

ENGINE OIL LEVEL MONITORING SYSTEM AND MULTI OBJECTIVE BIKE REPOSITIONING IN BIKE SHARING SYSTEMS BASED ON IOT

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering degree in
Electronics and Communication Engineering

By

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **CHERUKUMALLI RAVINDRAKUMAR (37130082) & DANDU KOUSIK VARMA(37130095)** who carried out the Project entitled "**ENGINE OIL MONITORING SYSTEM AND MULTI OBJECTIVE BIKE REPOSITIONING IN BIKE SHARING SYSTEMS BASED ON IOT**", under the guidance of **Mr.S.BestleyJoe.,M.E.,(Ph.D).,** during the period November 2020 to April 2021

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Abstract

Lately, the progressions in Information and Communication Technology (ICT) are principally centered around the Internet of Things (IoT). The paper portrays the plan and improvement of an IoT based oil level checking instrument and its operational system. In this we will perceive how to screen the level of the oil in the motor. At the point when the tanks are filled methods the appropriate suggestion can't be ship off every one of the people. To solve this issue, we will carry out the engine oil level monitoring system. Utilizing this programmed oil level pointer, we can screen when the oil is filled or not in the motor to the necessary individual through IOT.

Also, here we will create Device-to-Device correspondence is a promising strategy for the arising Internet of Things. Secure data trade assumes a critical part in the utilization of Device-to-Device correspondence.

Street mishaps are expanding in our country, the greater part of them are caused because of carelessness of not wearing the head protector, drive under the influence and over speeding which numerous prompts passing or extreme wounds because of absence of clinical medicines gave to the harmed individual at opportune time.

Henceforth it is fundamental for a framework which guarantees the security of biker, by making it required to wear the helmet. This undertaking additionally has different objectives like helmet must, alcohol denied and engine temperature observing.

TABLE OF CONTENTS

CHAPTER NO.	TITLE	PAGE NO.
	ABSTRACT	v
	LIST OF FIGURES	VI
	LIST OF TABLES	x
	LIST OF ABBREVIATION	x
1	Introduction	1
	1.1 General	1
	1.2 Motivation	1
	1.3 Existing system	2
	1.4 Proposed system	2
2	Literature survey	3
3	Aim and scope of the present investigation	5
	3.1 Objective of the project	5
	3.2 Block diagram	5
	3.5 Nodemcu5	
	3.6 LM35 sensor	6
	3.6.2 Features of LM35 sensor	7
	3.7 Smoke or Gas sensor	7
	3.8 Ultrasonic Sensor	7
	3.9 Level sensor	8

	3.10 Limit Switch	9
	3.11 Two channel relay	9
	3.11.2 Features of 2 channel relay	10
4	Experimental materials, methods & algorithms used	16
	4.2 Communication	12
	4.3 Temperature sensor	13
	4.4 Thermo couple	13
	4.5 Thermistors	14
	4.6 Semiconductor Sensors	14
	4.7 Sensor ICS	15
	4.7.1 Features of LM35 Sensor	16
	4.7.2 Operation of LM35	16
	4.8 Alcohol Sensor module	16
	4.9 Ultrasonic Sensor	21
	4.9.2 How ultrasonic sensor works	22
	4.9.4 Applications	22
	4.10 Arduino and its programming	25
	4.11 Writing Sketches	26
	4.12 Libraries	26
	4.13 Third party hard ware	28
	4.14 Serial Monitor	29
	4.15 Language support	29
	4.16 Boards	31

	4.17 UBIDOTS Explorer	32
5	Result and Discussion	33
	5.1 Result	33
6	Summary and Conclusion	35
	6.1 Summary	35
	6.2 Conclusion	35
	References	36

LIST OF FIGURES

FIGURE No.	TITLE	PAGE No.
3.3	Engine section	5
3.4	Helmet section	5
3.5.1	Nodemcu	6
3.6.1	LM35 sensor	6
3.7.1	Gas sensor	7
3.8.1	Ultrasonic sensor	8
3.9.1	Level sensor	9
3.10.1	Limit switch	9
3.11.1	Two channel relay	10
4.1	Helmet and Engine section	11
4.4.1	Thermocouple	14
4.8.1	Gas sensor module	17

4.8.2	Facades of standard gas sensor	17
4.8.3	Leads of gas sensor	18
4.8.4	Empty detecting component	19
4.8.5	Nickel-chromium detecting component	20
4.8.6	Wound piece	20
4.9.2	Frequency range of sound	22
4.9.3	Reciever and transmitter circuit	23
4.9.5	Flaw detector	24
4.10.1	Arduino software	25
4.15.1	Language support	27
4.17.1	Ubidots data hierarchy	32
5.1.1	Results of engine parameters(screen shot)	33
5.1.2	Results of helmet parameter(screen shot)	34

LIST OF ABBREVIATION

LED-	LIGHT EMITTING DIODE,
LCD-	LIQUID-CRYSTAL-DISPLAY
EOM-	ENGINE OIL MONITORING
IP-	INTERNET PROTOCOL
SPI-	SERIAL PERIPHERAL INTERFACE
RST-	RESET
GPS -	GLOBAL POSITIONING SYSTEM
GSM-	GLOBAL SYSTEM FOR MOBILE,

IOT-	INTERNET OF THINGS,
VLSI-	VERY LARGE-SCALE INTEGRATION
IC-	INTEGRATED CIRCUIT
RF-	RADIO FREQUENCY
AC-	ALTERNATING CURRENT
DC-	DIRECT CURRENT
RS-	RECOMMEND STANDARD,
USB-	UNIVERSAL SERIAL BUS
D-	DIODE
R-	RED
GND-	GROUND
G-	GREEN
B-	BLUE
SQUID-	SUPERCONDUCTING QUANTUM INTERFERENCE DEVICE

CHAPTER1

INTRODUCTION

1.1 General:

Auto engine credits, for instance, profitability to the extent quantitative and emotional limits, for instance, Engine execution limits are power and unequivocal fuel usage is straight forwardly related to the arranged instruments of the motor and its smooth working inside the requirement of carbon impression. Lubing up oil accepts a critical part to keep the motor running with needed execution. Engine oil and lubricating oil are inserted into opposing stresses based on operating conditions and fuel consistency, which ensures that the essence of engine oil and lubrication oils must be preserved to prevent grinding within the engine. To begin, oil should be changed on time to avoid potential motor problems; however, unnecessary oil changes should be avoided for environmental and monetary reasons. Oil decrease is the cycle by which the lubing up, cooling, cleaning, protection or fixing execution of the fluid decreases. Manufactured reactions like Oxidation, nitration, temperature rise, external contamination, shearing, ruinous encompassing, added substance utilization, etc are the fundamental components for accelerating the oil corruption measure. Consequently, degradation of oil and motor oil impacts the introduction of the machines like cog wheels, conveyances or automatisms where they are being used, and often the decrease of the oil properties is the justification individual occasions, exciting dissatisfactions and grows carbon impression. Discontinuous contrast in these oils is a fundamental piece of the up keep program of Engine updating action which is unquestionably not an ideal strategy monetarily and emotionally.

1.2 Motivation:

Of late, the movements in Information and Communication Technology (ICT) are chiefly based on the Internet of Things (IoT). In this undertaking we will perceive how to screen the level of the oil in the motor. At the point when the tanks are filled methods the legitimate implication can't be ship off every one of the people. Our inspiration is to defeated this issue. For that we will execute the programmed oil level marker. Utilizing this programmed oil level pointer, we can screen the degree of engine oil and fuel through IOT. Furthermore, here we will create Device-to-Device (D2D) correspondence is a promising strategy for the arising Internet of Things. Secure data trade assumes a vital part in the utilization of D2D correspondence. The most elevated loss of life was in Tamil Nadu. An aggregate of 6,105 (around 17 percent) bike clients who kicked the bucket here in road accidents who won't wear a helmet. In order to overcome this problem, we had made a bike which doesn't start if the rider won't worn helmet.

1.3 Existing system:

Overhead tank digital oil level indicator with an LCD display is to show the rising/ falling oil level in the tank. In already existing system there is only to tell the water level through some messages type.

1.4 Proposed system:

In proposed we are going to use oil level sensor is used to identify the oil level in the engine. Depend upon the level of oil, when the engine is drain means it will be monitored through the mobile phone by UBIDOTS cloud .Here we implement the IOT concept and also the automation. Oil level is low means its automatically give the information to your mobile and saved the data in cloud because it is highly used to identify the how much oil we consume 25K kilometers per once.By using this system we can also check the fuel level monitor using the ultrasonic sensor, and temperature sensor is used to measure the engine temperature. And also we are going to communicate the helmet and bike using wireless communication, here smoke sensor is used to measure the alcohol content, if the alcohol content is high then bike won't switch on.

