

**IOT Based ML enabled Prediction and Notification System for
Parkinson affected People**

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This Report Presented in Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science in Computer Science and Engineering

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APPROVAL

This Project titled “**IOT Based ML enabled Prediction and Notification System for Parkinson affected People**”, submitted by Sohana Afroz, ID No: 182-15-2089 and Md. Rahiul Hasan Rifat, ID No: 182-15-2125 and Tarikuzzaman, ID No: 182-15-2107 to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 18-05-2022.

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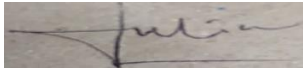
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DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Ohidujjaman, Assistant Professor, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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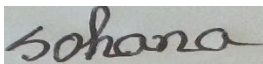
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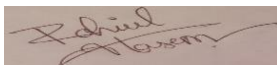
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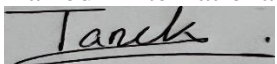
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ABSTRACT

This find out about explores magnificently about the Parkinson affected patient. As clinical science astonishingly superior with the assist of Internet of Things we have advised a futuristic replica that comprehensively will be reveal and diagnose a Parkinson affected people. We have collected statistics over from many papers although it is a unique sickness but many of us don't be aware of how to react to this and also don't recognize if he/she bought hit by Parkinson and it would be extremely useful for them to use our alert system. And we use Machine Learning (ML) correctly for the detection of this disease. We have proposed a special method, architecture based IoT and Machine Learning (ML) that will notify the machine for affected people via a robotic system. As we comprehend such disease are for the elderly and also a non-curable disorder however taking action in the intervening time will by some means will assist them a lot with our detection machine. To improve this condition, we also used Logistic Decision Regression (LDR) with ML for early diagnose and enhance the excellent of existence for neighborhood affected people. We have to propose an IoT-based Parkinson disorder observation device with robotic envoy that will deliver integrally trade for affected person as for modern-day world we need a current treatment and we've proposed such mannequin as a supporting hand for affected community.

Keywords: Parkinson disease, Machine Learning (ML), IOT (internet of things), DHT11 temperature and humidity sensor, NODE MCU, 9DOF Accelerometer Gyroscope Magnetometer MPU-9250

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CHAPTER 1

Introduction

1.1 Introduction

Bangladesh is a highly populous country. Additionally, there are not enough medical facilities and monitoring systems to meet the needs of this vast population. Parkinson's disease is a neurodegenerative illness that impacts millions of people around the world. Weariness, shaking (upper and lower arms, and jaw shaking as well), desire interference, blank, easy moving, apathy, postural dysfunction (depression and mood changes), repetitive gestures, dementia (loss of memory), what not to do, sleep confusion, and expecting are also classic symptoms of Parkinson's disease. The main aim of our research-based project is to create a multifunctional specialized tool that can provide different types of diagnoses related to Parkinson's symptoms at a time for a Parkinson's patient. Lowers the treatment costs for the patient as well as facilitates an easy decision-making system for a Parkinson's patient.

We proposed an IOT-based ML-based Prediction and Notification System for Parkinson's patients. The most important goal of our proposed machine is to predict Parkinson's sickness based totally on a body temperature and humidity. The first we do is gather a person's physique temperature, humidity, and acceleration value the use of a DHT11, 9DOF Accelerometer Gyroscope Magnetometer MPU-9250. The accrued data was then sent to a cloud server, the place it used to be analysed using the on line platform Thing Speak via a NODEMCU module. We then reach-me-down a ML algorithm to predict Parkinson's, and we reach-me-down a GSM module to send an alert SMS to the character at danger.

In the first section, we discussed the introduction. The remainder of the paper is geared up as the literature overview is discussed in the 2nd section. The 1/3 and fourth section is about the methodology and the dialogue of the results. The ultimate part carries the conclusion and future works.

1.2 Motivation

Nowadays healthcare science is fairly demandable amongst everyone. Besides it became less difficult for humans of rural areas to get primary cure from the use of the IoT Based ML-enabled Prediction and Notification System for Parkinson-affected People. It's been a terrific develop in inpatient monitoring for many years. It has the special advantage of simultaneal monitoring the state of affairs of Pulse and haemoglobin with Oxygen. Providing a measure of cardio function.

As human civilization has become more globalized, fitness has become a fundamental human need for every individual. In contrast, healthcare specialists no longer maintain continuous open communication with patient as far as financial arrangements are concerned. As with the United States, Bangladesh also views people with illnesses as communicable instead of non-communicable. Among non-communicable diseases in the United States, Parkinson's is the most prevalent. Due to the expense, most Americans are unable to take pleasure in a leisure check. Rural and metropolitan areas are continuously seeing more older people residing in them, and keeping track of their health while giving them a chance to live at a low cost is one of the most important appeals. The people in our nation are affected significantly by Parkinson's disease. In this nation, the majority of humans would benefit from finding a way to prevent Parkinson's ailments before they begin. A second motivating factor for this initiative is the cost of current Parkinson's diseases treatments.

1.3 Objective

The system can be bought by using human beings of any career with little money. This machine is organized for an IoT-based sanatorium tools monitoring and alert system. By developing this device, we favor a holistic analysis method for a Parkinson-affected patient. We will constantly give the fantastic performance to in addition enhance the device in the future.

1.4 Feature

In this extend we have made an effort to make the device as like easier and understandable to all professions of people.

- i. The tool will provide the monitoring process 24 hour for a patient.
- ii. It helps to reduce the work load for the nurse.
- iii. It will reduce medical diagnosis and monitoring cost.
- iv. It helps to regular homebased medical checkup for Parkinson affected patient.
- v. The tool maintains a regular database for every single person for his/her medical checkup.

1.5 Expected Outcome

In this topic are summarized. These are:

- i. The tool will be help to provides early warning system for any harmful symptom of a human body.
- ii. The tool work in dangerous environment such as the virus infected unit or war zone.
- iii. It can monitor patient condition

1.6 Problem Statement

This era that we are residing is absolutely surrounded with the aid of enhance science. Bangladesh is a fantastically populated country. And there do not have adequate scientific facilities and monitoring systems to make desirable services for this big population. The fitness problems of elderly persons need to be estimate on an efficient basis, thus is a higher strain, the pair in scientific lookup along with in hospitals, even as nicely even as in the company. At scientific organization and health centre, magnetic resonance imaging (MRI) is regularly employed to seize communication from an inpatient's bodywork, thus are then

prepared. Such tool is as well luxurious to apply in a residence or for personal apply, making use of as a portable implement due to its bulk also mass. It absorbs a lot of measure on each and every go to the clinic to have an ordinary evaluation, and manually recording may potentially produce human mistakes. Low-cost transportable science, then, plays an essential role in the diagnosis and treatment of Parkinson's disease.

Smartphones are frequently used for facts transmission and processing, despite their limited capacity and computing efficacy. Despite everyone thinking that Parkinson's attack victims cannot afford the best possible treatment, the biggest problem lies in soaring costs for Parkinson's attack medical care. If you have extensive funds, then you can also get remedy, but our state is not wealthy. Consequently, people in need are hard pressed to collect their money. This problem was resolved by make use of an Internet of things Based ML-enabled Prediction and Notification System for Parkinson-affected People representative network that regular the pulse price and body reversal. If the patient's pulsing charge get up in tandem with their physique reversal and sanatorium for treatment. It is additionally extremely portable.

1.7 Social Impact

Through the IOT, elderly patients have had their fitness monitoring continuously monitored, which has turned their lives around. People staying alone and their household projections are very well affected by this. The alarm system transmits messages to household members and healthcare specialists when the daily Parkinson's activities are disturbed or altered. Families and providers will be able to know immediately if an occurrence has taken place under this proposal.

Robotic technology has revolutionized the way that patients are treated and therapy is performed. You can also check it at home to find out why Parkinson's attacks have been reduced so you will be on the safe side. Monitoring the health center system is also possible with this technological know-how. Furthermore, students who pay close attention to this system may also be able to grasp how to use it rather quickly. Patient may also visit the healthcare center and be treated once they receive an alert prior to studying the Parkinson's disorder, and society will support this initiative by implementing the Parkinson's Project Predictions and Notifications System. Parkinson's disease will be saved from destroying a large number of people in society in the coming years. By this means, a Parkinson's sufferer

may now learn the news more quickly, whereas previously it was only a matter of time. Keeping track of time and finishing the work more quickly will ensure that time is not wasted. In light of the foregoing, it's obvious that this method can have a tremendous impact on society by advancing society and preventing Parkinson's attacks from occurring among many people.

