Development of Polyaniline Composite based Humidity Sensor

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Abstract: Humidity is an important environmental element because it influences weather, climate, and global climate change. Understanding how interior conditions are affected by humidity will aid in the storage of sensitive material. A sensor is a device that detects and responds to information or facts about the environment. The relevant input could be light, fire, motion, moisture, friction, or any other type of environmental existence. Among the numerous types of sensors accessible are temperature sensors, pressure sensors, humidity sensors, gas and alcohol sensors, and so on. Each sensor has a particular operating principle depending on the sort of physical quantity that is detected.

Keywords: Polyaniline, Humidity, Polymers.

1. Introduction

Climate management in greenhouses, plantation protection, soil moisture monitoring, and grain storage are all applications for humidity sensors in agriculture. Humidity sensors are employed in a variety of applications in general industry, including chemical gas purification, dryers, ovens, film desiccation, paper and textile manufacturing, and food processing. Among the most preferred mate materials are electrolytic metal oxides, alumina thin films, and ceramics. The most common materials used to monitor humidity are electrolytic metal oxides, alumina thin films, and ceramics. Polymeric humidity sensors have been intensively researched and used in industry for more than 30 years. Thin film humidity sensors made of polymers have a high processability, allowing for the manufacture of a wide range of geometry, including smaller sensor designs.

2. Literature Survey

Ramprasad and Rao [1] proposed a paper on the creation of a new processable and humidity sensitive chitin–polyaniline blend. PANI is blended with chitin using the solution blending process. Under atmospheric conditions, the free-standing films of blends are stable. The stability was checked, and the samples remained stable even after 75 cycles. The thickness of blend films can be minimized to minimize hysteresis and reaction

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time. The built humidity sensor achieves very strong results in the 10–100% humidity range, and the operating temperature range is found to be 20–60 C. It should also be remembered that the sensor has very high-water resistance and that the humidity reaction can be replicated with the sensor even after a year.

Kulkarni et al [2] have demonstrated conducting polyaniline-based humidity sensors that were ink-jet printed. At room temperature, PANI has been used for humidity sensing. A single-step chemical oxidative polymerization technique was used to create PANI-based aqueous ink-jet printable ink. This is a one-step polymerization approach for the direct synthesis of the polymer's conducting emeraldine salt process as an ink formulation. The resistance changed in response to a change in the percent RH. The authors discussed the configuration of the sensor using transmittance and absorbance properties in the discussion, and the experimental curve is also presented with the experimentation.

Lekha et al [3] have discussed about the subject of interfacially polymerized polyaniline /dodeca tungstophosphoric acid nanocomposites. Conductivity and humidity sensing have been improved. Interracially polymerized conducting polymer and its hybrid with grain sizes ranging from 10 to 50nm have discernible moisture content, which is critical in the dehydration temperature conduction mechanism. For polyaniline, the temperature and frequency dependent ac conductivity obeys the Corelated Barrier Hopping (CBH) and Overlapping Large Polaron Tunnelling (OLPT) models (PANI). The Grotthuss mechanism is responsible for the response to humidity in the high RH zone.

Biju and Jain [4] have discussed about Effect of polyethylene glycol additive in sol on the humidity sensing properties of a titanium dioxide (TiO2) thin film. The use of Polyethylene glycol (PEG) as an intermediate in the sol increases the humidity sensitivity of TiO2 thin films. The increased humidity exposure is caused by a decrease in crystallite size and the presence of nanopores. Sol-gel and spin coating methods were used to create TiO2 thin films. An analogous circuit that was well suited to experimental data was taken from the Cole-Cole plots. It has been discovered that as resistance is compared to

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DESIGN AND IMPLEMENTATION OF SMART ENERGY MONITORING SYSTEM USING IoT

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Abstract— In spite of numerous endeavors, Energy emergency is the current day issue and it is deteriorating step by step. To conquer the present circumstance individuals are finding different energy proficient assets. Among them, power is the primary concern which should be observed and controlled. With the ascent in force utilization in all aspects of the world there is a reaking ascends in force burglary and over use of intensity. This paper focuses on smart energy meter that eases the work of human. The GSM technology introduced eliminates all the drawbacks by absolutely automating the energy meter .i.e. the meter readings area unit taken and detected mechanically and detected units area unit often sent to the asking purpose mistreatment the GSM and corresponding bills area unit calculated and sent to the user at the right time. It reduces the time; it reduces the human men, and can offer correct readings. This method replaces ancient energy meter reading strategies and permits remote accessing of existing energy meter by the energy supplier. They will monitor the readings often while not visiting the person's house.

Index Terms — Smart Energy Meter, Internet of Things (IoT), Global System for Mobile Communications (GSM), Wireless Fidelity (Wi-Fi), webpage.

I. INTRODUCTION

Urbanization brings about increment of private and business loads at higher rate in developing countries, It will prompts an interest supply setback in various countries. The electrical energy use in India is the third most prominent after China and USA with 5.8% overall proposal in 2019.The per individual energy use rate in India is closer to 0.7 KW. India's proposal with overall energy solicitation will rise to 9% by 2035. To beat the condition people are finding diverse energy compelling resources.