CHAPTER2

LITERATURE SURVEY

[1]Author: Sidharth Sharma Supankar Das JitendraVirmani, Mamta Sharma Satbir Singh, Amitava Das “IoT Based Dipstick Type Engine Oil Level and Impurities Monitoring System”, 2019.

The paper depicts the plan and development of an IoT based oil pollutants, level checking instrument and its operational strategy. The examination work utilizes a one of a kind methodology with tweaked white LED spectrophotometry. The created instrument has done Qualitative and Quantitative evaluation of oil in IC engine's sump.

[2]Author: K.RaviKiran, Prof.K.PrahladaRao.“Real Time Vehicle Monitoring By IOT Application”, 2017.

Vehicle is continuously for many hours. It is necessary to early detect the any symptoms of any vehicle trouble. Raspberry Pi 3 using Sensors are used to detection of condition without relying. This sensors are cautiously monitoring the different parameters like Engine temperature, vibration, Brake Temperature, Brake links, Oil level in Engine, Fuel level in tank. These sensors will collect the data from different parameters of vehicle and Raspberry pi 3 gather this data

[3]Author: Keshav Kumar Jha, B.S. Pabla “A Real Time Engine Oil Monitoring System for Diagnosis of Lubricant utilizing IoT Network”, 2020.

In the advanced days, Internet of Things (IoT) is keen conveying approach and makes a vivacious impression in fate of auto industry. The progression of IoT advancement in each field can be gotten together with the rising events setting off a prerequisite for a prevalent human lifestyle and its applications are huge and endless. One such application can be inferred for the auto business to ongoing screen the motor oil on the grounds that in India, auto mechanics actually utilize traditional methods of engine oil management. So in this paper, we present, an IoT innovation based a constant Engine Oil Monitoring (EOM) System for conclusion of engine oil.

[4]Author: Gauri A. Patil, Gayatri A. Patil, Priyanka S. Sangle. “IoT based Smart Vehicles for oil Consumption”, 2018.

These days, real record of fuel filled and fuel usage in vehicles isn't kept up. It achieves a financial adversity. To avoid this we are executing for recognizing the proportion of fuel filled in the vehicle. So when specialist begins filling petroleum in your bicycle/vehicle, utilizing the Loadcell. The fundamental Objective of this cycle is to know unequivocal proportion of the petrol remaining in the fuel tank and how much distance it can travel.

[5]Author: Pavan Manjunath¹ ,Pritam Gajkumar² 1 Ph.D, .“IoT Based Handy Fuel Flow Measurement”,2019.

This investigation paper gives a framework of the IOT based fuel stream mechanized assessment sensors, by sending the consistent commitments to customer compact, about how much oil or diesel stream is siphoned into vehicle tank. The fundamental Objective of this cycle is to know positive proportion of the petrol remaining in the fuel tank and how much distance it can travel.

[6]Author: Sharma, S., Das, S., Garg, H., Sharma, M., Hazara, K. S., & Das, A. (2019). *"IoT Based Engine Oil impurities observation System: A Portable Colorimetric Analyzer"*, 2019

For getting most extreme proficiency of IC motor, periodical changing of motor oil is one of the significant necessity. Motor execution can be looked after successfully, if the corruption level of motor oils is checked routinely. The essential goal of this instrument is to take suitable choice about the substitution of motor oil with the goal that motor life cycle and carbon impression can be kept up. RGB sensor is used for concealing revelation of ooze obsession in Engine oil.

CHAPTER 3

AIM AND SCOPE OF THE PRESENT INVESTIGATION

3.1 OBJECTIVE OF THE PROJECT:

The objectives are detailed as follows:

- To monitor the level of engine oil by level sensor.
- To measure the temperature of engine using temperature sensor.
- It is economical and easy configurable system designed on low cost.
- To monitor the level of fuel by ultrasonic sensor.
- To check the alcohol content and control bike ignition using smoke sensor.

3.2 Block diagram:

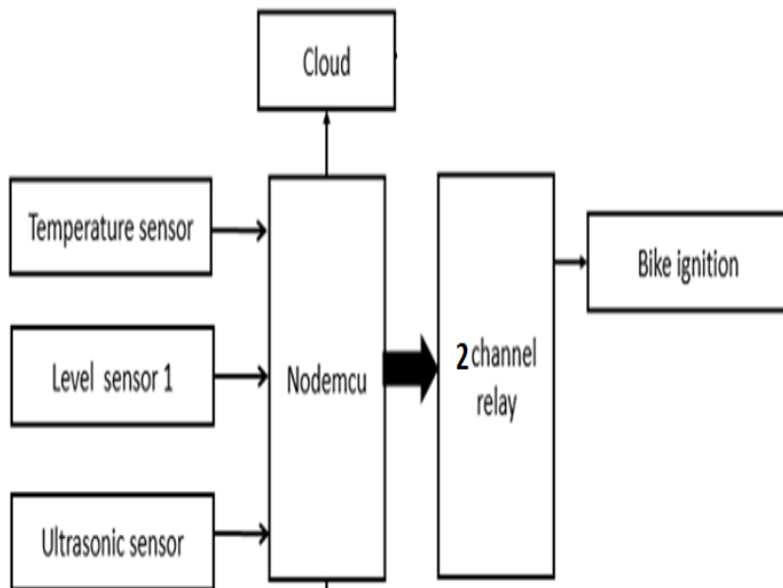


Fig 3.3: Engine section

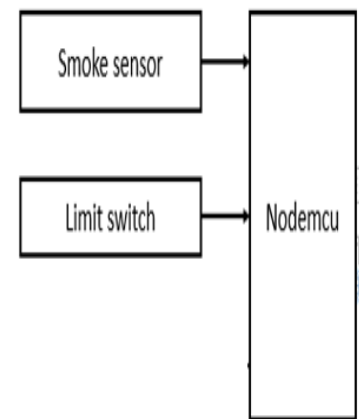


Fig 3.4: Helmet section

3.5 NodeMCU:

The LM35 sensor can be purchased as a sensor or a module. The insertion of the sensor is, however, the same. The sensor is a 4-pin community with just three pins used, while the module has three pins as previously seen. The only difference

between the sensor and the module is that the module includes a filtering condenser and a pull-up resistor, which must be used remotely for the sensor when necessary.

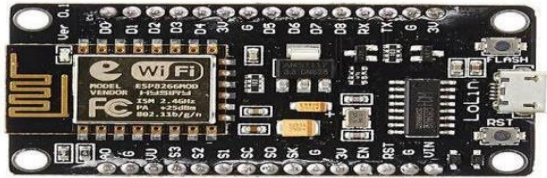


Fig 3.5.1:NodeMCU

3.6 LM35 sensor:

Either a sensor or a module can be bought from the LM35 sensor. The insertion of the sensor is nevertheless the same. The sensor comes as a 4-pin group from which only 3 pins are used while the module has three pins as previously seen. The only distinction between the sensor and the module is that the module contains a filtering condenser and pull-up resistor and you need to remotely use them for the sensor whenever necessary.

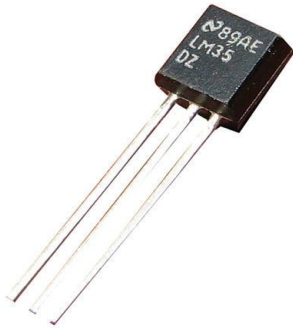


Fig3.6.1:LM35 sensor

The LM35 is a temperature and humidity sensor that is commonly used. The sensor supports an engaged NTC for quantifying the temperature and the 8-bit microcontroller for sequential details to calculate temperature and mugginess. The sensor is furthermore aligned and easy for other microcontrollers to work with.

With a precision of $\pm 1^{\circ}\text{C}$ and $\pm 1\%$, the sensor measures temperature from 0°C to 50°C and humidity from 20% to 90%. If you hope to calculate this, this sensor might be the right choice for you.

3.6.2 Features of LM35 sensor:

- Calibrated directly in celsius(centigrade)
- Rated for full I -55 to +150 degree celsius range
- Suitable for remote applications
- Low cost due to wafer-level trimming
- Operates from 4 to 30 volts
- Low self-heating
- $\pm \frac{1}{4}$ degree Celsius of typical nonlinearity

3.7 Gas sensor:

A smoke detector is a form of electronic fire alarm that naturally promotes the presence of smoke as a vital sign of fire and warns builders. Components of a structure's alert system include business and mechanical smoke detectors that serve as a symbol for the alarm board. As a consequence, the warning framework can include a smoke detector, heat detectors, or a body. These sensors are intended to recognize specific levels of temperature or fire signals. The light that induces caution is dissipated when smoke particles move through the Office of the Optical Indicator.