1.8 Report Layout

Here is a diagram showing the layout of the report. A graphical representation of the entire endeavor represents the presentation's visual presentation. Additional information will be found in the material. It consists of five chapters. . All chapters are defined in element with the aid of a socio-demographic portrait, which involve a tiny explanation.

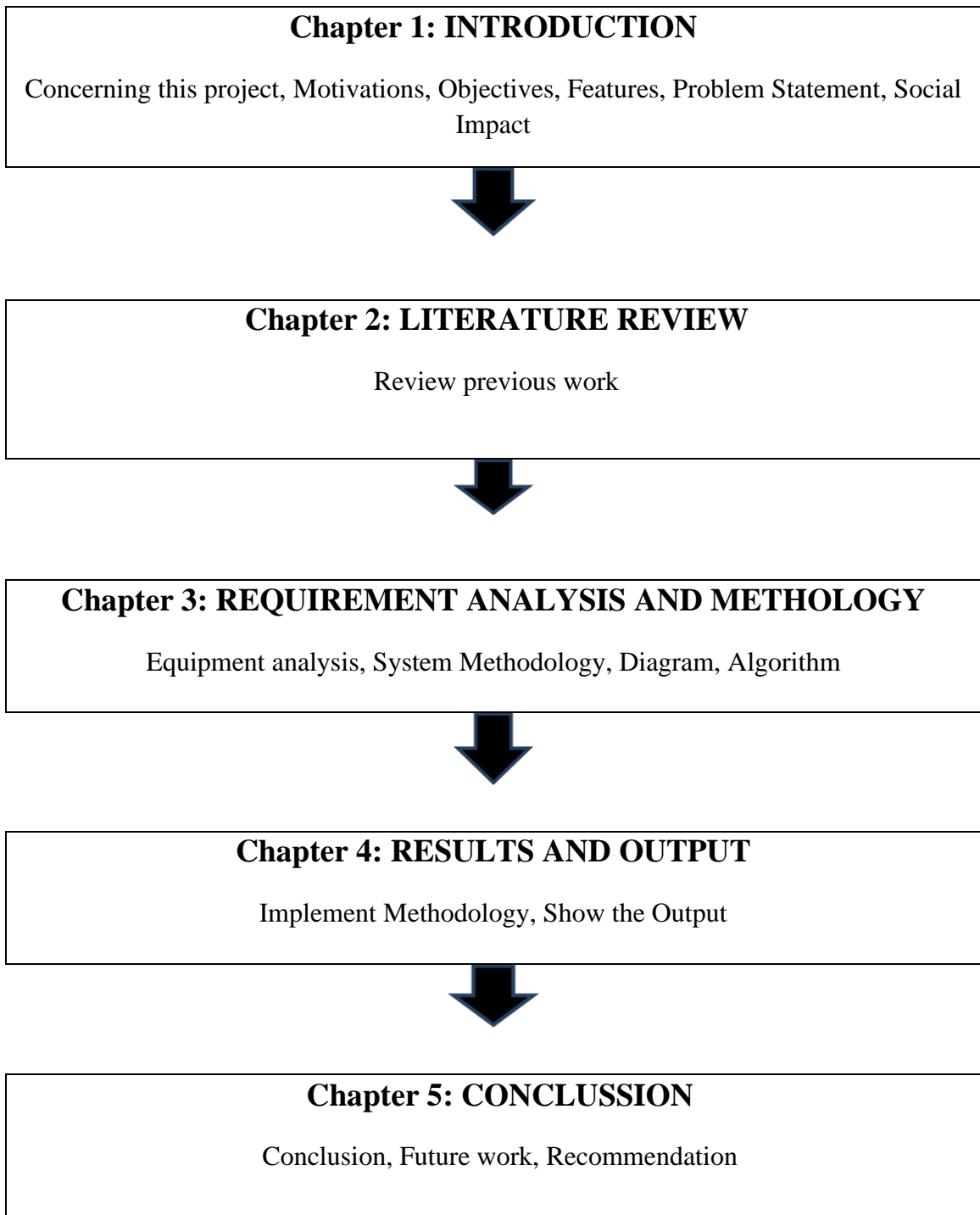


Figure 1.1 Report Layout

CHAPTER 2

Literature Review

The find out about paper shows that a neurodegenerative which affects so many human beings round the world is acknowledged as Parkinson's disease. That can be easily detected by way of using Logistic decision Regression (LDR) and computing device mastering (ML) helped via Dr. G. Puthilibai, Kranthi Kumar Singamaneni, D. Saravanan, Dr.P.Sagaya Aurelia. Now their fundamental objective right here is to pick out the disease easily. All the symptoms of Parkinson's are in Big Data (BD). The papers lead us to take suitable care of Parkinson's patients and enhance their excellent of life. Machine mastering enhances human wellbeing. Basically, the papers exhibit us advertising a massive information industry of disorder also which is better for both. And the proposed LDR incorporates 95% sensitivity, 93% of precision with 97% of classification efficiency. People who have Parkinson's are unsure if they have a clear way of discovering out the disorder through ECG or different blood exams and. The paper gives us a clue to how to get rid of the challenges and difficulties through Machine Learning (ML) set off Logistic Decision Regression algorithm (LDR). From my point of view, the paper has the entirety but how to deal with such form of affected person due to the fact many instances we see that unusual affected person get abuse and has no place in our modern-day society [1].

The paper shows that the need for a dynamic engineering system has become important for pre-sale tests of brain health and quality. Huge data, intelligent flight coding integration, classification algorithm establishment, classified mines of actual information expertise, and the ability to gain brain health quality that predicts dependent on intelligent for making a decision [2].

The paper shows that an organization, that shows explained in-depth as a process that collect the structured, procedure, and the concept of scheming procedures for performing particular project or resolve particular error, solvent applied to public health from a diversity of processes, which also include mechanical systems. In This information is represented by the framework connected with the sustained and monitoring and also organized strategy prepared for mentioned as SHMM [3].

The authors of say there is pressure the need to treat. Health Information Technology. At the same time, the use of common and Genomic (complete set of genes in the cell) technology, as well as the large growth of mobile medical technology, has proceed a large information which programs Medical and Healthcare Sector Maturity and technology, medical/technology, and technology across the Internet, cloud infrastructure, and the Internet [4].

Diana C. Yacchirema et al. Have proposed that the component or the stuff of measuring calculating brain health content develops in internet-based architecture and taxonomy methods for gathering and examine in the real-time data. And it also turns down mood swings which is a sign of unhappy, and also some Obstructive Sleep Apnoea (OSA) is caused by behaviour and attitude problems [5].

Yin Zhang & Meikang Qiu et al they ensuring the reliability of collected data is a tough challenge in this application such as any report that is reliable. On the other hand, these emerging advances have further complicated the collection and processing of medical information, but it has become more difficult. In addition, previously the information Produced in a large number of devices in a restricted time, different formats have features of being saved and generated quickly, which could be called a huge number of staff problems [6].

Deepak Puthal & Xindong Wu et al states that Wireless sensor networks are often equipped with resource-controlled sensing apparatus for primary applications for an example of advanced and self-regulated independent cities, digital, SDH, preciseness of agriculture and manufacturing control systems. Many of these devices are cultivated of their local and the data they collect and flow server take the data collection that are submitted. The data stream manager's (DSM) real-time monitoring and decision-making ability that could use during malicious attack traffic or delete data [7].

Shaker El-Sappagh & Farman Ali et al have made the data Classification quality of clinical multimedia could be enhanced by paying deep attention to data classification modelling framework by medical multimedia. In DBN, Extensive stakes on machine learning algorithms, remote diagnostic perception, intelligent online control Equipment connected to the establishment of apparatus health status that could use in data mining management Intelligence platform Identification rules Failure Operating equipment could use in relation to data mining Establishment of intelligence platform [8].

In This author of this paper says that the system identifies indicators and specifies sleep prognosis enable us to compare the results. Although (PD) Parkinson's Disease has the heath networks that consider in the literature, most of them have not gotten the data collected inspected data from medical tests, and gathered in a limited way [9].

The author of this paper says that a model has been proposed that is verily useful for inspecting huge amounts of data to the cloud earth. And also begin with patterns and mining as well as probabilities and patterns which are related to discrete patient information then applies these details to get the correct waves. Many thanks to the computers for that one person's personal well-being. It is now much easier than ever to see the improvement of a person tracking life-related details. Although the information on secure living records often contains confidential information, it can be a source of significant privacy concerns when it comes to processing personal health information [10].

