Brain Tumour Segmentation using U-Net Based Fully Convolutional Networks

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***Abstract*—A noteworthy test for treating brain tumor arranging and quantitative assessment is assurance of the degree of tumor. The Magnetic Resonance Imaging (MRI) procedure has developed as a forefront demonstrative apparatus for mind tumors without X-ray radiation. Manual division of brain tumor degree from 3D MRI volumes is an extremely tedious assignment and the execution is exceedingly depended on administrator's understanding. In this unique circumstance, a solid completely programmed division technique for the mind tumor division is important for a productive estimation of the tumor degree. This examination, proposes a completely programmed strategy for brain tumor division, which is created based on U-Net profound convolutional systems. Our technique was assessed on Multimodal Brain Tumor Image Segmentation (BRATS 2015) datasets, containing 220 high-review brain tumor and 54-second rate of tumor cases. Cross approvals have demonstrated that our technique can get raising division effectively.**

A user friendly and performance supported technique for recognition (segmentation) of tumor is utilized dependent on the mixture of 2 calculations. Division of tissue of tumor with exactness and reliability is much similar to the manual division and lessens the perfect opportunity for examination. At last, the tumor is detected from the MRI image and its correct orientation and also the structure is likewise displayed.

***Keywords*—Brain tumor, Image segmentation, Noise, Convolutional Networks (CNN), Magnetic Resonance Imaging (MRI)**

1. INTRODUCTION

Medical image analysis based on MRI is catching attention for the study of tumour of brains. The analysis aims at complete and intensive overview of the tumours and their imaging [1]. Recently, an yearly session called Multimodal Brain Tumour Image Segmentation (BRATS), takes place to define the benchmark processes used to segment and analyse the tumour of brain [2]. Currently various methods of deep learning have attained a high score in BRATS Challenges [3-5]. Essential dangerous cerebrum tumors are among the most loathsome kinds of disease, in light of the horrid guess, as well as because of the immediate results on diminished intellectual capacity and low infinitude. The survey of uses of deep learning in segmentation, image classification and various other similar domains has been done in [6]. The input images and corresponding segmentation maps are used to train the network [7]. A fully automatic and reliable method for segmentation of tumours of brain has been designed using U-net convolutional networks [8].

Most of incessant essential cerebrum tumors in grown-ups are essentially lymphomas and gliomas [9] of focal sensory system, which the last record for relatively 80% of threatening cases.

Two calculations are utilized for the division. So it gives the precise outcome for tumor division.The tumor might be essential or optional. On the off chance that it is a beginning, at that point it is known as essential. On the off chance that the piece of the tumor spreads to somewhere else and develops as its own then it is called optional. Ordinarily, mind tumor influences CSF (Cerebral Spinal Fluid). Regularly tumor cells are of many kinds namely Mass and Malignant. The recognition of the dangerous tumor is fairly hard when compared with mass tumor. For the precise identification of the harmful tumor that should be a 3-D portrayal of the cerebrum and 3-D analyzing device. A division is utilized on the location of mass tumor identification. The creating stage for the recognition is tangle lab since it is anything but difficult to create and execute. Towards, the end we are able to give framework to differentiate between the formation of the tumour and the tumor.

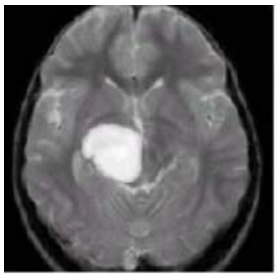


Fig. 1: Threshold Input

Fig. 2: Analysis by the persistent system

Fig. 1 is the image of threshold inputted to the system From the MRI itself, we can figure out the tumor area but it is not enough to carry on the treatment.

Fig. 2 shows exactly two grey values. White is considered as 1 and black is considered as 0. The background value is allocated to binary value 0 and object obtains the value of 1. So we are unable to determine the tumor from the resulting image. This is the major disadvantage of the persisting system.

1.1 Existing Method

The current technique depends on the thresholding and area developing. The thresholding technique disregarded the spatial attributes. Typically spatial qualities are imperative for the dangerous tumor recognition, yet the bit delineate contains 0 to 255 dim scale esteems. Also, the current method uses k-fold[10] algorithm whereas the proposed method uses k-mean algorithm.

2. IMPLEMENTATION

2.1 Pre-Processing

a) It performs separating of clamor and different artifacts in the picture and sharpening the picture for the sake of clarity.

b) RGB to grey transformation and forging additionally happens here. It incorporates the median filter for clamor expulsion. The conceivable outcomes of entry of clamor in current MRI examine are less.It may be interfering due to the thermal effect.

c) The principal point of this undertaking is to distinguish and segmenting the tumor cells. In any case, for the total framework, it needs the procedure of eradicating the clamor.

d) For more desirable comprehension of the capacity of the median filter, we included the salt and pepper clamor misleadingly and eradicating it utilizing the median filter.

2.2 Feature Extraction

a) The element extortion is extricating the bunch, which demonstrates the anticipated tumor presence at FCM yield. The extricated group is given to the thresholding procedure.

b) It smears double cover over the whole picture. It influences the dark grey

pixel to end up the unilluminated and the much-illuminated wind up more brilliant.

2.3 Algorithm used for approximation

Step 1: Initiate the procedure.
Step 2: Input the scanned copy of the MRI in the JPEG format.
Step 3:Inspect the format of the picture inputted and proceed to the aforementioned step if no error is shown.
Step 4:If a picture is in RGB design reciprocates it to grayscale otherwise proceed to subsequent stage.
Step 5:Locate edge on the grayscale picture.
Step 6:Compute the number of the illuminated spots in the picture.
Step 7: Measure the largeness of the tumor utilizing the modus operandi.
Step 8: Exhibit the magnitude and phase of the tumor.
Step 9: Terminate the Program.

The calculation checks the RGB or dark scale picture, changes over the picture into a binary picture by binarization strategy and distinguishes the edge of tumor pixels in the binary picture. Additionally, it figures the extent of the tumor by computing the quantity of white pixels in a binary picture.

3. DATASET

The proposed method is trained and validated on the BRATS 2015 dataset [2,12], which consists of 54 low-grade and 220 high grade glioma patients volumes that are already made skull stripped and is registered by intra patient. No further preprocessing is done in it. In this dataset each patient has four MRI scan sequences that consists of namely FLAIR, T1c, T2 and T1. The dataset is already skull – strippedand registered into the T1c scan and is interposed into 1x1x1 mm^3 with the sequence of 240x240x155. Furthermore the ground truth of the MRI scans of the dataset is furthermore manually labeled into 4 types of intra-tumoral class: that are 1 = necrosis, 2 = edema, 3 = non-enhancing and 4 = enhancing tumors and others are normal tissue. The Brain tumor segmentation problem exhibits severe class imbalance where the healthy voxels comprise 98% of total voxels, 0.18% belongs to necrosis, 1.1% to edema and non-enhanced and 0.38% to enhanced tumor.

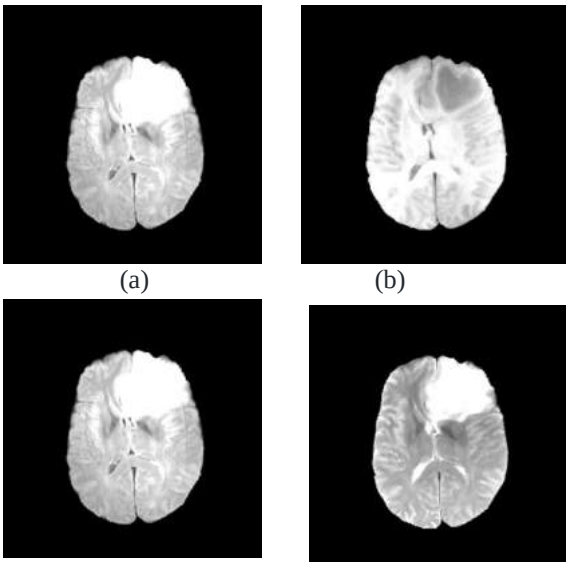
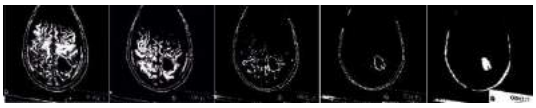


Fig. 3: Four different modalities of MRI of a HGG patient (a) Flair, (b) T1, (c) T1c and (d) T2

4. PROCESSING IMAGES

Fig. 4(a) shows the input image (b) depicts the addition of external noise to the input image (c) displays the gradual eradication of noise from the MRI which goes on through several steps to produce the final image in which tumour can be clearly determined. External noise is added to the input image in order to improve the efficiency of the process of removal of noise from the image.

(a) (b)



(c)

Fig. 4: (a) Input image, (b) Noise added to the image (c) Removal of Noise

5. ALGORITHM USED

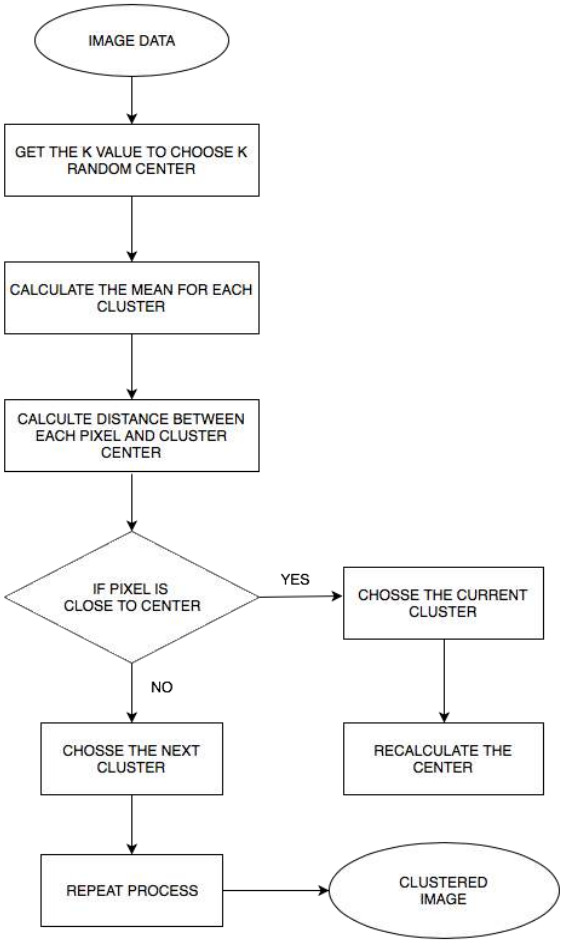
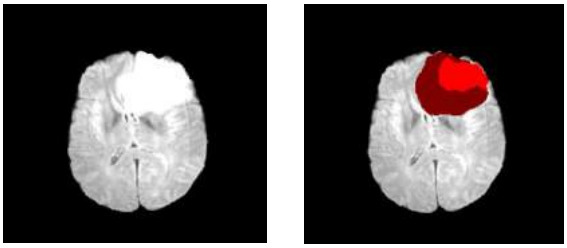


Fig. 5: Proposed Algorithm

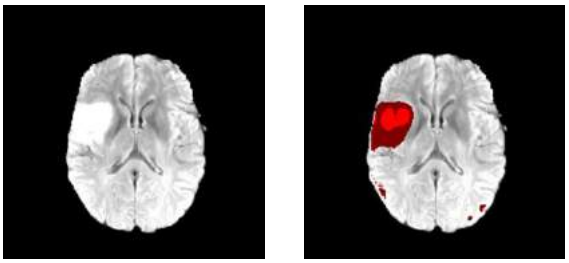
Fig. 5 depicts the algorithm used in the segmentation procedure of the tumour of the brain i.e. to get the area with tumor from the given image of the brain(MRI) using clustering process.