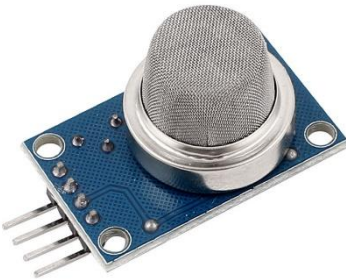


Fig 3.7.1:Gas Sensor

3.8 Ultrasonic sensor:

Ultrasound has a consistent effect on the range of human hearing. Our ultrasound sensors, like some others, use a special transducer to relay a heartbeat and determine resonance. The sensor calculates the distance to a target by measuring

the time between transmission and acceptance of an ultrasonic heartbeat. Distance Estimation Sensor Applications Using the "not touching" innovation, the Ultrasonic Sensors measure the distance of target objects or materials by air. ToughSonic® Sensors from Senix. They measure distance without causing harm and are simple to use and reliable. ToughSonic® sensors can withstand abuse whether they are used inside or outside.



Fig 3.8.1: Ultra sonic Sensor

3.9 Level sensor:

The degree of fluid and various fluidized solids including slurry, granules and powders showing a high surface are distinguished by the level sensors. Most obvious. from its name, level sensors are utilized to gauge the level of the free-streaming substances. Such substances incorporate fluids like water, oil, slurries, and so on just as solids in granular/powder structure (solids which can flow). In general, the compartment tanks are made secure by these substances because of their severity and maintain their level of rest. The length of the level sensors is measured by a pre-set reference.



Fig 3.9.1: PH Sensor

3.10 Limit switch:

Limit switches are used to ensure their toughness, ease of establishment and reliability in a range of uses and conditions. They will determine whether an article will be present or not, how it will travel, locate and finish. Then the limit switch deals with the machine's electrical circuit and its movements. These switches can be used for attractive starter control circuits as pilot gadgets to allow the elements of an electric powertrain to start, stop, slow down or accelerate.



Fig 3.10.1: Limit Switch

3.11 Two channel Relay:

Two-Channel 5V Hand-off Module is a hand-off interface board, it tends to be controlled straightforwardly by a wide scope of microcontrollers like Arduino, AVR, PIC, ARM, etc. It utilizes a low level set off control signal (3.3-5VDC) to control the hand-off. Setting off the transfer works the ordinarily open or regularly shut contacts.

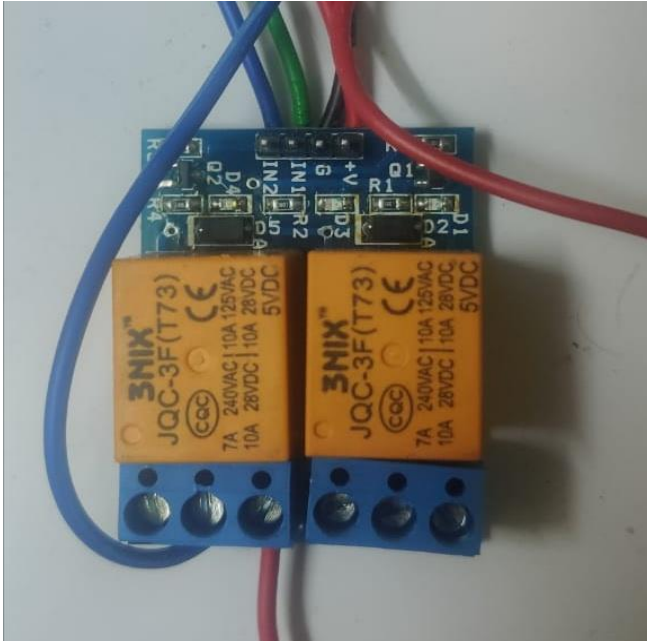


Fig3.11.1 : Two channel relay

3.11.2 The features of 2-Channel Relay module:

- Useful for safe control of higher amperage circuits. In power systems, the lower current can deal with the higher one.
- 2-channel high voltage framework yield, addressing the necessities of double channel control.
- Brand new and top caliber.
- Standard interface that can be controlled straight forwardly by micro controller.
- Wide scope of controllable voltages.
- Being ready to control high burden current, which can arrive at 250v,19A or 125v,15A.
- With a routinely open contact and a regularly closed contact.
- Around the board with 4 mounting openings, simple establishment and fixing.
- It has a typical end, a start, a shut end.

CHAPTER 4

EXPERIMENTAL MATERIALS, METHODS & ALGORITHMS USED

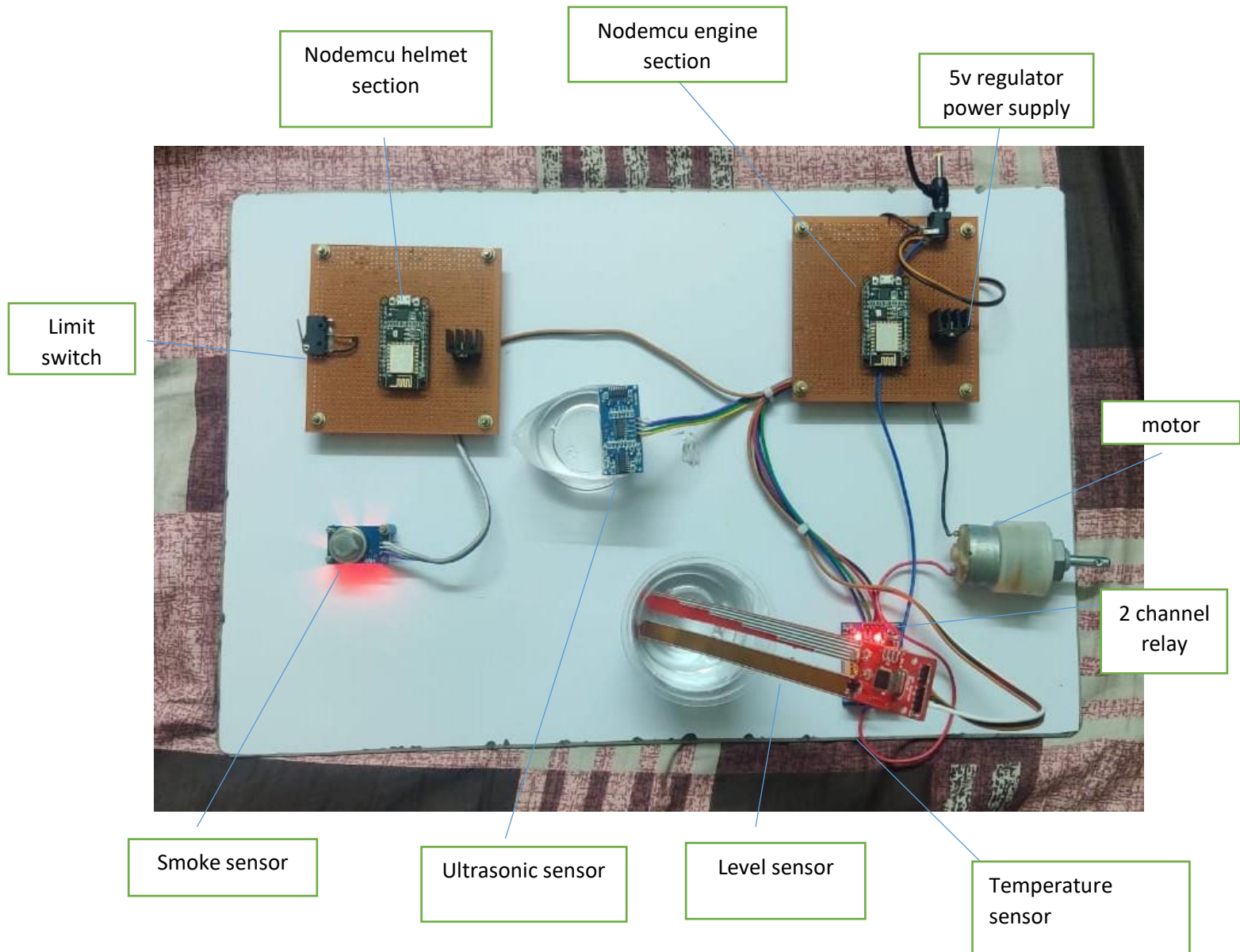


Fig 4.1: Helmet and engine section

4.2 Communication

A host PC is used to create and integrate microcontroller programs. An integrated environment change, or IDE, is the product used on the Host PC. The Arduino development environment is built on the open-source processing system (www.processing.org), and its creators describe it as a "programming environment and language for those who need to schedule photos, tasks, and collaboration." The Arduino programming language is an open source project called Wiring (wiring.org.co). Arduino is a great old-school C language. If you're new to this language, don't worry; it's not difficult to understand, and when you make mistakes in your project, the Arduino IDE criticizes you. The Arduino Uno has many offices from which it can communicate with a PC, another Arduino, or other microcontrollers. The ATmega328 provides sequential UART TTL (5V) connectivity via system pins 0 (RX) and 1. (TX). This sequential correspondence is sent over USB by an ATmega16U2, which can be used as a virtual com-port for programming on the computer. The Arduino programming includes a chronic monitor, which allows the shipment of simple literary information to the Arduino board. As data is sent to the PC through a USB sequence chip and USB association, the RX and TX LEDs on the board become streakable (yet not for consecutive correspondence on pins 0 and 1). Product Sequence correspondence on any of the Uno advanced pins is taken into account in a library. Furthermore, the ATmega328 preserves the correspondence between I2 C (TWI) and SPI. The Arduino programming language provides a Wire library to improve the use of I2C transport; see the subtleties documentation for more details.