Tianshu Wu & Shuyu Chen et al states that the big machine data age produces significant results by Data-based health management. Data source sensors include countless effective trapezoids for modern data. The conventional technique is labour-intensive the reason is it normally needs uncommon knowledge and depends on physical labour. The wearable health monitoring system (WHMS) that has been immobilize will allow frequent observe of the patient's needs both ends. On the other hand, using biosensors, such gadgets would be impotent to complete calculate of user wellness on a Java simulation platform [11].

The author of this paper says that the ongoing study papers are a judge in terms of the level of reliability and being appropriate conduct experiments for knowing the relatively huge number of virtual interments for ordinary usage for sleeping predictor. The simulation-based tech bed provides a load sensor that designs a sluggish motion-based simulation platform [12].

The author of this paper says many thanks for the fact that the number of members growing in DBN-based clinical multimedia research tools, the opportunity does not end their physicians can also have their chance to perform clinical trials in DBN model multimedia. So let's start with the internet-related topic, the hospital could be entered through a portal of the internet which do support the medical multimedia details as well as architectural details. Secondly, for using DBN has researched and reviewed medicine in the past also [13].

Abdur Rahim Mohammad Forkan & Ibrahim Khalil et al said that the tool that helps the doctors easily assess any particular patients for diagnosis is totally user friendly and collar looks at the circle also. The knowledge that depends on the environment is steadily involving platform that gives divers in present-time one's own health programs also big information appeal. Now the framework allows an awareness that is focused on knowledge to examine data [14].

Alexandros Angelopoulos et al shape of the major impartial to the panned planning is to assist physicians in their impartial management also judgement of usual Parkinson's disease motor problems and improvement. A device is also mentioned by the author that is usually used in today's sector to achieve and enhance maintenance called heath-controlled devices that include applications just like error monitoring, property protection. [15].

The author of this paper says now a day's huge range of residents are relocating. The hardest point of view of metropolis centre flooding is the provision of medical and academic services. Although hundreds of thousands of household devices are fashioned with analytics producers (like smart meters, cameras, etc.) that additionally assist the energy and index a giant amount of data for civilized city offerings [16].

The authors of say there is make use of big facts that graceful house for look over the person behaviour usage of learning and health appeal. Large data and gaining understanding are hard duties, especially in the learning and health-appeal services and

demand the managing also rood many types of facts that a clear understanding of the successful that manifest is require [17].

In This study paper shows that Strong belief grid, self-closing assemblies write in code, and complex uneasy networks analysed [18].

In This study paper suggests that there is one off cross-brain approach units a capable of being graded hyperlink in the middle of giant statistics and purpose mistake facet focus additionally working error wise commentary steps facet to get a system unreliability error function detection and operational error sensible detection steps characteristic to get a hierarchical correlation between large statistics and feature error [19].

Zhang et al say that Parkinson's is one of the most common diseases and they can easily view their results at their order had an excellent capacity to both diagnose and judge the gravity of PD. They manufacture the device for optimizing doctors' decision- manufacture processes regarding use of. In addition, since the information Produced by a large number of devices within a bounded spell of time, different formats have features of being saved and generated quickly, which can be denominated a large number of assets complication [20].

CHAPTER 3

Requirement Analysis and Methodology

3.1 Requirement Analysis

3.1.1 Node MCU

Hub MCU is displayed in the figure 3.1 an open-source advancement board dependent absolutely upon Lua firmware resolved definitively for IoT-based applications. Notwithstanding programming that deals with Espresso ESP8266 Wi-Fi SoC, it additionally assimilates is make on the ESP-12 module. The ESP8266 Wi-Fi is contained a large number, as appropriately as a CPU, RAM, Wi-Fi, and, surprisingly, an ongoing OS additionally Software Development Kit. The board integrates a 32-cycle MCU and a Transceiver for Wi-Fi organizations, as well as 11 GPIO pins and a relating simple information. It is roundabout that we may furthermore programming it the same way that we would some other Arduino or microcontroller. Furthermore, we gain a Wi-Fi transmission, which permits us to append to our Wi-Fi framework, to join our cell phone among various things. AT-request firmware is safeguarded inside this module that empowers it to be used with any microcontroller through the COM port. CH340 family of chips is laid out for being an additional a prudent option in contrast to the CP210x family of cips. The ESP8266 Node MCU is provided with 30 pis permit it to speak unwinding of the world.

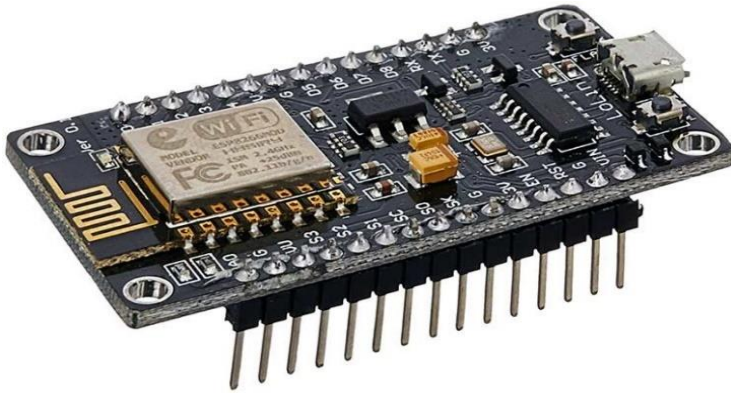


Figure 3.1: Node MCU ESP8266 Wi-Fi

Technical specs of Node MCU are given below:

- The information voltage length is 7V to 12V
- Hub MCU ESP8266 Voltage need for Operation: 3.3V
- Ten silica 32-bit RISC CPU Extensa LX106 used to be utilized as a Microcontroller.
- It has a request RAM which size is 64 KB, and furthermore a measurements RAM of ninety six KB.
- The Node MCU utilized the Wi-Fi Standard, and furthermore temperature range Was - 40°C to +125°C
- 80 MHz is the clock recurrence.
- Information transmission interfaces UART and GPIO are held up.

3.1.2 Jumper Wire

Jumper wire is displayed in the figure 3.2. A wire is a positive stick of metal that is commonly tube shaped design and it is useful. Mechanical loads directives for power media transmission sign completely moved the wire. Jumper circuit cardinal links incorporate association pins on each end, permitting them to interface two circumstances without the

prerequisite for patching between them. Jumper circuit are for the most part antiquated related to Node MCU and moreover other hardware to make it's easy to framework change the arrangement of a circuit as fundamental. Despite the fact that jumper circuits are open in assorted colors, the actual hues have no outcome. In spite of the fact that jumper wires are reachable in a few tones, the actual shades have no result. Jumper wires are determinedly close by in three particular variations.

- 1.Male to Male
- 2.Male to Female
- 3.Female to Female



Figure 3.2: Jumper Wire

A pin stands out from the male end, licensed to plug into objects, however woman points do not, permitting them to plug into different objects.

3.1.3 DHT11 Temperature and Humidity Sensor

DHT11 Temperature and Humidity Sensor is shown in the figure 3.3. This sensor exists a typically furnish reversal also humidness sensor detector. Both of the resistive used humidity sensor detector and additionally the thermistor are handed-down institution of the

DHT used for temperature and humidity sensors detect. DHT11 circuit appraises mugginess and temperature of the surrounding air and afterward achieves an advanced sign that is shipped off the data port of the microcontroller. Any MCU could likewise be utilized to concentrate on the advanced sign, and it is especially advantageous to do as such. It's especially simple for utilizing, however it wishes one of a kind timing to detain information. Between the two anodes of the dampness distinguishing capacitor is a dampness holding substrate that goes about as a dielectric. Moisture levels changed as capacitance expense went up or down. A thermistor is used in the estimation of temperature, which has an unfavourable temperature coefficient, thereby decreasing its resistance to vertical temperature rise. Three pins are provided on the DHT11 sensor module: one for the ground (GND), one for the power (VCC), and one for the data (A Data).

Some characteristics of DHT11 Temperature and Humidity Sensor:

- It is somewhere in the range of 3.5V and 5.5V to work voltage of the DHT11.
- The DHT11 works at a present day of 0.3mA for aspect and 60uA for reserve, individually.
- The DHT11 has a 16-cycle goal for temperature and relative moistness.
- The component of DHT11 is 15.5mm x 12mm x 5.5mm.
- DHT11 works at a 1Hz inspecting.

