomotor is introduced underneath. The servo motor is a social affair of four things: a run of the mill DC motor, a mechanical assembly decline unit, a position- identifying contraption and a control circuit. The DC motor is related with a mechanical assembly framework which offers contribution to a position sensor which is generally a potentiometer.

It uses the position identifying contraption to understand the rotational position of the shaft, so it knows which way the motor must swing to move the post to the informed position.

Battery:

A battery charger is utilized to put imperativeness into a cell or (battery- controlled) battery by convincing an electric move through it. Lead-corrosive battery chargers ordinarily have two endeavors to accomplish. The first is as far as possible, consistently as quick as feasible. The second is to keep up farthest point by compensating for self discharge. In the two cases perfect action requires exact identifying of battery voltage.

At the point when a normal lead- corrosive cell is charged, lead sulfate is changed over to lead on the battery's negative plate and lead dioxide on the positive plate. Over-charge responses start when most of

lead sulfate has been changed over, ordinarily bringing about the age of hydrogen and oxygen gas. At moderate charge rates, the majority of the hydrogen and oxygen will

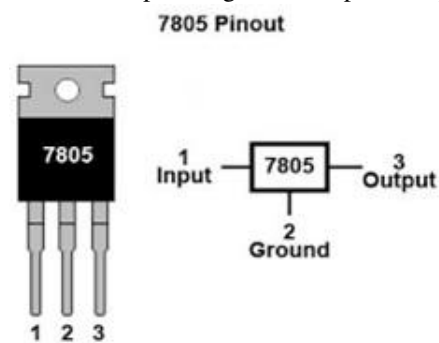
recombine in fixed batteries. In unlocked batteries in any case, parchedness will happen.

The beginning of over-charge can be distinguished by checking battery voltage. The figure on the following page demonstrates battery voltage refrains percent of past release limit returned at different charge rates.

Over charge responses are demonstrated by the sharp ascent in cell voltage. The time when over-charge responses start is subject to charge rate, and as charge rate is expanded, the level of returned limit at the beginning of over-charge decreases. At high charge rates, controlled over-charging is regularly as fast as could reasonably be expected.

Voltage regulator:

In most the electronic ventures we need a consistent DC voltage. Be that as it may, the supply that we are getting is 230V AC. So we have to change over the 230V AC into DC. Here we are planning a 5V DC power supply.



For 5V power supply 7805 IC is used. 7805 IC rating:

Input voltage – 7V to 35V

Current rating – 1A

Output voltage – 5V

4. BLYNK APP In this age of microcontrollers, there have been numerous developments and structures concerning the correspondence over a Wi-Fi organize between at least 2 contraptions. Since the presence of the ESP8266, the Wi-Fi correspondence between (at least 2) μ C has never been simpler.



Through blynk app data can be given and an essential case of the NodeMCU adaptation of the ESP866. This super bit of innovation can be effectively customized in the Arduino IDE [Integrated Development Environment] and cooperates with the Blynk- programming.

5. FUTURE ENHANCEMENT

This paper is a little scale exertion yet the equivalent can be executed with gigantic outcomes in an expansive scale that benefits all ranchers of the world. Aside from drilling, seed apportioning, other cultivating process like showering pesticides and fruit picking and so on can likewise be actualized in one robot along these lines making the machine fit

for performing various tasks. Sun oriented boards can be substituted instead of batteries.

6. CONCLUSION

This paper is mostly dependent on limiting labor and cost of the hardware, which can be reasonable to all ranchers. The vast majorities of the present effective agrobot models speak to utilization of amazing fuel based IC motors and substantial apparatuses, which require labor and causes pointless natural contamination and furthermore decrease in petroleum derivative. So as to take care of this issue, the utilization of computerization unmanned agrobot is actualized by this work. This task is created to naturally developing the land. This undertaking can be extremely valuable for ranchers.

6. REFERENCES

[1] Divya C. H., Ramakrishna, H. and Praveena Gowda (2013), International journal of current research vol.5.