As you go through the list of programming statements available in the Arduino IDE (choose Help->reference), you may believe there is little power to perform such tasks as operating service systems, work-step engines, understanding potentiometers, or displaying text on an LCD. The Arduino, like most C-dependent languages, retains the idea of "libraries." Repositories that provide extensions to core programming features. Libraries allow you to reuse code without manually copying and pasting it into all of your programs. The basic Arduino programming environment includes a few libraries that you can use, and you can download others from the Arduino support pages and third-party sites that distribute Arduino library code. Servo is a good

example of a library that you would possibly use for the Robot and many other robot projects. You can use this library to attach one or more hobby R/C servos to the Arduino's digital I/O pins. The Servo library is included in the Arduino installation kit Library->Servo. This includes the rows.#include <Servo.h>That tells the Arduino IDE you want to remember your sketch of the Servo library. With the help of the library now available to you, at least one servo can be managed by its various capabilities. myServo.write(90);Basically, Arduino portraits are direct and easy to read and understand. The software Arduino includes two main parts: set-up () and loop (). There are capabilities that customize according to their names: For example, setup() sets up an Arduino device to specify which I/O lines you plan to use and whether the lines were inputs or outputs. When the Arduino works, the loop() work is endlessly reworked.

4.3 TEMPERATURE SENSOR

Temperature is a natural quantity that is regularly estimated. This is understandable given that temperature is typically influenced by physical, electronic, synthetic, mechanical, or organic structures. Certain liquids, organic cycles, and, surprisingly, electronic circuits perform best at low temperatures. Temperature is one of the most highly valued variables, and there are several methods for measuring it. Temperature detection should be possible either directly with the warming source or remotely, without the use of emitted energies from the source. Temperature sensors such as thermocouples, thermistors, infrared, and semi-conductive sensors are also accessible today. There are also temperature detectors.

4.4 THERMOCOUPLE:

It is a kind of temperature sensor that is manufactured by connecting two different metals to one side. The connected end is the hot junction. These disparate metals are referred to as the cold end or cold junction on the opposite finish. At the last place of thermocouples the chilly intersection is CTI really shaped. In the event of a temperature distinction between the hot crossing and the cold crossing, a small voltage is generated. This voltage can then be calculated and therefore used to demonstrate temperature as an EMF (electro-intention power).

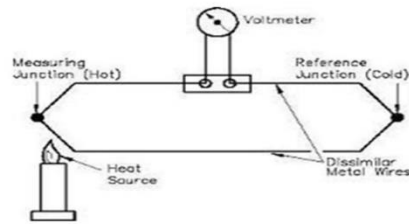


Fig 4.4.1: Thermo couple

4.5 Thermistors:

Like the RTD, the thermistor is a temperature detection device with temperature adjustments. Despite these thermistors, semiconductor materials are being used. Obstruction is fixed in a manner similar to RTD, but thermistors show an unusually non-linear opposition to a temperature bend. Therefore, we can see a huge blocking shift for a little temperature change in the thermistors that are operating. This makes it a deeply sensitive device, suitable for set-point applications.

4.6 Semiconductor sensors: They are organized into various categories, such as voltage output, current output, digital output, silicone resistance, and diode sensors. Current temperature sensors with a working temperature range of approximately 550°C to $+150^{\circ}\text{C}$ provide high precision and linearity. The efficiency of the interior speakers can be measured to advantageous consistency, such as $10\text{mV}/^{\circ}\text{C}$. They are also useful in chilly cross-section remuneration circuits for wide-temperature thermocouples. A brief description of this type of sensor is given below.

4.7 SENSOR ICS

There are a wide assortment of temperature sensor ICs that are accessible to improve on the broadest conceivable scope of temperature observing difficulties. These silicon temperature sensors vary altogether from the previously mentioned

types several significant ways. The first is working temperature range. A temperature sensor IC can work over the ostensible IC temperature scope of - 55°C to +150°C. The second significant distinction is that of utility. A silicone temperature sensor is a built-in circuit that may also include large sign preparation hardware within the sensor's box. The addition of pay circuits to temperature sensor ICS is insufficient justification. Some of these are simple circuits with a single voltage or current output. Others provide straightforward voltage-compatible detection circuits for ready control. Some additional integrated circuits for microchip-based architectures combine simple hardware detection with sophisticated data and control records. The majority of CAD sensors include a temperature display, an ADC, a computerized two-wire interface, and IC behavior monitoring registers. The temperature can be regularly calculated and reviewed as needed. If the sensor reaches a customized threshold, the host processor will educate it to show a high (or low) yield pin whenever desired. Lower rim temperature can also be changed, and the host can be notified if the temperature falls below this rim. Computerized yield sensors can be used to track solid temperatures in chip-based systems. The sensor has three terminals above temperature and a 5.5 V reserve limit. This type of sensor uses a temperature-based action material to fluctuate the opposition. This difference in opposition is detected by the circuit, and the temperature is calculated. As the voltage rises, the temperature rises with it. A diode can be used to observe this operation. Temperature sensors are ready for immediate and solid chip matching to microchip data. The sensor unit may be viable without the use of A/D Converters and simple processors. The LM35 is a temperature sensor model. The LM35 is a precision coordinated circuit temperature sensor with a straight voltage relative to the Celsius temperature. The LM35 has a control range of - 55 to +120 kilograms. The required CT sensor (2 kg to +150 kg) is depicted in the figure below.

4.7.1 Features of LM35 Temperature Sensor:

- Calibrated directly in ° Celsius (Centigrade)
- Rated for full I -55° to +150°C range

- Suitable for remote applications
- Low cost due to wafer-level trimming
- Operates from 4 to 30 volts
- Low self-heating,
- $\pm 1/4^{\circ}\text{C}$ of typical nonlinearity

4.7.2 Operation of LM35:

Temperature sensors that are essentially identical to other synchronized circuit temperature sensors may be associated with the LM35. It is very easily adhered to or mounted on a board, and the surface temperature is approximately 0.01 percent C. As a result, the surrounding air temperature is assumed to be the surface temperature; the true air temperature for the LM35 kick would be halfway between the surface temperature and the air temperature if the air temperature was substantially higher or lower than the surface temperature.

4.8 Alcohol sensor module

In the current state of innovation, it is important to control the delivery of gases. Monitoring gases from domestic appliances, for example, to forced air systems through electric fires and well-being structures in businesses, is critical. In gas sensors, these structures are critical. Gas sensors, like a nose, react precipitately to the gas, keeping the structure informed of any changes in the centralisation of vaporous particles. Gas sensors can be accessed in a wide range of environments depending on the degree of impact, the type of gas to be measured, the measurements actually taken, and other factors.

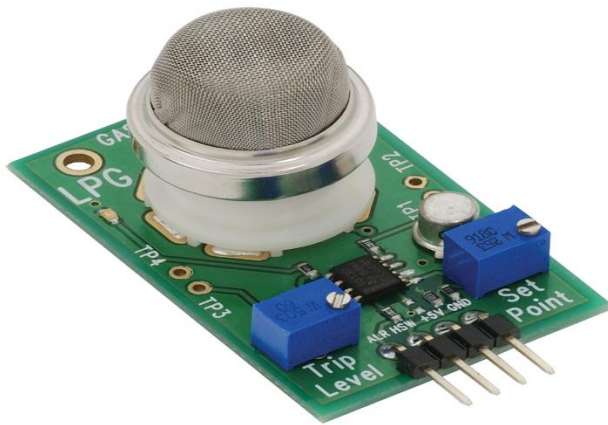


Fig 4.8.1:Gas sensor Module

The gas sensor module includes an exoskeleton of steel under which is housed a detection component. This detection part is revealed by associated leads to the current. This current is known as warming current, which ionizes the gasses entering the detection portion and consumes them. This increases the detection obstruction that changes the current estimate leaving the detection portion.

