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Embedded Sensors in Work Clothing to Provide Health Data of Workers

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Abstract - *Our work is related to a person safety using Arduino Uno. The person or mine worker are installed with sensors and WI-FI module. Gas sensor, temperature sensor, carbon dioxide sensor, and buzzer circuit also added in this project. The gas sensor is used to find the carbon level in the mine exhaust of the atmosphere and temp. sensor is using to find the operating condition are good or not for workers. If both are sensor value is not normal means the normal condition worker can work. Sensor is found in the position of the device, if the sensor value is abnormal or very high, means the value are sent local host at the same time buzzer will blow. Monitoring system the method and one thing we uploaded all values in local host.*

***Keywords:** embedded sensors, work clothing, worker's health, Arduino Uno*

I- INTRODUCTION

This consists of the safety purposes of the mine worker and here the sensor is used to monitor the atmosphere in mines. Abnormal values will activate the buzzer and the sensor value will be uploaded to the local host. Person tracking devices is not merely a decoration for safely purpose these days; it has emerged as indispensable requisite to safeguard against probable tribulations. Anyone who gives his life to risking for his work should assist personal assistance or for safety of his own environment, one is always burdened with uncertainty related to safe transit of persons/ passenger working in hazardous condition and hesitation about for long performance. This gave a jump start to introduce this wearable System which purposefully caters to individual and organizational needs for mine safety of workers, monitoring and enabling to optimize workers performance in transit to work and save each life's resulting as a safety solution for everyone for reducing carbon footprints on earth.

II-LITERATURE REVIEW

Important process variables can be monitored from a distributed control system, as proposed in Tan, Lee, and Soh's (2002) study [1] [6]. This system would be hosted online (DCS). In order to get efficient remote access to the DCS's process variables, this study suggests hardware and software design considerations. Using one's voice to command one's household appliances to carry out a certain task [2][8] was proposed by Potamitis, Georgila, Fakotakis, and G. Kokkinakis, 2003. The methodology is slanted toward enabling persons with disabilities to carry out functional tasks at home by using their voices to control equipment. Through analysis of the speaker's voice, a voice separation approach is chosen. Using a system called "A System for Smart-Home Control of Appliances Based on Time and Speech Interaction," [3][9] developed by S. M. Anamul Haque, S. M. Kamruzzaman, and Md. Ashraful Islam in 2006, it is possible to manage your home's electronics from your computer. To create this system, we used Visual Basic 6.0 as our primary programming language and the Microsoft Voice Recognition SDK and Voice Editing SDK to implement our speech recognition functionality. Timers and voice commands both work for operating appliances. This paper presents the design and implementation of SMS-based control for monitoring systems [4][7], by Ciubotaru-Petrescu, Chiciudean,

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Cioarga, and Stanescu (2006). There are three sections of this study that each use a sensor device to keep tabs on advanced software. A microcontroller serves as the brains of the operation, while a GPRS modem or a mobile phone's serial port RS-232 serves as the communication module. Status updates, such as a loss of power, can be sent through SMS. In 2008, [5][10] Jawarkar, Ahmed, Ladhake, and Thakare proposed voice-activated remote monitoring via cell phone. The microcontroller receives the spoken orders, converts them into text SMS, and sends them to the control system, where it makes a choice regarding a specific task based on the received text. (2015) "Remote Controlled Home Automation Using Android Application over WiFi Connectivity," [6][11] by Era Johri et.al.

III-PROBLEM STATEMENT

The technology was implemented based on their requirements. The following considerations were made

(1) During work in the field what kind of environment they are exposed to? What to monitor? (2) Design of the sensor based of the area they are working in. What to measure? (3) Do the workers have some prior health issues or any handicaps? (4) How to ensure that the workers are using the sensors continuously? (5) Document feedback received from the worker regarding the sensors and make changes.

Proposed System

The purpose is to develop automation of IoT based security system with remote control via Internet and Android phone. As technology advances, industries also become adaptive. New age factories are generally moving from old switches to unified control arrangements, for this RF based switches are used. Currently, remote-based IoT automation monitoring system provides an easier alternative to use with Radio Frequency based technology. To do this, the remote that interfaces with the Android app with Wi-Fi active on the transmitter side sends a data signal to the receiver to which the PC is connected.

Methodology

During this research we first conducted an assessment of the workers preferences and handicaps. There are many aspects that can hinder the application of this technology. For successful implementation of this sensor-technology in the work place it must meet multiple criteria. The most important information to keep in mind is the need of the employees working in the fields.

As at the transmitter in figure 1, the digital code for current detected for every room is detected and a different RF signal is generated and send in atmosphere. Then at receiver this signal is received & according to the assigned code & names will be displayed on the display. All other function will be performed by microcontroller.

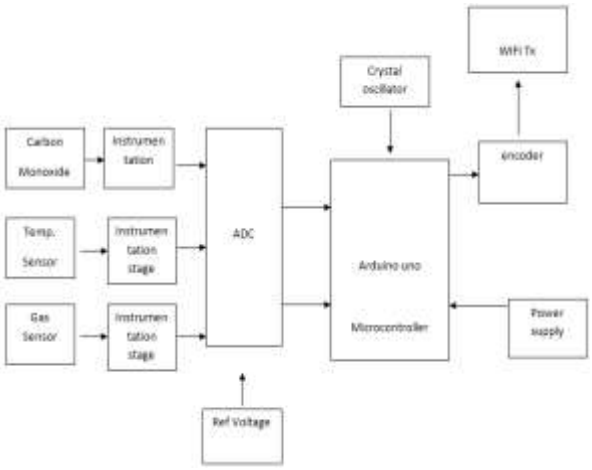

Fig.1- Transmission station

Carbon Monoxide Sensor:

This is a electrochemical sensor. It is highly accurate in reading the carbon monoxide value and it is very sensitive. The is in terms of the change in current flowing in the circuit.

Instrumentation Stage:

This is essential as the output from the sensor is not in the form of voltage, so it needs to be amplified and converted to the voltage form. The output needs to calibratealso. The output voltage needs to be proportional to the correct carbon monoxide value.

WIFI transmitter-

Code for every person is set differently. It consists of code generating logic circuit. The desired code for that parameter is set while designing.The desired code and data that is to be send is encoded by the encoder circuit. The encoder sends the code serially to the RX Tx module. The RX Tx module sends the code by using ASK type of modulation and the carrier of 2.5 MHz

WIFI Receiver –

This is receiver stage will receive the different code and data which are transmitted by the transmitter stage this will provide strong signal to the detector stage. Also

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suppressed noise level. ASK modulated signal is demodulated this signal is provided to detector stage.

Data detector-

this data detector will detect the signal to a code this decoded code is provide to the microcontroller according to the received code the detected signal is send to the microcontroller.

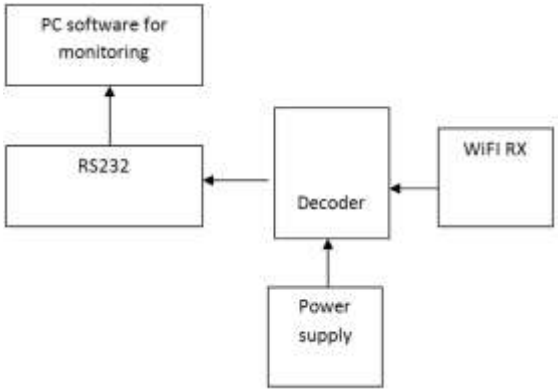

Fig. 2- Central monitoring station

Receiver section includes components like WIFI receiver; decoder; ATMEGA; relay; load driver stage fig. 2. The WiFi receiver and decoder are linked here in the receiver. Connected between the microcontroller and the transistor driver stage is this decoder. This driver links up with the relay, which in turn links up with various loads.

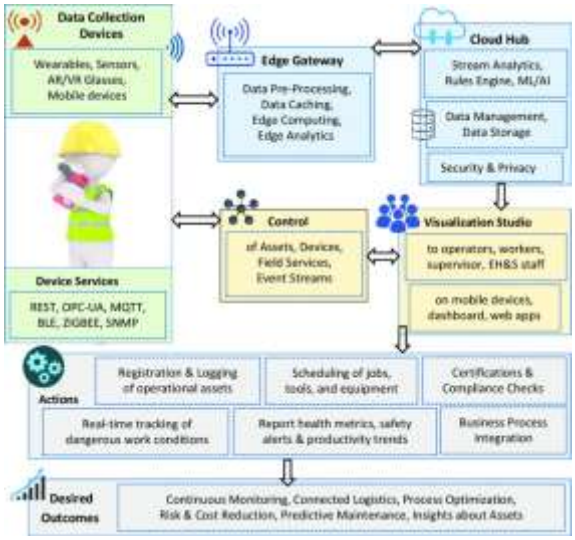

Fig. 3- Safety purposes of the mine worker

This gave a jump start to introduce this wearable System fig. 3 which purposefully caters to individual and organizational needs for mine safety of workers, monitoring and enabling to optimize workers performance in transit to work and save each life's resulting as a safety solution for everyone for reducing carbon footprints on earth. In big mines and all B and C grade mines now a day's only one problem becoming very critical that is environmental parameters in many areas of the mines there is very many parameters and in some area, there is less parameters so where there is more parameters it needs to monitored and try to find solution to control it. For that same reason this system is introduced which is very important, Because this system is a standalone system with a feature that it can be installed anywhere in the mines and the parameter monitoring department of company can keep track of the reading coming from all the area say if we installed with worker system the mines then it can be monitored and one can know where is more parameters and where is less parameters and if there is more parameters in some areas then one can make provision such as banning the vehicle from going to that area or banning only heavy vehicles from this area likewise action can be taken. It will save a lot of energy and time for the installation department to read the situation and take some action, it will also save manpower by sending man to specific place and ask him We monitor the readings of the mobile monitoring device for the whole day of heavy exercise. That is why this system is essential for anyone working in the mines. In the future, more sensors can be combined to read other parameters in this system such as noise parameters, air density, visibility.

IV-SCOPE OF RESEARCH

Participants identified five requirements for using sensor technology at workplaces. The dimensions of sensor technology implementations, the durability of the sensors, corporate commitments and laws, and the intrusiveness and privacy of workplace feedback.