6. DIFFERENT INPUTS AND THEIR OUTCOMES



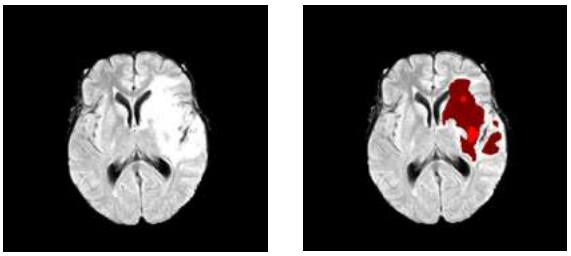
(a) (b)

Fig. 6: (a) Flair and (b) Predicted outcome



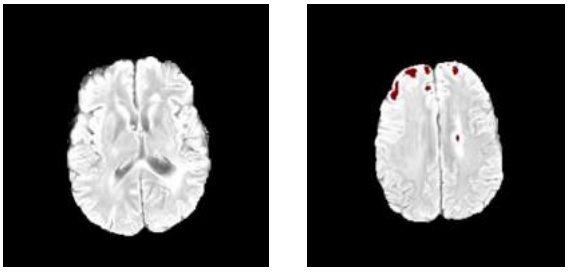
(a) (b)

Fig. 7: (a) Flair and (b) Predicted outcome



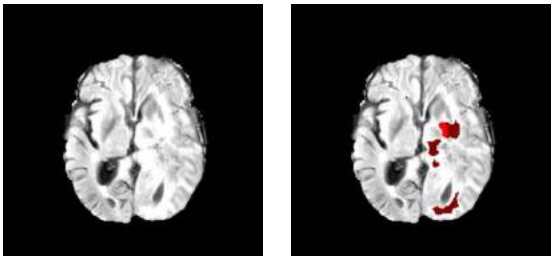
(a) (b)

Fig. 8: (a) Flair and (b) Predicted outcome



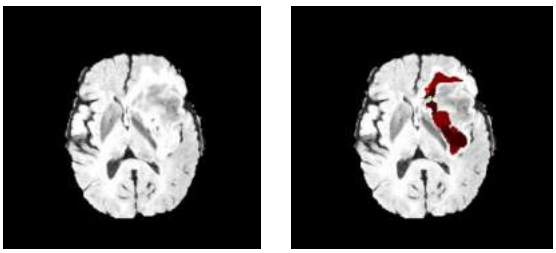
(a) (b)

Fig. 9: (a) Flair and (b) Predicted outcome



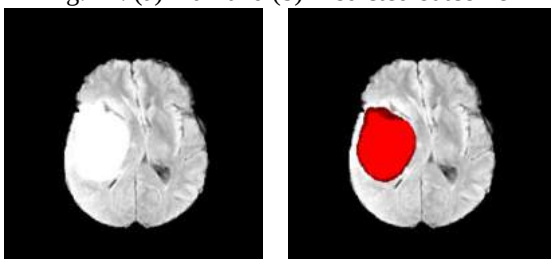
(a) (b)

Fig. 10: (a) Flair and (b) Predicted outcome



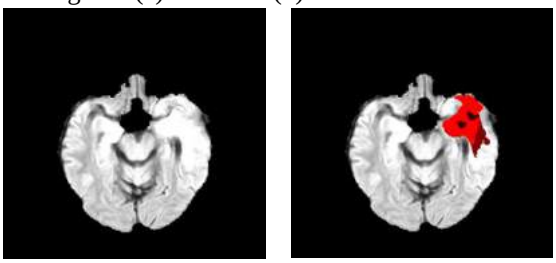
(a) (b)

Fig. 11: (a) Flair and (b) Predicted outcome



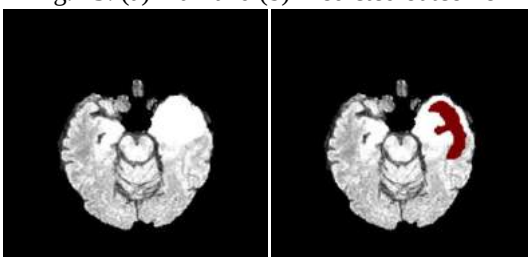
(a) (b)

Fig. 12: (a) Flair and (b) Predicted outcome



(a) (b)

Fig. 13: (a) Flair and (b) Predicted outcome



(a) (b)

Fig. 14: (a) Flair and (b) Predicted outcome

Figs. 6(a), 7(a), 8(a), 9(a), 10(a), 11(a), 12(a), 13(a), 14(a) are the flair images of the various samples which were taken as input and Figs. 6(b), 7(b), 8(b), 9(b), 10(b), 11(b), 12(b), 13(b), 14(b) are the predicted outcomes of the respective inputs after the complete procedure.

Fig. 15 shows the final image obtained after completing the procedure. The result consists of three different views i.e. front view, top view and side view of the brain with the tumor (in shades of red) detected.

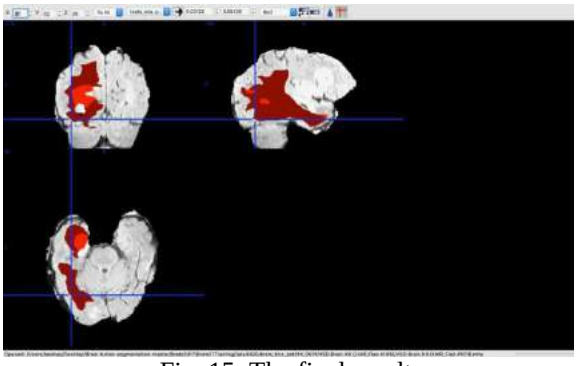


Fig. 15: The final result

7. Conclusions & Future Work

There are distinctive kinds of tumors. They might be a mass in the brain or harmful over the cerebrum. Assuming, that it is a mass then K-means algorithm is sufficient to extricate it from the brain cells. If there is any noise present in the MR picture it is expelled before the K means procedure. The noise-free picture is given as an input to the k-means and tumor is extricated from the MRI picture. And further segmentation implementing Fuzzy C implies for precise tumor shape extraction of threatening tumor and thresholding of output in feature extraction. At last approximate reasoning for ascertaining tumor shape and position figuring. The test results are contrasted from various calculations. The proposed procedure gives a more exact result. Later on 3D evaluation of cerebrum using 3D slicers with Matlab can be created.

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Data Encryption Standard Algorithm Using Java Remote Method Invocation & OpenMP

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Abstract--- Cryptography is a field of study of mathematical algorithms which are related to specific aspects of information security such as confidentiality, integrity of content, authentication (entity wise), and data origin authentication. Not only is encryption important but the speed at which the encryption occurs is also a matter of major concern. Java RMI is used for the purpose of parallel encryption of text. The same can also be implemented using OpenMP.

Keywords--- DES, OpenMP, RMI, Parallel, Speed.

I. Introduction

The Data Encryption Standard (DES) [3] is a symmetric cipher introduced and found by the National Institute of Standards and Technology (NIST). DES is an execution of Feistel Cipher. It utilises 16 rounds Feistel Structure. The block size is 64-bit.

However, key length is 64-bit, DES has ultimately a key length of 56 bits, since 8 of the 64 bits of the key are not utlised by the encryption calculation (work as check bits only). Most cryptography algorithms work better in hardware than software, systems implemented on hardware have significant drawbacks: they fail to give responses to flaws discovered in the algorithm implemented or to the changes in standards. Alternatively, it is feasible to implement cryptographic algorithms in software executing on multiple processors. In this project we have implemented DES algorithm in serial and parallel using RMI[4] and OpenMP. RMI is the stepping stone of distributed object-oriented programming in Java.[6] It explains how Java components can interact with one another in a multiple JVM environment.

RMI provides the required tools that are needed to create distributed Java applications (objects) that can invoke methods on other Java applications which are running on other Java virtual machines, such as remote hosts across the Internet.[5] OpenMP is the short for Open Multi-Processing. It is used for parallelization of program on shared memory systems.

This project implements DES algorithm and compares the time of execution, serially and parallelly using two platforms individually RMI and OpenMP.

II. Literature Review

A. Cloud Computing Security Model with Combination of Data Encryption Standard Algorithm (DES) and Least Significant Bit (LSB).

In this paper, how cloud computing security model used in file and message storage processes requires the DES cryptography algorithm and LSB steganography in the 16th round of bits to keep up the security and confidentiality of files and messages is explained.

If the key does not match then the file will not be downloadable. But it concluded in a way that cloud are more prone to security issues hence need more rigid encryption algorithm compared to DES.

B. Implementation Cryptography Data Encryption Standard (DES) and Triple Data Encryption Standard (3DES) Method in Communication System Based Near Field Communication (NFC)

DES and 3DES text data cryptographic method can be implemented on application of ACOS3 smart card data writing process and data reading process in NFC – based systems.

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The execution time of ACOS3 smart card data writing process and data reading process using DES cryptographic method is faster than DES cryptographic method.

C. Design and Simulation DES Algorithm of Encryption for Information Security

Algorithm consumes least encryption time and DES consumes maximum encryption time.

D. Parallelisation of DES algorithm

Using the memory with more latency (for example, using the interleaving technique) we can even increase the speed-up of the whole parallel program.

The hardware synthesis of the DES algorithm will depend on appropriate adjustment of the data transmission capacity and the computational power of hardware. The code containing, I/O functions is not parallelizable, because the access to memory is, by its very nature, sequential. The total speed-up received on PC computer is about 1.86.

III. Existing DES Approach

Considering improvement in performance of advanced encryption standard using Parallel Computing, here the problem faced was that faster frameworks could also have been used for implementation. Also, this method is vulnerable to network traffic, which can affect its performance.

While another pre-existing method is that of Parallelization of the Data Encryption Standard Algorithm. Here, memory with more latency is made use of so that there is an effective increase in the speed-up of the entire program (parallel) except the I/O function region because of its sequential nature.

Another method talks about how if large amount of data is input then the encryption/decryption time required is greatly reduced, provided the processing is parallel execution under distributed environment.[1]

Yet further a study talks about how application of all standard algorithms (RSA, DES, 3DES, AES) [2] when applied to a piece of information then the security parameter is enhanced by greater percent.

For applications like banking system, the DES algorithms effectiveness is being questioned due to the result of certain analytical results which demonstrate the weakness in the cipher.[7]

A Modified Simplified Data Encryption Standard Algorithm, a random key generation was done so that the attacker finds it difficult to guess the key and hence the vulnerability of communication data to be transmitted is reduced.

A. RMI Implementation

DES module: For the core DES cipher functionality. It will be executed in Client and server nodes. Key gen function will be included to generate random symmetric keys. Key extract function will be included to extract the symmetric keys. Encryption function and decryption function will be included in the module as well.

Decrypter module: Abstract class illustrating functionalities of the application. The DES module of decrypt and encrypt will be called remotely - (thus this module would need the use of library java.rmi.*). This classrom both Client and Server module.

Decrypter Interfaced (remotely) Implementation of the Decrypter interface remotely by both client and server modules.

Server Module (RMI): It will act as the server instance which will provide Decrypter Interfaced (remotely) objects to its clients. This module/class will be executed by the server node only.

Client Module (RMI): Simply a client, accessing the application via the objects available to it by the server. This module/class will be executed by the client node only.

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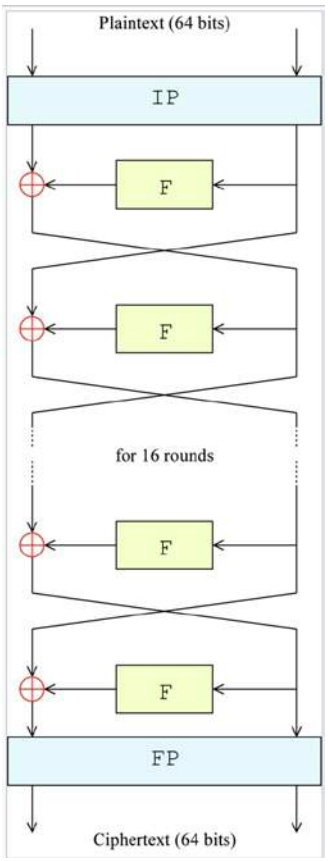

Fig. 1: The overall fiestal structure of DES

B. OpenMP Implementation

The simple serial code will be parallelised using OpenMP constructs wherever possible. omp get wtime construct will be used to get value of time elapsed in the execution.