A Smart Energy Meter (SEM) is an electrical gadget having energy meter chip for electric energy burned-through estimation and for advanced correspondence Smart energy meter, which utilizes the features of embedded structures for instance blend of hardware and programming to execute needed helpfulness. The paper clarifies about assessment of Arduino and various regulators, and the utilization of GSM and Wi-Fi modems to introduce 'Smart' idea. With the usage of GSM modem the purchaser similarly as expert association will get the used energy scrutinizing with the different whole, Consumers will even get cautioning in the construction text through GSM when they will show up at their edge regard which shoppers have set. Likewise with the help of Wi-Fi modem the consumers can screen there consumed perusing and can set the edge a motivation through page. The framework engages the power division to peruse the meter readings month to month without an individual visiting each house. The system will be accomplished by the use of Arduino unit that unendingly screen and records the energy meter studying in its lasting (non-unpredictable) memory space. The Arduino perpetually records the studying and therefore the live meter studying will be shown on page to the customer on solicitation. The system framework will be used to detach the force offer of the house once needed.
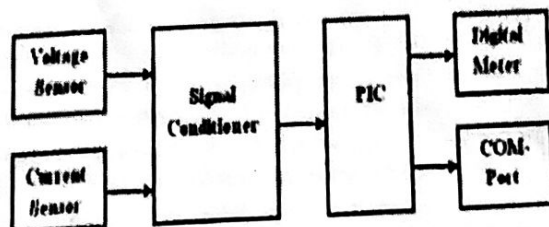

Fig. 1: Block diagram of Digital Energy meter

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Detect the Effect of Diabetes on Retina Using Image Processing and Classification Using Svm Algorithm

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ABSTRACT

Diabetic retinopathy is the main cause of blindness which can be avoided by early medical attention. In this paper, we have proposed an image processing method for detecting microaneurysm and exudates from the fundus images and classification of retinal images based on the features detected into different stages of diabetic retinopathy using SVM algorithm.

Index Terms: Diabetic retinopathy, microaneurysm and exudates detection, support vector machine (SVM) classification.

INTRODUCTION

Light enters the eye through the pupils and passes through the lens to reach the retina. Light waves are converted into electrical signals by a receptor in the retina. The optic nerves subsequently send this signal to the brain, where it is translated into visuals. This difficult task requires a lot of blood, which Retina has enough of. Diabetes can damage blood vessels and have an effect on the retina if a person has it for a long time. This condition is called "diabetic retinopathy".

The wall of tiny blood cells is coated by a type of cell called pericytes in the early stages of diabetic retinopathy. Pericytes are a sign that the retinal vessels have been injured. Without the help of pericytes, the wall of the retinal blood vessels swells, causing a microaneurysm. They rupture and cause haemorrhages and tiny blockages. Lipids and proteins flow through the injured artery wall and gather as hard exudates within the retina. Because the retina is starved of

oxygen as a result of the damage, it produces a substance called VEGF [vascular endothelial growth factor], which is known as neovascularization. These neovascularisations are extremely delicate, and they can burst at any time, causing retinal injury. We can categorise these alterations in the generated fundus image into distinct stages of diabetic retinopathy by applying image processing to detect them.

Detected microaneurysm and exudates are used as an input to the SVM classifier. Depending on the number of exudates and microaneurysm, fundus image is classified into sever, mild, moderate non-proliferative diabetic retinopathy.

LITERATURE SURVEY

Keith et al [1] proposed the most desirable SVM parameters which were decided through a cross-validation logarithmic grid search. During education candidate segments were assumed to be section of strange vessels if one 1/3 or greater of their length coincided with the blended manual annotation. As there were too few photographs with new vessels for separate education and check sets, the SVM was educated and tested concurrently by means of leave-one-out cross-validation. The SVM was once skilled using all the pic in the take a look at set barring the single take a look at image, and this technique was once repeated for each image. The feature price normalization was once also recalculated each time. The vicinity beneath the curve used to be used as the major measure of detector performance. It is have shown in the past that a computerized system, based totally on photograph exceptional evaluation and detection of micro aneurysms, would reduce the guide grading workload in Scotland and considerably limit the fee of walking the screening programme. Adding a detector for exudates has been shown to improve the detection of maculopathy. Detection of new vessels on the optic disc might also in a similar way enhance the detection of proliferative disease.

Development of Prototype Heart Pulse Rate Monitoring System

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Abstract: Heart rate measurement is a basic and essential for daily health monitoring. A heart rate monitoring system is a personal monitoring device that allows one to measure heart rate in real-time. If someone wants to record the data or use it to trigger events, there is a need to turn that mechanical pulsing action into an electrical signal and this can be done only through heart rate measuring system. The pulse rate helps to find out if the heart is pumping enough blood to the body and also helps to find the cause of various symptoms such as an irregular or rapid heartbeat, dizziness, fainting, chest pain or difficulty in breathing. More than million people are at high risk of having heart related diseases. It would be helpful if there was a way for these people to check the heart rate by sitting at home. In this paper focus have been made on realizing a portable, comfortable and low cost solution for long-term domestic heart rate monitoring. There are various methods or technologies to measure the domestic heart rate. We have mainly focused on IoT-based, polymer-based pressure sensors, optical sensors, plastic optical fiber sensor, smart phones, MEMS based piezoelectric pressure sensor. The most effective method will be considered as an efficient way of detecting the heart rate.

Keywords: Heart rate, IoT, polymer based pressure sensor, optical sensor, fiber sensor, smart phone, piezoelectric sensor, MEMS.

1. Introduction

One of the most important organ in the human body is heart. Circulating oxygen and blood throughout the body is done through heart acting as a pump, thus keeping the functionality of the body intact and healthy. A person to be healthy requires healthy heart rate. A heartbeat can be defined as a pumping action of the heart two-part occurring for almost a second. Heart beat is produced mainly due to the contraction of the heart. Health issues related to heart are very common and mostly found in old aged people. Heart diseases are one of the most important causes of death among various people. Heart rate has been an essential factor in indicating patient's health condition for quite a long time. As people are paying more attention towards their health conditions, long-term heart rate monitoring of more importance to everyone as it's a valuable indicator or early diagnosis of various diseases. Furthermore, heart rate monitoring is also essential for sports enthusiasts and

professional athletes to keep them physically fit and mentally strong. According to all these requirements, it is necessary to design and fabricate a device which is suitable for long-term heart rate monitoring and that is easy to use and free from external disturbance. The portability, the reliability and the cost become three key issues for long-term heart rate monitoring for daily use. The main focus is to help old aged people to monitor their heart rate staying at home instead rushing to the hospital.