Dimension and Heft of The Sensors

People using the sensors noted that the overall dimensions of the sensors can cause problems during its use in the field. Based on the feedback we found that the sensors must not hinder the ability of the workers to perform their tasks. Additionally, the workers requested that the weight of the sensors should be manageable so that dusting various tasks it should not get in their way of hamper the outcome of the task.

Durability of the Sensors

Durability of the sensors is the most important aspect for long terms success and implementation of the sensors in the work place. The work place can have dirt, fumes, radio signals which interfere with the sensors. It

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can get wet of be exposed to extreme heat. It must withstand all these conditions and still function while providing accurate data regarding the worker.

Company Goals and Rules

Different companies have different rules for the work place. Many companies have stipulations regading various gadgets a worker can carry into the work place. For example, most companies now a days do not allow smart phones in the workplace. In addition, the application of sensor technology must correspond to the standards of the (local) company.

Time Commitment

Users of the sensors wanted the implementation to consume less time, so that they can be efficient at the work place. For example, the users wanted a simple interface so that they were not forced to change the setting multiple times. They wanted clear instructions on how to wear the sensors and use them. The device needed to be simple so that no extra training would be required to operate it, plus they can use is simultaneously along with their work.

Motivating Users to Continuously Wear the Sensors

Three facets of the technology were reported to be necessary for motivating or impeding the long term use of the sensors:(1) workload measurement and monitoring; (2) data security and clarity of data ownership; and (3) user reviews.

Data Collection During Work Hours

Users wanted to know about the different data being collected about their physical health and work habits. This would allow them to make changes or take precautions to avoid injury to health. "For example, recognizing physical stress and what you can do about it."

Privacy of Data and Access to Data

User wanted direct ownership of the data collected and wanted to make their own decisions regarding sharing of data. “Give the data to the workers, they can then give it to the needed person or the requester.” In addition, the participants indicated that data could be shared. Example: General Practitioners (General Practitioners) will be allowed access to the health data of the workers. "When I declare that my GP may receive my results after health check, that's fine with me". Participants also approved of the health and safety measures taken by their own company health departments, but they were hesitant about the conflict of interest. Users were ready to share their health data with their employers on a need to know basis. The data would be shared temporarily and deleted after use. “I believe if you do it work-related, such as lifting, it is accessible to employers. Things like heart rate are a bit more personal.”

V- RESULT AND DISCUSSION

This study provides an insight in to the needs and like of the workers who operate in physically laborious jobs and how technology can be used to ensure their safe and increase efficiency at the same time. The participant categorized three workloads (physical workload, jobs with high exposure to heat and stress and jobs with high levels of noise) and one health hazard (tiredness) that she wanted to measure with the sensor technology application. The application of sensors fig.4 combined with the clothing and wearable devices was preferred the users. This made it easy to collect data during work hours and the exposure of the workers to the environment.

The biggest stipulation on the data collection was that it must be delivered to the workforce in real time without any lag but also must be monitored in a centrally located office.

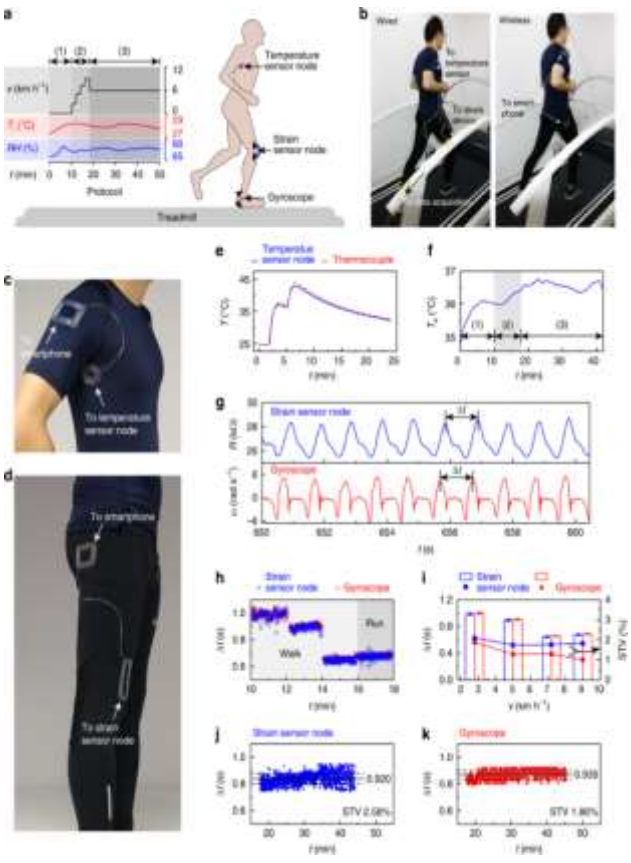

Fig. 4- Health regulation analysis

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In case of an emergency data must be sent to the user immediately. fig. 5 When this sensor is used on the workers during office hours it must comply with corporate rules and health regulation provided by the government. fig. 6 As an added bonus it must be comfortable to wear for long hours. To make sure that the technology is widely accepted and implemented it must function safely, it should be able to handle extreme work conditions and users must have independent control over distribution of the data. Users preferred to have real time feedback to avoid any major accidents. Users were a little sceptical about sharing health data with their employers. But in the interest of goodwill they agreed to share the data temporarily with the concerned authorities.

Fig. 5- Parameter sensed data

Fig. 6 Variation in sensed data

VI- CONCLUSION

The application of sensor technology helps workers in physically demanding jobs measure and monitor their work exposure. Hurdles to implementing the sensors, like data-privacy concerns, quality, convenience, and easy of use, must be carefully taken in to account for the successful assimilation of the sensor based health monitoring systems in the work place for a long period of time. Safety and health incredibly important at the workplace. Employee work conditions are of paramount importance to the companies. To take care of productivity within the post pandemic era it's important to supply security to people. the price of health care is rising; hence prevention is cheaper than the value of cure. In this regard sensors based monitoring systems help companies keep track of a healthy work environment. It also helps in minimizing risks to the workers. Because of this awareness among the companies to keep people safe at their place of work there is a rising trend of wearable technology such as smart watches, bands and other such devices. These help the company in monitoring situation awareness of the worker, avoid injury risks and make the work flow efficient. It has helped companies maintain healthy behavior amongst its employees and help worker become more cognitive. Current generation monitoring systems are geared towards monitoring physical aspects of the workers. But new generation systems are being created to monitor the overall psychological health of the people at the work place. These systems are being designed to monitor anger, depression or mood swings of the workforce. These newer systems will provide wide scope to manufactures to produce devices in large quantities to identify and number of occupational hazards and pitfalls. But to ensure wide spread adaptation of these devices, manufactures must conduct third party testing using independent contractors. This research is aimed at helping the manufactures to created monitoring sensors, using the feedback collected through this study. It will help manufactures to bridge the gap between the expectation of their customers and the design of the sensors and its implementation.

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Plant Nurturing and Disease Detection System

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Abstract *-This system has developed an automated system to determine whether the plant is normal or diseased. The normal growth of the plants, yield and quality of agricultural products is seriously affected by plant disease. This paper attempts to develop an automated system that detects the presence of disease in plants. An automated disease detection system is developed using sensors like temperature, humidity and color based on plant leaf's health conditions variations. The values based on temperature, humidity and color parameters are used to identify the presence of plant disease.*

Keywords- *Plant, detection, sensor, temperature, humidity, color.*

I- INTRODUCTION

India is a land of agriculture. Two-third of population relies upon agriculture for their livelihood. It is the basic foundation of economic development of the country. The agriculture also provides employment opportunities to very large percentage of population. Plant health condition plays a vital role to earn good profit for the farmers. Proper monitoring of plant health is required at different stages of plant growth in order to prevent disease affecting plants. Existence of pests and disease affect the estimation of crop cultivation and minimizes crop yield substantially. Present day system depends on naked eye observation which is a time consuming process. Automatic detection of plant disease can be adopted to detect plant disease at early stages. Various disease management strategies have been used by farmers at regular intervals in order to prevent plant diseases. In the present work, this issue is addressed using sensor based technology. This being the motivation, the problem entitled "Leaf Disease Detection using IoT is proposed to assist the farmers technologically. In the proposed work, focus has been on early detection of disease infection on plant leaves.

II- LITERATURE REVIEW

The relationship between the plants and the environment is multitudinous and complex. They help in nourishing the atmosphere with diverse elements. The relationship between the plants and the environment is multitudinous and complex. They help in nourishing the atmosphere with diverse elements. Plants are also a substantial element in regulating carbon emission and climate change. But in the past, we have destroyed them without

hesitation. For the reason that not only we have lost a number of species located in them, but also a severe result has also been encountered in the form of climate change. However, if we choose to give them time and space, plants have an astonishing ability to recover and re-cloth the earth with varied plants and species that we have, so recently, stormed. Therefore, a contribution has been made in this article towards the study of plant growth and its management. Twelve economically and environmentally beneficial plants have been selected for this purpose. Leaf images of these plants in healthy and unhealthy conditions have been acquired and alienated among two separate classes. We have collected about 4503 images of which contain 2278 images of healthy leaf and 2225 images of the diseased leaf. Further, we hope that this study can be beneficial for researchers and academicians in developing methods for plant identification, plant classification, plant growth monitoring, leaf disease diagnosis, etc. Finally, the anticipated impression is towards a better understanding of the plants to be planted and their appropriate management [1].

Agricultural productivity has a vital role in the Indian economy, but it is seriously hampered by pests and plant diseases. Neural networks have been a major step forward in the, Agricultural productivity has a vital role in the Indian economy, but it is seriously hampered by pests and plant diseases. Neural networks have been a major step forward in solving this problem in the past two decades. However, the existing systems in place are computation-heavy and costly to implement. Such tasks also ideally require a dataset of leaf images that simulates real environment conditions, which is hard to find. The motivation of this paper therefore is to solve all these issues by building a light-weight and cost efficient deep learning architecture with the proposed DenseNet-121 model that classifies leaf images from a dataset called 'Plant Doc' across 28 classes with 1874 training images and 468 validation images. A separate test dataset is held out only for checking model performance on unknown data. Implementation is done using Fastai framework, because of its faster computational power, easy workflow and unique dat a cleaning functionalities. Overall, the classification accuracy achieved is 92.5%[2].