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Student Article

8. Solar Power Tracking Generating System-Swathi Gopireddy

1. INTRODUCTION

The green energy also called the regeneration energy, has gained much attention nowadays. Green energy can be recycled, much like solar energy, water power, wind power, biomass energy, terrestrial heat, temperature difference of sea, sea waves, morning and evening tides, etc. Among these, solar energy is the most powerful resource that can be used to generate power. So far the efficiency of generating power from solar energy is relatively low. Thus, increasing the efficiency of generating power of solar energy is very important.

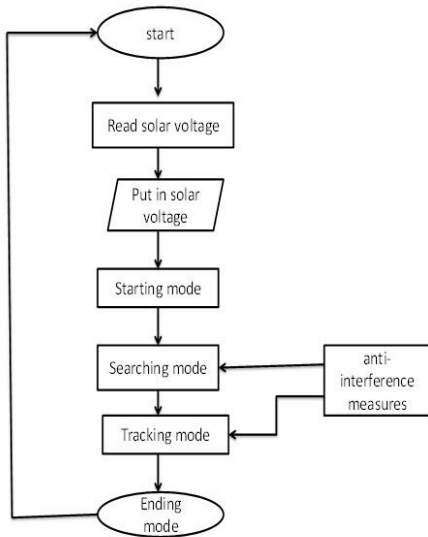
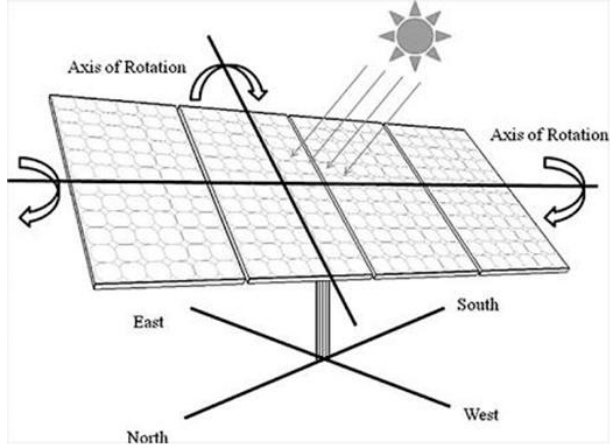
In the past, solar cells have been hooked with fixed elevating angles. They do not track the sun and therefore, the efficiency of power generation is low. For example, the elevating angle of a solar cell for the largest volume of illumination in daytime is 23.5° in southern Taiwan. Since the fixed-type solar panel cannot obtain the optimal solar energy, the transformation efficiency of solar energy is limited. Many scholars have proposed different methods for tracking the sun. Many different light source sensors, light intensity sensors, intelligent vision techniques, and CCD equipments were applied to compute the absorbed time of the sun radiation in everyday for measuring the volume of solar energy. So far the majority of solar cell panels worldwide are hooked with fixed angles. Thus, it is clear that the method of tracking the sun is a technique worthy of being developed.

The main goal is to design and implement a solar tracking control system using field programmable gate array (FPGA). The CdS light sensitive resistors are used. Feedback signals are delivered to the assigned chip through an A/D converter. A fuzzy controller was developed and implemented on the FPGA platform. A Cyclone II chip of the Altera Company is adopted as the control kernel. Finally, a comparison between

the tracking system and the fixed system is made. From the experimental results, the proposed tracking system is verified more efficiently in generating.

