Performance Analysis of Heart Disease Prediction

S.Dinesh[1], M.Arunkumar[2], V.Karthik[3], Mr.G.Anand[4]
[1, 2, 3] Dept of Electronics and Communication Engineering
[4]Assistant Professor, Dept of Electronics and Communication Engineering
[1, 2, 3, 4] N.S.N college of Engineering and Technology, Karur,India

Abstract- *Heart disease is one of the major disease world wide so many peoples suffered for heart disease. Diseases can affect people both physically and mentally, as contracting and living with a disease can alter the affected person's perspective on life. A disease that affects the parts of an organism and isn't caused by any immediate external injury. Diseases are often known as medical conditions that are related to specific symptoms and signs. The deadliest diseases in humans are coronary artery disease (blood flow obstruction), followed by cerebrovascular disease, and lower respiratory infections. Heart diseases are unpredictable and unavoidable. We can predict heart disease using machine learning techniques.*

Keywords- Cleveland Heart Disease Database, Decision Trees, Random forest, Hybrid algorithm, Machine learning

I. INTRODUCTION

The data mining is the process of discovering patterns in large data sets involving methods at the intersection of machine learning, statistics, and database systems. Data mining is an interdisciplinary subfield of computer science with an overall goal to extract information (with intelligent methods) from a data set and transform the information into a comprehensible structure for further use. Data mining is the analysis step of the "knowledge discovery in databases" process, or MRNN.Data mining tools have been developed for effective study of medical information, in order to assist clinicians in making better diagnosis for treatment purposes. Today medical services have come a long way to treat patients with various diseases. Among the most lethal one is the heart disease problem which cannot be seen with a naked eye and comes instantly when its limitations are reached. Heart disease is one of the disease due to that death will occurred mostly, and according to the world health organization the percentage is more for that.

II. LITERATURE SURVEY

The author studies heart disease using the random forest in [1] with the Cleveland dataset. The author used the Chi Square feature selection model and genetic algorithm (GA) based feature selection model for the study. They proved in the experimental results that their proposed model with Genetic algorithm feature selection has given high accuracy than the existing models. However, the results are evaluated with existing machine learning models.

In [2], the author has generated specific rules based on this PSO algorithm and evaluated different rules to get a more accurate rule for heart disease identification. After evaluating the rules, C5.0 is used for the classification of disease based on binary classification. The author used UCI repository data for implementation and evaluated high accuracy using PSO and the Decision tree algorithm.

Backpropagation neural network for heart disease prediction was discussed in [3]. Deep learning model, which is a highly effective learning model for disease prediction. The author used a neural network for learning and prediction. The author us the Cleveland dataset for the study and implemented simulation in Matlab. However, the work can be done with deep learning models and highly accurate, and this can be extended to real world applications.

The author in [4] discussed prediction of heart disease using datamining practices. They studied and evaluated with some techniques such as the KNN algorithm, decision tree algorithm, neural network classifications, and Bayesian classification algorithms. The author also studied the genetic algorithm's use in feature selection for heart disease essential features. And experimented with the study and evaluated high accuracy decision tree model.

[5]An Efficient Detection and Classification Method for Landmine Types Based on IR Images Using Neural Network: This paper presents some preliminary results for the detection of buried Anti-Personnel Landmines (APLs) using an infrared imaging system, an algorithm for the detection of landmine candidates by exploiting features in the images after extracting the object from background. Different threshold levels are applied to select groups of pixels that correspond to the object, and are the ones that could indicate a target position to the produced binary images.

Heart disease calculation using different machine learning Procedures is studied in [6]. Classification and

regression models are used for prediction, namely the Decision tree, KNN algorithm, SVM, and linear regression procedure is used for the study. Experiment results proved that the KNN algorithm with the highest accuracy. However, this model can be implemented in a real-time environment or applications.

A cognitive approach is carried out in [7] for heart disease prediction. In this work, five machine learning algorithms are considered for prediction, and all are evaluated with accuracy. Logistic model tree is implemented to get better results in prediction, which used an ADA boost and bagging model to forecast heart disease. Their investigational results have exposed that random forest achieved high accuracy on predictions.