Focusing on the effect of universal food insecurity, over 60% of sub-Saharan countries are predicted to be in a state of malnourishment and yet several farming places are under drought state. The climatic condition is believed to be biannual dry seasons which is very difficult for farmers to cultivate crops due to shortage of water and poor soil fertility. Yet heavy rainfall is still a great threat for the farmers since it devastates cash crops. The use of a smart greenhouse with Artificial Intelligence to grow and protect plants in both dry and wet seasons and reduce labor-intensive human tasks and automate pervasive data analytics of daily plant status can surprisingly boost food security. Here we present a fully automated greenhouse system with artificial intelligence embedded in it that uses around 10,000 plant images in it that initially nurture plants under optimum atmospheric conditions by taking real-time decisions, detecting any kind of illness, and interestingly notifying the stage of fruit ripeness. By implementing a neural network-based computer vision approach we were able to keep track of the health status of the plants caused by several microorganisms. The obtained predictions and results accurately verify how machine learning can be used to increase gross national food security by implementing such systems in multiple farming areas without prior human involvement [3].

The impact of rice plant diseases has led to a 37% annual drop in rice production. It may happen basically due to the lack of knowledge in identifying and controlling rice plant diseases, but still there isn't any proper application has been developed which is capable enough to identify these rice plant diseases accurately and control those diseases. In order to identify rice plant disease by an application itself, Convolutional Neural Networks (CNN) can be used. Many of researchers have used CNNs for plant disease identification because of their accuracy in image identification and classification. But, there's still a handful researches have been conducted regarding the identification of rice plant diseases. This study provides a comprehensive understanding of current rice plant illnesses as well as the Deep Learning approaches used to detect such diseases. It also analyzes several kinds of techniques that have been employed in the literature by analyzing all of them with their benefits and drawbacks. It has discovered the most accurate ways in all levels of the image identification procedure as a consequence of this research, that will be valuable in recognizing rice plant illnesses 4].

Crop cultivation is one of the prime sources which determines a nation's prosperity and economic growth. But most of the farmers face difficulties to survive due to lack Crop cultivation is one of the prime sources which determines a nation's prosperity and economic

growth. But most of the farmers face difficulties to survive due to lack of enough labors, inappropriate and traditional methods followed to monitor agricultural fields and plant growth etc. As technology has evolved, it is possible to automate the various phases of farming activities. There are many standard sensors available to remotely monitor the soil moisture content, pH content, fire detection in the field, intruder detection etc. All these sensors sense the information and is fed to a central coordinator which will process the data and initiate necessary actions. All these are done over internet and thus the concept can be called as Smart farming using Internet of Things. It is also possible to analyse the image of plant leaf to identify the various plant dis-eases with the help of Machine Vision. Our model thus reduces the farmer's overhead using IoT and computational intelligence [5].

In India agriculture is the main source of income for generating the economy. Diseases in plants are a major unavoidable problem, and hence detecting the diseases is the necessity of the day in the domain of agriculture. The main diseases found in tomato plants are viral, fungus and bacterial diseases. The detection will help improve the quantity and quality of the products with an optimum yield. In this paper a comparative analysis is carried out for the algorithms Support Vector Machine, Convolution Neural Networks, Decision tree classifier, and k-Nearest Neighbour (k-NN) with the result of 97%,97%,90% and 80% respectively[6].

The Food and Agriculture Organization of the United Nations (FAO) reports that up to 40% of global crop production is lost annually due to weeds, pests, and diseases, and these losses could worsen without proper pest and disease management (OECD/FAO, 2012). Conventional approaches to pest monitoring and management are insufficient in meeting present demands in terms of efficiency, coverage, and cost-effectiveness. (Wolff et al., 2016). To address this issue, the development of smart pest control technology (Kanwal et al., 2022), the improvement of agricultural pest control systems, and stronger regulation of foreign species are demanded to collect pest outbreak data in a timely, accurate, and comprehensive manner. In the future, the focus of agricultural pest control will be on developing the fundamental theories, key technologies, and major products and equipment of "preventable," "controllable," "treatable," and "green" pest control throughout the process [7].

Powdery mildew is one of the major diseases of facilities vegetables, In order to achieve Early, fast, and accurate diagnosis of powdery mildew, with TCS3200 color sensor and Infrared sensor as detecting port and 12864 dot matrix LCD as display, the system explores the external change such as the color change of the blade in health and disease Stage and change of reflection spectra. Through tracking experiment of different stages of cucumber leaves infected, the results show that the system can identify change of optical frequency values and the RGB values in the health cucumber leaves and infected Cucumber leaves and thus provides effective warning alarm for controlling early disease occurrence[8].

Agriculture plays a vital role in the economic growth of any country. With the increase of population, frequent changes in climatic conditions and limited resources, agriculture plays a vital role in the economic growth of any country. With the increase of population, frequent changes in climatic conditions and limited resources, it becomes a challenging task to fulfil the food requirement of the present population. Precision agriculture also known as smart farming have emerged as an innovative tool to address current challenges in agricultural sustainability. The mechanism that drives this cutting edge technology is machine learning (ML). It gives the machine ability to learn without being explicitly programmed. ML together with IoT (Internet of Things) enabled farm machinery are key components of the next agriculture revolution. In this article, authors present a systematic review of ML applications in the field of agriculture. The areas that are focused are prediction of soil parameters such as organic carbon and moisture content, crop yield prediction, disease and weed detection in crops and species detection. ML with computer vision are reviewed for the classification of a different set of crop images in order to monitor the crop quality and yield assessment. This approach can be integrated for enhanced livestock production by predicting fertility patterns, diagnosing eating disorders, cattle behavior based on ML models using data collected by collar sensors, etc. Intelligent irrigation which includes drip irrigation and intelligent harvesting techniques are also reviewed that reduces human labor to a great extent. This article demonstrates how knowledge-based agriculture can improve the sustainable productivity and quality of the product 9].

Cassava is an important Thai industrial crop. Thailand is a leader in cassava production; therefore, the large

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volume of cassava has been produced and exported from Thailand. However, cassava disease is the main factor to reduce cassava production and directly affects farmers' income. In this study, we aimed to introduce a novel method to automatic cassava disease classification by using deep learning algorithms. An input data was a collection of cassava leaves images containing five different classes, i.e., healthy, Cassava brown streak virus disease (cbsd), Cassava Bacterial Blight (cbb), Cassava green mite (cgm) and Cassava mosaic disease (cmd). Notwithstanding, we focused on the cbsd only in this study forasmuch as this disease has a high impact on the production. We conducted an experiment to evaluate method performance. Our system provided reasonable performance. The accuracy and Fmeasure of the system were 0.96. This is evidence that our system is applicable to efficiently classify the cassava diseases automatically. In future works, we will investigate an appropriate solution to classify other diseases of cassava [10].

Indian economy is dependent on Agriculture, which includes growing certain plants for food and numerous other wanted items as well as nurturing of domestic animals. Nutrients have a significant job in crop production and farming. Harvest yields is decreasing continuously. There are number of explanations behind this diminishing of harvest yield. Nutrient deficiency is one such factor included. The proper and timely finding of nutrient insufficiency and suitable fertilizer for that insufficiency are the serious issues looked by growers. Subsequently, so as to improve productivity, a consistent checking framework for following the nutrient status in plants is required for increasing the quality pf yield as well as production. Different frameworks using digital image processing, computer vision, IOT are used to analyze the deficiency side effects a lot sooner than natural eyes could perceive. This empowers the farmers to implement remedial activity in time. This paper concentrates on the review of different techniques for diagnosing nutrient deficiency in plants 11].

2.1 Problem Statement

Plant diseases seriously affect the normal growth of plants, the yield and quality of agricultural products. In recent years, with the dramatic changes in climate, the natural environment of the plant growth has been damaged by pollution, frequent natural disasters, as well as the development of agricultural production. From the literature survey presented above, it is observed that the work on plant disease detection using IoT reported in the literature is scarce.

III -METHODOLOGY

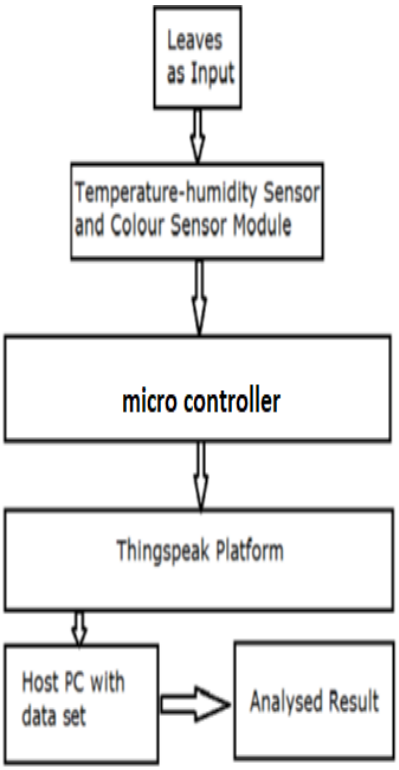

Fig (3.1.1) System block diagram

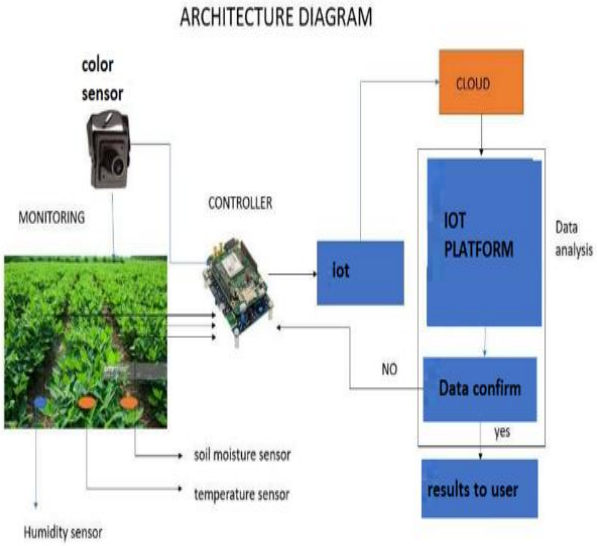

Fig (3.1.2) Architecture of the system

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3.1.1 Temperature and Humidity sensors:

The DHT11 is a basic, ultra low-cost digital temperature sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analogue input pins needed). We use the DHT11 to sense the temperature on the surface of leaf to determine whether it is healthy or diseased.