2. Literature Survey

[1] In this research paper they have described about the design of low cost heart rate monitoring device from fingertips based on the Bluetooth technology. Heart Rate (HR) is considered as one of the vital parameter for this device. The entire system is divided into several parts compromising of Heart Rate module, Android application and Bluetooth module. The Heart Rate (HR) module takes up heart rate signal by a non-invasive technique (Photoplethysmography) from the patients and sends the signal wirelessly to computer or android application using Bluetooth module. Their designed system can be embraced and combined as a part of telemedicine constituent. The received data from heart rate module using this technique can be saved and viewed for further medical usage. Bluetooth's signal can be transmitted between 15 to 20 meters radius, indeed the result from this device prototype can be utilized for various clinical investigations. Data is acquired using the capability of a heart pulse sensor. The microcontroller captures and process the data signals from the human's heartbeat. The IoT platform does the further analytics and visualization of the processed data. The proposed system is flexible, reliable and confidential for a heartbeat rate monitoring and control system using sensor network and IOT technology.

[2] In this paper they focused on realizing a portable, comfortable and low cost solution for long-term domestic heart rate monitoring. They proposed, manufactured and tested a tiny but efficient measurement system composed of a polymer-based flexible pressure sensor and an analog anti-interference readout circuit. The proposed polymer-based pressure sensor

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SIGN LANGUAGE INTERPRETER FOR DEAF AND MUTE

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Abstract: People have a characteristic capacity to view, hear and exchange information within their surrounding environment. Lamentably, few people with disabilities won't be able to utilize their senses to the most ideal degree. Such individuals rely upon different methods for interaction like gesture-based communication. Although the deaf and mute can be able to communicate with those who are having the same disability of being deaf and mute or who know their sign language, it provides a greater challenge for them when they try to communicate with those who hardly know what their gestures mean, when they are involved in any professional or social situations. Hence, there is a major need for an interpreter who can translate or interpret all the gestures into speech or text, or any device which has advanced technology to perform the work of an interpreter and convert the gestures into speech and text to make communication between both deaf and mute and abled people effective and efficient. This could help diversely abled individuals in their day-by-day lives by making an interpretation of their signals into significant English letters and words. The presented review paper showcases various devices as well as technologies to interpret the gestures into a form that can be understood by able people.

Index Terms – **Hand Gesture Recognition, Flex Sensor, Accelerometer, Speech Synthesis, Gesture Vocalizer, Digital Glove, Human Computer Interaction, Computer Vision.**

I. INTRODUCTION

Communication using sign language uses a visual form that includes hand gestures and signals, expression from the face, as well as body language while being considered as an organized and well-developed language. Although sign language can be helpful for other people, it serves as the basic means of communication among deaf and mute people. The primary disadvantage of usage of this form of communication in a world where the verbal form is dominant is that not enough people understand and comprehend sign language. Therefore, the best way to bridge this gap would be to implement a translator in between these two communities, where sign language would be translated into verbal form, making it an easier way of communication.

The main goal of gesture recognizers are to recognize particular gestures performed by humans and to use them for controlling the devices or to interpret the information into a form that can be understood by abled people. Two main methods to perform this are by [1] using data glove: Here a data glove is considered with all the required sensors to recognize the gestures are inbuilt in it, which can convert movement of fingers in to electrical energy to analyze the posture as well as the position of the fingers as well as the hand. And by [2] using the vision-based method: This technique is based upon how humans are able to interpret any message from the region around them and also it is non-invasive. A vision-based interface is feasible to be designed for a controlled environment although difficult for generic use.

II. LITERATURE REVIEW

[1]A data glove in which if a message is obtained, at first it is sent to a microprocessor, here it is Intel Galileo Gen 2 and is processed in it. Output is displayed on the Grove-LCD in the form of text and it is according to the sign given as input from any sign language. The text output is obtained by conversion of the sign language by the microcontroller during processing into the form of text. Grove-buzzer sensor is utilized to interpret this signal in the form of speech. The device proposed in this paper has found its usage in home automation where various gestures can be used to control variety of functions for example, switching any equipment on or off. This feature can be utilized in any basic electronic device.

[3]Sign language recognition system based on the leap motion sensor comes with Application Programming Interfaces (API) which is usually supported by the manufacturer of the product. The motion performed by the fingers or hand can be sent to user-designed programs to use the sensor as an alternative computer-human interface, by using the Application Programming Interfaces. In three dimensional medium, the sign language recognition using leap motion sensor is a miniaturized, low-cost sensor for sensing the gestures using the motion of hands and fingers. As the data transmission frame in terms of frames per second is assigned as 15, the device is pretty fast and responsive. The disadvantage of usage of leap-motion sensor is that for

Anytime medicine vending machine

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ABSTRACT

Availability of fundamental medical care is a significant foundation of advancement towards building a solid future. Prescriptions assume a significant part of human existence. Improvement of innovation is occurring quickly from microelectronics to Nano advancements, one of the development is "Programmed candy machine for therapeutic medications." Our thought is to make accessibility of medication all the time at a moderate price. As the name recommends it is a candy machine that administers medication needed according to the client's decision. It permits the client to choose the required medication, pay, the sum after which it confirms the sum checked and administers the medication. It lessens labor, time, and energy. It can likewise be introduced in clinics and there is no need of keeping up any records of prescriptions gave as all that will be recorded consequently by the machine utilizing distributed storage, and this aids in restocking of medication by sending an alarm message to the approved individual.

Keywords: ATM (Anytime medicine vending machine), Raspberry-pi, RFID, GSM.

INTRODUCTION

Each measurement or foundation whether it is business or wellbeing-related needs to improve as innovation develops. Numerous developments have come up and the wellbeing segment has not been abandoned in this head ways. Different medication candy machines have been created to make medical care benefits more effective and solid. Throughout the long term, we have seen developments of candy machines for different items like beverages and other food wares particularly rolls and cakes. Clinical creators hence have faced the challenge of building up a clinical candy machine for drugs. The issue arises when need of some drug impressing and medicine stores are not open or prescription isn't open in stock, especially amid evening time and in trips. In some cases in many emergency clinics particularly open emergency clinics, it is extremely regular to find that giving of medications takes very long and along these lines, this machine is one approach to check the issue of time squandering. For the machine to work adequately, the patients need to utilize an interesting ID that can forestall disarray among patients and the meds to take from the gadget. The engineering of the medication distributor is planned cautiously and it has sensors to distinguish the quantity of medication dispensed and when to administer and the amount to apportion.