III. EXISTING METHOD

The SVM based heart disease prediction has been implemented. There are many peoples are suffering by this fatal disease. It is necessary to diagnose this disease accurately, but the process of diagnosis of these diseases is complicated.
Maximum numbers of causalities are occurred by this disease therefore it is necessary to diagnose this disease at the early stage. There are many limitations in the traditional methods.

DISADVANTAGES

- Less sensitivity
- Less accuracy
- Less Performance

IV. PROPOSED METHOD

This project In this method, different input attributes have been used in order to overcome the issue of prediction of heart disease. We proposed an efficient and accurate system to diagnose heart disease, and the system is based on deep learning techniques.

The proposed system uses the MRNN architecture to predict heart disease. Hybrid modelling is a novel technique in which the probabilities derived from one machine learning model are given as input to another machine learning model. This hybrid model gives us better-optimized results based on both machine learning algorithms, which are considered for the implementations. The proposed work is implemented with the Sklearn libraries, Pandas, Matplotlib, and other compulsory libraries.

We have the dataset downloaded from the UC Irvine repository. There are binary groups for heart disease in the downloaded information. The machine-learning algorithm is implemented along with the hybrid model, such as decision trees and random forests.

ADVANTAGES

- High accuracy.
- intelligent and effective heart disease prediction.
- Improved decision-making for the prevention or treatment of heart diseases in their early stages

V. METHODOLOGY

Dataset collected with attributes sex indicates the gender of the patient, age indicates the age of the patient, test bps indicates the resting blood pressure, cp indicates the chest pain, bps indicates the fast blooding sugar, indicates cholesterol, indicates the maximum heart rate achieved, rest indicates the resting electro. result (1 anomality), old peak indicates the ST depression induce. ex, indicates the exercise induced angina, ca indicates the number of major vessels, slope indicates the slope of peak exercise ST, attribute, indicates the thalassemia. The sample of collected data is shown in the below figure.

The dataset is visualized to get number of Heart disease cases and number of normal cases from the dataset. It is shown as histogram plot as given below.

The dataset is visualized to get number of Heart disease cases and number of normal cases from the dataset. It is shown as histogram plot as given below.

The proposed workflow has the following advantages

- Implemented machine learning algorithm .
- Accuracy of all proposed algorithm is arrived to show the best model.
- Implement a model to make the proposed work as an optimized model.

The execution is carried out with the below given methodologies.

- Dataset is collected from uci.edu
- Data Visualization is done.
- Splitting dataset into test and train data.
- Apply DT and RF models for training and analysis.
- Train the model.

- Test the trained model and predict values.
- Get single input from user and predict heart disease through hybrid model.

Cleveland dataset is considered. It is split into two parts as training and testing sets. We have assumed 70% of the dataset as training input to the machine learning algorithms and fit the model. the remaining 30% as testing data for heart disease prediction. MRNN is used to predict heart disease for 30% test input, and the values predicted to be plotted and compared for accuracy.