3.1.2 Colour Sensor:

The TCS3200 is a programmable colour light-to-frequency converter/sensor. The sensor is a single monolithic CMOS integrated circuit that combines a configurable silicon photodiode and a current-to-frequency converter. The output is a square wave (50% duty cycle) with frequency directly proportional to light intensity (irradiance). We use the DHT11 to sense the colour of leaf to determine whether it is healthy or diseased.

3.1.3 Microprocessor:

Raspberry Pi is a series of small single-board computers (SBCs) developed in the United Kingdom by the Raspberry Pi Foundation in association with Broadcom. The Raspberry Pi project originally leaned towards the promotion of teaching basic computer science in schools and in developing countries. The original model became more popular than anticipated, selling outside its target market for uses such as robotics. It is widely used in many areas, such as for weather monitoring,[19] because of its low cost, modularity, and open design. It is typically used by computer and electronic hobbyists, due to its adoption of the HDMI and USB standards.

- Broadcom BCM2711, Quad core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz
- 1GB, 2GB, 4GB or 8GB LPDDR4-3200 SDRAM (depending on model)
- 2.4 GHz and 5.0 GHz IEEE 802.11ac wireless, Bluetooth 5.0, BLE
- Gigabit Ethernet
- 2 USB 3.0 ports; 2 USB 2.0 ports.
- Raspberry Pi standard 40 pin GPIO header (fully backwards compatible with previous boards)

3.1.4 Power Supply:

For our all IC we require 5V D.C. supply which can be generated by step down transformer, full wave bridge rectifier, filter condenser & voltage regulator IC7805. 12V supply for relay is generated separately using the same procedure as above. This supply requirement can be fulfilled in our case using the battery back up and providing recharge facility to it.

IV-RESULT & DISCUSSION

In this work, it is been concluded that plant disease detection is the technique to detect infected portion from the leaf. The plant disease detection consist of two steps, in the first step the image segmentation is done and in the second step technique of feature extraction and classification is applied which will classify diseases and normal portion in the image. In this paper, various techniques of plant disease detection is reviewed and discussed in terms of various parameters. Improvement in accuracy level for detecting plant diseases from images was achieved by applying this proposed technique The best average accuracy of 83.7% was achieved using the SURF features in the proposed work. Successful classification is achieved for different cases Algorithm was tested on five diseases on the plants- Early scorch, Cottony mold, ashen mold, late scorch, tiny whiteness. Precision between 83% and 94%,is achieved, The experimental results indicate that proposed Approach significantly enhances accuracy in automatic detection of normal and affected product. In this method different disease spots are detected accurately and results are not affected by background, type of leaf, type of disease spot and camera.

VI. CONCLUSION

As we have studied recent development in the agriculture sector a good promising technologies are emerging in this segment in through a long evolvement. By reading and studying we have we come to a conclusion that we have explore this subject to help the farmers which directly and indirectly guide about the crop needs. Also, the early detection of any severe disease which harm the entire crop.

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Object Based Vehicle Track Navigation System

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Abstract *An Intelligent object and tracing autonomous vehicles are required in various applications such as space, transportation, industry, and defence. Mobile robot vehicles can also handle material handling, disaster relief, patrolling, and rescue operations. Therefore, a simple and reliable vehicle is required to travel freely in a static or dynamic environment. Smooth and safe navigation of mobile vehicles through the cluttered environment from the start position to the goal position with following a safe path and producing optimal length is the main aim of tracking object navigation. Regarding this matter, researchers have explored several techniques for navigation path planning, out of which this sensor and tracing of already decided track navigation is adopted here in the implementation. This system has tried to develop navigation techniques that are well-suited for static and dynamic environments and can be implemented for the real-time navigation of mobile vehicles.*

Keywords- *Navigation, track, object, vehicle, path.*

I -INTRODUCTION

The vehicle can transport the load to a pre-decided location using navigation and delivering the material. The system introduced here has a specialty as it can track and man oeuvre the path given to it, i.e. it is a self-guided vehicle. As it has the self-guiding ability, it can be implemented in industry to complete the specified task without manual intervention, i.e. a person doesn't have to keep watch on the activity. If suppose one task of sending one object from one place to another is specified, it will do with utmost accuracy if the path is set to it. The heart of the system is a microcontroller capable of efficiently performing complicated tasks. This vehicle uses two motors for the left and right side for effective manoeuvring for sideways turning and forward and reverse direction movement.

II -LITERATURE REVIEW

This literature presents a new approach to integrating semantic information for vision-based vehicle navigation. Although vision-based vehicle navigation systems using pre-mapped visual landmarks can achieve submeter-level accuracy in large-scale urban environments, a typical error source in this type of system comes from visible landmarks or features from material objects in the background, such as cars and pedestrians. We propose a gated factor graph framework to use semantic information associated with visual elements to make decisions on outlier/ inlier computation from three perspectives: the feature tracking process, the geo-referenced map-building method, and the navigation system using pre-mapped landmarks. The visual feature's class category is extracted from a pre-trained deep learning network trained for semantic segmentation. Our implementations demonstrate the feasibility and generality of our approach on top of two vision-based navigation systems.

Experimental evaluations validate that using our method to inject semantic information associated with visual landmarks substantially improves accuracy on GPS-denied navigation solutions for large-scale urban scenarios[1].

In this literature, a novel navigation system for commercial vehicles using laser range sensors is presented, which in particular supports backward driving of trucks and truck-trailer combinations to approach target objects or positions precisely and collision-free. The system can be used in an autonomous or semi-autonomous manner and is aimed at relieving drivers of the stress of manoeuvring tasks and helping them avoid damage. A laser range scanner mounted at the vehicle's rear measures the pose of all objects in the scene. After target selection, the system generates a navigable path from the current position to the final target position. During the approach, the system tracks the target object using a hierarchical, multi-phase object model and continuously computes the current vehicle pose. It controls the vehicle along the planned path by generating commands for autonomous steering and speed limitation, braking at the final target position, and collision avoidance. The driver only supervises the approach and confirms vehicle motion using the throttle pedal. A very challenging application example for system evaluation has been implemented: backwards driving under a swap body for picking it up and interchanging it. The prototypical application has been successfully tested with a truck and a truck-trailer combination under varying environmental conditions. The results prove the system's suitability for further applications[2].

In urban environments, detecting moving obstacles and free space determination are vital issues for driving assistance systems or autonomous vehicles. This literature presents a lidar-based perception system for passenger cars, able to do simultaneous mapping and moving obstacles detection. Nowadays, many lidars provide multi-layer and multi-echo measurements. An intelligent way to handle this multi-modality is to use grids projected on the road surface in global and local frames. The global one generates the mapping and the local one deals with moving objects. An approach based on positive and negative accumulation has been developed to address the remnant problem of quickly moving obstacles. This method is also well-suited for multi-layer and multi-echo sensors. Experimental results carried out with an IBEO Alasca and an Applanix positioning system show the performance of such a perception strategy[3].

We address the problem of vision-based navigation in busy inner-city locations using a stereo rig mounted on a mobile platform. In this scenario, semantic information becomes essential. Rather than modelling moving objects as arbitrary obstacles, they should be categorized and tracked to predict their future behaviour. To this end, we combine classical geometric world mapping with object category detection and tracking. Object-category-specific detectors serve to find instances of elementary object classes (in our case, pedestrians and cars). Based on these detections, multi-object tracking recovers the objects' trajectories, making it possible to predict their future locations and employ dynamic path planning. The approach is evaluated on challenging, realistic video sequences recorded at busy inner-city locations[4].

A modular system architecture has been developed to support visual navigation by an autonomous land vehicle. The system consists of vision modules performing image processing, three-dimensional shape recovery, geometric reasoning, and modules for planning, navigating, and piloting. The system runs in two distinct modes, bootstrap and feedforward. The bootstrap mode requires analysis of entire images to find and model the objects of interest in the scene (e.g., roads). In the feedforward mode (while the vehicle is moving), attention is focused on small parts of the visual field as determined by prior scene views to continue to track and model the objects of interest. General navigational tasks are divided into three categories, all contributing to planning a vehicle path. They are called long-, intermediate-, and short-range navigation, reflecting the scale to which they apply. The system has been implemented as a set of concurrent communicating modules and used to drive a camera (carried by a robot arm) over a scale model road network on a terrain board. A large subset of the system has been reimplemented on a VICOM image processor. It has driven the DARPA Autonomous Land Vehicle (ALV) at Martin Marietta's test site in Denver, CO[5].

This literature describes an approach for different data fusion tasks in an autonomous vehicle. One fusion system is designed for the fusion of data from the object-detecting sensors of the vehicle to increase the accuracy and reduce the large amount of sensor data. Another approach uses navigation data to obtain accurate vehicle state information. It is based on information provided by

the ego-position sensors of the vehicle as well as on the object-detecting sensors. The vehicle guidance system uses the output of both fusion systems to determine the desired path of motion for the autonomous vehicle[6].

In the last decade, Global Navigation Satellite Systems (GNSS) have taken a key role in vehicular applications. However, GNSS-based systems are inoperable in enclosed areas like car parking areas. To overcome this problem, we developed an infrastructure-based positioning system that utilizes customary monocular surveillance cameras to determine the position of vehicles within a car parking area. The position information is also provided via car-to-infrastructure communication to the appropriate vehicle to substitute the in-vehicle positioning system. This literature focuses exclusively on this system's visual detection and positioning component for detecting and locating moving objects in car parking areas. A detailed evaluation demonstrates that the proposed approach can meet the requirements of common vehicular use cases such as navigation, obstacle warning or autonomous driving[7].