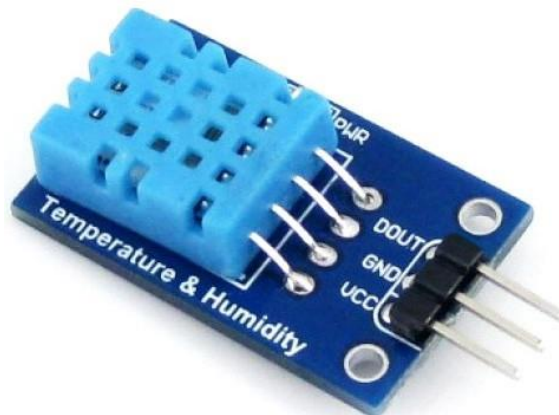


Figure 3.3: DHT11 Temperature and Humidity Sensor Module

3.1.4 9DOF Accelerometer Gyroscope Magnetometer MPU-9250

9DOF Accelerometer Gyroscope Magnetometer is shown in the figure 3.4. The GY-9250 is a 9-axis moving and additionally a Stalking put in force that accommodates a 3-axis gyro, 3-axis accelerometer, and 3-axis magnetometer, and also a DMP all in a little package inside reach and additionally as a pin-compatible enhance from the GY-6515. In the employer of its committed I2C detector bus, the GY-9250 proper give suited 9-axis Motion Fusion™ outturn. This GY-9250 Moving Stalking implement, with its 9-axis combination, Co-processor Motion Fusion™, additionally run-time normalization microcode, enable maker to remove the rich and challenging option, limitation, and system-level mixture of discrete gadget, guaranteeing greatest moving presentation for customer. GY-9250 is as well outlined to border with a number of non-inertial numeric detectors, truly a pressure detector, on its spare I2C seaport.

Some traits of 9DOF Accelerometer Gyroscope Magnetometer MPU-9250 Sensor are given below:

- It is 16-bit analog-digital radically change and digital conversion for the gyroscope out-turns.
- It is 16-bit Analog – Digital seriously change and digital conversion for the accelerometer results.
- It is 16-bit Analog-Digital transform and digital conversion for the magnetometer results.
- Gyro full-scale compass of some usefulness ± 250 and ± 500 and ± 1000 and additionally $\pm 2000^\circ/\text{sec}$.
- Accelerometer is a sizable compass of some usefulness supply $\pm 2g$ and $\pm 4g$ and $\pm 8g$ and also $\pm 16g$.
- Magnetometer is a extensive compass of usefulness is $\pm 4800\mu\text{T}$
- I2C and also SPI is sequential seaport
- It is 3-5volt in Power supply.

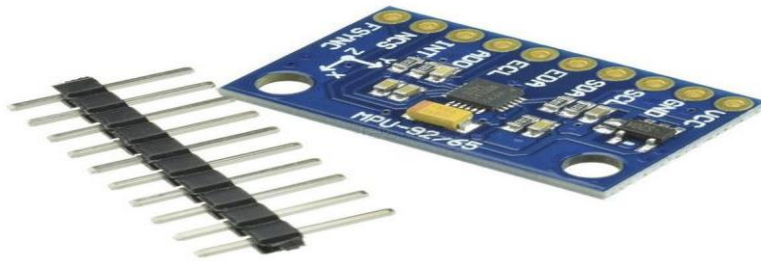


Figure 3.4: 9DOF Accelerometer Gyroscope Magnetometer MPU-9250

3.2 Methodology

3.2.1 System Architecture

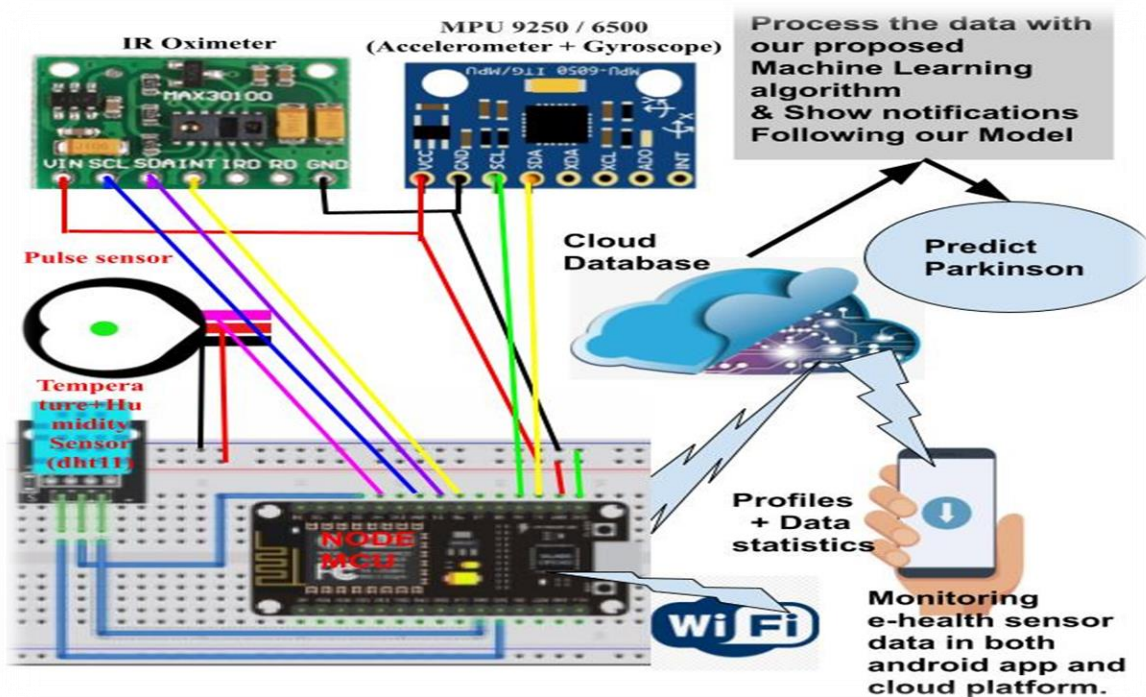


Figure 3.2.1: System Architecture

System Architecture is shown in the figure 3.2.1. This machine architecture is proposed by IOT primarily based ML enabled prediction and Notification gadget for Parkinson affected human's ailment. We make use of a diversification of modules to finish our entire project. This is our project which one is IOT based totally machine to predict Parkinson disease and we have maintained a desktop learning algorithm which one is improve through us which will be in a position to predict Parkinson disorder earlier than that we make this gadget is covered some components node MCU, MPU 9250 accelerometer Gyroscope and DHT11 sensor. We can measure the acceleration and Gyroscope fee of X, Y and Z axis of a affected person information. DHT11 which is discover sensor which is additionally can observe temperature and the value of sweat of a human being and this node MCU accumulate the facts from the sensor with mobile hotspot or WIFI on a router. Here, we used the Node MCU module, which is an open-source units and enable data transmission by means of a Wi-Fi network. Node MCU additionally sends data to the Thing Speak, In Internet of Things analytics, connected devices are gathered, displayed, and evaluated in real-time to provide analytics.

3.2.2 Flow Chart

Flow chart is shown in the figure 3.2.2. First our system will be start. Then, our gadget will be turned on as soon as we flip the power on. Our system will begin NODEMCU collects the facts from each MPU9250 Gyroscope and DHT11 sensors process the statistics for the subsequent step.

In the next step, our gadget will NODEMCU switch the collected statistics to Thing Speak Server. And also, subsequent step, the Thing Speak cloud server saved the data. If there is no hassle is Parkinson taking place the Device is stop.

Else, there is any problem is Parkinson is no taking place it will let us comprehend and then will Process again and do the job for what is it made for.