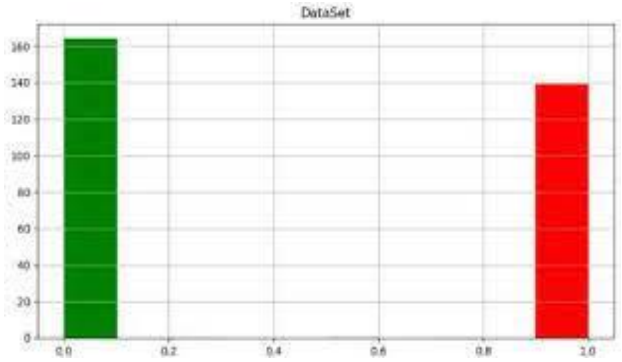


Fig 1.Dataset

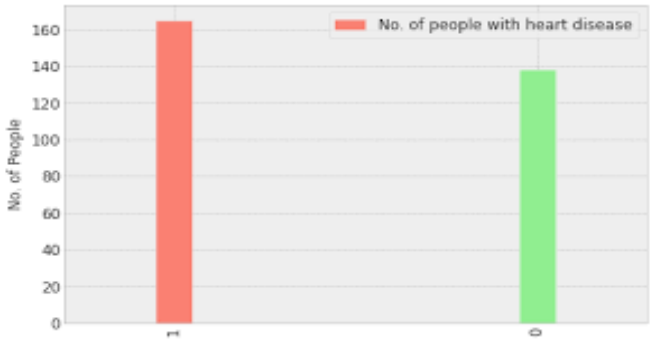
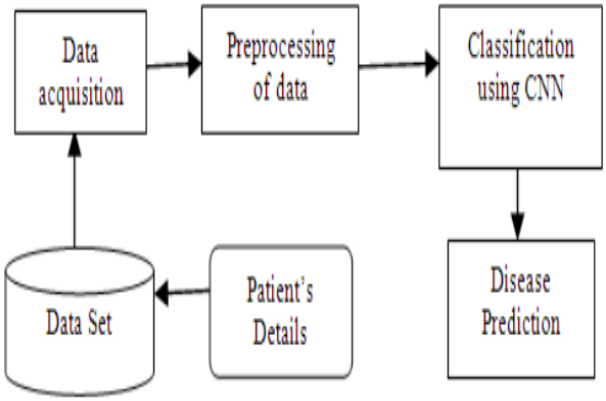


Fig 2.Visualization of heart disease prediction using Dataset

BLOCK DIAGRAM



POWER SUPPLY

Power supply is a reference to a source of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU. 12v battery is fixed to supply the DC motor for locomotion of the wheels.

RASPBERRY PI

The Raspberry Pi hardware has evolved through several versions that feature variations in memory capacity and peripheral-device support. This block diagram depicts Models A, B, A+, and B+. Model A, A+, and the Pi Zero lack the Ethernet and USB hub components. The Ethernet adapter is internally connected to an additional USB port. In Model A, A+, and the PI Zero, the USB port is connected directly to the system on a chip (SoC). On the Pi 1 Model B+ and later models the USB/Ethernet chip contains a five-point USB hub, of which four ports are available, while the Pi 1 Model B only provides two. On the Pi Zero, the USB port is also connected directly to the SoC, but it uses a micro USB (OTG) port.

ARM Processor

The Broadcom BCM2835 SoC used in the first generation Raspberry Pi is somewhat equivalent to the chip used in first generation smartphones (its CPU is an older ARMv6 architecture),which includes a 700 MHz ARM1176JZF-S processor, VideoCore IV graphics processing unit (GPU), and RAM. It has a level 1 (L1) cache of 16 KB and a level 2 (L2) cache of 128 KB. The level 2 cache is used primarily by the GPU. The SoC is stacked underneath the RAM chip, so only its edge is visible. The Raspberry Pi 2 uses a Broadcom BCM2836 SoC with a 900 MHz 32-bit quad-core ARM Cortex-A7 processor (as do many current smartphones), with 256 KB shared L2 cache. The Raspberry Pi 3 uses a Broadcom BCM2837 SoC with a 1.2 GHz 64-bit quad-core ARM Cortex-A53 processor, with 512 KB shared L2 cache.

Fig Raspberry pi

We start with the L293D. L293D is a popular motor driving IC. It is a 16 pin IC. The IC has 8 pins on both the

sides. It has 2 enable pins, 1 V_{SS} pin, 1 V_S pin, 4 ground pins, 4 input pins and 4 output pins. Though not required here, but in case you wish to learn how to interface L293D with a microcontroller.