Vehicle tracking data can be helpful for the timely and efficient control and management of traffic. They may constitute a verifiable real-world platform for comparing traffic simulation outputs. The acquisition of vehicle tracking data is expensive and technically complex, frequently requiring costly traffic monitoring systems. “Infrastructure-based” and “Non-infrastructure-based” techniques are currently used to obtain traffic data worldwide. This literature presents a methodology for tracking moving vehicles that integrates Unmanned Aerial Vehicles with video processing techniques. The authors investigated the usefulness of Unmanned Aerial Vehicles in capturing reliable individual vehicle data by using GPS technology as a benchmark. A video processing algorithm for vehicle trajectory acquisition was introduced. The algorithm is based on OpenCV libraries. An instrumented vehicle was equipped with a high-precision GPS to assess the accuracy of the proposed video processing algorithm. The video capture experiments were performed in two case studies. From the field, about 24,000 positioning data were acquired for the analysis. The results of these experiments highlight the versatility of the Unmanned Aerial Vehicles technology combined with video processing techniques in monitoring real traffic data[8].

Autonomous vehicles promise numerous improvements to vehicular traffic: increased highway capacity and traffic flow because of faster response times, less fuel consumption and pollution thanks to more foresighted driving, and hopefully fewer accidents thanks to collision avoidance systems. In addition, drivers can save time for more valuable activities. For these vehicles to safely operate in everyday traffic or harsh off-road environments, many problems in perception, navigation, and control must be solved. This literature overviews the most current trends in autonomous vehicles, highlighting the concepts common to most successful systems and their differences. It concludes with an outlook on the promising future of autonomous vehicles[9].

Some aspects of these early achievements have reached series production through car driver assistance systems. Lane detection facilitates lane departure warnings (LDWs) for the driver. It augments the driver's heading control in lane-keeping assist systems (LKAS). The detection and tracking of vehicles driving ahead are used in adaptive cruise control systems (ACC) to keep a safe and comfortable distance. More recently, precrash systems emerged that trigger full braking power to lessen the damage if a driver reacts too slowly. Meanwhile, the attention of research in autonomous vehicles has switched its focus from the well-structured environments encountered on highways as studied in the beginning to more unstructured environments, like urban traffic or off-road scenarios. This trend has been boosted by the 2001 National Defense Authorization Act, in which the U.S. Congress mandated that by 2010, one-third of the aircraft fleet in 2015 and one-third of the operational ground combat vehicles were unmanned. Especially for unmanned ground vehicles (UGVs), the Defense Advanced Research Projects Agency (DARPA) is still powering development at universities and in the industry to reach this goal[10].

This literature addresses the modelling of the static and dynamic parts of the scenario and how to use this information within a real sensor-based navigation system. The contribution in the modelling aspect is a formulation of the Detection and Tracking of Mobile Objects and the Simultaneous Localization and Map Building in such a way that the observations' nature (static/dynamic) is included in the estimation process. This is achieved by a set of filters tracking the moving objects and a map of the static structure constructed online. In addition, this literature discusses how this modelling module is integrated with a real sensor-based

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navigation system, taking advantage of the dynamic and static information selectively. The experimental results confirm that the complete navigation system can move a vehicle in unknown and dynamic scenarios. Furthermore, the system overcomes many of the limitations of previous systems associated with distinguishing the nature of the parts of the scenario [11].

2.1 Problem Statement

To develop efficient less hardware-based track vehicle which can detect object as well as track independently to navigate seamlessly. Which can navigate and control the vehicle at moderate working speed despite of atmosphere light and other changing parameters.

III- METHODOLOGY

One simple, useful task for a robot is to follow a track. Sometimes, it's not that simple."Track following" is a rather general term, and can include a wide variety of topics. The method used would depend on the equipment available (number of sensors) and the type of track/course to be followed.

1-front object track navigation sensor – it is a special type sensor in which the reflective and objects are detected, there is stream of data defines the track and other objects which help to microcontroller to define the motion of motor to move the vehicle.

Sensors- The number of sensors will have a huge effect on the method of track following used.

- With only 1 light sensor, the robot will have to know where the track is, or spend time to searching to find it.
- With 2 light sensors, it's possible to remember which direction the track went.

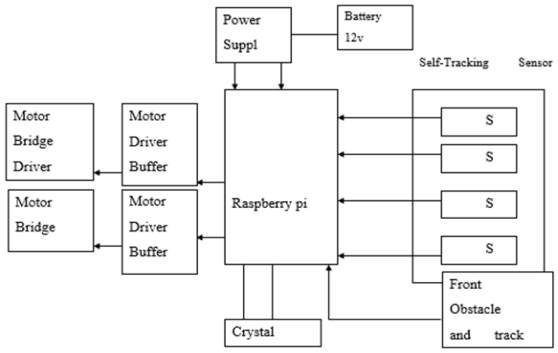

Fig (3.1.1) System Block Diagram

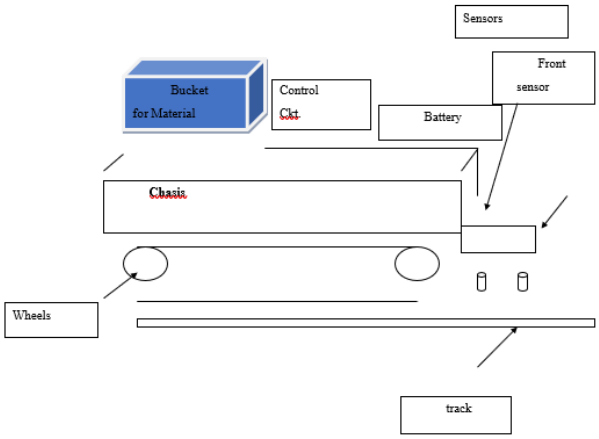

Fig (3.1.2) Vehicle arrangement

3.1 Block diagram Description:

3.1.1 Microprocessor:

Raspberry Pi is a series of small single-board computers (SBCs) developed in the United Kingdom by the Raspberry Pi Foundation in association with Broadcom. The Raspberry Pi project initially leaned towards the promotion of teaching basic computer science in schools and developing countries. The original model became more popular than anticipated, selling outside its target market for uses such as robotics. It is widely used in many areas, such as weather monitoring, because of its low cost, modularity, and open design. It is typically used by computer and electronic hobbyists due to its adoption of the HDMI and USB standards.

- Broadcom BCM2711, Quad core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz
- 1GB, 2GB, 4GB or 8GB LPDDR4-3200 SDRAM (depending on model)
- 2.4 GHz and 5.0 GHz IEEE 802.11ac wireless, Bluetooth 5.0, BLE
- Gigabit Ethernet
- 2 USB 3.0 ports; 2 USB 2.0 ports.
- Raspberry Pi standard 40 pin GPIO header (fully backwards compatible with previous boards)

3.2.2 Power supply:

We require a 5V D.C. supply for all our IC, which a step-down transformer can generate, a full wave bridge

rectifier, filter condenser & voltage regulator IC7805. 12V supply for the relay is generated separately using the same procedure as above. This supply requirement can be fulfilled in our case by using the battery backup and providing a recharge facility for it.

3.2.3 Self track sensing arrangement:

This arrangement consists of four differently placed sensors at a specified distance enabling slight deviation in the path tracking. The one + four sensor works in pairs to govern the centre position. One pair governs the horizontal deviation, while the other governs the vertical deviation. The four sensors are placed so that their sensing path converges simultaneously. That enables highly accurate path tracking.

3.2.4 Motor buffer driver:

This stage provides the needed isolation from the main driver stage and a current boost of the microcontroller signal, as microcontrollers don't have the driving capability. It can only drive up to 4mA.

3.2.5 Motor bridge driver:

This is the final driver stage. It incorporates the H bridge configuration to achieve total control over the motor in both directions, that is, the forward and reverse directions.

IV- RESULT & DISCUSSION

The vehicle can transport the load to a pre-decided location using navigation and delivering the material. The system introduced here has a speciality as it can track and manoeuvre the path given to it, i.e. it is a self-guided vehicle.

As it has the self-guiding ability, it can be implemented in industry to complete the specified task without manual intervention, i.e. a person doesn't have to keep watch on the activity. Suppose one task of sending one object from one place to another is specified. It will do with utmost accuracy if a path is set.

The heart of the system is a microcontroller capable of easily performing complicated tasks. This vehicle uses two motors for the left and right side for effective manoeuvring for sideways turning and forward and reverse direction movement.

VI. CONCLUSION

We are developing a system in which all challenges of guidance and navigation are taken care of in a defined manner. To obtain the navigation, we have selected track-based navigation because it is a simple form of navigation with visual and clear sensing methods. At the same time, tuning the sensor with defined track material is simpler. Developed algorithms will program the distinguishing of the track or no track detection. A special purpose and very reliable sensor will be developed and deployed to the lower side of the vehicle suitable to detect the track material. Also, to detect the front and side objects, the non-contact sensor are implemented in front of the vehicle. The complete system is developed with the microcontroller, the most cost-effective and reliable high-performance control programmable device.

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Raspberry Pi Based Assistive System for Bedridden Persons

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Abstract - *In recent year many assistive systems for disabled have been developed. In this paper we present a unique assistive system for bedridden persons they cannot move anywhere which work on Human machine interface using raspberry pi. Tetraplegia and quadriplegia is a paralysis condition where a patient cannot move parts below neck. Such persons may face some problem like dumb, deaf etc. The proposed assistive system is to enable communication between tetraplegia patient and caretaker. The proposed system work on voice based command and performs the action against the input. The patient can also use this system for device automation, for controlling fan, light and other devices. HMIs to monitor and configure set points , control algorithm send commands and adjust and establish parameters in the controller. Used python programming language.*

Keywords- *Raspberry pi, Human Machine Interface, Voice Command Algorithms*

I –INTRODUCTION

Tetraplegia or Quadriplegia is a paralysis condition caused by illness or injury that results in the partial or total loss of body. The patient may also lose some difficulties like deaf, dumb, blindness etc. Because of this persons cannot perform voluntary action and becomes a bedridden. The persons have to be taken care of someone always like family members. It is difficult for the patients to make caretaker or someone who take care of patient understand what they need. And even the patient face major problem like they won't be able to communicate with the world. There are many systems developed and introduced for the tetraplegia patients to communicate with the outside world. Such as Brain wave technique and Electro-oculography as well as eye waver technology. In these techniques, electrodes are pierced through the epidermis of skin and in eye detection system incorporate with different technologies such as eye blink detection, eye center localization and conversion of the eye blink to speech, That system uses an efficient method which is depends on image processing techniques for detecting human eye blinks and generating inter-eye-blink intervals.