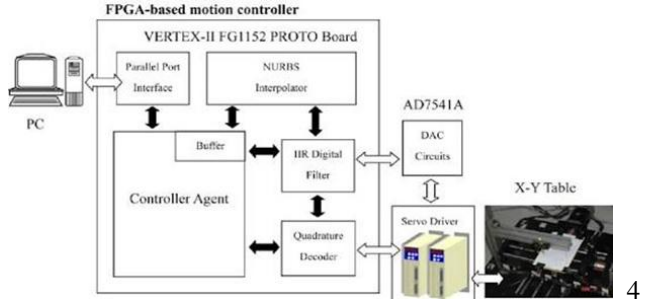
1. ARCHITECTURE OF SYSTEM HARDWARE The system architecture of the proposed solar tracking control system using FPGA is shown in Fig. 2.2. A feedback signal is produced from the CdS light sensitive resistors since the sun shines and is inputted to the FPGA through an analog/digital converter. Then, the controller in the chip delivers an output, the corresponding PWM signals, to drive the stepping motors. Thus, the directions of the two-dimensional solar platform can be tuned to achieve optimal control, respectively. There are three modes in the controller as follows:

(1) . **Balancing mode** To set the initial position of the solar platform, we use mercury switches for balancing position. The goal is to set boundary problems around for preventing too large elevating angles, which may make the solar panels crash the mechanism platform, and thus damages the motors and the platform.



(2). **Automatic mode** The tracking light sensors are based the intensity of light reception of the CdS light sensitive resistors. The sensors can deliver different signals to the FPGA controller through an analog/digital converter according to the different sunlight intensity. The Nicosia CPU is the main

control kernel. By tuning the two-dimensional solar platform, the optimal efficiency of generating power can be achieved.



.DESIGN OF SOLAR TRACKING SYSTEM

The solar tracker system requires movement in different directions, and uses electric motors as prime mover, based on this; solar tracker system motion control is simplified to electric motor motion control.

A. Electrical components design of solar tracking system
 The main components in the solar tracking system are standard photo voltaic solar panels (PV), a deep cycle rechargeable battery, micro controller, signal conditioning circuits, and motor drive, these components are connected to the sensors and the solar rotation mechanism as shown in fig 6.1. In solar tracking system design, any light sensitive device can be used as input sensor unit to detect and track the sun position, based on sensors readings, and generated sun tracking error, the control unit generates the voltage used to command the circuit to drive the motor, that outputs the rotational displacement of electric motor, which is the motion of solar tracking system. Thus the solar tracking system consists of mechanical part and electrical part. The electrical part components are:

1. **Microcontroller (Arduino Mega 2560).** Arduino is used to develop interactive objects, taking inputs from a variety of switches or sensors, and controlling a variety of lights, motors, and other physical outputs. Arduino projects can be stand-alone, or they can communicate with software running on the computer (e.g. Flash, Processing, MaxMSP.) The boards can be assembled by hand or purchased preassembled; the open-source IDE can be downloaded for free. Moreover, The Arduino Mega 2560 is a microcontroller board based on the ATmega2560 . It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

In addition, the Arduino programmer is based on the processing integrated development environment (IDE) and uses a variation of the C and C++ programming languages, and C++ was used for programming our Arudino microcontroller.

2. Actuator and drivers.

Electric motors most used for solar tracker are PMDC and stepper motors, the proper selection of motor and drive combination can save energy and improve performance. A suitable, available, easy to control and interface selection

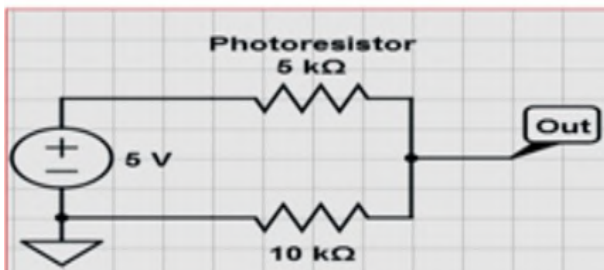
is PMDC motor. For bidirectional driving, a motor can be driven via H-bridge drive formed by two pairs of Darlington transistors, or H-Bridge in IC's, e.g. L298n, which is 16 pin chip dual H-Bridge motor driver, so with one IC we can interface two DC motors. The current output of microcontroller is too low and delicate to drive a high current DC motor, the motor will damage the controller since the output posts of the microcontroller is not designed to drive high current devices. A high current driver interface is thus required that drives the motors from an external source such as a battery or mains supply.