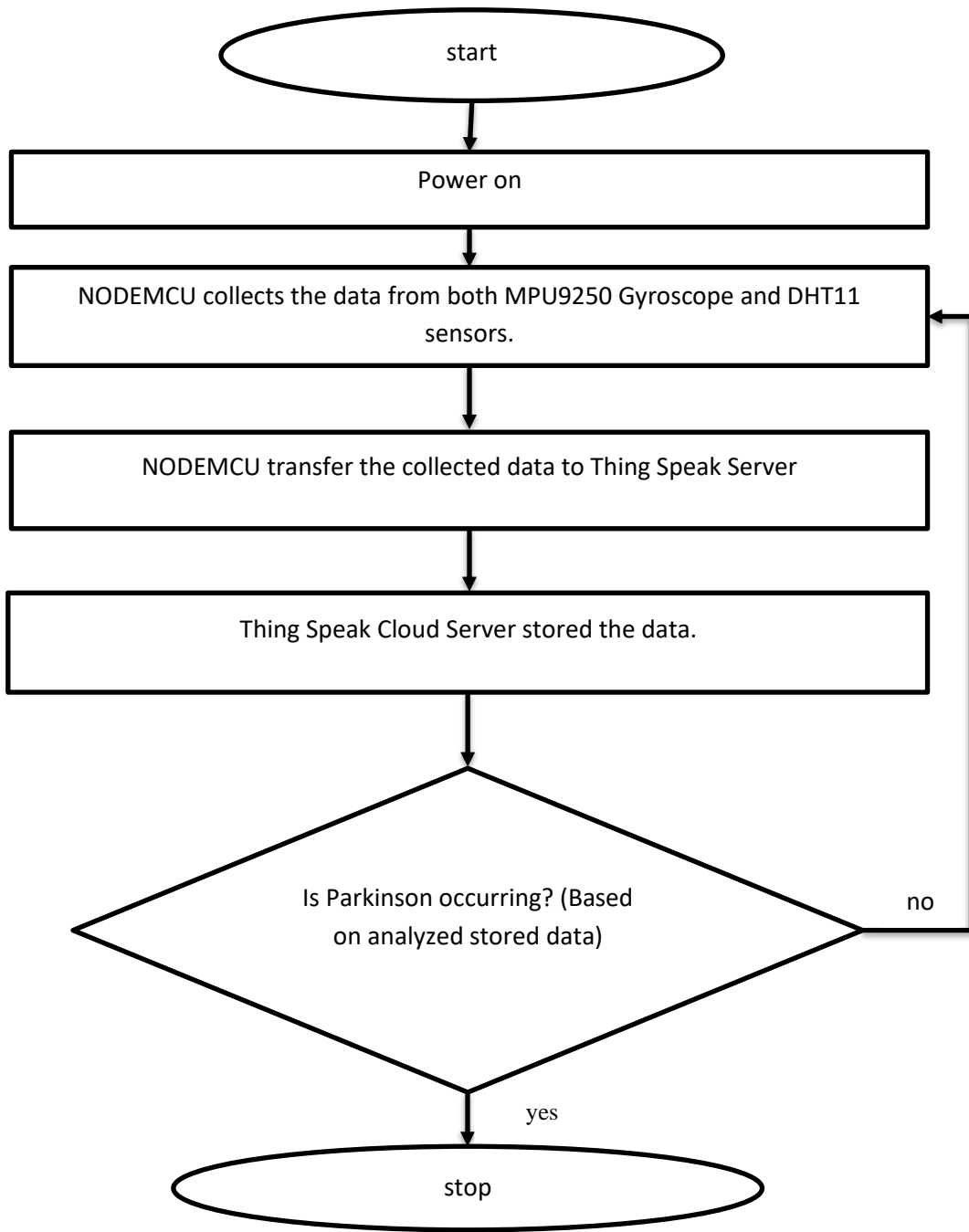


Figure 3.2.2: Flow Chart

3.2.3 Algorithm

In this algorithm we shown step1 is start then step 2 is worked electricity on and next step is work accumulate information and some other step is stored data and result.

Step 1: Start

Step 2: Power On

Step 3: Node MCU collects the statistics from both MPU9250 Gyroscope and DHT11 sensors.

Step 3.1.1: Node MCU switch the accrued data to the Thing Speak.

Step 3.1.2 Thing Speak Cloud Server stored data

if (Is Parkinson takes place based on analyzed saved data)

Then go step 4

else go to step 3

Step 4: Stop

3.3 Dataset

In the dataset we use 4 distinctive algorithms. There are Support vector Machine (SVM), Logistic Regression, Decision Tree and Random Forest.

3.3.1 Dataset Algorithm Description

Logistic regression:

Calculated relapse is an order organization expand on oversight perusing utilized anticipate possibility of an objective variable. The sort of the objective factors is dichotomous, and that implies that main two groupings are accessible. Subsequently, the outcome needs to have been a discrete or express number. Put differently, in parallel realities examination, the reaction variable is double in nature, and the information is coded as one or the other 1 (which addresses effective or yes), or some other wide assortment 0. The Logistic Regression is exceptionally connected with the Linear Regression, except for how they are applied. Strategic relapse has been familiar with make quick work of ordering troubles, while straight relapse has been familiar with resolve relapse issue. The variable ward needs to unquestionably be innately order. There ought to be of the unbiased variable.

Support Vector Machine:

SVM is in organization of bulk generally familiar with supervised teaching algorithms, and it may additionally be acquainted with clear up categorizing and regression issues, respectively. SVM algorithm, the motivation is to discover the satisfactory repeat or rather prey acquainted with divide extent into courses, with the goal that more prominent insights position might be readily situated into the awesome arrangement in the following. The most helpful limit. The exorbitant focuses help make the hyper plne picked via SVM. In that Support Vector Machine techniques, every reality thing is plotted as a spot in n-layered degree, with n being only charge specific direction, as the worth of each single element. It does order through finding the unpredictable plane that initially recognizes with 2 classes. SVMs are used inside a scope of utilizations, including penmanship acknowledgment, interruption discovery, facial recognizable proof, email order, quality characterization, and web website page age. We lease SVMs because of the reality they are in a situation to find dangerous connections among your realities notwithstanding you making numerous alterations alone. SVMs are utilized in PC learning therefore.

Random Forest:

There is no doubt that Random Forest algorithm is make information randomly and pick the sample information so they know as Random Forest. Random Forest is among ensemble educating gadget outperforms selection trees. Radom Forest cause is an SLA (Supervised Learning Algorithm) which combination many models and result. Random forest makes many choice trees and merge multiple timber each other and size the value and merge its accurately and also estimated the cost of this problem. Random forest appears that make/measurement of many trees. It is classification of decision bushes and this algorithm create character and uncorrelated trees. We rent Random Forest algorithm due to the fact of they are measure precisely price of this problem and merge the more than one value.

Decision Tree:

Decision tree algorithm is an algorithm that is supervised of the family. The most important motive of this algorithm is used to make a tree and educate a model to construct the information and predict the statistics or price of the class. The goal value of instructing their policies and predicts value. Decision tree make a data which is education sample facts and additionally the facts and represented form the selection trees regulations which policies grant the correct value. Decision tree called classification algorithm. It is tree and this tree is structured and classifier tree. Decision tree has 2 nodes one node is Decision node and every other is the Leaf node. It is classification of decision timber and this algorithm create individual and uncorrelated trees. We rent Decision Tree algorithm because of they are measure precisely cost of this trouble and merge the more than one value. Decision tree make some examples it can be used like a binary tree.

3.3.2 Dataset Analysis:

We are the usage of it for our research. There are 24 columns in the dataset. Like:

Name: In first column represent Name column.

MDVP: F0 (Hz): The second column represent as MDVP: F0 (Hz) is the Sub attributes and its description is Median/Average vocal fundamental frequency and also its attributes is Fundamental frequency.

MDVP: Fhi (Hz): The third column represent as MDVP: Fhi (Hz) is the Sub attributes and its description is Maximum vocal fundamental frequency and also its attribute is Fundamental frequency.

MDVP: Flo (Hz): The fourth column represent as MDVP: Flo (Hz) is the Sub attributes and its description is Minimum vocal fundamental frequency and also its attribute is Fundamental frequency.

MDVP: Jitter (%): The 5th column represents as MDVP: Jitter (%) is the abbreviations and the feature description is MDVP jitter in proportion.

MDVP: Jitter (Abs): The 6th column represents as MDVP: Jitter (Abs) is the abbreviations and the feature description is MDVP complete jitter in MS.

MDVP: RAP: The 7th column represents as MDVP: RAP is the abbreviations and the feature description is MDVP respective amplitude perturbation.

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MDVP: PPQ: The 8th column represents as MDVP: PPQ is the abbreviations and the feature description is MDVP five-point spell perturbation result.

Jitter: DDP: The 9th column represents as Jitter: DDP is the abbreviations and the feature description is mode complete difference of differences in the middle of jitter cycles.

MDVP: Shimmer: The 10th column represents as MDVP: Shimmer is the abbreviations and the feature description is MDVP community shimmer.

MDVP: Shimmer(dB): The 11th column represents as it is the short form and the feature description is MDVP local shimmer in dB

Shimmer: APQ3: The 12th column represents as Shimmer: APQ3 is the short form and the feature description is Three-point size perturbation result.

Shimmer: APQ5: The 13th column represents as Shimmer: APQ5 is the short form and the feature description is Five-point size perturbation result.

MDVP: APQ: The 14th column represents as it is the short form and the feature description is MDVP 11-point size perturbation result.