The proposed system works on voice based command and perform the action against the input command, this is done by using Human machine interface module through raspberry pi kit.To monitor and configure set points, control algorithms, send commands, and adjust and given parameters in the controller for these action use HMIs (Human Machine Interface) module. We are trying to design a standalone speaker dependent speech recognition circuit that may be interfaced to control just about anything electrical, such as; appliances, robots, test instruments, VCR's TV's, etc.

The output of the system is displayed by the microprocessor on the seven segment display. The

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recognized voice is stored as the code of word. Have you ever talked to your computer? (And no, yelling at it when your Internet connection goes down or making polite chit-chat with it as you wait for all25MB of that very important file to download doesn 't count).

II - LITERATURE SURVEY

The Literature survey was conducted for the dissertation in all possible means through the media of Text Books, Reference books, and Data books ,Technical magazines and of course the powerful Information media of Internet. In this topic of Speech based command control of Computer application control, we collected the information from all the above sources and compared the same with each other and also with our approach of communication and found that the method suggested in the Project is relatively with new concept and more accurate and automated with less manual intervention and hence easy to accept than the other conventional methods[1].

We need to improve the usage and the utility of the same in the best possible manner. We need to analyses the problems faced by the customer and we should try to minimize the same so as to improve the total efficiency of the system [2]. We are trying to build a standalone speaker dependent speech recognition circuit that may be interfaced to control just about anything electrical, such as; appliances, robots, test instruments, VCR's TV's, etc [3]. A Hear Cascade Classifier methodology is used for getting eye and facial axis information based on eye movement of the patient[4]. The system will be recorded by the eye movement and blink of patient and it is processed and converted into corresponding voice output, and this system also used for bedridden or paralyzed condition persons. The paralysis or bedridden persons can also use this system for device automation, for controlling fan, light and other devices[5].

Image capturing and processing using eye blink detection is a demanding project. There are number of ways to implement this project and each system implementation involves many functional components. The easiest as well as best method to detect eye blinks is using infrared LEDs. Such system makes the best use of technology and improves the accuracy [6]. Hashim N A et al. proposed a system that can assist paralyzed or Tetraplegia or Quadriplegia patients by tracking person's eye and counting the blinks, and employs this count to control various appliances and play pre-recorded audio messages[7]. In Voice Based Home Automation System using Raspberry Pi is the project which will be very helpful for old age people and disabled persons, basically for one's who cannot perform basic activities efficiently[8].

III -BLOCK DIAGRAM

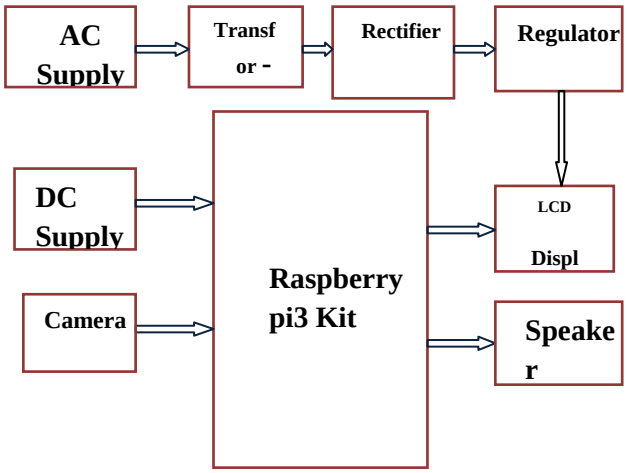

Fig. 3.1 Block diagram

The device consists of a Raspberry Pi 3B, speaker or earphones, Raspberry pi camera, Transformer, LCD display, power offer (230V AC) and a rectifier converts ac to pulsating dc. The voltage regulator regulates the voltage to a fixed level to power the Raspberry Pi. The camera should manually be pointed towards the text and an image is captured. This image is then processed by the Raspberry Pi and therefore the audio output is given through the speaker.

It helps in research work and use programing language like python. It does everything what a computer does like, playing live games and videos, databases and word processing. It helps to interface with the external world and used in digital processing, music equipment, sensors and weather stations. Raspberry Pi 3 board is used in this device.

3.1] Raspberry Pi 3 Mode lB

Fig3.2: Raspberry Pi 3 ModelB

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The Raspberry Pi 3 Model B+ is the latest product in the Raspberry Pi 3 range, boasting a 64-bit quad core processor running at 1.4GHz, dual-band 2.4GHz and 5GHz wireless LAN, Bluetooth 4.2/BLE, faster Ethernet, and PoE capability via a separate Poe HAT The dual-band wireless LAN comes with modular compliance certification, allowing the board to be designed into end products with significantly reduced wireless LAN compliance testing, improving both cost and time to market.

The device consist of Raspberri pi 3B, speaker or earphones, Raspberry pi camera ,power offer (230VAC) and a rectifier convert ac to pulsating dc. To power the raspberry pi voltage regulator regulates the voltage to fixed level. The camera should manually be pointed towards the text and image is captured. The raspberry pi has small peripheral devices like USB, ABC, Bluetooth, WIFI and SPI. Raspberry pi 3B+Linux operating system name Raspbianstretch. In this system the printed text is placed under the camera view by the blind person to ensure the image of good quality and fever distortions. Then an applicable assistive blind system a localization algorithm might prefer higher recall by the sacrificing some precision.

Hardware Specification

5MP Raspberry Pi 3 Model B Camera

1. Raspberry Pi 3 ModelB
2. LCDDisplay
3. Capacitors
4. Transistors
5. Cables &Connectors
6. Diode
7. PCB

Sofware Specification

Operating system: Raspbian(Stretch)

Language:Python3

Platform: Tesseract, Open CV
Library: OCR engine, TTS engine
The proposed project is executed under the operating system rasbian which is derived from Debian operating system. The language used as the python language that may be a script language. The camera should manually be pointed towards the text and image is captured. The raspberry pi has small peripheral devices like USB, ABC, Bluetooth, WIFI and SPI. Raspberry pi 3B+Linux operating system name Raspbian stretch.

IV- METHODOLOGY

4.1] HMI module

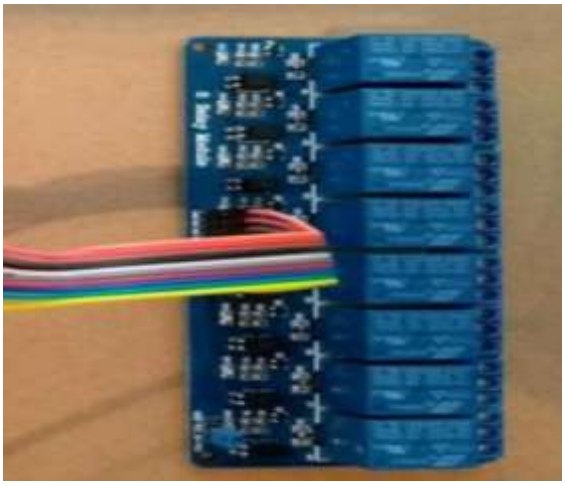

Fig 4.1: HMI module

An HMI work with a human users to interact with a system's machinery using graphical interface. As new technology develops, HMIs are becoming more use in everyday tasks for consumers. petrol pumps, self-service system, vendor machines, all use HMIs to process user inputs, translate into machine readable code, and perform tasks without the need for a workman,mechanic ,labourer or other employee. In the referance of production and process control systems, a visual representation of the control system provided by HMI, and also provides real time data acquisition. An use of HMI is to increase productivity by providing a centralized display of the control process that is relatively user-friendly and tremendously.

HMI can check and control the process so that users may update system processes without changing any of the hardware.HMIintegreted with manufacturing line, it must first be working with a Programmable Logic Controller (PLC) which acts as the central processing unit. The input information from input devices first collect PLC (physical sensors or commands from the HMI) and convert it to processes for manufacturing. thsese process is being performed ,and the HMI provides a display of received inputs, control process outputs, and defined user command to perform the tasks.

4.2] Using voice_command

Now by using 1st voice command turn LED ON, and then system stay for until the another voice command turns it off again.

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```
defrun(self, voice_command):
        self.say("LED Turns on")
        led.on()
        sleep(4)
        self.say("LED Turns off")
        led.off()
```

Above voice command that is automatically passed to your run program methodology is a string translation of Google Assistant API .

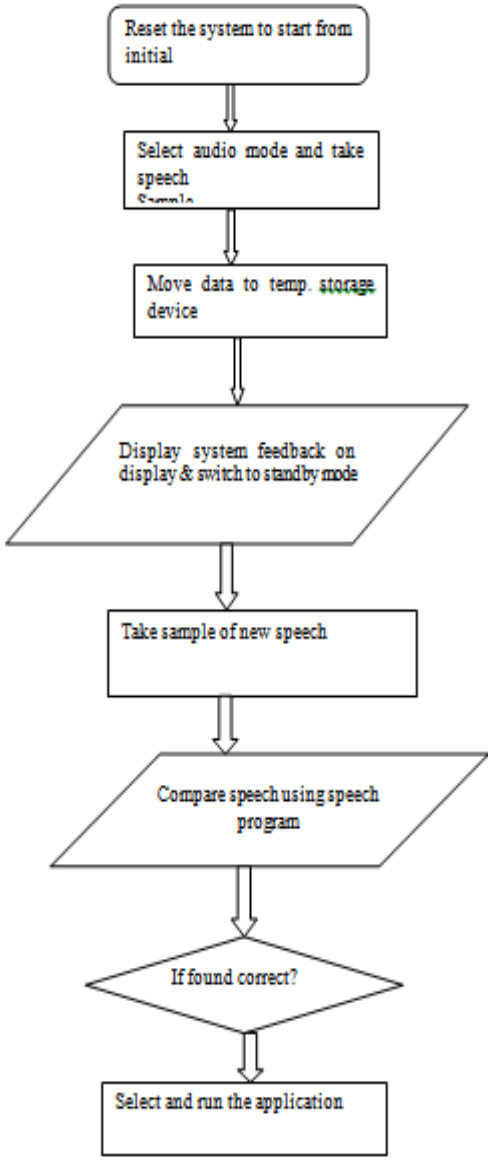
Here's what you're going to do:
Within our run system, translate the voice_ command string into all lower case Search through the string.
If it contains voice command the word "on", turn the LED on
If it contains voice command the word "off", turn the LED off
In a program python language is used.

4.3] Microphone

This is the device which converts the sound signal to the electrical signal. The two plates are mounting apart at very low distance forms as a capacitor. The moving plate is connected to diaphragm. The diaphragm moves according to the sound waves which are strike on the diaphragm which result to change in current flow of the condenser mike. This output is applied to the amplifier section which is amplified by selective gain. The output current is a proportional to the sound signal striking on the diaphragm

4.4] Flowchart

V- DESIGN AND IMPLEMENTATION



Setup Rapsbserry Pi:

For the raspberry pi to able to perform all the functions properly we need to define all the input and output pins of devices connected to it and to which no. of pin of raspberry pi it is connected to.