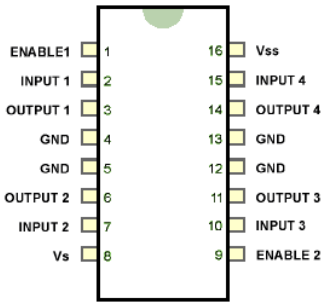


Fig: L293D Pin Configuration

H. IOT

In this project we introduced a special technique IoT. IoT allows objects to be sensed or controlled remotely across existing network infrasture creating opportunity for more direct integration of the physical world in to the computer-based systems and result in improved efficiency, accuracy, and economic benefit in addition to reduced human intervention.

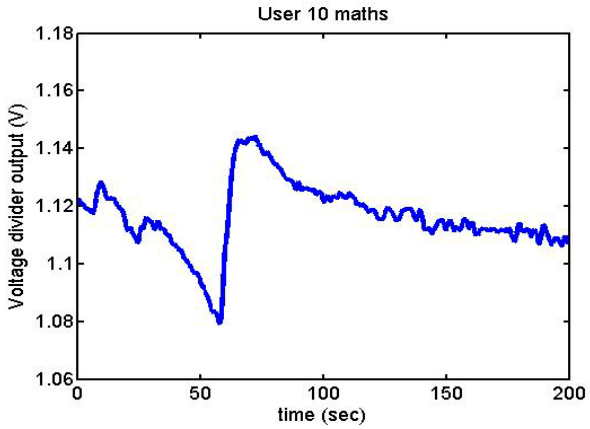
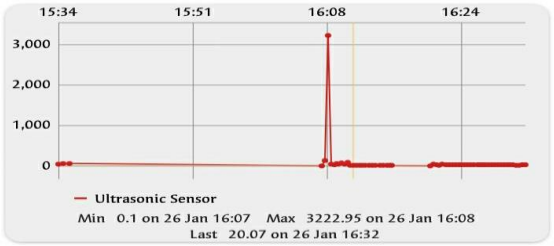
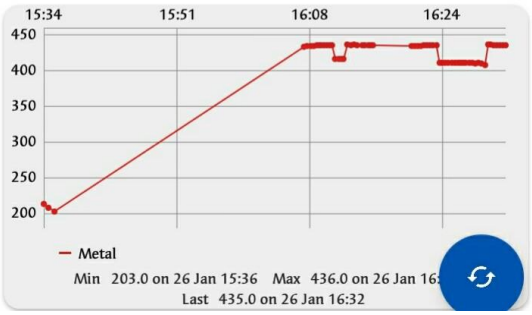


Fig . Thingsspeak web page





VI. SOFTWARE DESCRIPTION

The pdfgen package is the lowest level interface for generating PDF documents. A pdfgen program is essentially a sequence of instructions for "painting" a document onto a sequence of pages. The interface object which provides the painting operations is the pdfgen canvas. The canvas should be thought of as a sheet of white paper with points on the sheet identified using Cartesian (X,Y) coordinates which by default have the (0,0) origin point at the lower left corner of the page. Furthermore the first coordinate x goes to the right and the second coordinate y goes up, by default.

The above code creates a canvas object which will generate a PDF file named hello.pdf in the current working directory. It then calls the hello function passing the canvas as an argument. Finally the show Page method saves the current page of the canvas and the save method stores the file and

closes the canvas. The showPage method causes the canvas to stop drawing on the current page and any further operations will draw on a subsequent page (if there are any further operations -- if not no new page is created). The save method must be called after the construction of the document is complete

Before describing the drawing operations, we will digress to cover some of the things which can be done to configure a canvas. There are many different settings available. If you are new to Python or can't wait to produce some output, you can skip ahead, but come back later and read this! First of all, we will look at the constructor arguments for the canvas. The filename argument controls the name of the final PDF file. You may also pass in any open file object (such as sys.stdout, the python process standard output) and the PDF document will be written to that. Since PDF is a binary format, you should take care when writing other stuff before or after it; you can't deliver PDF documents inline in the middle of an HTML page! The pagesize argument is a tuple of two numbers in points (1/72 of an inch). The canvas defaults to A4 (an international standard page size which differs from the American standard page size of letter), but it is better to explicitly specify it.