Shimmer: DDA: The 15th column represents as Shimmer: DDA is the short form and the feature description is Average complete differences in the middle of the size of consecutive spell.

NHR: In 16th column represents as NHR is the short form and the feature description is Noise-to-harmonics ratio.

HNR: The 17th column represents as HNR is the short form and the feature description is Harmonics-to-noise ratio.

Status: the 18th column which use for status.

RPDE: The 19th column represents as RPDE is the short form and the feature description is Recurrence spell of bulk entropy calculate.

DFA: The 20th column represents as DFA is the short form and the feature description is Sign fractal climbing exponent of detrended fluctuation scanning.

spread1: The 21th column represents as spread1 is the short form and the feature description is 2 nonlinear calculate of basic.

spread2: The 22th column represents as spread2 is the short form and the feature description is Frequency variation.

D2: The 23th column represents as D2 is the short form and the feature description is Correlation dimension.

PPE: The 24th column represents as PPE is the short form and the feature description is Pitch period entropy.

Temperature: In 1/3 column is signify as temperature column.

Least temperature: 28 degrees.

Greatest temperature: 38 degrees.

Humidity: In the fourth column represent as humidity.

Least humidity: 48

Greatest humidity: 100

Target CVD: The last section addresses as target individuals that have conceivable to

Parkinson or not.

0 for no longer occur Parkinson sickness

1 for manifest Parkinson sickness

3.3.3 Dataset graph

Parkinson by Temperature is shown in the figure 3.3.1 and Parkinson by humidity is shown in the figure 3.3.2. our following dataset Contain 2 graph. First Temperature range that will fall as the temperature falls Parkinson's disease. Lastly, humidity rate and also which humidity charge is hazardous and may fall Parkinson disorder is shown.

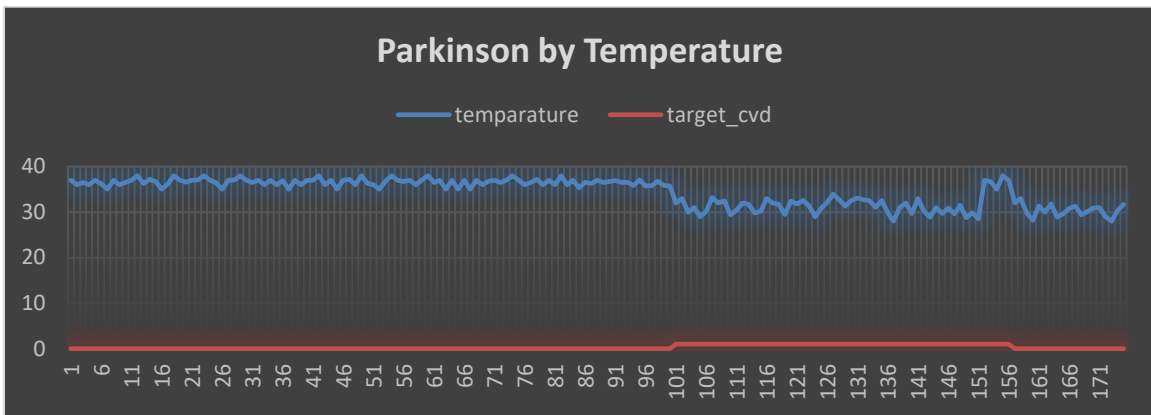


Figure 3.3.1: Parkinson by Temperature

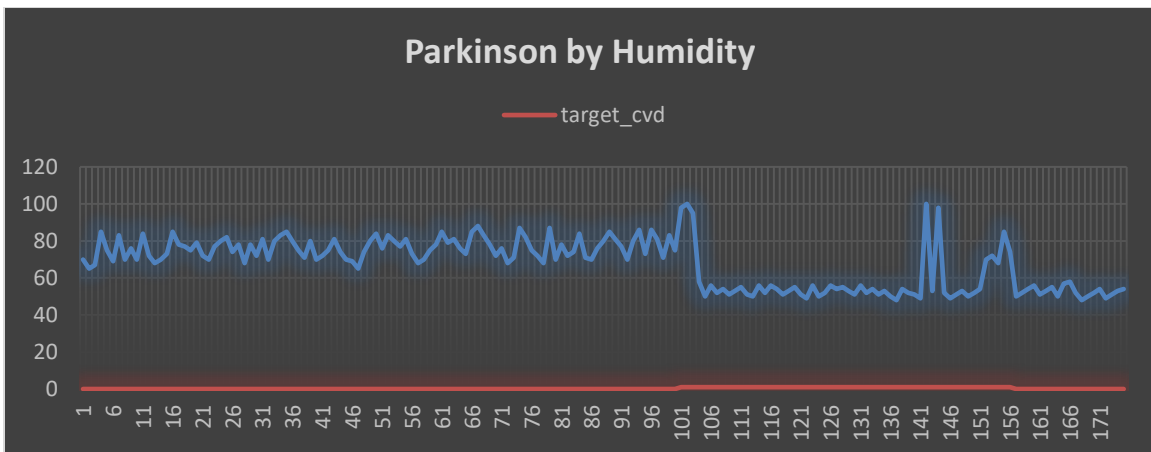


Figure 3.3.2: Parkinson by Humidity

CHAPTER 4

Result and Discussion

4.1 Project Implementation

Project Implementation is shown in figure 4.1.1. In this experiment, we used NODEMCU, DHT11, and other equipment humidity sensor and additionally MPU 9250 accelerometer Gyroscope. On the board put NODEMCU then join DHT11 temperature and humidity sensor. Now MPU 9250 accelerometer Gyroscope is connected with all of gear in our project. Node MCU collects the information from both MPU9250 Gyroscope and DHT11 sensors. And Node MCU transfer accumulate information from aspect speak server.

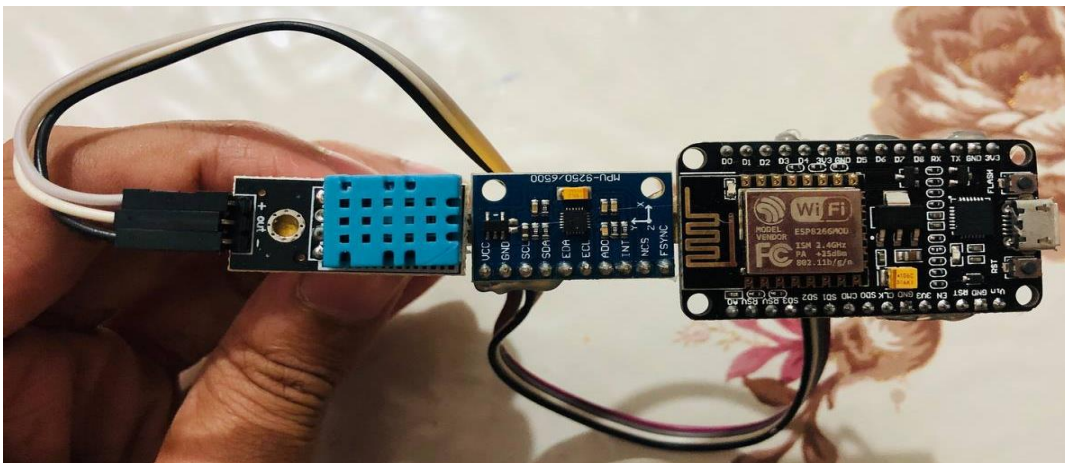


Figure: 4.1.1 Project Implementation

Temperature & Temperature Gauge Live Output is shown in figure 4.1.2. Here we can see Temperature live statistics in Thing Speak Server that are proven our undertaking the records is sent in the cloud server database with the aid of in Node MCU and Wi-Fi. Then

our collected data is stored in the link: “<https://thingspeak.com/channels/1562218>”and also download the CSV file from the Thing Speak Server.