```
pwmPin = 18 # Broadcom pin 18 (P1 pin 12)
ledPin = 23 # Broadcom pin 23 (P1 pin 16)
butPin = 17 # Broadcom pin 17 (P1 pin 11)

dc = 95 # duty cycle (0-100) for PWM pin

# Pin Setup:
GPIO.setmode(GPIO.BCM) # Broadcom pin-numbering scheme
GPIO.setup(ledPin, GPIO.OUT) # LED pin set as output
GPIO.setup(pwmPin, GPIO.OUT) # PWM pin set as
```

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```
output
pwm = GPIO.PWM(pwmPin, 50)  # Initialize PWM on pwmPin 100Hz frequency
GPIO.setup(butPin, GPIO.IN, pull_up_down=GPIO.PUD_UP) # Button pin set as input w/ pull-up

# Initial state for LEDs:
GPIO.output(ledPin, GPIO.LOW)
pwm.start(dc)

print("Here we go! Press CTRL+C to exit")
try:
while 1:
if GPIO.input(butPin): # button is released
pwm.ChangeDutyCycle(dc)
GPIO.output(ledPin, GPIO.LOW)
else: # button is pressed:
pwm.ChangeDutyCycle(100-dc)
GPIO.output(ledPin, GPIO.HIGH)
time.sleep(0.075)
GPIO.output(ledPin, GPIO.LOW)
time.sleep(0.075)
except KeyboardInterrupt: # If CTRL+C is pressed, exit cleanly:
pwm.stop() # stop PWM
GPIO.cleanup() # cleanup all GPIO
```

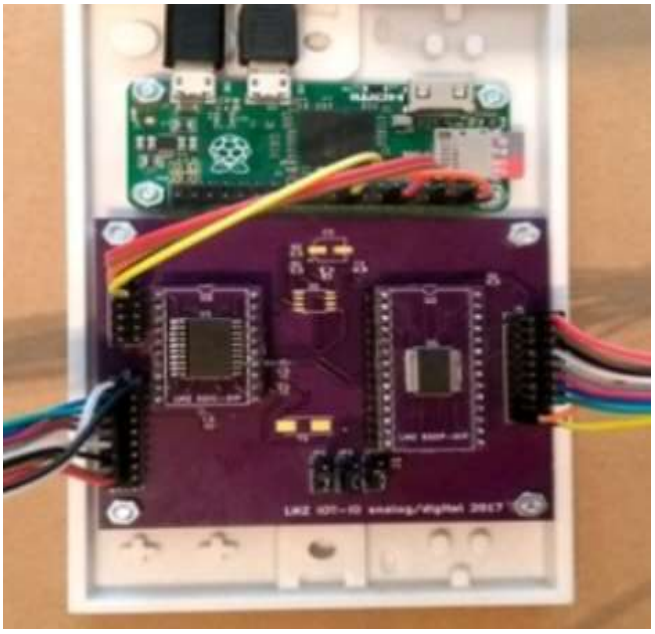
Conversion of image to text using OCR tool

```
DEFAULT_CHECK_COMMAND = "which"
WINDOWS_CHECK_COMMAND = "where"
TESSERACT_DATA_PATH_VAR = 'TESSDATA_PREFIX'

VALID_IMAGE_EXTENSIONS = [".jpg", ".jpeg", ".gif", ".png", ".tga", ".tif", ".bmp"]

import argparse
import logging
import os
import shutil
import subprocess
import sys
import tempfile

from constants import VALID_IMAGE_EXTENSIONS, WINDOWS_CHECK_COMMAND,
DEFAULT_CHECK_COMMAND,
TESSERACT_DATA_PATH_VAR
```

```
defcreate_directory(path):
"""
  Create directory at given path if directory does not exist
:param path:
:return:
  """
if not os.path.exists(path):
os.makedirs(path)


defcheck_path(path):
"""
  Check if file path exists or not
:param path:
```

VI - RESULT

The program coded for detecting the voice using HMI are compiled using OpenCV platform that supports python code, and OpenCV library. The image processing libraries like numpy, scipy, dilb, and shape predictor are used to import the code.



Within our run system, translate the voice_command string into all lower case Search through the string.

If it contains voice command the word “on”, turn the LED on If it contains voice command the word “off”, turn the LED off In a program python language is used.

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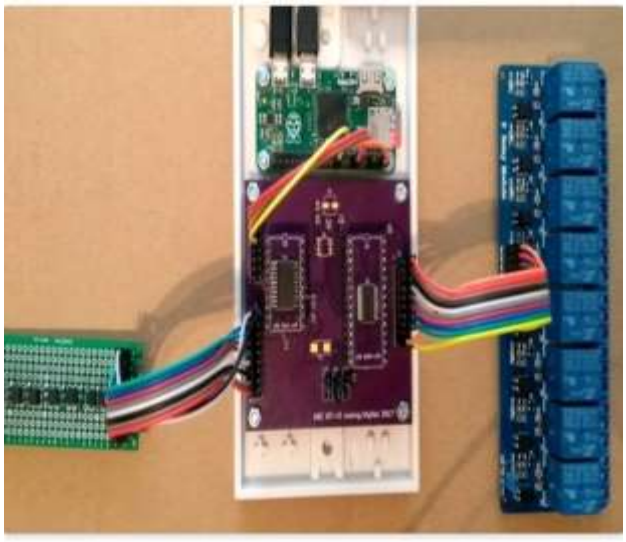

Table 1: Combinations of input and its corresponding voice outputs

No of input	Voice output
1	Light
2	Fan
3	Nurse
4	Water

VII - ADVANTAGES AND DISADVANTAGES

Advantages:

1. As the main intension of the project is to help people who is in paralysed condition
2. User friendly (easy touse).
3. It is very compact to theuser.
4. High rate of translation:
5. The speed of translation is much higher than the human translation it takes more than an hour for translating 10,000 words for human whereas, few seconds are enough for the device to translation
6. Cost efficient

VIII - CONCLUSION AND FUTURE WORK

The proposed system enables people suffering from Tetraplegia and quadriplegia ,is a paralysis condition. This system is intended to assist the paralyzed and bedridden person to lead a normal life by controlling things and communicating their needs with less effort. According to physically challenge person the code convert the input voice into predefined voice command.

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Security Monitoring and Self-Control System for Home

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Abstract *–In this paper with the increase in energy consumption and population, there is a grave need to conserve energy in every way possible. The inability to access and control the appliances from remote locations is one of the significant reasons for energy loss. The users use a web or an Android application to instruct these systems. This system can use various communication methods such as Wi-Fi, GSM, Bluetooth, and Zig Bee. Different controlling devices and configurations can be found in existing systems. Such systems have already been found in many places for various applications. This project presents a home automation system using Wi-Fi, an Android application and google firebase. It's a real-time database system.*

Keywords- Embedded Systems, Remote access Systems, Mobile Applications, Web Applications and Home Automation System

I. INTRODUCTION

The main idea of this design is to develop a home automation system using an Arduino IDE with WIFI being ever controlled by any Android smart phone. As technology is advancing so houses are also getting smarter. Modern houses are gradationally shifting from conventional switches to centralized control system, involving remote controlled switches. Presently, the house's traditional wall switches are scattered along various hallways, making it dangerous for a person to approach them and utilize them. Indeed, more it becomes more delicate for the senior or physically hindered people to do so. Remote controlled home automation system provides a most modern result with smart phones. In order to achieve this, a WIFI microcontroller is programmed with the Arduino IDE. At the receiver end while on the transmitter end, a GUI application on the cell phone sends ON/ OFF commands to the receiver where loads are connected. By touching the specified position on the GUI, the loads can be turned ON/ OFF ever through this technology. The loads are operated by relay through optoisolators and ULN2003 relay driver.

II. LITERATURE REVIEW

Existing home automation systems have traditionally relied on manual control methods, requiring homeowners to operate various devices individually [1]. This limitation prompted the development of wireless sensor networks to automate and enhance home security [2].A paper proposes the use of IoT-enabled devices and wireless communication networks to create a comprehensive home automation system [3]. This system allows homeowners to control various aspects of their homes, such as lighting, temperature, and security, remotely through mobile applications. Another study explores the integration of artificial intelligence (AI) technologies into home security systems [4]. By incorporating AI algorithms, the system can analyze and identify potential threats, such as unauthorized access or suspicious activities, and notify homeowners or security personnel accordingly. The advancement of smart home technologies has led to the development of voice-controlled home automation systems [5]. Through natural language processing and voice recognition, homeowners can interact with their smart devices and control home functions simply by issuing voice commands. Paper [6] proposes the utilization of video surveillance systems and motion detection sensors to enhance home security. These systems can detect intrusions, monitor activities, and provide real-time alerts to homeowners or security services. The emergence of smart locks and biometric authentication

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technologies has significantly improved home security [7]. These systems utilize fingerprint or facial recognition to grant access, eliminating the need for traditional keys and enhancing the overall safety of homes. The integration of cloud computing technology into home automation systems enables centralized control and monitoring [8]. Homeowners can access and manage their smart devices and security systems remotely, enhancing convenience and flexibility. One research study focuses on the development of a scalable and interoperable framework for home automation and security. This framework aims to integrate diverse devices and protocols, ensuring seamless communication and compatibility between different components of the system.