LITERATURE REVIEW AND COMPARATIVE STUDY

In this part, a portion of the current examination on medical care and medication access has been talked about which propelled the plan and technique of the whenever medication candy machine

[1] built up a medication allocator for the model for guardians just as the patients of Alzheimer's illness. In the gadget, the parental figures need to include the drugs or top off the containers by filtering the medications utilizing standardized identification scanners. The patients need to contact the screen of the GUI and the medicine(s) will be administered out. If the patients neglected to take their medications in a given period the parental figure gets advised through SMS.

[2] examined the development of savvy medicine gadgets having a serious level of versatility and far-off reasonability. The allocator makes some genuine memories clock to monitor the patient's prescriptions and when the patient presses a catch at the right time the foreordained drug is apportioned out from the medication plate. They have utilized infrared sensors to monitor the number of medications administered out. They have likewise utilized LAN to intermittently send medication status without the intercession of the patient.

ECG Signal Acquisition and ECG Data Transmission

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Abstract: Heart-related disorders are the most common health condition that can influence various aspects of life. Heart rate monitoring plays a vital role to predict health conditions. Telemedicine is providing health-related resources and information through telecommunications technology and electronic information. One of the most emerging trends in day-to-day life is the telemedicine system. This telemedicine system is evolving as a result of reducing the overall cost of the patient, in particular for disadvantaged patients and border area patients, by reducing travel allowances, hotel expenses, and the sum to be charged by specialists for some complicated illnesses. Patients do not need to consult with physicians with the use of telemedicine services, and patients may be able to obtain successful care from their locations or local hospitals.

Keywords: ECG, NodeMCU, Wi-Fi, IoT, Cloud, ESP8266, Blynk

INTRODUCTION:

The telehealth system is one which the most emerging trend in today's life. This telehealth system is emerging because of reducing the total cost of the patient especially for poor patients and the patients from border areas by reducing traveling allowances, accommodation charges, and the amount is required to meet the specialists for some complicated diseases. With the help of the telehealth systems, the patients may not need to meet the specialists or the diagnostic persons and the patients can get effective treatments by sitting in their places. Because of these reasons, the people from villages are interested in telehealth systems.

In this telehealth system, the patients are not needed to meet the specialists or diagnostic person continuously until their problems get solved. Some data acquisition nodes depend upon the disease of the patients will be placed with the patient's body and the acquired data will be transmitted to the specialists or diagnostic persons by the communication nodes. These communication nodes could also be a GSM technique or CDMA technique or otherwise could be wireless local area network (WLAN) like Bluetooth, ZIGBEE, Wi-Fi, etc., The transmitted signals from the communication node will be received by the use of technology in the receiver end and then this signal will be monitored in the specialist's monitor. This detailed process will be done in the telehealth systems.

II. METHODOLOGY:

The proposed system consists of ECG Sensor, Arduino Microcontroller, WIFI module, Cloud or server, and MATLAB tool. It displays the extracted data or extracted parameters on the cloud through a WIFI module and WIFI access point for immediate access to the experts or doctors. Fig 2. shows a block diagram of the proposed system. The first electrodes capture the ECG signal and send it to the controller. The Arduino UNO is the controller used in this project, which processes the ECG signal and sends it to the WIFI module.

ESP8266 is used to send data to the cloud that is Thing Speak wirelessly. An acquired ECG data can be transmitted by using this cloud-based system. By using the Internet, doctors can be able to access the data from the cloud or server. Thing Speak cloud is the open Internet of Things (IoT) platform with MATLAB analytics used to visualize data to doctor or expert, then the doctor or expert's analyst makes decisions.
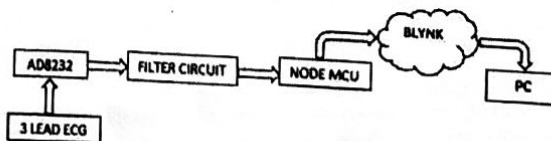

FIG .BLOCK DIAGRAM

III. LITERATURE SURVEY:

A literature review covering papers published. The search was conducted using the IEEE explorer, cited literature in the included articles, and various journals.

Mishra [1] has proposed the circuit, consisting of Arduino Uno, W-LAN module and the ECG sensor was well connected. The ECG leads are then color-coded and implanted on the patient's body. Now when the circuit is turned on, the heart rate is continuously monitored and an ECG waveform is generated.

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Design and Development of Fuel Accuracy Measurement and Theft Detection in Vehicles

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Abstract —This paper presents the planning, implementation and characterization of a hardware platform for stockpile indication System for vehicles, the first style goal is to plot a system capable of watching the stockpile in real time.to calculate the number of fuel filling within the tank and at petrol-stations. this method is predicated on hardware likewise as package. The Hardware half consists of stockpile circuits, on-board Arduino's modules, liquid show (LCD) and Flow Level detector. whereas the package half consists of Arduino IDE. this method measures fuel volume and sends measured volume to the owner's mobile through the GSM network. It additionally provides a way for detective work felony or fraud incidents just in case of fuel fill within the tank is a smaller amount than the specified fuel to be crammed or fuel felony from vehicle. this method permits watching of stockpile, having a reduced price thanks to reasonable and easy-to-acquire electronic elements.
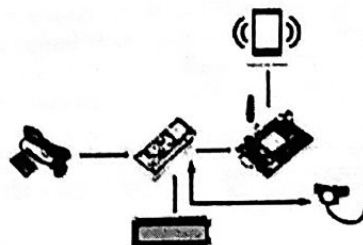
Keywords-Ultrasonic fuel level sensor, GSM module, Microcontroller, LCD, Flow level sensor