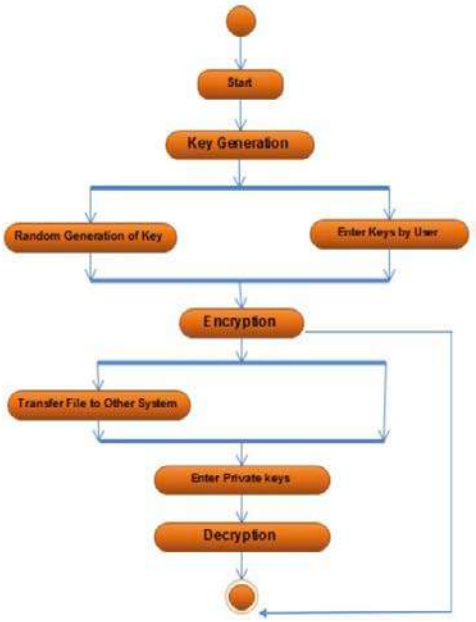

Fig. 2: Activity Diagram for OpenMP

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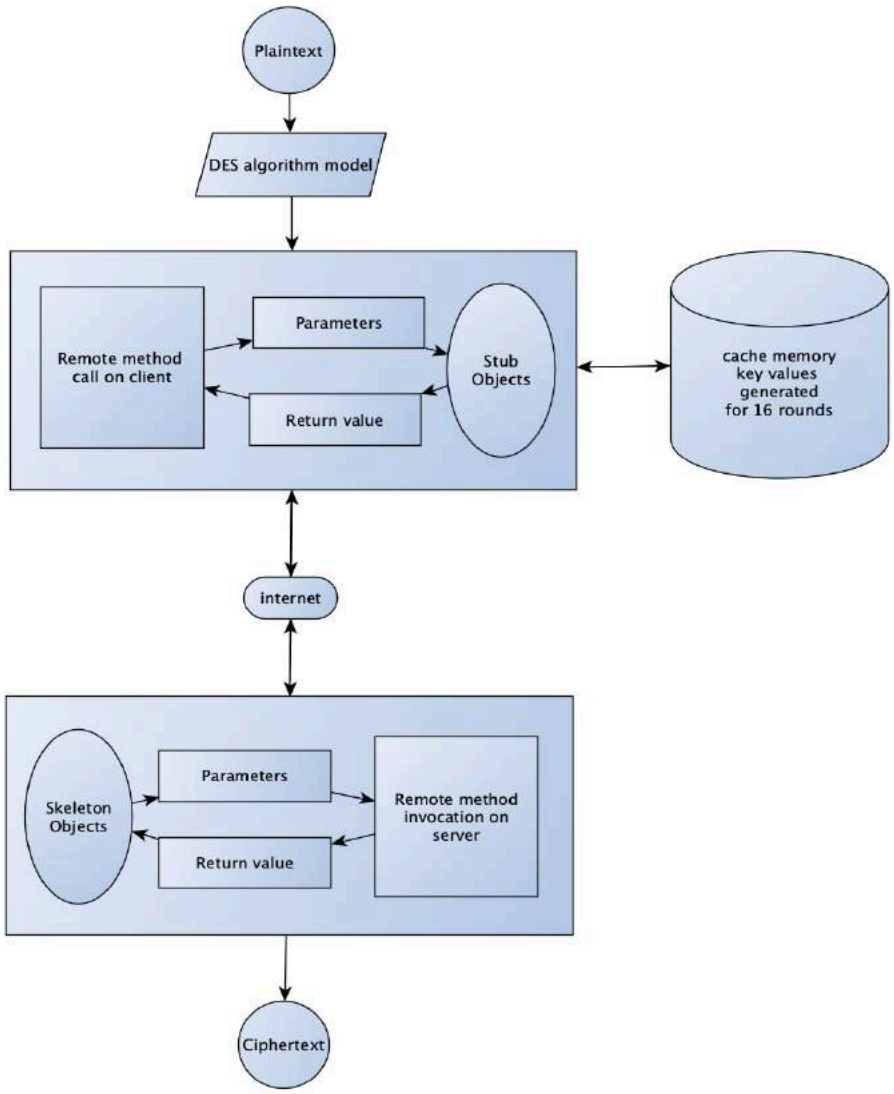
IV. Modified Approach

Our model uses two ways to implement DES algorithm, first method being using Java RMI to implement the algorithm parallelly in a client-server structure to reduce the execution time. Using Java RMI model to encrypt the DES algorithm is not restricted by the number of cores in a processor, unlike traditional parallel techniques which are bound by the number of processing elements, because Java RMI is an API that executes model in client and server stub and skeleton respectively which are created virtually by JVM. Furthermore, the time taken to run the model on a set of text data to encrypt them reduces as we run them later compared to the previous time they were executed. Hence, the entire code does not get executed instead only the encryption part is executed again.

The second way we implement DES is by using OpenMP. OpenMP is a traditional shared memory multiprocessing programming API that can be used on any platform. The run-time after executing any model in OpenMP depends on environment variables, compilers and library routines. In this paper we compare and contrast both the methods based on the time complexities.

Algorithm



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V. Implementation and Result Analysis

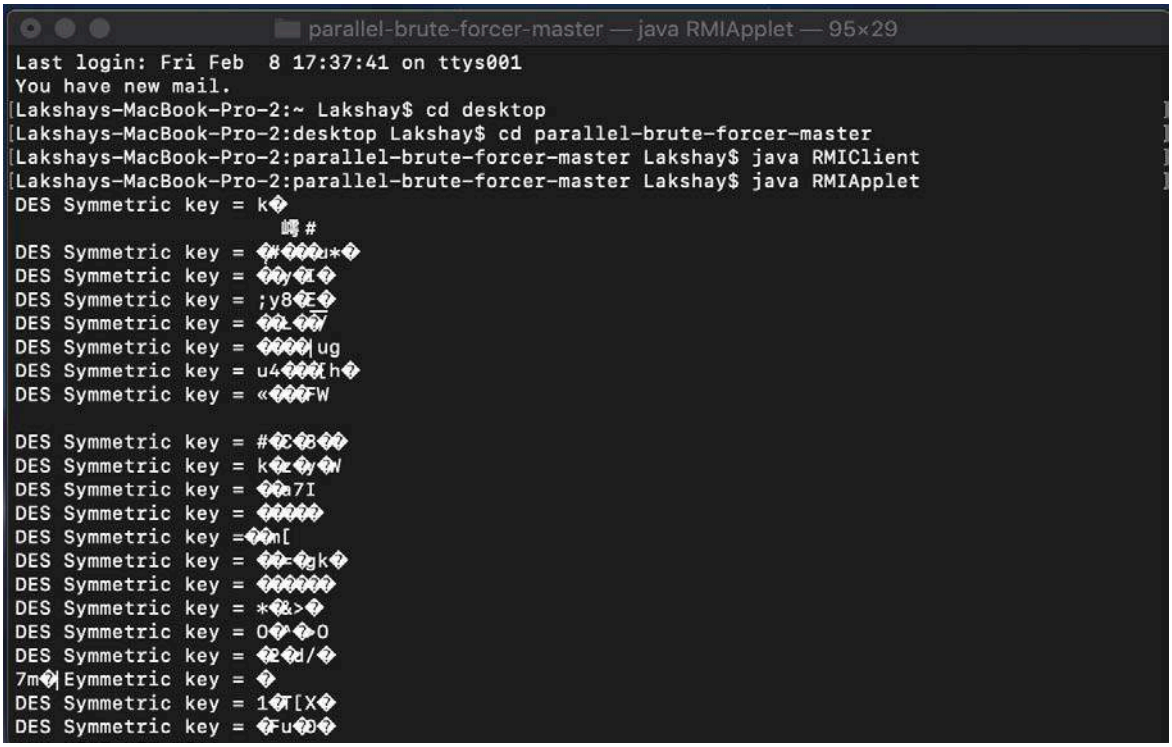

Fig. 3: RMI Client terminal

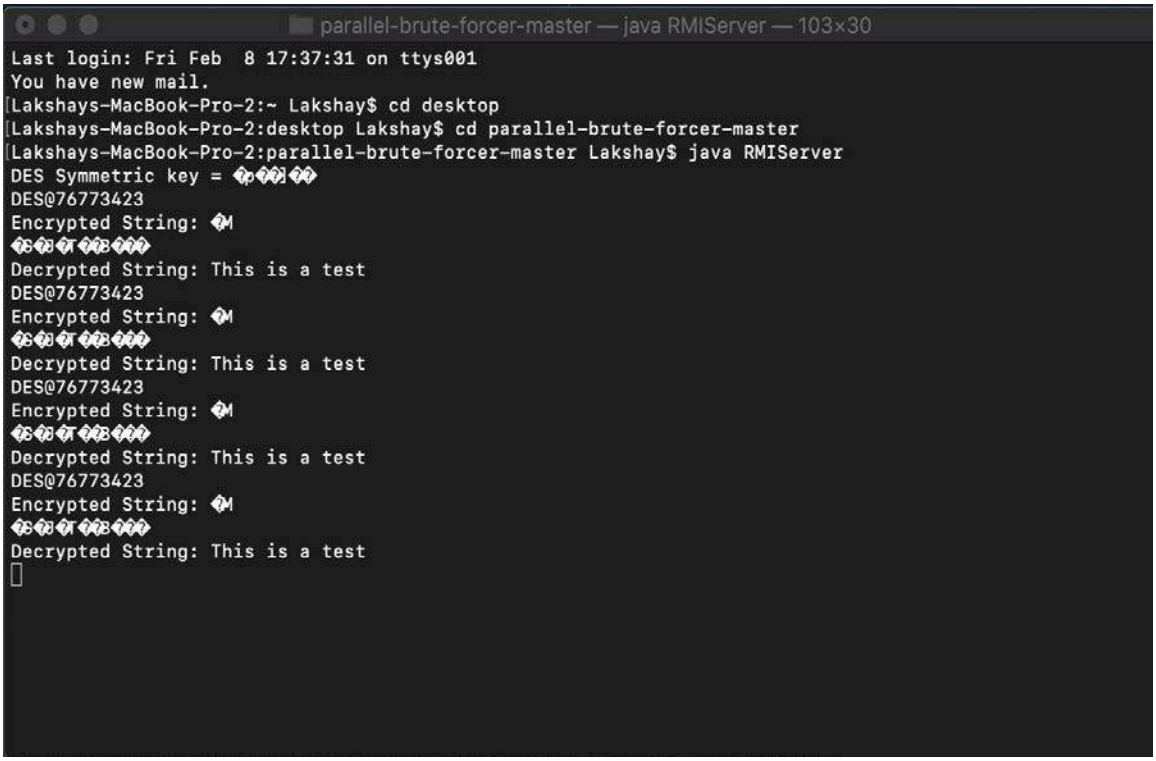

Fig. 4: RMI Server terminal

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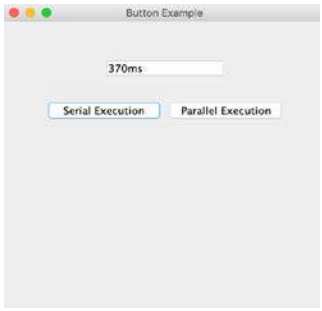
Serial Execution