III. PROPOSED SYSTEM

The project aims to develop a home automation system that utilizes the Arduino IDE and Wi-Fi technology to enable control through an Android smartphone. The primary objective is to enhance the functionality of modern houses by replacing conventional wall switches with a centralized control system and remote-controlled switches. This system is particularly beneficial for individuals with limited mobility or seniors who may find it challenging to operate switches located in different parts of the house.

a)Hardware Structure

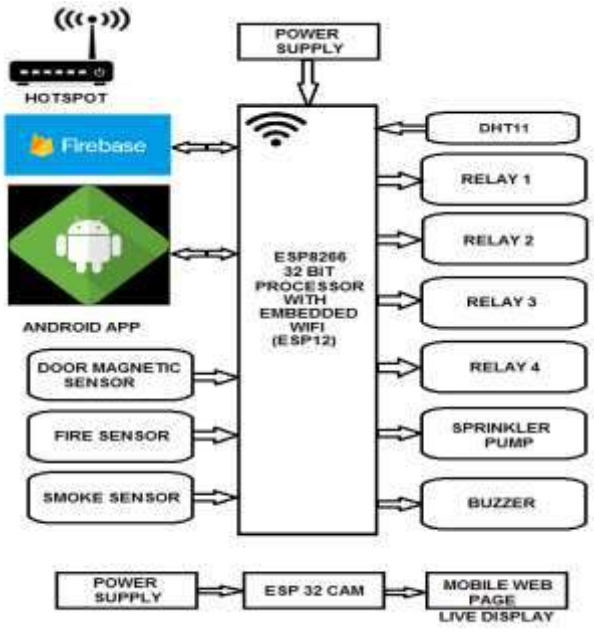

Fig No.01 shows the diagram of proposed system

ESP-12E:ESP-12E is a low power consumption of the UART-Wi-Fi module, with very competitive prices in the industry and ultra-low power consumption technology, designed specifically for mobile devices and IOT applications, user's physical device can be connected to a Wi-Fi wireless network, Internet or intranet communication and networking capabilities. ESP-07 the use of small ceramic antenna package can support IPEX interface. Users have a variety of installation options.

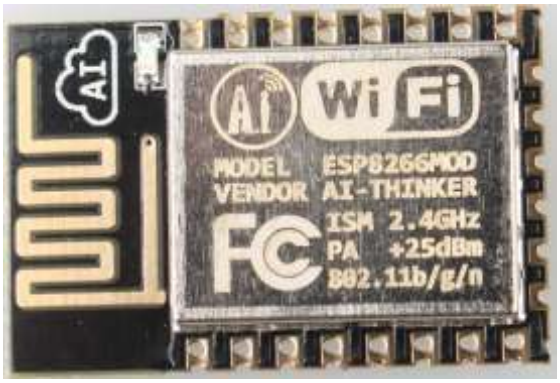

Fig No.02 ESP-12E

ULN2003: The ULx200xA devices are high-voltage, high-current Darlington transistor arrays. Each consists of seven NPN Darlington pairs that feature high-voltage outputs with common-cathode clamp diodes for switching inductive loads. The collector-current rating of a single Darlington pair is 500 mA. The Darlington pairs can be paralleled for higher current capability. Applications include relay drivers, hammer drivers, lamp drivers, display drivers (LED and gas discharge), line drivers, and logic buffers. For 100-V (otherwise interchangeable) versions of the ULx2003A devices. The ULx2003A devices have a 2.7-kΩ series base resistor for each Darlington pair for operation directly with TTL or 5-V CMOS devices.

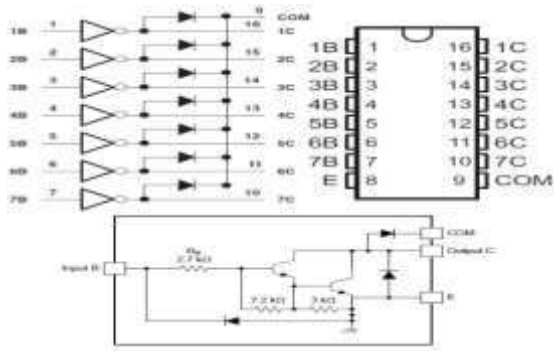

Fig No.03 ULN2003

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Temperature Sensor & Humidity Sensor

(DHT11): The DHT11 humidity and temperature is a type of sensor which is used to measure the humidity and temperature of environment with accuracy. After sensing the respective parameters, it provides output to controller. Humidity Range: 20-90% RH, Temperature Range: 0-50°C

Fig No.04 shows the Temperature and Humidity sensor

ESP32-CAM:ESP32-CAM is a low-cost ESP32-based development board with onboard camera, small in size. It is an ideal solution for IoT application, prototypes constructions and DIY projects. The board integrates Wi-Fi, traditional Bluetooth and low power BLE, with 2 high-performance 32-bit LX6 CPUs. It adopts 7-stage pipeline architecture, on-chip sensor, Hall sensor, temperature sensor and so on, and its main frequency adjustment ranges from 80MHz to 240MHz.

Fig No.05 Esp32 cam module

Buzzer: A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, train and confirmation of user input such as a mouse click or keystroke

Fig No.06 Buzzer

Fire Sensor: A sensor which is most sensitive to a normal light is known as a flame sensor. That's why this sensor module is used in flame alarms. This sensor detects flame otherwise wavelength within the range of 760 nm – 1100 nm from the light source. This sensor can be easily damaged to high temperature. So, this sensor can be placed at a certain distance from the flame. The flame detection can be done from a 100cm distance and the detection angle will be 600. The output of this sensor is an analog signal or digital signal. These sensors are used in firefighting robots like as a flame alarm.

Fig No.07 Fire sensor

Sprinkler pump: A sprinkler pump is a part of a fire sprinkler system's water supply and powered by electric, diesel or steam. The pump intake is either connected to the public underground water supply piping, or a static water source (e.g., tank, reservoir, lake).

Fig No.08 Sprinkle pump

Smoke sensor: A smoke detector is an electronic fire-protection device that automatically senses the presence of smoke, as a key indication of fire, and sounds a warning to building occupants. Commercial and industrial smoke detectors issue a signal to a fire alarm control panel as part of a building's central fire alarm system.

Fig No.09 Smoke Sensor

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Operational Flow Chart:

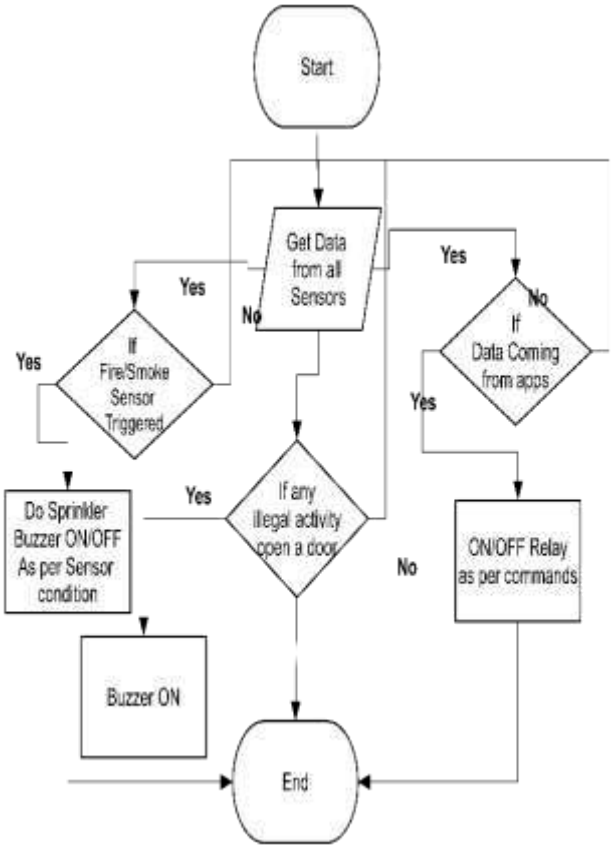

Fig No.10 Operation Flow Chart

IV. RESULT & DISCUSSION

Fig No.11 Test-1

Test-1 Door open Check

Result - Door open alert on android and buzzing sound from Buzz

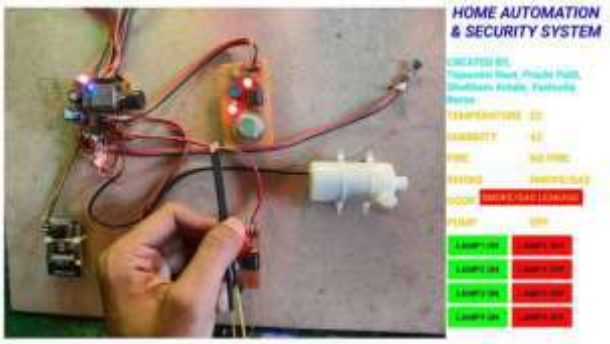

Fig No.12 Test-2

Test -2 Gas leakage check

Result - Alert on Android application and turn on of sprinkler

Fig No 13 Final Propose Project

V. CONCLUSION

Based on all the systems surveyed and their advantages and drawbacks, this project presents the features of an ideal system for home automation with remote access. An ideal design should be available from all over the world to a user in real time. An internet network is identified as a candidate for this, Only the Internet can guarantee that access is always available. This will give

rise to a standard access method for domestic appliances using the Internet protocol. The user interface should be associated mobile application. So that individuals of all kinds can access the system. Additionally, such a system must to be straightforward to install. Only then can automated dwellings become commercially viable. The design of the user interface for these applications needs to be given a lot of care. Plug-and-play capabilities will be a benefit for the system. The ease of adding a new device to an automated house will play an essential role in carrying forward the designs commercially.

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