INTRODUCTION

Block diagram

In today's era we have a tendency to square measure perpetually hearing concerning gasoline thefting. these days Most of the gasoline bunks have fraud pumps in order that it displays the quantity entered however the amount of fuel crammed within the fuel tank is far lesser than the

displayed worth. because of these, most of the gasoline bunks house owners are becoming cash in on gasoline bunks. This ends up in large profits for the gasoline bunks owner however at a similar time the shoppers square measure cheated. Most of the vehicles incorporates analog meters thus it's unimaginable to exactly comprehend the quantity of fuel within the vehicle and additionally it's unimaginable to cross check the amount of fuel GSM being a 1 of the foremost common communication and utilized in the movable communication. they're distinctive in some ways as systems or applications is created to figure with the GSM communication because it is worldwide wont to be crammed within the gasoline tank at a petroleum bunk. during this project we have a tendency to square measure centered on making a display of the precise quantity of fuel contained within the vehicle's tank and additionally facilitate in cross checking the amount of fuel crammed at the gasoline tank and additionally offer indication of fuel stealing to the vehicle owner by causation messages and ringing calls to the owner's cellular.
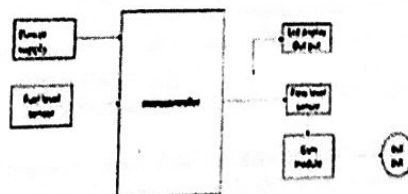
Schematic diagram

METHODOLOGY

The system contains supersonic detector modules, Gsm module SIM800, liquid flow detector, liquid show (LCD) to

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Design and Implementation of Arecanut Tree Climbing Robot

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ABSTRACT

Arecanut is one of the most widely grown crops across the southern part of India. The shortage of competent labourers and safety are the two most pressing concerns in this industry. This work attempts to construct an arecanut tree climbing robot using geared DC motors to climb the tree and a sharp blade mounted on the robot to pluck the cluster of areca nuts with a 180 degree rotating mechanism to solve this problem. The robot is controlled wirelessly by the remote which consists of an ATMEGA 328 microcontroller and the HC12 transceiver module, which is a half duplex wireless serial communication module with a communication range of 1km.

Keywords: Climbing, DC motors, ATMEGA 328, HC12

INTRODUCTION

In the agricultural sector, a scarcity of skilled and efficient labourers is a major issue. One of the crops that has been hurt the most by this is the arecanut. Arecanut trees grow to be about 55-75 feet tall. Climbing the trees at least five times a year is required for a good harvest. In India, there is a severe lack of human areca tree climbers who can gather areca nuts. The majority of the labourers are alcoholics, and they will climb the tree after taking a small amount of alcohol, which is dangerous for both the labourers and the owner of the arecanut farm. Sometimes the demands of the labourers will be more than the expectations. As a result, automation is the ideal method for overcoming the aforementioned issues.

In the market there are mainly two kinds of robots available, one is manually controlled and another is petrol engine-based robots. Manually controlled robots completely depend on mechanical structure and it is controlled using ropes, but this model requires much manpower to pluck the arecanut, hence the efficiency will be very less. Robots powered by gasoline engines can carry humans up to half way, after which they must manually pluck the areca nuts.

The project's goal is to create a robot that can ascend to the top of a tree and pluck a handful of areca nuts. It consists of Direct Current (DC) motors with gear to climb the tree, blade to cut the arecanut and a remote to operate the robot.

PROBLEM STATEMENT

The research in this field has revealed a variety of robot designs for tree climbing. After examining the various designs, it becomes clear that maintaining sufficient friction forces able to control the body, preserving structural stability during up and down motion, and precision gripping are all crucial characteristics to consider.

Arecanut tree has a height of about 55 - 75 feet and the circumference of the arecanut tree varies as it reaches the top. As a result, the robot must be ready to reach at top of the tree while adapting to the variable circumference, as well as chop the cluster of areca nuts while adjusting to the proper position.

LITERATURE REVIEW

Bhat et al [1] has done an analysis that a scarcity of trained and efficient labour is a major issue in the agriculture industry, thus creating automated alternatives is critical. Pesticides are unavoidable while cultivating Areca nuts, particularly in wetter climates. This study's goal is to build a rugged and lightweight Semi-Autonomous Robot that can climb an areca tree utilizing a single high torque drive motor and a laser guided servo-controlled nozzle to spray insecticides. The spring-based grasping adjusts automatically to the changing diameter of the trunk and offers the necessary traction to climb the trees. The primary processing unit is a microcontroller called ATMEGA 32, that is used for controlling, transmitting, and receiving. With the RF transmitter/receiver pair, the HT12 Encoder and Decoder pair is employed. This robot is meant to be controlled remotely by a layperson. This would undoubtedly solve the problem of human labour scarcity while also improving quality and production.

Substitute for an Amputated Hand using a Bionic Arm

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Abstract: In today's society, most people lose body parts due to accidents or disease, and most people lose their hands as a result of this incident. This article discusses how to solve this problem utilizing a low-cost prosthetic arm. Using an Arduino microprocessor and 3D printing technologies, a low-cost bionic arm was created. Bionic arms currently on the market are prohibitively expensive and cumbersome to wear, making them unaffordable for the poor. The major goal of this research is to create a low-cost prosthetic arm. The low prosthetic arm is made up of a myoware sensor that detects EMG signals from muscles during relaxation and contraction, an Arduino microprocessor that converts analogue EMG signals to digital signals, and seven motors in 3D printed hand material that move the hand.

Keywords: EMG (Electromyography), Myoware muscle sensor, 3-D printing, Arduino microcontroller and Bionic arm.