Pulse width modulation (PWM) is a very efficient way to change the direction and speed on DC motors for the solar tracking operation. PWM signals are used for a wide variety of control applications, such as controlling DC motors, valves, pumps, hydraulics, and other mechanical parts. Relay shield is small current signal control power equipment commonly used electronic module, enabling high-power single-chip control devices are widely used in SCM system to make smart home project; and can be directly plugged into the Arduino compatible the use of various types of motherboards, eliminating the patch cable troubles.

3. Light sensor selection and circuit.

Light detecting sensor that may use to build solar tracker include; phototransistors, photodiodes, LDR and LLS05-A light sensors, a suitable, inexpensive, simple and easy to interface sensor is analog LDR. Two main solar tracking system arrangements; one-axis (one directional) sun tracking system using two light detectors and two-axis (two directional) sun tracking system using four light sensitive sensors, in both cases, sensors are mounted on the solar panel and placed in an enclosure, the LDRs are screened from each other by opaque surfaces. The sensors that were used in this work are the photo resistors. Photo resistors are semiconductors (just like solar panels) and have a reduced resistance when light is incident upon them.

This, when paired with a resistor of a fixed value in a voltage divider became very useful. Fig shows how the voltage divider is setup



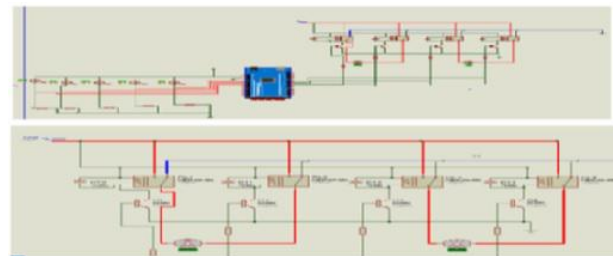
To utilize this knowledge, we took the four total voltage dividers and arranged them on each side of the solar panel. By arranging them in this manner, we were able to compare the voltages at V_{out} from the left and right sides (one axis) as well as the top and bottom sides (second axis) to see which ones had more light exposure. If one side is getting more light than another, the incident photons must be striking the panel at some angle. The goal of this tracking system is to reduce this angle, along both axes, to zero, making the

incoming photon perpendicular to the panel.

4. MPDC Motors. In a dc motor, an armature rotates inside a magnetic field. Basic working principle of DC motor is based on the fact that whenever a current carrying conductor is placed inside a magnetic field, there will be mechanical force experienced by that conductor. All kinds of DC motors work in this principle only. Hence for constructing a dc motor it is essential to establish a magnetic field. The magnetic field is obviously established by means of magnet. The magnet can be any types i.e. it may be electromagnet or it can be permanent magnet. When permanent magnet is used to create magnetic field in a DC motor, the motor is referred as permanent magnet dc motor or PMDC motor.

5. Battery. The energy storage is required in most of PV systems, because the energy generation and consumption do not generally coincide, moreover, the solar power generated during the day is very often not required until the evening and therefore has to be temporarily stored, for this reason an electrical storage batteries are commonly used in PV systems. Ideally, a battery bank should be sized to be able to store power for 5 days of autonomy during cloudy weather. If the battery bank is smaller than 3-day capacity, it is going to cycle deeply on a regular basis and the battery will have a shorter life. System size, individual needs and expectations will determine the best battery size for any system

The main aim of our design is to design automated solar tracking system. For this purpose we used Arduino microcontroller, four LDR for finding the light intensity and two PMDC motors for the horizontal and vertical movement, in addition, we implemented one application program using embedded C++ and loading the program into the Arduino microcontroller. The block diagram of the electrical system components is illustrated in Fig.6.2. where the simulation has been conducted on Proteus simulation package. In the simulation, the light sensitive LDR device is used as input to detect and track the sun position, based on sensors reading and generated sun tracking error, the Control unit (Arduino) generates the voltage used to command the circuit to drive the motor that outputs the rotational displacement of electric motor, which is the motion of solar tracking system.