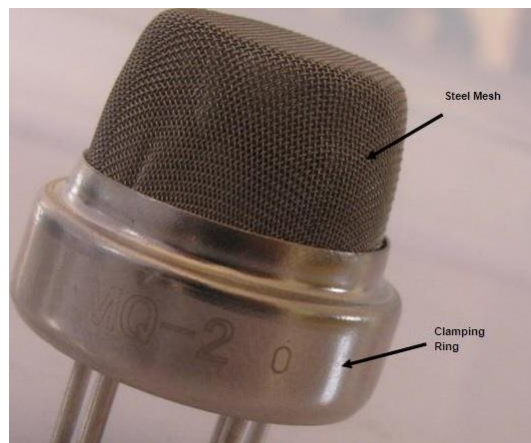


Fig 4.8.2: Facades of a standard gas sensor module

The image shows a steel network, a copper ring and a typical gas sensor module's interfasses. The main feature is the treatment of the stainless steel network: To ensure only the vapor components can move through the internal sections of the sensor, examine the suspended particles.

- Protects the sensor's inner parts.
- Displays a blast network enemy holding the sensor module.

Perfect high temperature and gas pressure.

The sensor network is divided into two layers to efficiently supervise these capacities. The grille would surely remain in the body with a copper brace. The connecting paths of the sensor are thick so that the sensor can be connected to the circuit immediately and provide the temperature measurement required. It is made of copper and is stained. The signal is supplied by four of the six leads (A, B, C, D) while two (1, 2) are used for the detective part to provide sufficient warmth. The pins are placed on the sturdy base of Bacelite, so that the connected leads can be firmly adhered to.



Fig 4.8.3:leads of gas sensor

The highest point of the gas sensors is removed in order to see the internal parts of the sensor: sensing portion and assembly cables. The detection component and six

related legs extending across the base of the bakelite describe the structure of the hexapod.



Fig 4.8.4:empty detecting component

This illustration shows an empty detection section consisting of tin oxide-coated aluminum oxide steel. With a ceramic substratum, heating capacity and tin oxide are enhanced and resistance to gas adsorption (the methane and its components for this situation). A well-known conductive alloy, Nickel-Chromium combines the leads which warm the detector portion. Passes through the detection portion of small changes in the current are bound by platinum wires. The cables are connected to the component body detection, while the chromium-nickel cables are not connected.



Fig 4.8.5:Nickel-chromium detecting component

Although various wires are attached to the component's external body, nickel chrome wires are placed in a spring molded inside the component. The picture shows an empty clay wound piece of the cable.

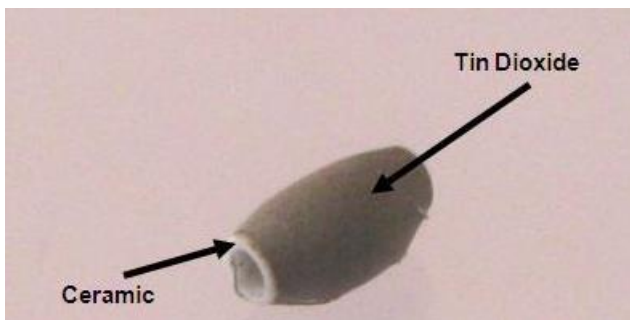


Fig 4.8.6 wound piece

The photo shows the clay with a highly adsorbent tin dioxide coating on the surface. The ionizing temperature of every gas to be observed is explicit. The sensor is responsible for working at the optimal temperature for the ionization of gas particles. The detection component's fired premises are exposed to warming current via nickel-chromium wire. Warmth is transmitted in the area where the gases cooperate and ionize in the component. Ionizing once, the tin dioxide is absorbed. Adsorbed particles modify tin dioxide layer obstruction. This increases the current course

through the detection portion and transfers the output to the device controlling the functioning of the gas sensor.

4.9 Ultrasonic (UV) Sensors or Ultrasound Sensors

Bats are terrific creatures. Toss away from the eyes but such an exact dream that, whenever you run, you will remember a moth and a wrecked feather. The vision is perhaps more interesting than ours and has been a great deal of human vision, but it does not undoubtedly go beyond our reach. Ultrasonic is the technique used for navigational purposes by bats and several other species from the animal collective. We have perceived and imitated a number of these signals efficiently and addressed their potential in an attempt to impersonate nature's methods to gain an advantage on all. The history of the experience dates back to 1790. Lazzaro Spallanzani discovered that bats flew by using their hearing rather than sight. It's a really different experience. In 1826, Jean-Daniel Colladon invented sonography, which used an underwater ringer to measure the speed of sound in water. The research and analysis work in this field progressed gradually until Pierre Curie's disclosure for current ultrasound transducers was established in 1881. It has been discovered that there is a relationship between electric voltage and friction on glass material. The terrible Titanic disaster sparked a lot of interest in this field, and Paul Langevin invented the hydrophone to identify ice sheets. It was the primary ultrasound transducer. The hydrophone, which could send and receive low repeat sound waves, was used to explore the oceans during World War I. To investigate ultrasound, a note referring to SONAR was also used. The clinical review has begun. In the late 1930s, Dr. Karl Dussik used a hyperphonography technique to capture ultrasound wave echos on paper. This technique was used to create ultrasound images of the brain to help in tumor diagnosis and the adoption of ultrasound imaging. Since then, various researchers such as Ian Donald, Douglas Howry, Joseph Holmes, John Wild, and John Reid have identified a range of ultrasound sensors in the medical field that have enabled malignancies in the stomach, ovarian pimples, twin embarkations, tumors, and so on to be detected. In the early 1960s, industry was already reluctant to embark on fading, and techniques such as ultrasonic soldering and unschädliche testing were already in place.

4.9.1 How Ultrasonic Sensors work?

Ultrasound sensors are instruments that use mechanical energy as ultrasound waves to adjust the use of electrical/mechanical energy to calculate distances between the sensor and the objective element. Ultrasonic waves are longitudinal mechanical waves that pass through a medium in the direction of the wave through a series of compressions and rarefactions. On the human hearing scale, ultrasound is defined as a steady wave frequency of 20,000 hertz. According to the form of use, the frequency spectrum was extensively sorted, as shown in the figure below.

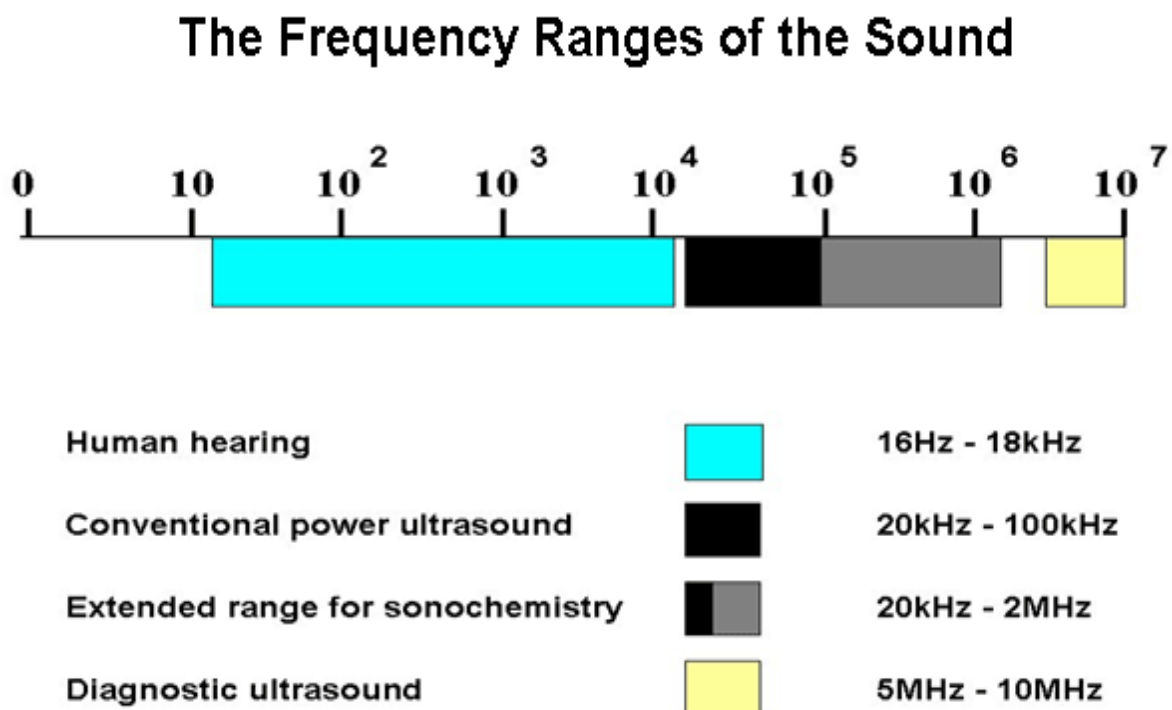


Fig 4.9.2: Frequency ranges of sound

The diffusion of an energy impression occurs at the time when ultrasonic waves occur in the article over large, up to 180 degrees strong points. As a result, part of the energy of the episode is expressed as echos and is heard by the transducer. The distance from article (L) can then be calculated by means of the relation speed of ultrasonic waves (v).