I. INTRODUCTION

From low-cost 3D printed designs to hi-tech advancements, modern advances in the area of prostheses are changing lives all over the world. Where there was once stigma, amputees are now empowered and enhanced. There is currently a lot of technology available on the market for building bionic arms. Surgical methods are also an option, but they come with a slew of drawbacks, including heart problems and back pain in certain patients. Many side effects can be avoided by using a bionic arm. EEG is another way used to implement the bionic arm. An EEG signal is generated in the brain, and the bionic arm is then implemented using that signal. However, it is not as effective as EEG, and takes too long to process the data. The relaxation and contraction of the muscles in the hand produce an EMG signal. EMG technique extracts EMG signal from hand using various sensors available on the market. Artificial hands were once created manually out of wood and iron, but have now been replaced by electronic components such as sensors and microcontrollers for real-time applications. Soldiers lost their legs and hands in battle back in the day, so the idea for bionic arms and legs arose from this, and thanks to advances in 3D printing technology, it is now easier than ever before.

II. LITERATURE SURVEY

Electromyography is a technique in which a specific potential is generated when muscles contract and relax as a result of nerve stimulation [1]. Electromyography (EMG) is more efficient than electroencephalography (EEG) because signals from the brain take longer to detect than signals from muscle contractions and relaxations [2].

The electromyograph gadget can detect EMG, which is a process known as electromyography. Implementing an adaptive filter to eliminate noise from an EMG signal can be beneficial. The adaptive filter is highly efficient in real time and its effects in ordinary and high noise circumstances [5].

Many ways are currently available on the market to minimize the cost of a prosthetic hand; they employ simple concepts to execute and complex techniques are accessible, but the cost is high and the efficiency is higher than low-cost techniques [3].

To account for the varying muscle bulk of different users, an auto calibration function is required, and users with less muscled have difficulty achieving some of the thresholds for switching modes for different users [7]. Some frictional elements of the bionic arm, where an FSR sensor is used in connection with an EMD for slippage detection, and a PVDF sensor is used in conjunction with a basic method for stiffness detection. When a trans-radial amputee is able to perform the P/S motion partially using his or her remaining forearm, a mechanical forearm mechanism is used to extend the pronation and supination (P/S) action [9]. The construction of the arm with RYRPRR - RP - RRRP as the configuration is calculated with 23 DOF and 10 steering engines [6] has the difficulties of dynamic modelling of a flexible arm and the complexity of force analysis. To control a flexible manipulator, the flexible arm can achieve periodic

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Design and Implementation of Flight Control Board for Quadcopter

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ABSTRACT

Unmanned aerial vehicles, or drones, have drawn extensive attention during the last decade together with the maturity of the technology. This paper presents the design of a flight controller using Arduino Uno and MPU 6050. Flight controller controls the quadrotor both manually and autonomously, is realized by integrating MPU 6050 microprocessor unit with selected gyroscope, accelerometer, magnetometer, barometer and GPS sensors. Flight control software is written in C programming language. Software, peripherals, and the drive mechanism are the three basic parts of a flight controller. The data from the sensors is processed by the microprocessor and produces an output signal using the motors control algorithms. The electronic speed controller (ESC) sends the produced PWM output signal to the motors.

INTRODUCTION

A drone or Unmanned Aerial Vehicle (UAV) is an aerial vehicle that does not require an on board pilot to perform the flight. The UAVs are controlled by the pilots through a controller, but self-controlling systems are becoming more common [1]. UAV's are mostly piloted by humans using a remote control known as a Radio Controller (RC). On the other side, the device integrator will operate it autonomously [2]. UAVs were originally designed for military purposes, but their use in civilian applications such as firefighting missions and civilian defence, such as surveillance of a large facility's pipeline, is gradually increasing. Finally, UAVs can be used in search and rescue operations, assisting in the recovery of missing or stranded people in inaccessible locations.

One such classification of UAV is Quadcopter. It is a multirotor air vehicle with four rotors. Unlike conventional helicopters, which use a special mechanism to adjust the pitch of their propellers, quadrotors use fixed-pitch propellers like airplanes [3]. It consists of only four propellers of equal diameter that raise and propel it forward. These four props are symmetrically mounted on a cross shaped skeleton, with the payload in the middle of the frame. Those props are rotated every two rotations and vice versa, resulting in zero torque applied to the drone.

In the current proposed paper, a flight controller is designed using aurdino uno and MPU6050. Software, peripherals, and the drive mechanism are the three basic parts of a flight controller. The data from the sensors is processed by the microprocessor and produces an output signal using the motors control algorithms. The Electronic Speed Controller (ESC) sends the output signal to the motors.

The idea of a quadcopter had come into existence in the beginning of the 20th century. The first attempt to build the quadcopter was made by Jacques and Louis Breguest in 1907 but this design was unstable so they couldn't build the rotating wings of quadcopter. After this Etienne Oehmichen was the first scientist who made the experiment on rotating wings and that managed to take off successfully[4]. This model was made up of steel tubes and at the end it had four rotor blades. He also inserted five double blade motors laterally to ensure that it is stabilized. Furthermore, the series of inventions have been done on the flight controller in which a number of sensors were introduced into the flight controller in order to increase the stability of the quadcopter.

Subsequent Development

The incorporation of the advanced sensors helped in increasing the hovering stability of the drone. The hover control was achieved using a microcontroller and a PID controller configuration. This led to the increasing use of drones in the field of agriculture to monitor crops of an area. This was one of the major advantages of using the drone. However, the drones were still not sufficiently modified to perform complex task. So, scientists introduced few other sensors like tilt sensors, infrared sensors to increase the efficiency of drones in their task. The tilt sensor keeps track of the drone's pitch, while the infrared sensor uses the body's different radiation to distinguish the subject of interest of other objects. But there were no sensors to find the location where the drone is flying so the scientists introduced the Global Positioning System (GPS) module which will find the location of the flight and send this information to the remote controller. Mechanical flight control system become more complicated and heavier as the aircraft grows in size and

Design and Implementation of LPG leakage detection using resistive sensors

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Abstract— Liquefied petroleum gas (LPG) is a popular fuel especially in metropolitan areas. Leakage of gas is a concern, especially in the industrial sector, as well as in residential areas. Because of the rising rate of gas leaks, home security has become a serious concern. With ateliers, residential areas, and vehicles such as compressed natural gas (CNG), buses, and cars that run on gas power, gas leakage is a major cause of concern. Installing a gas leakage detection kit at sensitive locations is one of the preventive techniques for preventing accidents caused by gas leakage. The goal of this study is to present and discuss a design for a gas leakage detection system that can detect, alarm, and control gas leakage automatically. This system also features a user alerting mechanism. The system is based on a gas leak detective sensor.