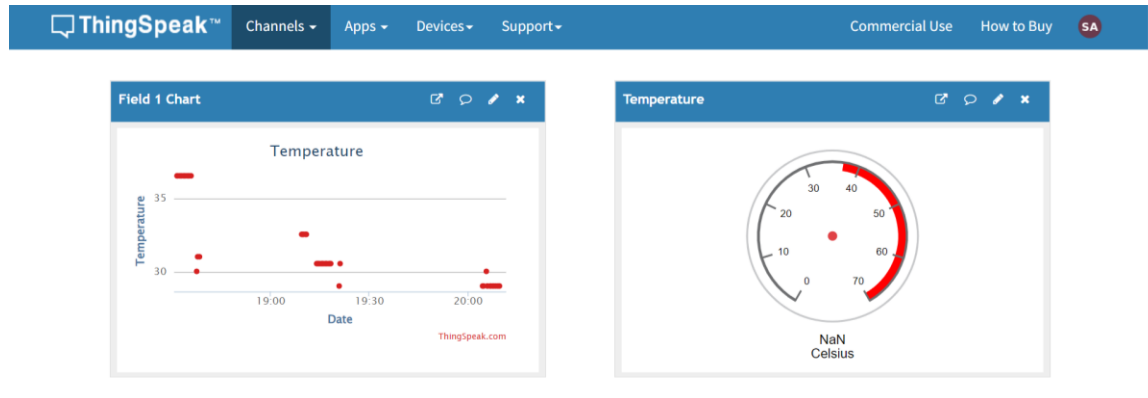


Figure:4.1.2 Temperature & Temperature Gauge Live Output

Humidity and Number of Humidity Output is shown in figure 4.1.3. Here we can see Humidity live statistics in Thing Speak Server that are proven our challenge and the actual time data add here use range of humidity and also down load the CSV file from the Thing Speak Server.

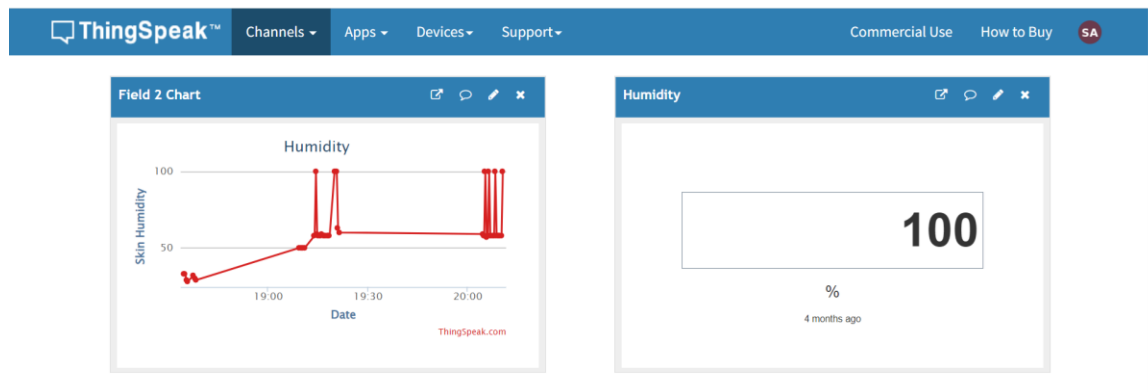


Figure:4.1.3 Humidity and Number of Humidity Output

X-axes & Y- axes Acceleration output is shown in figure 4.1.4. Here we can see X-axes & Y- axes Acceleration Live data in Thing Speak Server that are shown our project. Thing Speak Server is a cloud server. Which one is factor speak me server the usage of it as ©Daffodil International University

making a low-priced layout that's why we didn't might also new cloud server? And the real time data add here use X-axes Acceleration and Y-axes Acceleration and additionally down load the CSV file from the Thing Speak Server.



Figure:4.1.4 X-axes & Y- axes Acceleration Output

Z-axes Acceleration & X-axes Gyro Value Output is shown in figure 4.1.5. Here we can see X-axes & Y- axes Acceleration Live data in Thing Speak Server that are shown our project. Thing Speak Server is a cloud server. Which one is thing speaking server using it as making a low-cost design that's why we didn't may new cloud server? And the real time data upload here use X-axes Acceleration and Y-axes Acceleration and also download the CSV file from the Thing Speak Server.

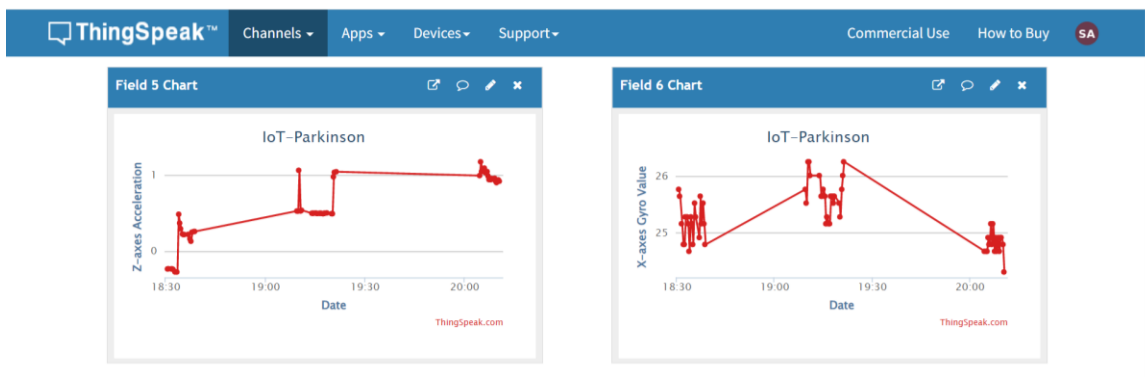


Figure:4.1.5 Z-axes Acceleration & X-axes Gyro Value Output

Y-axes and Z-axes Gyro Value Output is shown in figure 4.1.6. Here we can see Y-axes and Z-axes Gyro Value Live statistics in Thing Speak Server live statistics in Thing Speak Server that are shown our challenge and additionally down load the CSV file from the Thing Speak Server.

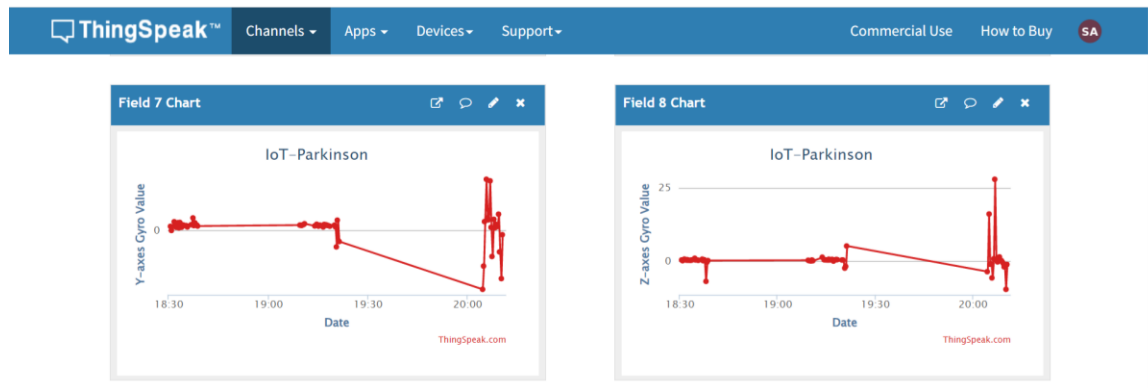


Figure:4.1.6 Y-axes and Z-axes Gyro Value Output

4.2 Accuracy of Measurement

Accuracy of measurement is shown in the figure 4.2.1. The bar chart gives information about how a good deal right forecast our sensor gives progressively information. Rundowns the information by means of choosing and revealing the chief elements. Most importantly, there is the difficulty of temperature. It can quantify temperatures with an exactness of round 98% on the other hand than 100 percent. The dampness can then be estimated with 95% exactness as an option than 100 percent accuracy. Moreover, Acceleration X-axes Acceleration 66% accuracy. And Acceleration can be measured with Y-axes Acceleration 0.122% accuracy, Z-axes Acceleration is 89%. Finally Detect X-axes Gyro Value is 24.91, Y-axes Gyro price is 0.91, Z-axes Gyro Value is 1.13.