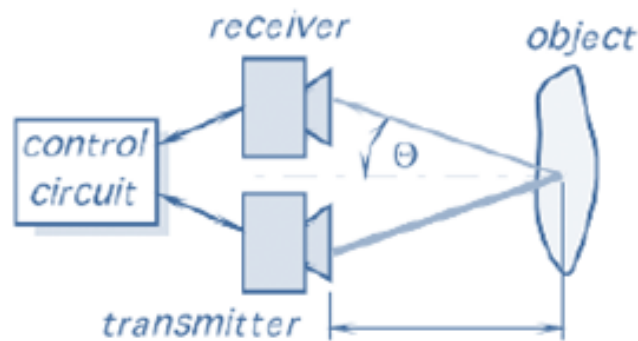


Fig 4.9.3: Receiver and transmitter circuit

Generating Ultrasonic Waves

It is critical to build surfaces such as a stomach for the age of mechanical waves, which can then facilitate movement into the medium as friction and rarefaction before they occur. During the age of ultrasonic waves, piezoelectric materials working in motor mode and magnetostrictive materials were widely used at repeatable scopes of 1-20 MHz and 20 to 40 kHz, respectively. The sensors use piezoelectric clay transducers, which are versatile when an electric signal is applied. These are connected to an electronic oscillator, the output of which produces swinging voltages at the appropriate frequency. Lead zirconate titanate materials are well-known piezoelectric materials used in clinical ultrasound imaging. For best results, the repetition of the applied motions should lead to the recurrence of the pottery, which immediately produces motions by reverberation. It offers extremely high affectability and efficiency when operating in reverberations. Since piezoelectricity is reversible, it produces electrical voltages when ultrasonic waves reverse their target and penetrate the clay structure. As a result, a transducer will act as both a transmitter and a receiver in beat mode. Where continuous distance estimates are needed, separate transducers for transmitting and collecting can be used. In industry, sensors are mostly used in displays, which can be mechanical clusters of swinging or turning sensors or electronic clusters that can be straight, bendable, or inserted. Various types of showcases have been used to picture the

output of an ultrasonic sensor, the shape of which depends on the nature and power of the transducers used. Mechanical displays, as well as bent and staged electronic Clusters, produce a sectoral field of view, whereas straight displays produce a direct field. Direct graphical plots with plenty of time on the y-pivot in the x-hub known as amplitude mode or A modes or power balanced B-examinations with a spot showing how plentiful reflected waves can be are examples of modes showcased. In different modes, M-mode and Doppler (D) mode are used. The reflected and transmitted signals can be seen from the center of a transducer movement in the majority of these sensors, keeping the target set in a specific medium (water as a rule). The sound bar travels quickly, causing the transducer to produce the shortest lines possible. The less the pillar's shape, the more responsive the sensor. Nonetheless, the conceivable point grows with the width of the bar between the transducer and the floor. The following pillar examples are shown: Hub and Cross Sectional bar profiles

The limits at which the ultrasonic sensor is estimated include transmission velocity, weakness, powerful reach and objective such as grayscale, center and horizontal objective. Nominal frequency, maximum frequency, concentration frequency, width of pulses, affectability and noise are various boundaries signal ratios (SNR).

Importance of Ultrasonic Sensors

A variety of sensors rely on other actual transduction standards such as sensor detection with optical reach and microwave-based devices. Why should one in any case use ultrasonic transducer because the sound speed is extremely delayed than the electromagnetic wave speed? The correct answer lies in the current investigation. Gadgets based on EM waves are too fast. As the EM waves are slower, the time taken by ultrasonic waves is longer than that taken by the latter, thereby making the assessment more efficient and less lavish. As they rely on sound waves rather than EM waves, they work where the last wave doesn't work. For example, light based sensors will last exceptionally, due to the simple identification of fluid levels or high glare conditions in the article and the visibility of the resulting media. For all purposes, ultrasonic gadgets based on sound generation will be unimpacted. These often function well in wet environments in which optical

shafts will experience the harmful consequences of water per refraction in the environment. The ultrasonic sensors can be located in the center of two sensors on EM wave, Infrared rangefinder on the lower end and LIDARs on the upper end due to their scope and precision. Unlike LIDARs, the ultrasonic receptionist is less accurate or important than the IR receptive sensor which is extremely impervious to conditions and requires re-calibration in the event of changing environment. These gadgets also benefit from modesty and simplicity in clinical imaging, as opposed to MRI and X-Ray filters. No dangerous effects of ultrasonic waves at the power levels are recognized instead of radioactive techniques or X-beams and are particularly suitable for the imaging of sensitive fabrics.

4.9.4 Applications

The test was conducted to tackle problems of Ultrasonic Sensors, especially in clinical imaging, in which ultrasounds are identified. Ultrasonic sensor antiquities such as acoustic shadowing and acoustic enhancement are exploited in the form of tissues that enable the separation between strong cystic tissue. In applications like plastic soldering, cleaning decoration and remote detection and telemetry, helping to avoid frameworks, the company also obtained incentives from ultrasonic sensors. Ultrasonic sensors have been referred to as the most beloved device for distance and design in advanced mechanics. Even the fashion industry uses ultrasound sensors such as hair enhancement inserts for hair styling.

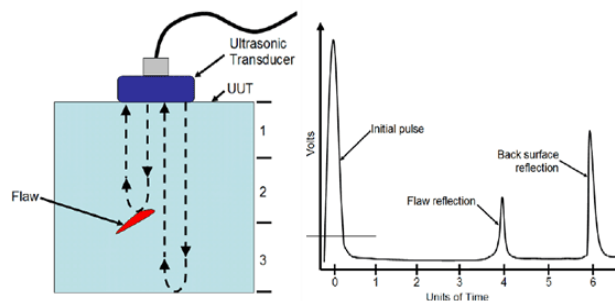


Fig 4.9.5:Flaw detector

Flaw Detection Using Ultrasonic Sensors

ME 445 INTEGRATED MANUFACTURING TECHNOLOGIES

EXPERIMENT 1

"PROXIMITY SENSORS"

Software required:

Arduino IDE

Embedded C

4.10 ARDUINO UNO AND ITS PROGRAMMING

A simple but undeniable PC, the Arduino microcontroller has a wide balance in redirection and master business. The Arduino is easy to use. The Arduino is an open source that means that gear is reasonably evaluated and computer programs are free to improve. This guide is for ME 2011 undergraduates or anywhere who are curious about the Arduino. There are heaps of tools for Arduino's cutting edge customers. The guiding board of the Arduino Uno is a decent choice for undergraduates and educators (Spark fun DEV-09950, \$29.95). You can build projects and interface circuits with the Arduino board to obtain switches and different sensors, and you can quickly monitor motors and light. The Arduino microcontroller is an easy to use but unbelievable PC with a large base in the diversion and expert market. Arduino is an open source, involving a sensitive assessment of equipment and free programming of improvements. This guide is available for ME 2011 understudies or anywhere that interestingly stands up to the Arduino. There's a lot of assets for cutting edge Arduino customers to lurk the internet. This guide includes the Arduino Uno board for understudies and teachers (Spark fun DEV-09950, \$29.95). You can write and manufacture interface circuits with the Arduino board to understand switches and sensors and to monitor engines and lighting without exertion. That's the idea of the Arduino.



Fig 4.10.1:Arduino software

Arduino Software (IDE)

- Writing Sketches
- File
- Edit
- Sketch
- Tools
- Help
- Sketchbook
- Tabs, Multiple Files, and Compilation
- Uploading
- Libraries
- Third-Party Hardware
- Serial Monitor
- Preferences
- Language Support
- Boards

A text processor for writing code, a book support, a toolbar with daily capacity capturing, and a menu progression are provided in Arduino Integrated Development Environment - or Arduino Software (IDE). It interacts with Arduino and Genuino to pass and talk to programs.

4.11 Writing Sketches

The outlines are called the programs that are written with Arduino Software (IDE). These images are written in the word processor and saved with the .ino increase folder. The supervisor has highlights to cut/stick and search/stick document. When

saving and sending, the message area gives feedback and also shows errors. The help displays the text yield of the program Arduino (IDE), including total error messages and other details. The board and serial port are shown in the lower right corner of the window. You can check and upload the programs, create, open, save portraits and open a serial monitor with the toolbar.