Keywords—LPG (liquefied petroleum gas); gas sensor; buzzer; alarm;

I. INTRODUCTION

Liquefied petroleum gas (LPG) is the most commonly utilized cooking gas in our household. LPG gas is a flammable gas that can cause serious harm to people and property if it is accidentally released. As a result, it must be handled with caution and extra caution to avoid any possible leaking.

Because of its smokeless combustion in the air, liquefied petroleum gas (LPG) has been used for almost six decades, first as an industrial fuel and then for home cooking and heating. Propane and butane are generally blended in a 60-40 ratio as the major components of this gas. In recent years, gas leak detection in residential homes has become a major concern. Gas leaks have been blamed for several accidents in both residential and industrial settings, according to the electronic and print media. In recent years, the number of people who have died as a result of gas cylinder explosions has risen. Typically, accidents occur as a result of human error rather than a technological failure that allows gas to escape into the atmosphere. Hundreds of millions of people use LPG around the world, and it has over 1000 uses. Industry, commercial enterprise, farming, transportation, cooking, power generation, agriculture, recreational reasons, and heating are all examples of this.

LPG is an odorless gas that is made up of a blend of propane and butane. Both saturated and unsaturated hydrocarbons are found in it. The stanching ingredient used to give aroma to odorless LPG is Ethyl Mercaptan. LPG is a liquefied petroleum gas that has mostly replaced traditional fuel systems in the home and business.

II. LITERATURE REVIEW

Zargar *et al* [1] has reported that Sol-gel screen-printing was used to create ZnO and ZnO/MWCNT nanocomposite films that were successful. In the ZnO/MWCNTs nanocomposite film, the crystallite size has increased. MWCNTs in the ZnO matrix improved the nanocomposite film's structure and optical properties. MWCNTs dominate the ZnO peaks in the Raman spectra, which have been examined extensively. The ZnO/MWCNTs film had a higher porosity than ZnO and MWCNTs that were equally distributed, according to SEM examination.

Thai *et al* [2] has described practical applications in hydrogen energy, breath analysis, air pollution monitoring, and industrial control, the classification of various gases such as H2 and NH3 utilizing a low-cost resistive semiconductor sensor is favored. To improve H2 and NH3 sensing performance for effective monitoring and classification, porous bilayer Pt/SnO2 thin-film sensors were constructed. To optimize the response to H2 and NH3 gases, different Pt film thicknesses of 2, 5, 10, and 20 nm were deposited on 150 nm SnO2 film-based sensors using the sputtering method. The produced Pt/SnO2 films considerably increased the sensor response to NH3 and H2 when compared to pure SnO2 thin films, according to gas sensing data.

Ram *et al* [3] has studied The behavior of a nanocomposite made by combining 3 wt% and 5 wt% WO3 nanoparticles in PEDOT was investigated. Before and after ion beam irradiation, morphological, structural, and spectroscopic analyses of hybrid nanocomposite films were conducted. The XRD data demonstrated that as the fluence increased, the particle size decreased, revealing chain scission with irradiation. The fault enhanced surface diffusion has a significant impact on the surface roughness, according to SEM and AFM images. The optical band gap shrinks as ion fluence increases, from 2.34–2.18 eV for 1 wt% hybrid composites to 2.39–2.14 eV for 5 wt% hybrid composites rise in amorphous nature (disorder state) of the material following ion beam irradiation is depicted by the increase in Urbach energy, which corresponds with XRD results.

Jadhav *et al* [4] has reported the Green papaya leaves were used to synthesize and characterize SnO2 nanoparticles. In the combination of SnO2 nanoparticles, they used the green leaves of the papaya plant as a reducing specialist. When compared to traditional procedures such as sol-gel system technology, laser removal strategy, solvothermal strategy, dormant gas accumulation technique, substance reduction strategy, and so on, green synthesis avoids harmful synthetic compounds. X-ray diffraction, Field emission scanning electron microscopy, Transmission electron microscope, X-ray photoelectron spectroscopy, and Energy-dispersive X-ray spectroscopy were used to evaluate the arranged SnO2 nanoparticles.

Vattappalam *et al* [5] has reported the Al-ZnO thin films produced using the SILAR approach have been found to have improved and rapid LPG sensitivity. When compared to unirradiated samples, irradiated samples have a higher sensitivity. The response time for all samples was found to be 1 s, regardless of doping concentration or irradiation dosage, while the sample recovery time was shown to be lowered with irradiation. The difference in irradiation dosage did not influence sensitivity, response time, or recovery time. Finally, the results show that the Al-ZnO thin film is a good choice for sensor manufacturing at a low cost.

Ibrahim *et al* [6] has examined Via tin chloride dihydrate as the starting precursor, pure SnO2 and V2O5 doped SnO2 nanopowders were produced using a sol-gel

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DESIGN AND IMPLEMENTAION OF SOIL MOISTURE ANALYSER

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Abstract: — In past years, the issue of replacement has gotten more genuine and over years' horticultural laborers have handled rapidly. In such circumstances there are new ranchers who have started their farming cycle. In any case, the commencement to the innovation of cultivating transformed into a pivotal organization question for fresh out of the plastic new ranchers. In this investigation, we zeroed in on the way that to make up for the water the executives are a piece of the administration difficulties of the new ranchers (foundation of cultivating innovation), to assemble a dirt dampness estimation framework because of dampness sensor. In incorporation, clarification of water system sum and consequently the arrogance of results is performed which is done on the deliberate information.