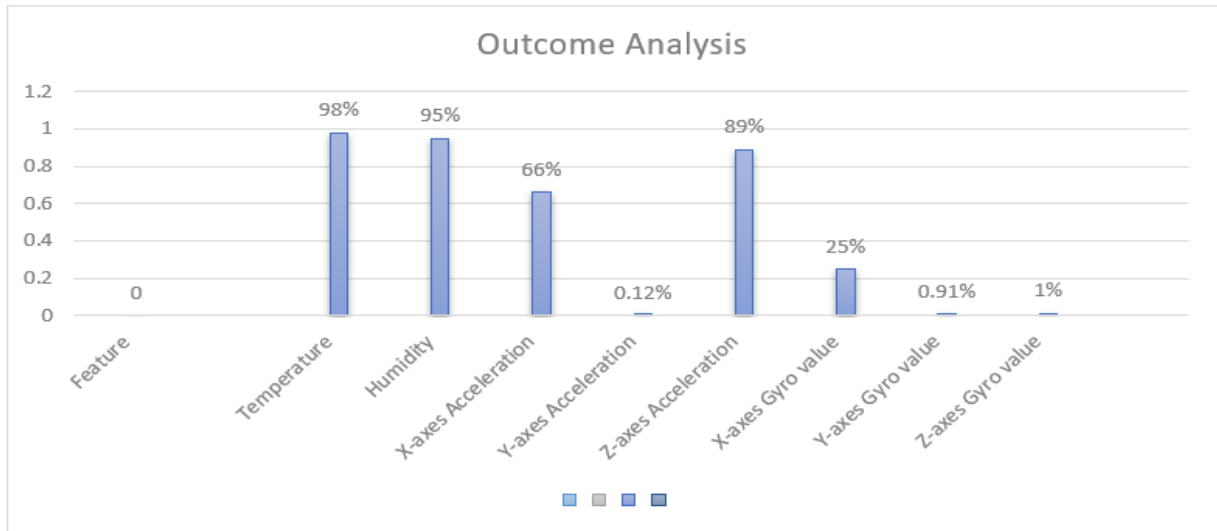


Figure 4.2.1: Accuracy of Measurement

4.3 Experimental Evaluation

We utilized distinct types of laptops mastering algorithm in this project, like the assist vector computer (SVM), Random Forest, logistic regression, Decision Tree implementation and in contrast by using mannequin accuracy.

A disarray network is delivered and a disarray grid made for evaluating the precision of figuring gadget learning strategies to call attention to how frequently every class has been designated. An illustration of a disarray lattice is demonstrated beneath that we use in our undertaking.

Here, we reused SVM calculation in our undertaking. Furthermore, via applying this calculation we have 85.71% precision.

Result Of SVM:

Result of SVM ¶

```
score_svm = round(accuracy_score(Y_pred_svm,y_test)*100,2)
print("The accuracy score achieved using Linear SVM is: "+str(score_svm)+" %")
```

The accuracy score achieved using Linear SVM is: 85.71 %

Figure 4.3.1: Result of SVM

We involved Random Forest calculation in our venture. Furthermore, through calculation, gotten 90% precision. That potential our main goal gives an expectation of 90%.

Result of Random Forest:

```
X_train_prediction = model.predict(X_train)
training_data_accuracy = accuracy_score(Y_train, X_train_prediction)

print('Accuracy score of training data ', training_data_accuracy)
```

Accuracy score of training data 0.9038461538461539

Figure 4.3.2: Result of Random Forest

We involved the Logistic Regression calculation in our undertaking. Also, through calculation, gotten 82.86% precision. That capacity endeavor gives an expectation of 82.86%.

Result of Logistic Regression:

Result of Logistic Regression

```
score_lr = round(accuracy_score(Y_pred_lr,y_test)*100,2)
print("The accuracy score achieved using Logistic Regression is: "+str(score_lr)+" %")
```

The accuracy score achieved using Logistic Regression is: 82.86 %

Figure 4.3.3: Result of Logistic Regression

And lastly, we used the Decision Tree implementation algorithm in our project. And by means of making use of this algorithm, received 90% accuracy is highest. That means our project offers a 90%.

Result of Decision Tree:

```
x_train_prediction = model.predict(X_train)
training_data_accuracy = accuracy_score(Y_train, X_train_prediction)
```

```
print('Accuracy score of training data ', training_data_accuracy)
```

```
Accuracy score of training data  0.9038461538461539
```

Figure 4.3.4: Result of Decision Tree

Here we can see our venture prediction accuracy. It's given an accuracy of 85.71 % through the use of the Support Vector Machine algorithm. The 2d one is given 90% accuracy with the aid of using the Random Forest. The Third one is given 82.86% accuracy through the use of the Logistic Regression algorithm. And we have acquired 90% accuracy with the aid of using the Decision Tree algorithm.

Confusion Matrix in our project

Making the Confusion Matrix.

```
from sklearn.metrics import confusion_matrix, accuracy_score
cm = confusion_matrix(y_test, y_pred)
print(cm)
```

```
[[20  3]
 [ 2 10]]
```

===Confusion Matrix===

Table: 4.1 Confusion Matrix

		Predicted		
		Positive	Negative	
Actual	Positive	20	3	23
	Negative	2	10	12
		22	13	

The accuracy of each item represented as a graph algorithm is proven in figure 4.3.5 the accuracy of each algorithm can now be seen in a graphical illustration. We illustrated the aspects of our undertaking using a bar chart, whose X-axis indicated aspects of the undertaking and its Y-axis indicated how accurate it was. Here used four Features and their Percentages. Firstly, makes use of SVM which is 85.71%, Secondly, use Random Forest Algorithm which is 90 %, Next Logistic Regression which is 82.86% and Finally, Decision tree which is 90%.

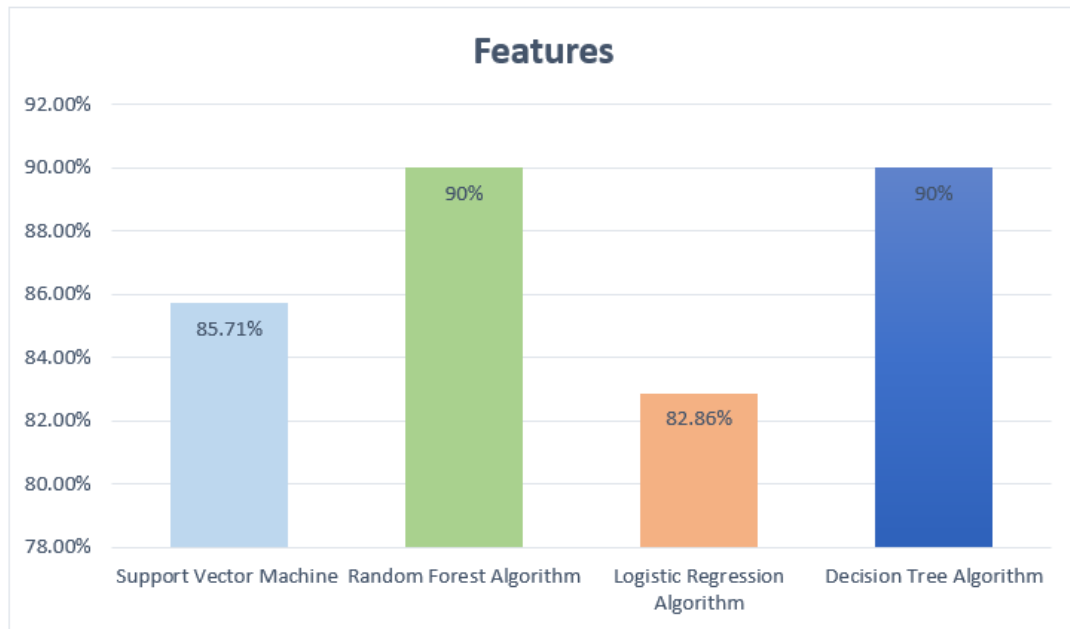


Figure 4.3.5: Graphical representation of accuracy for each algorithm.

4.4 LIMITATION

It is completely fit for anticipating Parkinson's. Also, it can't suggest drugs in the wake of anticipating Parkinson's infection sickness.

CHAPTER 5

Future works and Conclusions

5.1 Future works

In the future we prefer to produce an Android platform that holds region frame help impersonal workforce finding out supply the premature treatment manner for the human being. The above utility will also speak with the site visitors' police to assist in clearing the route whilst the urgent motor vehicle can attain the not far from health facility as rapidly. In the future, we may additionally get additional statistics from several sensors that are currently absent and that will assist us to discover a number physique function outcomes of the human body. We may additionally also design the identical kind of assignment to reveal other persistent diseases like a heart attack. If further up-gradation is feasible to this project, it can also discover a heart blockage for any coronary heart sickness patient.

5.2 Conclusions

Parkinson's infection has been one of the predominant reasons for casualty, early location of Parkinson's attacks is basic for everybody. A Parkinson's affliction is trying to perceive; subsequently, we are giving this technique that will help with the early discovery of Parkinson's. This contraption distinguishes a patient's temperature and dampness with the guide of the DHT11 temperature and mugginess sensor and furthermore MPU 9250 accelerometer Gyroscope. indeed, even while the individual would be at the home. Patient's wellbeing insights, for example, temperature is described utilizing detector and save someone's life in the cloud via Node MCU. Moreover, such contraption likewise helps with the medical care checking framework, with all victims being found through an individual on the main server. Our proposed framework, which supports the size of a singular's temperature and stickiness. This strategy has likewise been created for creatures to keep their lives.

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