4.12 Libraries

Libraries offer additional use for pictures, such as equipment work or information control. Pick a library from the Sketch > Import Library menu to use the library in a sketch. This would require at least a # joint at the highest point of the contour and add your drawing to the library. Since libraries are moved with your sketch to the floor, they increase the space they take. If a sketch does not, then just delete its articulations from the highest point of your code at this point, which includes articulations. A guide is once published by libraries. A few libraries are merged with the programming of Arduino. Other sources can be downloaded from a combination or from the Library Manager. You can import a library from a compressed document and use it in an open sketch starting with the 1.0.5 version of the IDE. For an external library see these instructions. To compose your own library, see this instructional exercise

4.13 Third-Party Hardware

The equipment list of your sketchbook registry can be supported by outsider equipment. The added stages can include board definitions, center libraries, bootloaders and developer definitions, as well as the board menu definitions. In order to register the devices, the external stage would then be disconnected in its own sub-catalogue. (Try not to use the word 'arduino' or you can revoke the inherent phase of Arduino.) Only delete your registry to uninstall. See the Arduino IDE 1.5 external hardware determination for the subtleties of making packages for external devices

4.14 Serial Monitor

This displays the sequential USB- or chronic connector transmission from the Arduino or Genuino board. Input text and snap on "send" or press enter in to send information to the board. Choose the baud rate from the dropdown menu that coincides with the serial rate. Start your sketch. Start your sketch. Notice that when you connect with the chronic screen the board is reset on Windows, Mac or Linux (it will reset your sketch). Please note that the Serial Monitor doesn't have control characters; you can use an external terminal program to connect it with the COM port that relegates to your Arduino board if you need to fully administer the sequential correspondence with control characters.

4.15 Language Support

Preferences

Any tilt may be set on the tilt exchange (found under the Arduino menu on the Mac, or File on Windows and Linux). The rest can be found in the tilt book, the region of which is included in the tilt speech.

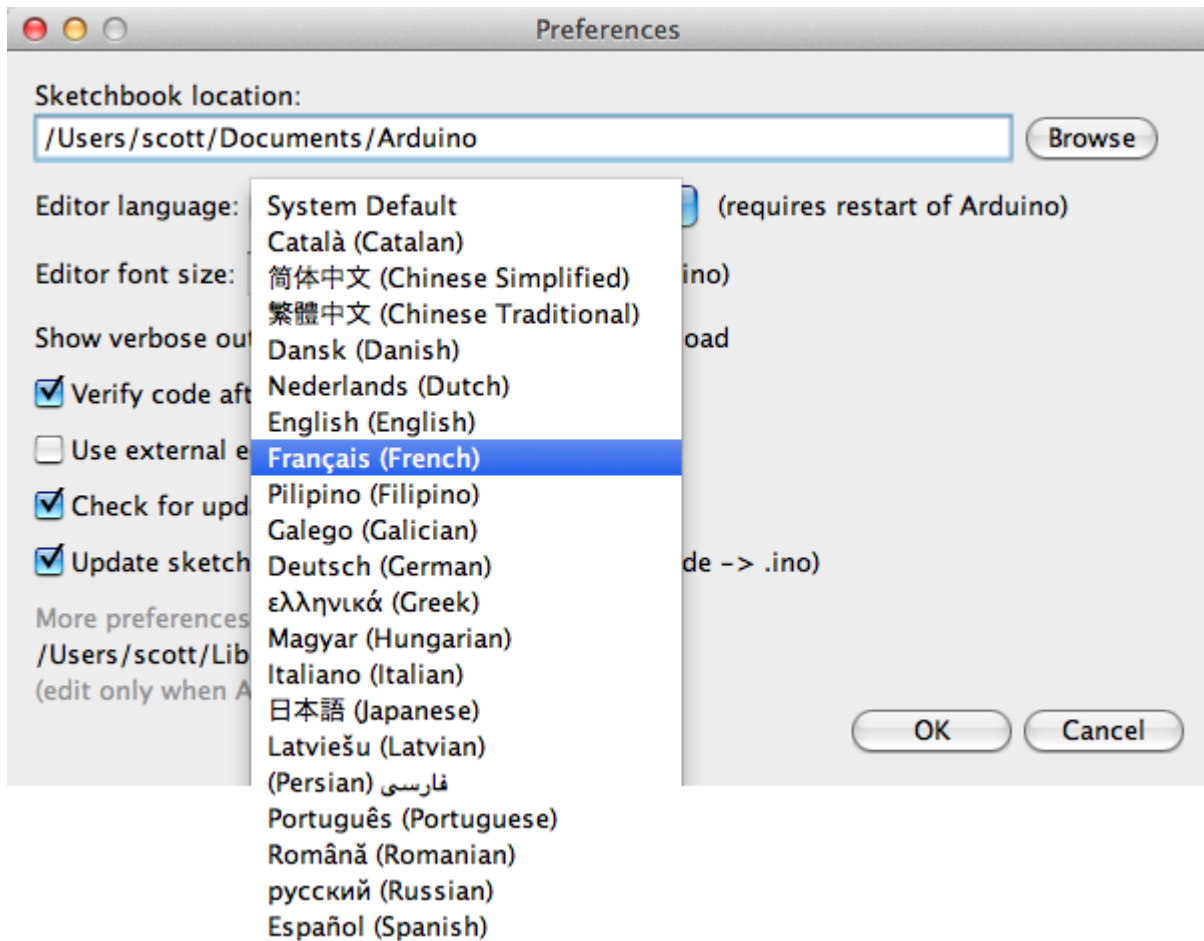


Fig 4.15.1: Language support

The Arduino software (IDE) has been transformed into 30+ different dialects since the 1.0.1 version. Of course, the working system selects the IDE loads in the language. This is determined by the area environment for controlling money and date designs on Windows and theoretically Linux, and not by the language in which the working system has been displayed.) If you want to physically modify the language, start the Arduino Software (IDE) and open the Preferences window. There is a down menu of updated dialects near the Editor Language. Choose from the menu your preferred language and restart the product to use the language selected. The Arduino Software (IDE) default to english if you do not uphold your job system language

Drop down language. When you restart the Arduino Software this setting results (IDE). In addition, you can restart the Arduino software (IDE) to update it into the new default language as a consequence of changing your workframe settings.

4.16 Boards

The board selection has two effects: it sets the limitations used for ordering and moving representations, such as the computer processor and baud rate, while setting and recording and cabling settings used by the bootloader order consumed. Therefore if you have transfers effectively with a particular determination, you will have to cheque it before you consume the bootloader, irrespective of whether you have effectively transfers. A correspondence table between the various sheets can be found here. In the accompanying rundown ArduinoSoftWare (IDE) recalls the sheets, all based upon AVR Core, for support. In the regular establishment the Board manager recalled that help for the emerging number of new sheets depending on different centers such as Arduino Due, Arduino Zero, Edison, Galileo etc. could be added.

HTTP

HTTP is the dominant protocol for Internet information sharing. It supports data encoding that is commonly referred to as stable HTTPs or HTTPs. You submit and receive packages with HTTP and HTTP when you use a web browsers (MS Edge, Firefox, Google Chrome, etc). As a result, HTTPs have not been common for data sharing in IoT. It was therefore not surprising. When a developer wants to implement HTTP communication, he should look for a RESTful API which shows all endpoints needed to communicate with a third party application (like Ubidots). You may refer to our REST API in this section to learn how to send and retrieve data from our servers. Note: This section is meant to help you understand what's going on in interacting with Ubidots, so that you can copy it into your own firmware. This means that all examples do not use our custom libraries.

4.17 UBIDOTS EXPLORER:

Introduction

Refer to our updated correspondence agreements: HTTP, MQTT and TCP/UDP here, to send or collect data from your computer gadgets. The reason is to help you understand what takes place behind the stage when you talk to Ubidots so you can double this in your firmware. We are also away from the use of library templates. However you can look to our viable gadgets and programming interface areas if you would like to use one of our libraries (Python, and others, C). The Functioning of the Ubidots? Whenever a computer updates a sensor value in a variable, it creates a data point or "point." Ubidots keep in variable dots from your devices and have the corresponding time stamps for these stored dots:

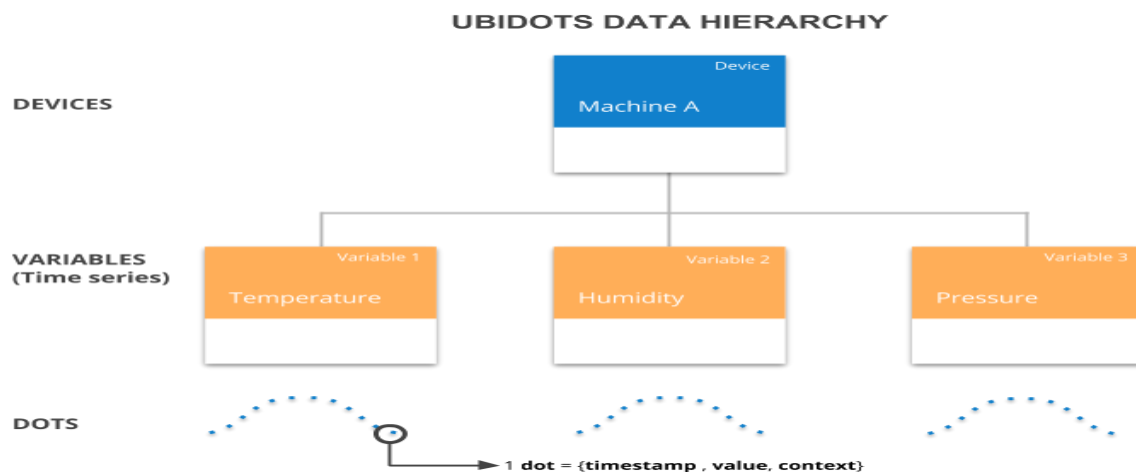


Fig4.17.1: UBIDOTS DATA HIERARCHY

CHAPTER 5

RESULT AND DISCUSION

In this project we are determining the complete values of each different objective had shown inubidots cloud, which is used to give the inputs and monitor the output of the different objectives i.e. not wearing the helmet, alcoholic condition, engine oil level, fuel level and engine temperature.