Keywords: Soil moisture sensor, NodeMCU, Arduino UNO

I. INTRODUCTION:

Horticultural advancement is having dashing velocity, multi directional and quick spread as per existence. After green unrest ranchers began utilizing worked on social practices and farming contributions to concentrated editing frameworks with worker escalated programed to upgrade the creation potential per unit land time and info. It gave reasonable climate to every one of these further developed quality sorts to encourage and show their yield potential in more up to date regions and seasons. Horticulture comprises of raising creatures and developing plants which prompts yield creation and consequently we will actually want to keep an organic strength in nature.

Farming improvement is having jogging speed, multi directional and quick spread as per existence. The current cultivating frameworks prompts decrease of natural matter and soil supplements because of tedious reaping. There is lacking exertion to renew supplements bring about helpless amount and nature of reap for the ranchers. By understanding the dirt dampness, it assists ranchers with taking legitimate choices on what sort of yield to planted, in which region and at what time. Accordingly, this has been done as it was done in the good 'ol days with sheer experience has made cultivating simpler in the day and age. Innovation has made an upset in agribusiness and with computerized data on climate, soil, wellbeing, sicknesses, crop the board ranchers are better prepared to confront difficulties ahead on schedule.

II. METHODOLOGY:

The proposed system consists of Soil Moisture Sensor, Arduino Micro controller, WIFI module, Cloud or server. The soil moisture sensor reads the moisture level in soil. It has to be calibrated with the soil moisture meter in order to make the sensor show the direct moisture measurements. Hence, the soil moisture meter readings are noted in different level of soil moisture with the corresponding resistance reading of moisture analyser and by plotting a graph a liner equation was obtained. The Arduino reads the moisture content in the soil and send it to the NodeMCU which reads and stores the data in database. The webserver is used to plot a curvilinear graph and extract an equation. Once the equation is derived the test data is used to draw a graph and find accurate measure of required moisture in the soil.
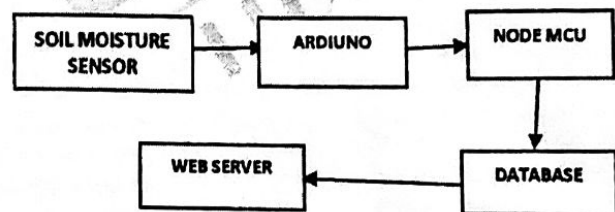
Fig: Block Diagram

Literature Survey:

A literature review covering papers published. The search was conducted using the IEEE explorer, cited literature in the included articles, and various journals.

Maniraj et al[1] have put forward a paper which provides how to see the dampness of the sector and control water system to the irrigation field using arduino and moisture sensor. The main aim is to make the system on and off with no human intervention by designing and according to the level set on the system. The proposed project helps the farmers use water in an efficient way to irrigate the farmland with automatic irrigation system. The system is made automatic by using micro controller device. In the proposed system the local host or the server receives all the information about the water level and the irrigation status. To communicate with the micro controller Java platform is being used to communicate with micro

Research Article

DESIGN AND IMPLEMENTATION OF LANDSLIDE EARLY WARNING AND MONITORING SYSTEM

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ABSTRACT

Landslides are one of the natural disasters that often occur in different parts of the world. It refers to several forms of mass wasting that may include a wide range of ground movements, such as rock falls, deep-seated slope failures, mudflows, and debris flows. This natural phenomenon cannot be abolished, but one can reduce the losses by an early warning system using wireless sensor networks. Early warning systems depend on a sensor node used to read different properties of slope and soil condition with particular parameters. The parameters that are received are used for the detection of downhill movement of soil, debris or rocks. However, one should replace the entire system due to the damage to the sensor node when a landslide occurs. Sensor node has IMU sensors to monitor the movement of particles and microprocessors, which are economical to manufacture and could be installed in a small space.

INTRODUCTION

Natural disasters are often unforeseeable and occur in a matter of minutes. As a result, technology to capture relevant signals must be created. Monitoring time is kept to a minimum. Wireless sensors are one of the most common types of sensors cutting-edge technologies that can react swiftly to changing conditions changes in data are sensed, and the data is sent to a data analysis programme Wireless sensor network (WSN) technology allows for the real-time capture, processing, and transfer of important data with high resolution[1]. Landslide mapping has traditionally relied on visual inspection of aerial pictures and extensive field surveys. However, those technologies are ineffective for mapping broad areas time-consuming, resulting in a void that remote sensing has been able to fill. Due to spatial resolution limitations, typical optical satellite images, such as that obtained by the Landsat Thematic Mapper (TM) is only useful for land-based applications researches on slides[2]. However, monitoring should not be limited to vibrational analysis in order to have a foolproof system. There are a variety of other factors that might be tracked. In a landslide, for example, the pore pressure might be monitored. Changes in the soil's shear strength as a result of the response The introduction of wireless technology aided in the monitoring of sites that were previously dangerous and inaccessible, such as active volcanoes and isolated locations.

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Sensor that can be used wirelessly WSNs are increasingly being used for real-time monitoring landslides and other similar occurrences WSN was used in a trial project to detect landslides. This website is well-known for its frequent updates. In the past, there have been landslides. We sent out numerous Deep Earth Probes. DEP probes with a tiltmeters, MPU6050, and temperature sensor. The water level is detected using the dielectric moisture sensor. External geophones were installed and connected to DEP's wifi node. Our findings from the pilot. We discovered that geophones may be used throughout the deployment to minimise the system's power limits and costs in a cost-effective manner. The geophone can also be used to pinpoint the location of the slip which predict the motion's direction including all of these concepts a more efficient design. In the current proposed paper, the landslide monitoring system is designed using Siren, Raspberry Pi 3 Mode+, Sensors[3].

LITERATURE SURVEY

1. The proposed project based on Wireless Sensor Network (WSN) technologies. Wireless sensor networks are one of the emerging areas which have equipped scientists with the capability of developing real-time monitoring systems. This paper discusses the development of a WSN to detect landslides, which includes the design, development and implementation of a WSN for real time monitoring, the development of the algorithms needed that will enable efficient data collection and data aggregation, and the network