Parallel Execution

Fig. 5: Java GUI for run-time comparison

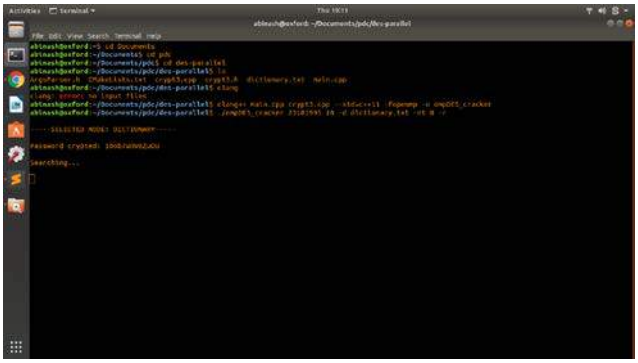


Fig. 6: OpenMP execution and runtime display

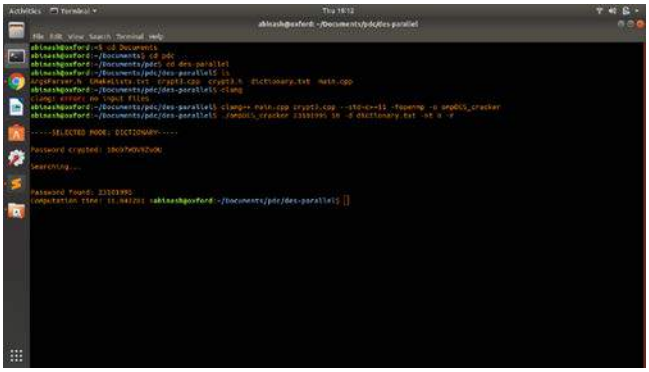


Fig. 7: Run Time Analysis of DES in Serial and Parallel

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Number of times executed	serial run-time (in ms)	parallel run-time (in ms)
1	1377	650
2	1012	9
3	427	2
4	461	12
5	386	2
6	403	6
7	401	8
8	495	5
9	384	10
10	465	16

Fig. 8: Run Time Analysis of DES in Serial and Parallel using java RMI

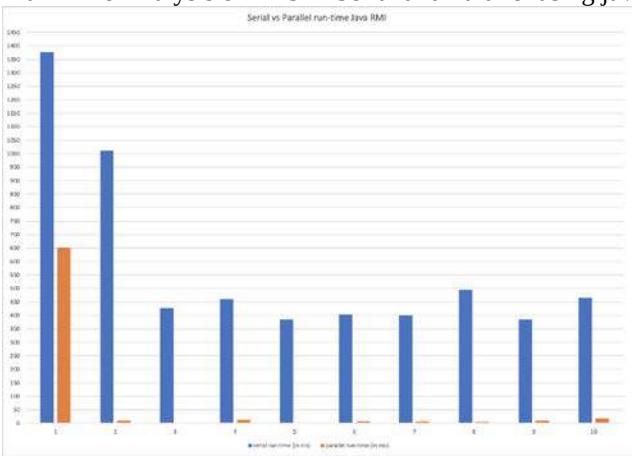

Fig. 9: Time comparison amongst the number of times the model is executed

Fig. 10: Comparison of serial parallel-using java RMI and parallel-using OpenMP

Serial	**Parallel**	
	Java RMI	***OpenMP***
1012	11	9

VI. Performance Evaluation

Parallel execution time is less than serial execution time by almost half in RMI parallelization which is a significant difference in time. But the difference reduces further if the encryption happens in the second cycle because after each cycle the amount of code to be executed reduces as the basic code's output is stored in cache memory and only the encryption part of the code is executed in further cycles. Thus, reducing time of execution significantly.

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VII. Conclusion

DES Algorithm is computationally expensive and when implemented in a single processor environment takes a few seconds to encrypt even a small phrase like This is a test phrase. When implemented in a client and server based scenario using Remote Method Invocation (RMI), time taken for encryption is nearly ten times faster. This not only shows the computational power that RMI gives to a programmer but also justifies the motive of the study of parallelising the code for faster results.

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Sight for Blind with Panic Button

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***Abstract*— Visual impairment as an impediment has been normally happening in each general public in the history. Amid the vast majority of the history, outwardly debilitated individuals (and every single crippled individuals besides), have been viewed as a social weight and if not dealt with by their families, most would die in the cruel condition. Daze children would be deserted, and dazzle grown-ups would regularly finish up as homeless people. The capacity to peruse and compose, which the visually impaired network recaptured with Braille's development, was simply the initial step to training, liberation, and independence of visually impaired people. This venture will comparably improve lives of outwardly weakened by giving them an approach to stroll around openly and have better authority over things.**

Keywords—Raspberry Pi, Tensorflow, GSM, Wifi Module, Panic Button

I. INTRODUCTION

This paper surveys the cutting edge in the field of assistive gadgets for sight-debilitated individuals. It focuses specifically on different frameworks that utilization picture and video preparing for changing over visual information into an other rendering methodology that will be valuable for a visually impaired client. Such substitute modalities can be sound-related, haptic, or a mix of both. There is along these lines the requirement for methodology change, from the visual methodology to another; this is the place picture and video preparing assumes an essential job. The conceivable exchange tangible channels are analyzed with the motivation behind utilizing them to show visual data to thoroughly daze people. A refinement is made by the last yield channel. This paper determines that Haptic encoding is the frequently utilized by methods for either material or consolidated material/sensation encoding of the visual information. Sound-related encoding may prompt minimal effort gadgets, yet there is have to deal with high data misfortune brought about while changing visual information to sound-related one. Notwithstanding a higher specialized unpredictability, sound/haptic encoding has the benefit of making utilization of all accessible client's tactile channels. In this paper 2D pictures were coded by tone blasts speaking to specks comparing to picture information. Picture handling was insignificant. The vertical area of each spot was spoken to by the tone recurrence, while the even position was passed on by the proportion of sound plentifulness.

II. LITERATURE REVIEW

A. Character recognition and detection system for visually impaired people

This paper portrays an approach to manage concentrate and see content from scene pictures sufficiently using PC vision development and to change over apparent substance into talk so it will in general be joined with gear to make Electronic travel help for ostensibly weakened people in future. Perceiving content from scene picture is progressively troublesome when appeared differently in relation to that from printed chronicles. Bundles of research has been done on recognizing scene substance to beat certain challenges like perspective mutilation, perspective extent, content measurement, etc. Speed, unusualness, cost and accuracy are basic parameters must be considered while arranging such structures. PC vision is one of the creating developments that can be used to help ostensibly ruined people for course (both indoor and outside), getting to printed material, and etc.

B. Recognition of Object for blind people based on feature extraction

This paper gives a diagram of different visual substitution frameworks created in the ongoing years. It points additionally to present a proposed technique that reestablishes a focal capacity of the visual framework which is the distinguishing proof of encompassing items. This technique depends on video examination and elucidation. In this manner, the commitment of this paper is to display a visual substitution framework dependent on assessing quick and hearty calculations to perceive and find protests in pictures.

C. A multifunctional Reading assistant for visually impaired

This paper tends to the significance of the innovation where an archive can be checked and the content data bolstered into the PC can be broke down for content parts. These perceived segments are then vocally integrated. This paper goes for stretching out this innovation to portable use, since up until now, the innovation is constrained to families and static use. The modules utilized for this present paper's model incorporate human-machine interface, Windows API, Camera API, Image handling module, TTS motor and application portion. The article acknowledgment works utilizing the accompanying components: Gradient square characterization, design discovery and confirmation,

division and binarization, OCR for content acknowledgment, post OCR approval, information gestion. The paper likewise covers the different existing acknowledgment strategies, including content peruser for visually impaired individuals that utilizes the K-NFB peruser, normal scene content perusing calculations, utilized for content acknowledgment for tag ID or programmed sign interpretation for outsiders. It likewise completes a definite report on programmed content perusing, expressing that their model makes utilized of various finished areas for various literary substance (utilizing edge thickness measures). For content division and acknowledgment, they have utilized content extraction methods, in light of on shading pictures or luminance. This is trailed by an examination of item acknowledgment utilizing the modules referenced above and an indisputable provide details regarding results, that were prevalently positive.

D. Fuzzy relative position between objects in image processing: a morphological approach

In order to conform to the uncertainty of spatial relative position musings, this paper proposes another significance of the relative position between two things in a delicate set system. This definition depends upon a morphological and delicate model arranging strategy, and includes emerging an article from a fluffy scene tending to the component of fulfillment of a directional relationship to a reference object. It has unimaginable formal properties, it is adaptable, it fits the motivation, and it will as a rule be utilized for collaborator point of reference insistence under imprecision.

E. Blind navigation system using image processing and embedded system

This paper for the most part centered around giving visually impaired people the capacity to get to the data given by street signs. It comprises of a programmed street sign acknowledgment framework. This framework additionally gives the information that us required for notice and directing the individual, to make his/her voyage less demanding. This framework depends on human arrangement of acknowledgment. It utilizes a LPC2138 microcontroller with a glimmer memory of around 256 kB, a ultrasonic sensor which utilizes the idea of the Doppler Effect. A GSM module is utilized that works at 1800 MHz The calculation essentially changes over the pictures to grayscale and after that identifies the SURF highlights and stores it in its database. It does likewise to coordinate pictures with the database aside from that it coordinates the highlights in the wake of separating at that point. This technique provides some confidence to the visually impaired individuals. In any case, it doesn't give the exact area to the client utilizing the GPS. It is additionally a marginally costly arrangement and should be made less expensive so as to be adaptable. This paper emphasized on the point of making something but not affordable and far too complex for a visually impaired person to use. The technology is fine and would be helpful for the visually impaired but is not helping the person in making life easier.

F. Image recognition for visually impaired people by sound

A few endeavors have bene made to utilize picture acknowledgment to help the outwardly disabled. One such endeavor included edge identification in the information picture, in light of the acquired edge data, sound is created. the sound is additionally examined by utilizing measurable properties like mean from wavelet coefficients. the different factual properties were found to vary dependent on the term of sound which thusly relied upon the length of the picture. these factual properties were utilized to arrange the pictures in different classifications, and the class of the picture was recorded in human voice utilizing receiver. The suitable chronicle was said to be played dependent on the scope of the measurable properties.

G. Emergency Panic Button

Google's Android platform for cell phones has immediately formed into a genuine open source elective. We investigated the Android Operating System (OS) and programming improvement condition and assessed a few of its capacities by building a working application. This application gathered speed and area data from the Global Positioning System (GPS) beneficiary, utilized the Google Maps Application Programming Interface (API) to decide the area of adjacent clinics, and offers message to emergency clinics and relatives, if an individual need an assistance. The stage demonstrated equipped for supporting a merging of various administrations, and we accept such cell phones have expansive appropriateness to open wellbeing issues.

H. Computer Vision Technologies for visually impaired: An overview

This paper underscores to think about the distinctive methodology or procedures used to help the visually impaired or vision debilitated individuals. It is a relative overview which brings up the preferences and weaknesses of every system alongside some critical focuses. It portrays the different strategies from crude dimension to comparable/high experienced, making it helpful for specialists for further investigation.

I. Text Reader for Blind : Text to Speech

Human asset and the PC framework give the ideal worldview of an inconvenience shooter. Such frameworks should be easy to use, precise, and performing multiple tasks as they are required by each segment of individuals. Be that as it may, with regards to outwardly hindered individuals they (the product's/frameworks) represent a lot of battle and trouble and the total use of the offices is hampered while utilizing the visual interface. This can be unraveled by utilizing the conference capacity. Remembering this the product will probably peruse the content present in the screen, website page, report or a content entered in a content box utilizing Free TTS content to-discourse Synthesizer. The content will be changed over into a discourse by breaking down and preparing the content utilizing Natural Language Processing (NLP) and afterward utilizing Digital Signal Processing (DSP) innovation to

change over this handled content into combined discourse portrayal of the content. Through the discourse or voice outwardly disabled individuals can almost certainly hear huge volume of content simpler. Other than simply the content to discourse office the product will have an office to remove the content into a sound document like *.mp3, *.wav and so forth. It will be a productive manner by which dazzle individuals can likewise connect with the PC and use the offices of the PC.