B. Mechanical components design of solar tracking system
Mechanical engineering parts of the solar tracking system shown with free body diagram in Fig. 10 (a, b). Our analysis of the solar tracking system is focused on static analysis of all parts of the system. The static analysis considers the center of gravity for the all parts, forces that affect the balance of the solar tracking system, and calculation of the torques needed for lifting the solar panel in horizontal and vertical

axis. Moreover, the static analysis considered the effect of winds on the solar panel. The first and necessary step in static analysis is obtaining the center of gravity for the following mechanical parts.

5.Features of the designed tracker

The attractive feature of the constructed prototype is the software solution of many challenges regarding solar tracking system. The designed prototype requires only two photo resistors to sense the light, which lessens the cost of the system. Power consumption of the system is negligible.



The solar PV modules are generally employed in dusty environments which is the case in tropical countries like India. The dust gets accumulated on the front surface of the module and blocks the incident light from the sun. It reduces the power generation capacity of the module. The power output reduces as much as by 50 percentage if the module is not cleaned for a month. To reduce this loss, a brush along with rollers was fixed with the panel. This brush-roller system rolls down twice in 24 hours, when the panel is in vertical position and makes this prototype a self-cleaning system.

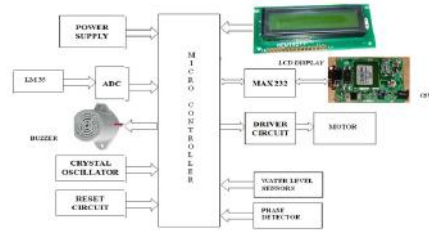
CONCLUSION

This paper presents a solar tracking power generation system. The tracking controller based on the fuzzy algorithm is designed and implemented on FPGA with a NiosII embedded system. Set up on the solar tracking system, the CdS light sensitivity resistors are used to determine the solar light intensity. The proposed solar tracking power generation system can track the sun light automatically. Thus, the efficiency of solar energy generation can be increased. Experimental work has been carried out carefully. The result shows that higher generating power efficiency is indeed achieved using the solar tracking system. The proposed method is verified to be highly beneficial for the solar power generation.

Student Article

9. GSM BASED SUBMERSIBLE MOTOR CONTROL FOR IRRIGATION SYSTEM-Venkata Ramana

Block Diagram



Working Principle

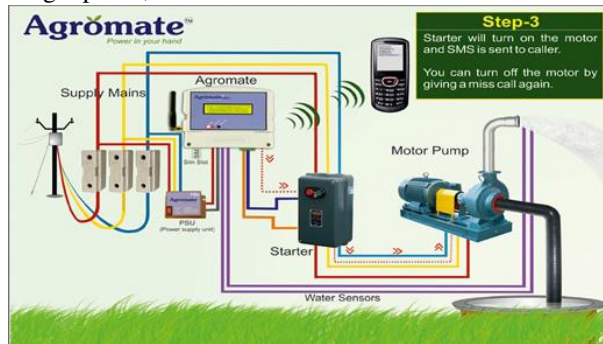
This system can be preferred three function

By using GSM modem we monitor and control the submersible motor

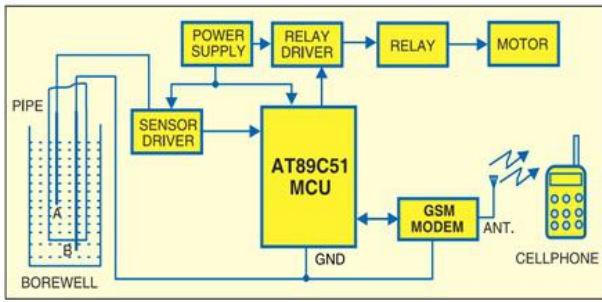
motor running at dry condition

phase detector This system is fixed to motor starter and then it is connected to a power supply unit(PSU) or a adapter.