OUTCOME OF PROJECT

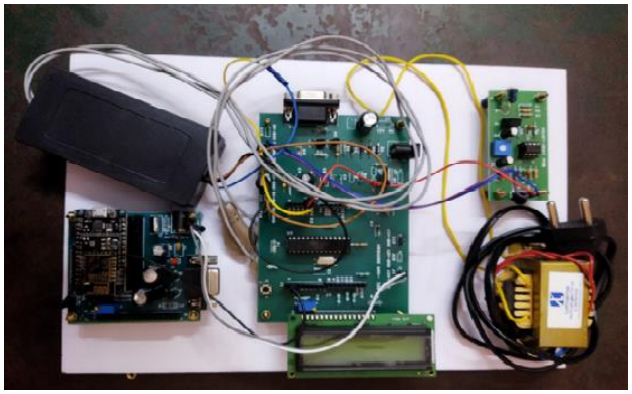


Fig Top view

Fig 11.results

VII. CONCLUSION

Here by we conclude that, using the metal sensor the landmine can be easily detected and will prevent much life from distortion. All the environmental condition and the control for the robot will be updated in the IOT website. The command for the robot will be given through the IOT website. According to the command the robot will move front, back, left and right. By this process many life can be saved.

VIII. FUTURE SCOPE

The future scope is concentrated on the improvement of the body designs by placing suspension system to over shock from the uneven surfaces. The power system is developed by replacing the battery with the solar panels to produce continuous power. In case of plastic, detector can be replaced by ground penetrating RADAR and other, mechanism. In this prototype may include shock absorbers and adjusters tthat can be installed to the wheels, so that the robot can run on any terrain.

REFERENCES

[1] Maid Ghareeb, AliBazzi, Mohamad Raad, Samih AbdulNabi, "Wireless Robo-pi For Landmine Detection",2017IEEE.

[2] KishanMalaviya, Mihir Vyas, Ashish Vara, "Autonomous Landmine Detecting Robot" 2015.

[3] Arbnor Pajaziti1, Ka C Cheok**, "**Semi-autonomous mobile robot for mine detection" 2015.

[4] M.G.KaleV .R.RatnaparkheA.S.Bhalchandra,"Sensor For Landmine Detection And Techniques: A Review" 2013.

[5] A.Mahmoud and H. Farouk, "An Efficient Detection and Classification Method for Landmine Types Based on IR Images Using Neural Network" 2010.

[6] L. Robledo, M. Carrasco and D. Mery**, "**A survey of land mine detection technology", 2009.

[7] Przemyslawklesk, andrzejgodziuk, mariuszkapruziak, and bogdanolech, "Fast Analysis Of C-Scans From Ground Penetrating Radar Via 3-D Haar-like Features With Application To The Landmine Detection" volume 53,no,7,july 2015.

[8] senihaesenyuskel,Jeremy Bolton, paulD.Gadef, "landmine detection with multiple instance hidden markov models",sep 23-26, 2012.

[9] IraklisGiannakis,AntoniousGiannopoulos,craig warren, "Numerical Modelling And Neural Networks For Landmine Detection Using Ground Penetrating Radar",2015.

[10] V.abilash,j.paul Chandra kumar, "Ardunio Controlled Landmine Detection Robot" volume 7 issue no.5,2017.

[11] NaqarFarooq,Nehal Butt, Samedshukat, nouman Ali Baig, Sheikh Muhammad Ahmed, "Wirelessly Controlled Mines Detection Robot"2016 IEEE.

[12] Seong Pal Kang,JunhoChoi,Seung-Beum Suh, Sungchul Kang, "Design Of Mine Detection Robot",2010 IEEE.

[13] N.Saravanan,R.Kaviyarasi, P.Malini,"Wireless LandMine Detection And Surveillance Robot"volume 4,issue 3,march-2017.

[14] Andrew Karem And HichemFrigui, "A Multiple Instance Learning Approach For Landmine Detection Using Ground Penetrating Radar",2011 IEEE.

[15] chamakh Yousef, ben rachedmohammed, " Mine Detecting Robot Protyping"