III. PROPOSED SYSTEM

Our major focus in this paper is to help the visually impaired in walking as well as help them in case of emergency, so for that we are proposing a model in which there will be a blind person's stick to which there will be an ultrasonic sensor attached and a camera module for raspberry pi.

The ultrasonic sensor will determine the presence of something in front of the stick and the camera module will be actively taking pictures of the object in front. That image will be converted to text using tensorflow and we will be employing a module that will convert text to audio. And the visually impaired person will be able to hear the audio using headphones that he/she will be wearing.

IV. ARCHITECTURE

There are three main aspects to our framework. The first part begins with a basic *Object Recognition System* that is available online for free, containing thousands of images and objects trained one by one. They cover a vast array of objects that can come in contact with the stick. The second part is *cross checking the object recognized with the database* our stick has. There are two ways to do this. The cheaper alternative is to save all the data within the stick. The memory can range up to 16 - 32 GB and would store all the information locally. The other alternative would be to have wireless connectivity embedded in the stick. This option has more risk as any contact to water or regular wear and tear can damage the stick. We also need to take care of the fact that the outer covering of our stick must be light yet durable to withstand any sudden jerks or wear and tear. The camera lens must be made up of gorilla glass so that even if a blind person taps it on a foreign object, it doesn't crack. The third part is using an *ordinary text to speech converter and provide the audio translation of the recognized object.* There are further two ways to do this. We can either add a speaker to the tail of our stick and publicly announce or declare what object it is or send information to a pair of headphones that can be worn by the blind person.

Integrating our Object Recognition Software with the Hardware: The block diagram of safety stick for blind people contains a camera module, Raspberry Pi, Tensorflow, Text to Speech Module and Headphones through which helps visually impaired to listen about what is present in front of them.

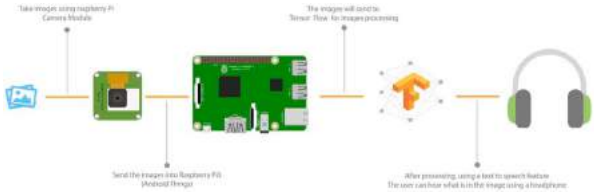


Fig 1. Proposed Model Design

V. MODULES

A. Object/Obstacle Detection

The main intent of detection of obstacle is to determine the nearness of obstacles before the clients, while the deterrent cautioning speaks to and sends this data to the clients.

This can be done using many methods:

1. ET Sensor
2. Top Hat Sensor
3. Touch Sensor
4. Lever Sensor

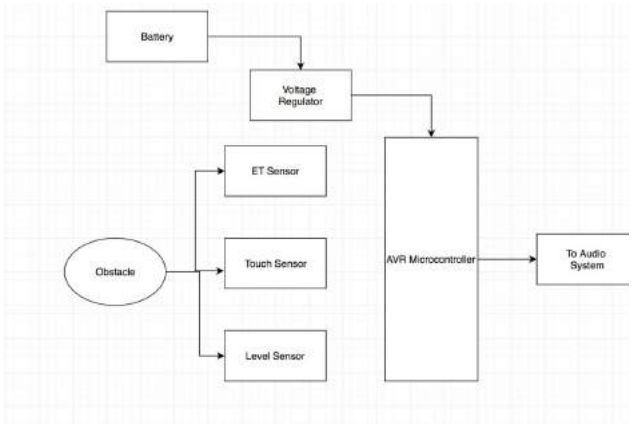


Fig 2. Obstacle Detection

B. Image Recognition

Picture affirmation, with respect to machine vision, is the limit of programming to perceive objects, places, people, making and exercises in pictures. PCs can use machine vision propels in blend with a camera and man-made mental ability programming to achieve picture affirmation. Picture affirmation is used to play out a broad number of machine-based visual errands, for instance, denoting the substance of pictures with meta-marks, performing picture content chase and controlling self-decision robots, self-driving automobiles and disaster avoiding systems.

While human and animal cerebrums see protests easily, PCs experience issues with the task. Programming for picture affirmation requires significant machine learning. Execution is best on convolutional neural net processors as the specific errand by and large requires immense proportions of force for its register concentrated nature. Picture affirmation counts can work by usage of close 3D models, appearances from changed focuses using edge acknowledgment or by segments. Picture acknowledgment calculations are

frequently prepared on a huge number of pre-named pictures with guided PC learning.

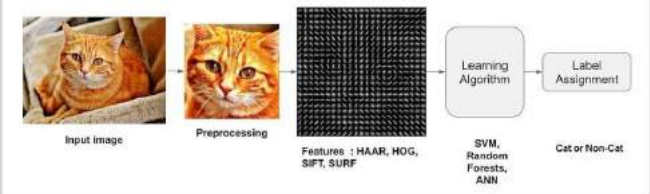


Fig 3. Image Recognition

In this type of image/object recognition the system need not learn or rather it utilizes lazy learning of just storing some image descriptors in a search indexing data structure like the Kd-tree or Locality sensitive hashing (LSH). This has three stages:

1. Key point detection
2. Descriptor extraction
3. Matching and verification

C. *Object Detection*

Object Detection is looking for real-world item instances like bike, flowers, car, TV and humans in motion-less images or Videos. This helps in the localization, detection and recognition of various objects within an image itself which caters to us with a better understanding of an image as a whole.

Object Detection can be done via multiple ways:

1. Feature-Based Object Detection
2. Viola Jones Object Detection
3. SVM Classifications with HOG Features
4. Deep Learning Object Detection

In this project, we'll be using Deep Learning Object Detection as Tensor flow uses Deep Learning for computation.

Tensor flow is Google's Open Source Machine Learning Framework for dataflow programming across a range of tasks. Nodes represent mathematical operations, while the graph edges represent the multi-dimensional data arrays (tensors) communicated between them.

Fig 4. Object detection

The smart stick on detecting any obstacle, will click a picture of the same. The identified image will then be used to identify the object using Tensor Flow. the image of the object will be compared to various objects in the database and on finding a match, the name of the object will be sent to the next module to convert the name into audio.

D. *Converting into Audio*

There are plenty of open source codes and API's for text to speech conversation. Once our SSD model identifies which object is there, we just need to convert that name into a string and pass that string as a parameter to the TTS function (Text-to-Speech).

Our brains influence vision to appear to be simple. It doesn't require much exertion for us to tell distinction between a lion and a tiger, read a sign, or perceive a human's face. In any case, these are difficult issues to explain with a PC: they just appear to be simple in light of the fact that our minds are extraordinarily great at understanding pictures. In the previous couple of years, the field of machine learning has gained gigantic ground on tending to these troublesome issues. Specifically, we've discovered that a sort of model called a profound Convolutional Neural Network that cancan accomplish sensible execution on hard visual acknowledgment undertakings - coordinating or surpassing human execution in a few areas.

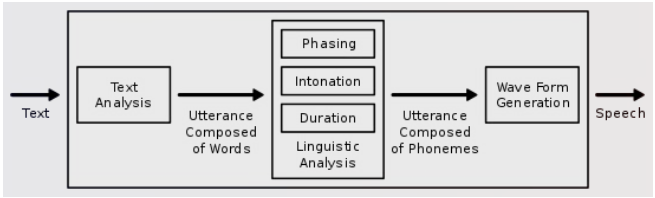
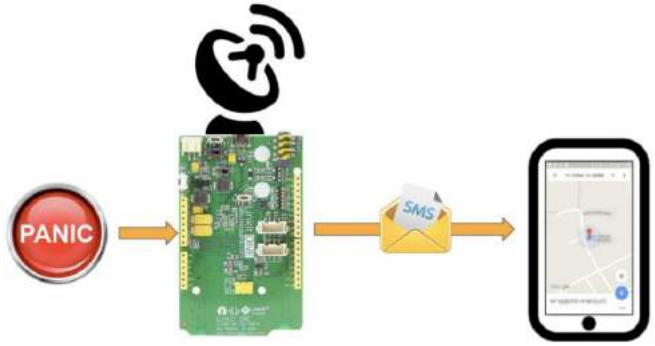


Fig 5. Text to Speech

Using the aforementioned, an image recognition algorithm can be made. Further the images can be named by using the dataset of Tensor Flow. Given that we have everything on the computer, text to speech algorithm can be used to convert the data to audio. This combination of image recognition and text to speech translator can give us a device that will tell the visually impaired what they are looking at. This way they will have a better sense of surroundings.

E. *Panic Button*

In this module we incorporate safety feature for the blind. This module uses GPS and GSM module to implement the functionality. When the visually impaired person clicks on the panic button when he thinks he is in some emergency, then the GPS module collects the current location of the blind person in the form of geo-coordinates (i.e. latitude and longitude) and this information is added along with an emergency message. This message is then sent by the GSM module to the guardians or relatives of the blind person so that they can come to his location as soon as possible.



VI. CONCLUSION

The Sight for blind is a product prototype to aid the blind people in their day to day lives. The product uses concept of image processing using Tensor Flow and text to audio conversion so that the blind knows what the object detected is. Further developments that can be done in the product are – firstly the range of objects that can be detected are restricted to knowledge of just one API, some objects that look similar will need personalized training on specific data so that they can be differentiated. Second, the hearing of audio will not be useful for a person who is both blind and deaf. As a solution we can send vibrations that can alert the person of objects in front of him/her.

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SETI (Search for Extra Terrestrial Intelligence) SIGNAL CLASIFICATION USING MACHINE LEARNING

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Abstract - In this paper, a literature review on SETI signal spectrogram image classification is presented. Since there has been an abundance of astronomical data, automation seems to be the easier solution for classification and this brings in machine learning into the picture. In this paper, we have discussed both traditional methods and automated methods and also made an analysis of which algorithm comparatively has better performance

Keywords: SETI, Spectrogram, Convolutional Neural Network, signal classification.

1. INTRODUCTION

1.1 Theoretical Background

The goal of SETI is to understand and explore the nature and origin of life in this universe and how intelligence evolved.

The University of Berkeley, Berkley SETI Research Center created a project named "Breakthrough Listen" which is stated as one of the most elaborate search for alien life and communication. The radio signal data from space is gathered by Parkes Observatory in New South Wales and Green Bank Observatory in West Virginia and the optical data is collected by Automated Planet finder located in California

This project has the software and hardware for signal collection, money, time and the expert to run. The only sticking point is the data. Even after compromising on the raw data's time or frequency resolution, Breakthrough Listen is archiving 500GB and data every hour[1]

1.2 Motivation

During 2017, SETI conducted a machine learning competition where simulated datasets were given to the competitors and a blinded test set. The team that won the competition, obtained an accuracy of about 95 percent. They used a Convolutional Neural Network and the aim was to classify signals by going beyond the traditional methods for signal analysis. The goal was to convert the signal classification task into image classification by converting them into spectrograms. [1]

SETI has now started to release datasets for machine learning for the purpose of automated classification. Even though the dataset that is released is small, it is still sufficient for deep learning analysis. The motivation of this project is to apply machine learning techniques to classify images with decent accuracy.

1.3 Aim of the proposed work

To classify spectrogram signals using machine learning techniques namely Convolutional Neural Network and Image processing techniques.

1.4 Objective(s) of the proposed work

- Develop an algorithm to classify signals of the datasets.
- Stimulate the data to create new datasets with different types of signal.