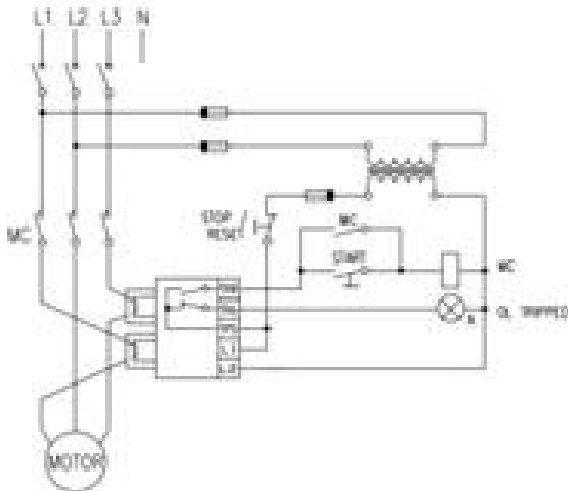
The power supply unit helps in controlling the power and voltage fluctuations. The PSU helps in power indication and works on 3-Phase as well, the adapter helps to work on Single phase,



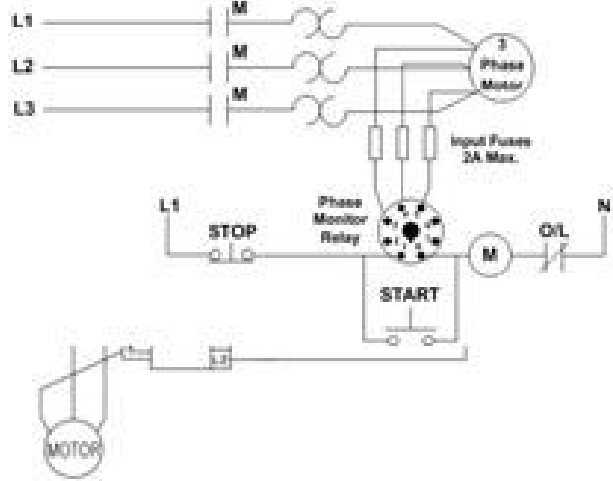
Whenever the supply will be occurred the GSM device send message or a miss call has to be given in order to register mobile number. After that the former call again to the GSM device it can be connected to the supply and motor will be turned on. Similarly the water level in a bore well drops below the threshold level for pumping, its pump motor may get air-locked or even burn out due to dry running. It is inconvenient for farmers to walk all the way to their fields at night just to switch the pump motor 'off.' Besides, he may never get to know the problem. This problem can be solved by using this GSM-based system if the motor will running under the dry condition i.e. the water level will be below the threshold value the water level sensor will sense this level and the signal will be send to sensor driver it can be send the signal to microcontroller and GSM device this GSM device will be send the message to the registered mobile number i.e. motor running under dry condition.so that the former will send message i.e. turn OFF to the system then motor will be off and safe condition.



Basically, in the agricultural irrigation the motor is connected to the control panel. The control panel contains protection relays and contactors. The control panel checks the usually known problems and rectify it prevent the motor from damage. The known faults that may occur are phase sequence, absence of a phase change, dry running of the motor and overload condition. The control panel in this study contains three types of protection relays A- Electronic overload relay (OL). Typical wiring diagram of overload seen in figure.



Two of the three motor cables are fed through integral current transformers mounted on the body of the relay. B-Phase sequence relay (Phs) to perform a protection when one of the supply phases is missing for three phased submersible motor and over/under voltages.



C- Liquid level relay (L.L) is used to monitor the water level of submersible pump For example connection of 3-ph supply will be changes that means if phase will be changed the phase detector will be sense this one and send the signal to the GSM system and again send the message to the registered mobile number is phase changer so that the former will be turn of motor it will be in safe condition.

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