5.1 RESULT

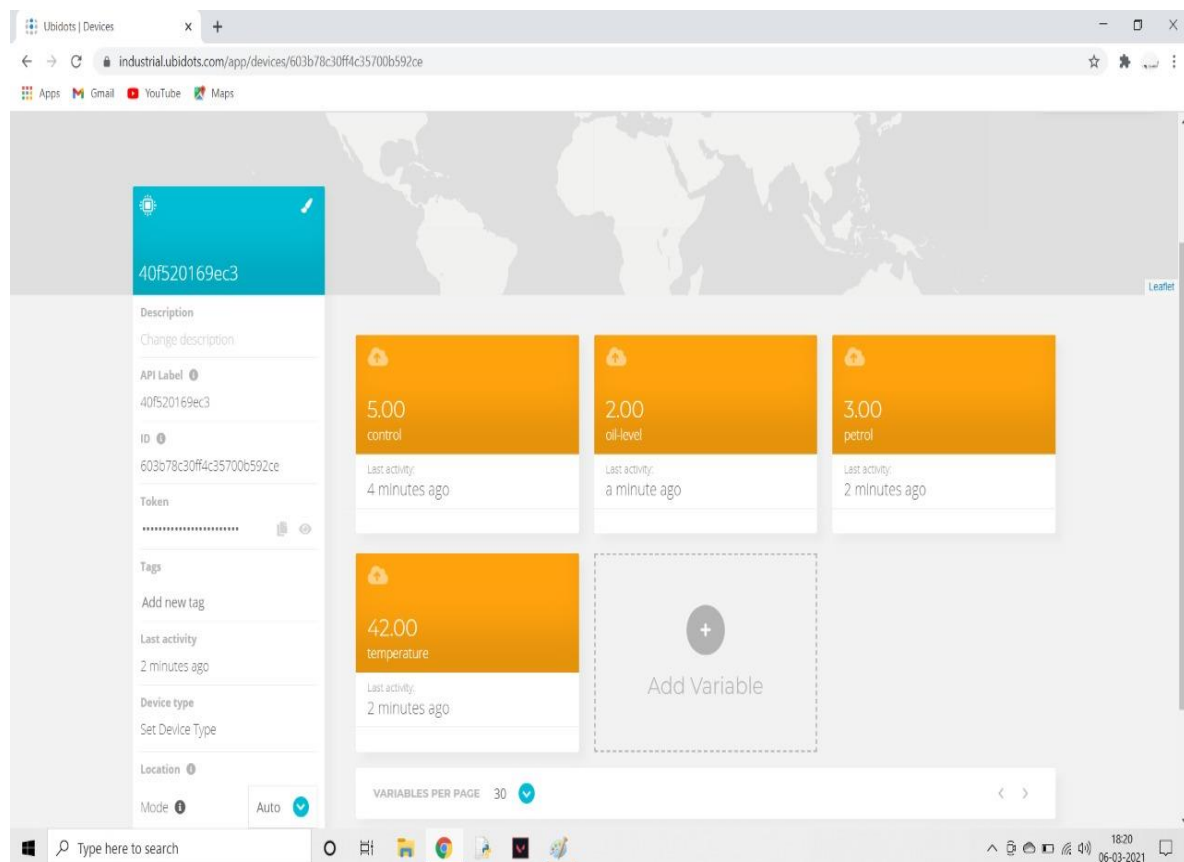


Fig5.1.1:Results of Engine parameters(screen shot)

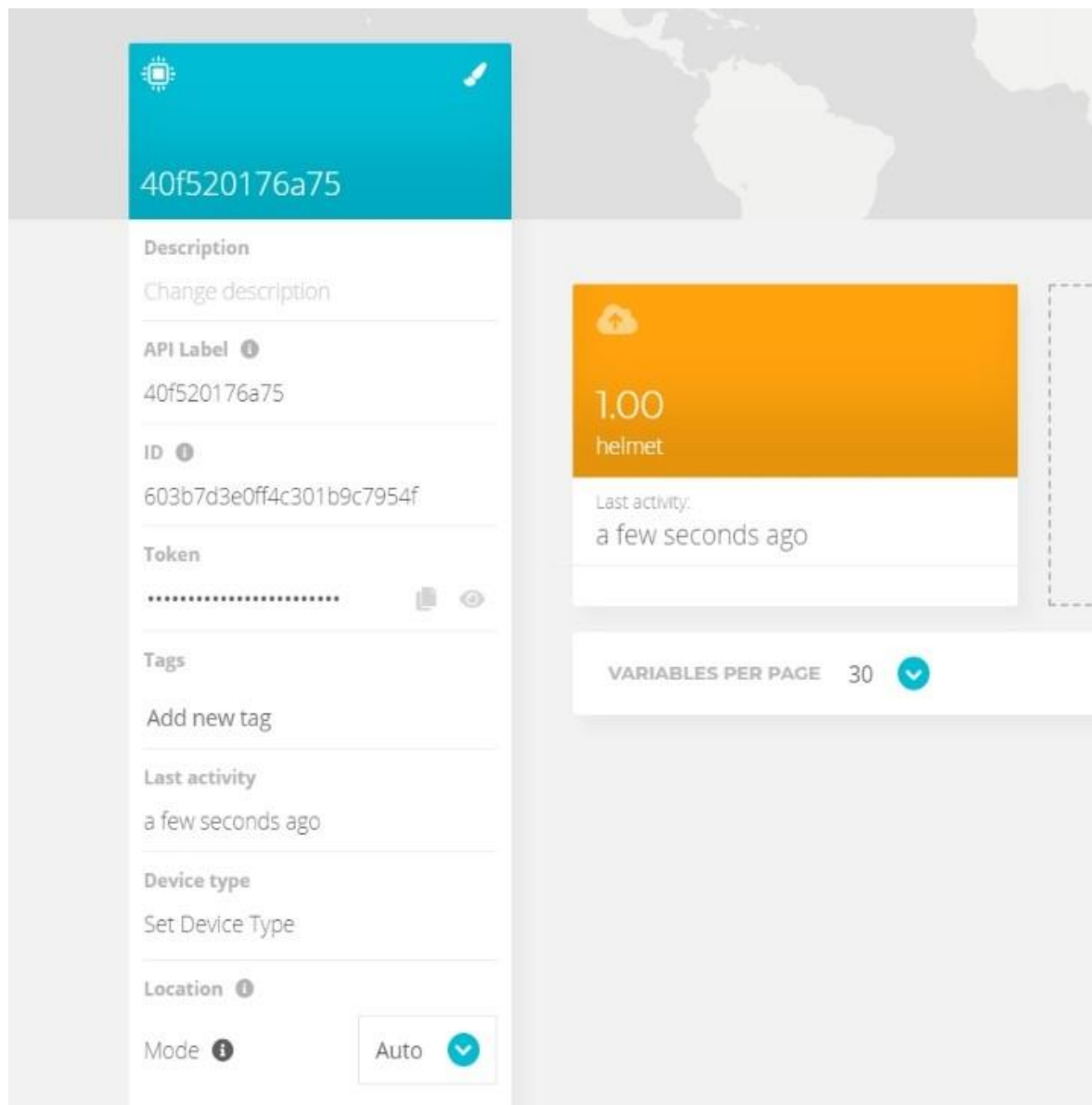


Fig5.1.2:Results of helmet parameter(screen shot)

CHAPTER 6

SUMMARY AND CONCLUSION

6.1 Summary:

For a period of seven months, I have been involved with the project "ENGINE OIL LEVEL MONITORING SYSTEM AND MULTI OBJECTIVE BIKE SHARING BASED ON IOT" and I have learned to associate, set up and program portion components in this project, DANDU KOUSIK VARMA and CHERUKUMALLI RAVINDRAKUMAR And we have worked immensely to get some knowledge in Electronics and communications during this project era.

6.2 Conclusion:

Looking at the figures, the features of the proposed device are helpful in the monitoring of motor oil, fuel levels, engine temperature and in complying with the regulations on the use of helmet and prohibition of alcohol.

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