2. LITERATURE SURVEY

2.1 Survey of the Existing Models/Work

Traditional classification method:
An advanced method for classifying bird species from the audio signals is presented in [1]. The authors use features like syllable textures in audio spectrograms, which has a considerable discerning effect amongst the bird classes. The spectrogram is computed from the audio. The syllables from the spectrogram is extracted using an enhanced syllable extraction technique. Then, GLCM –Gray Level Co-occurrence Matrix is computed using the texture features and are further used for classification.

A system to monitor food intake by using a microphone in throat is discussed in [3]. The aim of the work is to classify the food being intaken using the spectrogram analysis. The food being classified are sandwich chewing, sandwich swallows, water swallows and none. The obtained F-score value was 0.84.

A spectrogram based classification technique is used for classifying music genre is detailed in [4]. The proposed technique combines the Singular Value Decomposition (SVD)'s dimensionality reduction power with the Wavelet Package Decomposition (WPD)'s multi resolution analysis so the the desired features can be extracted. The accuracy of the new method is evaluated using GTZAN and ISMIR datasets.

A novel method is examined in [5], where a model to classify movements using accelerated spectrogram which is used in combination with dynamic time warping method is discussed. The method firstly collects data using an accelerated sensor which is embedded in a mobile device. Then it filters coordinate information. Then, the data is modified to a spectrogram and the RGB values of the spectrogram are used in classifying the movements. A DTW algorithm is used in the classifying these changes. The model is evaluated by experimenting with 3 human movements namely walking, moving upstairs and downstairs.

A system is designed to classify basic types of digital modulation signals such as Phase Shift-Keying (PSK), Frequency Shift-Keying (FSK) and Amplitude Shift-Keying (ASK) is discussed in [6]. The spectrogram time frequency analysis for analysis and a rule based classifier is used for classification. The instantaneous frequency is removed from the frequency-time presentation and then used to estimate the parameters of the modulation type. This data is fed as input to the rule based classifier. The accuracy of the system is evaluated by adding Gaussian white noise. The accuracy obtained is around ninety percent

A biological image based classification technique to classify creatures based on their sounds is proposed in [7]. The method involves spectrogram image extraction using relative spectral transform-perceptual linear prediction, spectrogram routing using Hilbert curve, feature matching using cosine similarity and 1-D spectrogram classification using Gaussian mixture model.
A novel method is proposed in [8] to extract features from modulation spectrogram and or classification of phonemes in Gujarati. The 2-D modulation spectrogram is reduced to a 1-D feature vector , which is smaller than the original. The language was manually classified into thirty one classes.
Then Support Vector Machines (SVM) is used to classify the phonemes. The accuracy of the classification is 95% which is better compared to the Mel frequency cepstral coefficients (MFCC), which yields 92.74 % classification accuracy.

A new method is proposed in [9] which uses a time frequency approach for spectrogram image processing technique to analyze EEG signals. Texture Features are extracted using Gray Level Co-occurrence Matrix (GLCM) and then further dimentionality reduction is done using Principal components analysis (PCA). Then K nearest neighbor is used to classify EEG spectrogram and the accuracy was shown to be 70 percent for EEG spectrograms.

A novel method of classification for bird song syllables was proposed in [10] where multitaper spectrogram is decomposed to singular vectors, which is used as feature vectors. This method is

particularly useful for signals that contain several components and have variations in the frequency as well as time fields. The method is compared with several other methods and the experiments show that there is a string similar component in all signals and when the weak components differ, then for sch cases, singular vector decompositions seems useful.
A method for feature extraction for classifying music and speech audio is developed in [11]. A novel technique which combines signal and image processing technique is proposed. The audio is first segmented and converted to a spectrogram image and then image preprocessing techniques are applied to detect necessary features . Finally, 2-D fourier transform is applied to transform these extracted features to find out the energy of the signal at particular frequencies. A support vector machine is used for classification. Results show that the proposed method achieves good accuracy as expected.

Automated classification:

A method is proposed in [12], where signal data from Allen telescope array is used to find extraterrestrial signals from outer space. Representation learning, which uses different types of self-supervised and auto-encoding deep learning, are used to identify and categorize various forms of Radio Frequency Interference(RFI).The excision of RFI allows the remaining signals to be explored to find anomalies worthy of follow-up measurements. The work is corroborated with Search for Extra Terrestrial Intelligence Institution and it focuses on dimensionality reduction and clustering for RFI categorization, automated representation learning, Fast fourier transform for feature engineering and density equalization to do unsupervised learning.

A proposal for Deep Convolutional Neural Networks for the Generation of High Fidelity Images from Radio Interferometer Visibility Data is discussed in [13]. In this paper, the authors argue that a deep convolutional neural network (CNN) can be a highly (computationally) effective approach to radio interferometer image generation starting from raw visibilities and producing high fidelity, cleaned (deconvolved) images as an output. They consider the linear and nonlinear operations performed in image generation and how they have analogs in a standard CNN. They also discuss the potential computational cost savings that might be had by replacing our complicated image processing pipelines with neural networks.

2.2 Summary/Gaps identified in the Survey

Although spectrogram classification has been done previously, using machine learning, only a handful papers have been published and for the undertaken dataset, no machine learning papers have been published yet. So there is a dearth of using machine learning for spectrogram classification.

3. PROPOSED SYSTEM REQUIREMENT ANALYSIS AND DESIGN:

Requirements analysis encompasses those tasks that go into determining the needs or conditions to meet for a new or altered product or project, taking account of the possibly conflicting requirements of the various stakeholders, analyzing, documenting, validating and managing software or system requirements.

Requirements analysis is critical to the success or failure of a systems or software project. The requirements should be documented, actionable, measurable, testable, traceable, related to identified business needs or opportunities, and defined to a level of detail sufficient for system design.

3.1 Requirement Analysis

3.1.1 Functional Requirements

3.1.1.1 Product perspective

Execution time i.e. speed is one of the crucial factors for the proposed system. Signals should be processed quickly so that quick action can be taken to trace that signal.

3.1.1.2 Product Features

The system classifies the signal accurately.
The system classifies the signal within acceptable time limit
The system will not consume more system resource
The system will be functioning all time without any break.

3.1.1.3 User characteristics

The user is not required to know any technical details. Just looking at the output and figuring out what class the signal belongs is enough from the user end.

3.1.1.4 Assumption,Dependencies & Constraints

Assumption

The system assumes that a GPU(Graphics Processing Unit) is installed in the system. Also,t he system requires keras python library and keras works only on 64 bit system. Matlab is also a pre-requisite.
Another assumption made is that the system works perfectly and does not malfunction.

Dependencies

The system is divided into two parts. The output of the first part determines whether the second part is required to be executed. The first part classifies one among the seven output classes(one vs all classification). If it classifies accordingly, second part need not be executed as the output class is already known. If not, then the second part is to be executed to know the class.

Constraints

The system can run only on 64 bit system.

3.1.1.5 Domain Requirements

The system requires Python 3 or above and Matlab.

3.1.1.6 User Requirements and Product Specific System Requirements

The user expects the system to work with as much accuracy as possible and also should not exhaust memory space and execute within the time limit.
The system should alert the user when the required type of signal is detected.

3.1.2 Non functional Requirement

The system should be easily accessible to anyone who desires to use it.
The system should be compliable to user demands. The recovery of system from a disaster should be smooth. The efficiency of power consumption should be optimal.
The system should be extensible to be able to run in different platforms and different operating systems. The system should be resistant to faults .i.e. exception handling should be incorporated in the system. The system should be easy to maintain. The access to the system should be private only to required persons and security locks like password protection should be enabled.
The system should be portable to all platforms. The system must be reliable to the maximum extent to produce correct output. The response time should be less.
The robustness of the system should be such that it is not often prone to system errors.
The system should be stable and must not produce the different output at different times.
The testability of the system should be easy to facilitate easy testing.

3.1.3 Engineering Standard Requirements

The system should not cost more as there is no primary investment in any form and thus the returns should be cheap. The system should not cause harm to environment in any form like pollution or contamination. The dataset required should be acquired from a spectrometer that is not polluting to the environment. The system should not be accessible to all persons and should be password protected for security purposes. Any misuse and leak of information can cause unwanted problems. The system should not be biased towards any political needs i.e. no compromise in algorithm like biased training or testing due to political pressure. The

system should not store or send any data without user's notification. Also unwanted leakage of data in any form from memory should be prevented. The system should be aimed for sustainable long term use and thus should incorporate elasticity in the algorithm. The system must not work on illegally obtained data and should not do anything illegal like stealing system information, sending hidden emails etc. The system should be easy to inspect in the sense that all codes should be visible and nothing should be hidden from the tester.

3.1.4 System Requirements

3.1.4.1 Hardware Requirements

The system works only on 64 bit operating system with installed GPU(Graphics Processing Unit) and minimum 12GB RAM.

3.1.4.2 Software Requirements

Python 3.6 or above and Matlab should be installed for the system to work.

4. DESIGN OF THE PROPOSED SYSTEM

The Design Overview is section to introduce and give a brief overview of the design. The System Architecture is a way to give the overall view of a system and to place it into context with external systems. This allows for the reader and user of the document to orient themselves to the design and see a summary before proceeding into the details of the design.

4.1 High Level Design

The architecture is pipe and filter model. In this pipe and filter style each component has a set of input streams and a set of output streams. A component reads streams of data on its input streams, processes the data and writes the resulting data on its output streams. Hence components are termed filters. The connectors of this style merge the streams together, i.e., they transmit outputs of one filter to inputs of another filter. Hence the connectors are termed pipes. Among the important invariants of the style is the condition that filters must be independent entities: in particular, they should not share state with other filters. Another important invariant is that filters do not know the identity of their upstream and downstream filters. Thus, filters may not identify the components on the ends of their pipes.

The software has basically 2 components, the first part does one vs all classification for one class. Based on the output of the first component, the second component is executed. If the output of first component is not a class, then the second component is executed. If not, the second component is not executed. It is shown in Figure 1.

5. IMPLEMENTATION

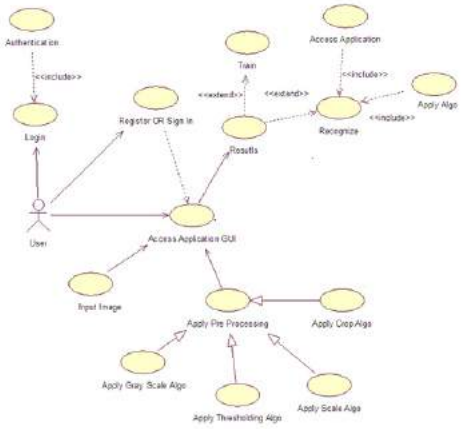

Fig1. Proposed model

6. RESULTS AND DISCUSSION

VGG16

Accuracy :0.142857(14.2857%)

	PRECISION	RECALL	F1-SCORE	SUPPORT
0	0	0	0	100
1	.14286	1	0.25	100
2	0	0	0	100
3	0	0	0	100
4	0	0	0	100
5	0	0	0	100
6	0	0	0	100
Micro averag	0.14286	0.14286	0.14286	700

e				
Macro average	0.02041	0.14286	0.03571	700
Weighed average	0.02041	0.14286	0.03571	700

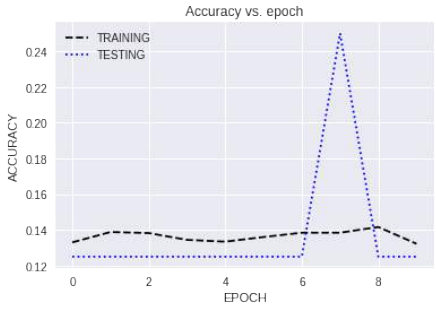

Fig. 2. Accuracy of VGG16

VGG 19

Accuracy :0.142857(14.2857%)

	PRECISION	RECALL	F1-SCORE	SUPPORT
0	0.14286	1	0.25	100
1	0	0	0	100
2	0	0	0	100
3	0	0	0	100
4	0	0	0	100
5	0	0	0	100
6	0	0	0	100
Micro average	0.14286	0.14286	0.14286	700
Macro average	0.02041	0.14286	0.03571	700
Weighed average	0.02041	0.14286	0.03571	700

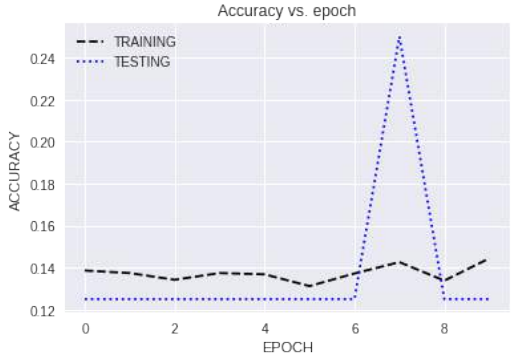

Fig. 3. Accuracy of VGG19

ALEXNET

Accuracy :0.142857(14.2857%)

	PRECISION	RECALL	F1-SCORE	SUPPORT
0	0	0	0	100
1	0	0	0	100
2	0	0	0	100
3	0	0	0	100
4	0	0	0	100
5	0.14286	1	0.25	100
6	0	0	0	100
Micro average	0.14286	0.14286	0.14286	700
Macro average	0.02041	0.14286	0.03571	700
Weighed average	0.02041	0.14286	0.03571	700

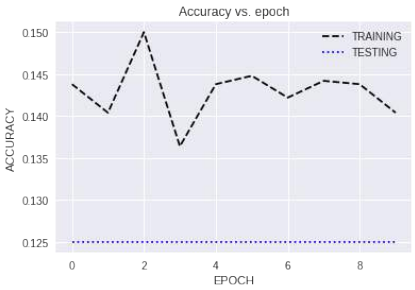

Fig. 4. Accuracy of Alexnet

GOOGLENET

Accuracy :0.142857(14.2857%)

	PRECISION	RECALL	F1-SCORE	SUPPORT
0	0	0	0	100
1	.0	0	0	100
2	.14286	1	0.25	100
3	0	0	0	100
4	0	0	0	100
5	0	0	0	100
6	0	0	0	100

Micro average	0.14286	0.14286	0.14286	700
Macro average	0.02041	0.14286	0.03571	700
Weighed average	0.02041	0.14286	0.03571	700

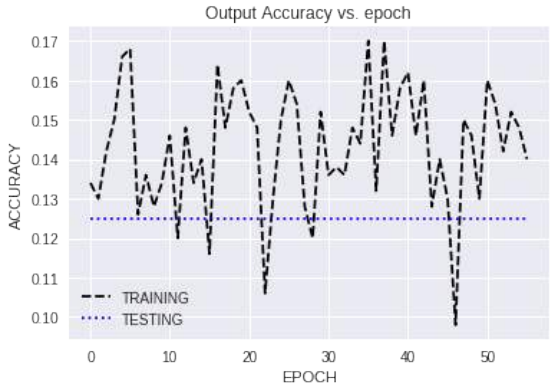

Fig. 5. Accuracy of Googlenet

INCEPTION NET

Accuracy :0.664285(6.4285%)

	PRECISION	RECALL	F1-SCORE	SUPPORT
0	0.73636	0.81	.77153	100
1	0.69231	0.45000	0.54545	100
2	0.90385	0.47000	0.61842	100
3	0.68224	0.73	0.70531	100
4	0.91429	0.32	0.7407	100
5	0.51503	0.97	0.66897	100
6	0.63830	0.9	0.74689	100
Micro average	0.66429	0.66429	0.66429	700
Macro average	0.72541	0.66429	0.64722	700
Weighed average	0.72541	0.66429	0.64722	700

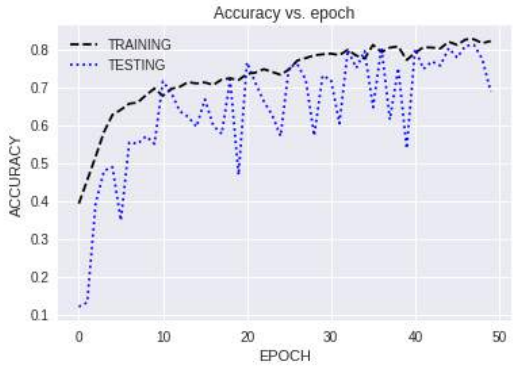

Fig. 16. Accuracy of Inception net

PROPOSED MODEL

Accuracy : 0.824285(82.4285%)

	PRECISION	RECALL	F1-SCORE	SUPPORT
0	0.83333	0.80000	0.81633	100
1	0.81982	0.91000	0.86256	100
2	0.89655	0.78000	0.83422	100
3	0.68644	0.81000	0.74312	100
4	0.96774	0.60000	0.74074	100
5	0.90385	0.94000	0.92157	100
6	0.76230	0.93000	0.83784	100
Micro average	0.82429	0.82429	0.82429	700
Macro average	0.83858	0.82429	0.82234	700
Weighed average	0.83858	0.82429	0.82234	700

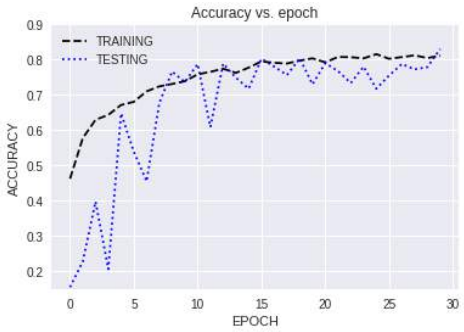

Fig. 18. Accuracy of proposed model

7. CONCLUSIONS,LIMITATIONS AND FUTURE SCOPE

The proposed model clearly classifies better than the traditional model. The main reason being the number of parameters in the traditional models are very big in proportion compared to the training data size (5600 images). Thus the model does not train well and acts as a random classifier. One more observation is that the precision of class one is less and the recall of class 2 is also less. This means that the class 1 images are misclassified as class2. Thus the CNN does not classify these two classes accurately. This problem can be overcome if we process class 1 separately using image processing techniques. The class 1 images are straight lines so using Hough transforms, we can setect easily whether a straight line is present or not. So we can train the CNN with the rest of the 6 classes.

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Smart Medicine Box

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Abstract

In present day society, involved life has affected people to neglect various things in regular day to day existence. The elderly people and the all inclusive community setbacks of record sicknesses who need to take the pharmaceuticals helpful without missing are encountering dementia, or, at the end of the day in their step by step plan. Considering this situation consider has been done in this. Paper evaluating the advances of home social protection which are starting at now used for upgrading this condition by causing the intended to recollect arrangement, remote watching and invigorate new prescription data of patients, which ought to be conceivable by prescriber through web.

Keywords—*Arduino UNO, Tensorflow, GSM, Wifi Module, ThingSpeak*

I. INTRODUCTION

Presently multi day's human services is a weight factor for frameworks that are battling with maturing populace, commonness of incessant illnesses, and the going with ascend in expense. We are searching for new innovation [2] that will enhance the nature of patient consideration and in the mean time diminish the expense of consideration through early identification and mediation and more compelling illness/quiet administration. It is accepted that the future human services framework ought to be preventive, prescient, customized, inescapable, participatory, tolerant focused, and exact, i.e., p-wellbeing framework. Wellbeing informatics, that is a developing interdisciplinary territory to propel p-wellbeing, for the most part manages the procurement, transmission, preparing, capacity, recovery, and employments of various kind of wellbeing and frameworks for observing a man. The present development identifies with interoperability of restorative gadgets. Restorative arrangements are pivotal to the act of the cutting edge therapeutic field.. Physiologic estimations like circulatory strain and temperature, x-beam and ultrasound imaging, organization of intravenous prescriptions, and support of basic life capacities are on the whole standard systems that utilization therapeutic gadgets. Be that as it may, at present, every gadget is intended to remain solitary as an island. In medicinal gadget interchanges [4], director frameworks show an arrangement of wanted abilities while asking for an affiliation. Specialist frameworks react by expressing the capacities they bolster over the association. Gadgets are getting littler and not so much prominent but rather more agreeable to utilize. To begin with, with their remote network [3] together with the broadly accessible framework, the gadgets can give constant data and encourage auspicious remote intercession to deal with occasions, for example, heart assault, especially generally undeserved territories where master treatment might be inaccessible. The goals of this paper are to give a diagram of obsensing without deterrents and wearable e-human services frameworks with specific spotlight on rising advances [2], and furthermore to recognize the significant difficulties identified with this zone of research. Therapeutic gadgets are basic to the act of present day pharmaceutical. Physiologic estimations like circulatory strain and temperature, x-beam and ultrasound imaging, organization of intravenous pharmaceuticals, and support of basic life capacities are for the most part routine techniques that utilization restorative gadgets. Be that as it may, at present, every gadget is intended to

remain solitary as an island. To address this issue, the Foundation of Electrical and Gadgets Architects Inc. (IEEE) is creating two new purpose of-care restorative gadget gauges. IEEE P1073.2.2.0 Wellbeing Informatics Purpose of-Care Therapeutic Gadgets Correspondence Application Profile Affiliation Control Capacity will accommodate the foundation, discharge and separation of a relationship between a medicinal gadget specialist and a framework going about as a director. In medicinal gadget interchanges [5], supervisor frameworks demonstrate an arrangement of wanted capacities while asking for an affiliation. A brilliant medication box [7] depends on the solution pack [8] [7] framework and the drug box sends a pharmaceutical out of the crate at the fitting time. In the event that the patient does not take the medication away, the Crate would advise the parental figures by means of message. This framework enhances the intuitiveness among patient and parental figures, however it functions admirably just if a web association is accessible.

II. LITERATURE REVIEW

A man performs step by step practices at typical between time of time. This recommends the individual is sanely and physically fit and having a standard presence. This uncovers to us that the general thriving of the individual is at a particular standard. Elderly people need to lead a self-sufficient lifestyle, anyway at position, people end up slanted to different setbacks [6], so living alone has high perils and is dreary. Starting late on progression of a structure to screen the activities of elderly person that help be given before any unexpected situation happened.

Existing frameworks on a savvy restorative pack comprise of models some of which are simply programming based. Being utilized for significantly the senior subjects an application based medicinal box will be bulky for old matured individuals to utilize, it comprised of an application in which an aggregate of 8 alert settings were conceivable. The application utilized the PDAs possess electric lamp and sound framework for the alert to ring and the contacts spared in the telephone just were utilized to send messages to remind the buyer to have the prescription. The disadvantage in this framework being that everything must be done physically for consistently and for each caution setting preceding the measurements which will basically be somewhat brutal on the matured individuals to convey a cell phone each minute with them and set alerts for the rest 3 times each day.

Another framework which gave restorative arrangements depended on an ARM 7 PC processor, it is a smaller scale controller which is generally utilized for major implanted applications. This current framework depended on inserted frameworks not being associated with the Web , making it a framework which is absolutely implanted based , not an IoT arrangement. The referral framework comprised of a RTC (Continuous Clock) it is fundamentally a modernized clock which monitors the current time which is exceptionally exact. The need of a RTC Module in the framework accompanies the need of taking the restorative snoozes at a specific estimated time purpose of a period in multi day , say a patient needs to take 3 medication measurements in multi day, so the RTC monitors the exact time on which the patient takes the drug for that specific nap in the entire day the ongoing clock was available inside the LPC2148 which is an Incorporated Circuit generally utilized in the ARM 7 Group of smaller scale controllers, the significant work of this IC is to refresh the draw up registers in the given schedule vacancy clock recurrence.

The control messages are represented by the product KEIL which is an IDE for get together level projects (Snow capped mountain). The detecting of the spaces of the restorative box

pills happens by the light based detecting and stacking procedure in the arrangement of pill apportioning. The yield of the detecting of the drugs is multiplexed, essentially the signs are joined with one another and shared on a typical medium to share the data transfer capacity which decreases the expense and it is an alarm asset too. This multiplexing happens with the assistance of a multiplexing IC fundamentally a MUX. The framework has additionally utilized a GSM Module which has a sim space in it, it sends the cellphone messages to the concerned individual, This is usefull as when the patients time is there to take the pharmaceutical, the alert rings and through thr gsm module the message is send to his/her relatives or the scientific expert for hint to take the prescription on time. It is essentially an update for taking the meds on time by advanced mobile phone messages. To decrease the impedance from the close-by sensors a one side leading MYRAL material division is made between every one of these sensors. Space based detecting is extremely invaluable as it distinguishes over measurements of the pill. The keenness of the pillbox is accomplished utilizing savvy space detecting systems like capacitance based opening detecting. The significant inconvenience of this framework can be that it very well may be constrained with deference of the association issues and correspondence scopes of the advanced cell and GSM module.

In the keen medicinal box update framework they have utilized a recreation programming proteous 8 which has schematics attracted it also. The essential equipment utilized in an Arduino Uno and atmega 382P which has an aggregate of 28 pins and it utilizes a 16Mhz precious stone oscillator because of the nearness of glimmer memory in it, streak memory encourages the microcontroller to hold the information regardless of whether the power supply is missing, it diminishes the loss of memory and pill lengths which makes it exceptionally usefull as a result of its re-programmable nature. In the present framework they have utilized a 16*2 LCD show which shows the time and length for the prescriptions to take, the LCD module is associated with the arduino uno with the assistance of the information transport and with the assistance of control pins present in the ATMEGA smaller scale controller and as utilized in the before models they have utilized a RTC module which advises the genuine and precise time to set cautions and updates for taking the pills at time. In the time and improvement of savvy medicinal box they have utilized a 12V DC control supply which starts the arrangement of the brilliant restorative box. Wi-Fi module to interface the gadget and the cell phone for correspondence or sending the medicinal condition to the attendant on duty.The Wifi Module ESP 8266 is independent and takes a shot at TCP/IP convention and gives the microcontroller access to the web as in the WiFi arrange utilized by them. Arduino goes about as the controller the location will be work by sensors which are PIR movement sensor, temperature sensor, ultrasonic sensor, infrared sensor which gives the yield to the application specifically They have utilized a servo engine that will be utilized in the container to drop the pharmaceutical, DC engine will move starting with one place then onto the next place while accepting the direction from the small scale controller. Programming utilized for the recreations are outlines are Proteus 8 proficient which are utilized to construct the reproduction of the undertaking LM35 part is utilized to recognize temperature changes in the pharmaceutical box for insurance.

III. PROPOSED SYSTEM

A wifi module and GSM module based drug box will be planned and created to screen and assess the prosperity of the elderly living alone in a home domain [7].The created framework is wise and does not utilize any camera or vision sensors as it encroaches protection.

In a large portion of the current frameworks there are versatile applications utilized or just a microcontroller like ARM 7 family ATMEL microcontrollers are utilized which ends up lumbering as it can quit working or give less yields where there is some association mistake or correspondence issues, same is the situation with the GSM module , if there are availability issues the message will convey late or perhaps it doesn't considerably convey.
Fundamentally our savvy restorative box will be utilized by old matured individuals, for them doing manual work will be an issue like setting cautions physically for each measurement won't be conceivable. In our proposed strategy we are utilizing both a gsm module for detecting suggestions to the relatives or companions of the patient to tae the pharmaceuticals on time and then again we are utilizing a WiFi module ESP 8266 which will be associated with the arduino uno and additionally associated with open source cloud based arrangement things talk. Things Talk will encourage the patient and the specialist too to check the advancement by visual charts and metrices. By associating our undertaking to the web and making it an Iot based arrangement here we are sparing a great deal of time and cash in light of the fact that occasionally in functional life it is conceivable that the specialists might be occupied and can't meet the patient by and by, for this situation the specialist will sign in to the thingspeak record and access the charts and measurements to check the change or debasement of the patient and make additionally strides in like manner. In our task we have utilized a RTC which is a constant clock, it gives extremely exact time and sets alerts and updates as indicated by the pill which is to be gone up against the perticular purpose of time.

IV. ARCHITECTURE

General IOT structure:

IoT is the integration of the one-of-a-kind electronic sensors, peripherals,
etc. presenting facts or records of any sort into a physical network.

Wi-Fi Module esp8266:
In any IoT based system, the hardware consists of a aggregate of sensors, microcontroller, display, and the most important, hardware presenting get entry to to the internet. This hard-ware need to be succesful of importing the information from the sensors or microcontroller to the internet.
Example of one such hard-ware is esp8266-01.

HARDWARE USED:

ARDUINO UNO, WIFI esp8266, GSM module, servo motor,LED, 16*2 LCD, RTC module BREADBOARD, WIRES, USB WIRE (for connecting the arduino to the computer).

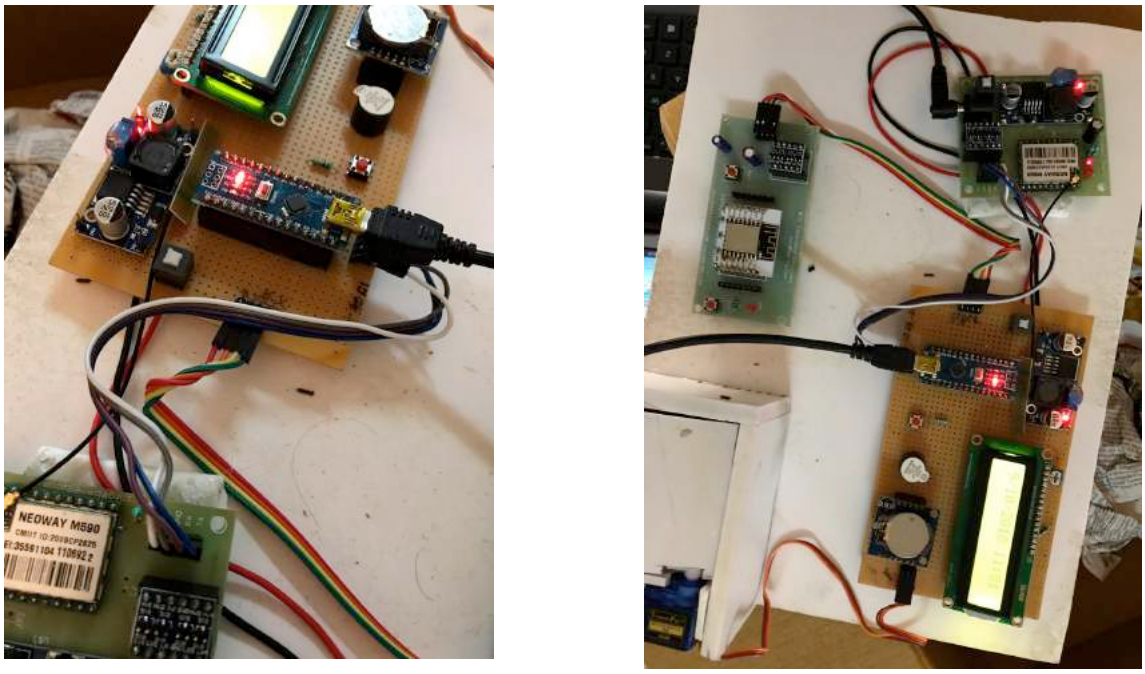

Fig 1. Hardware Implementation

SOFTWARE USED:ARDUINO IDE, THINGSPEAK

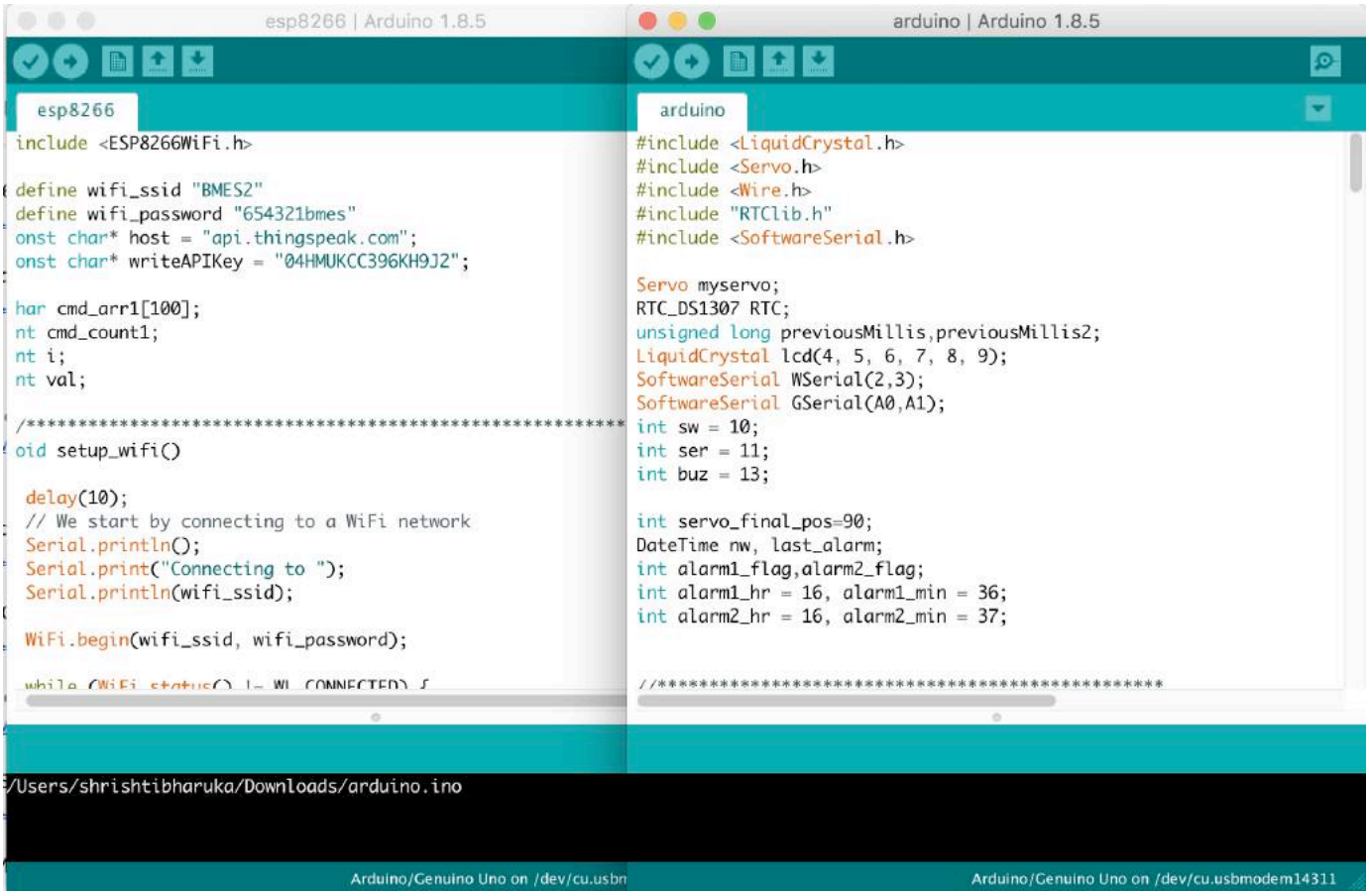

Fig 2. Software Implementation

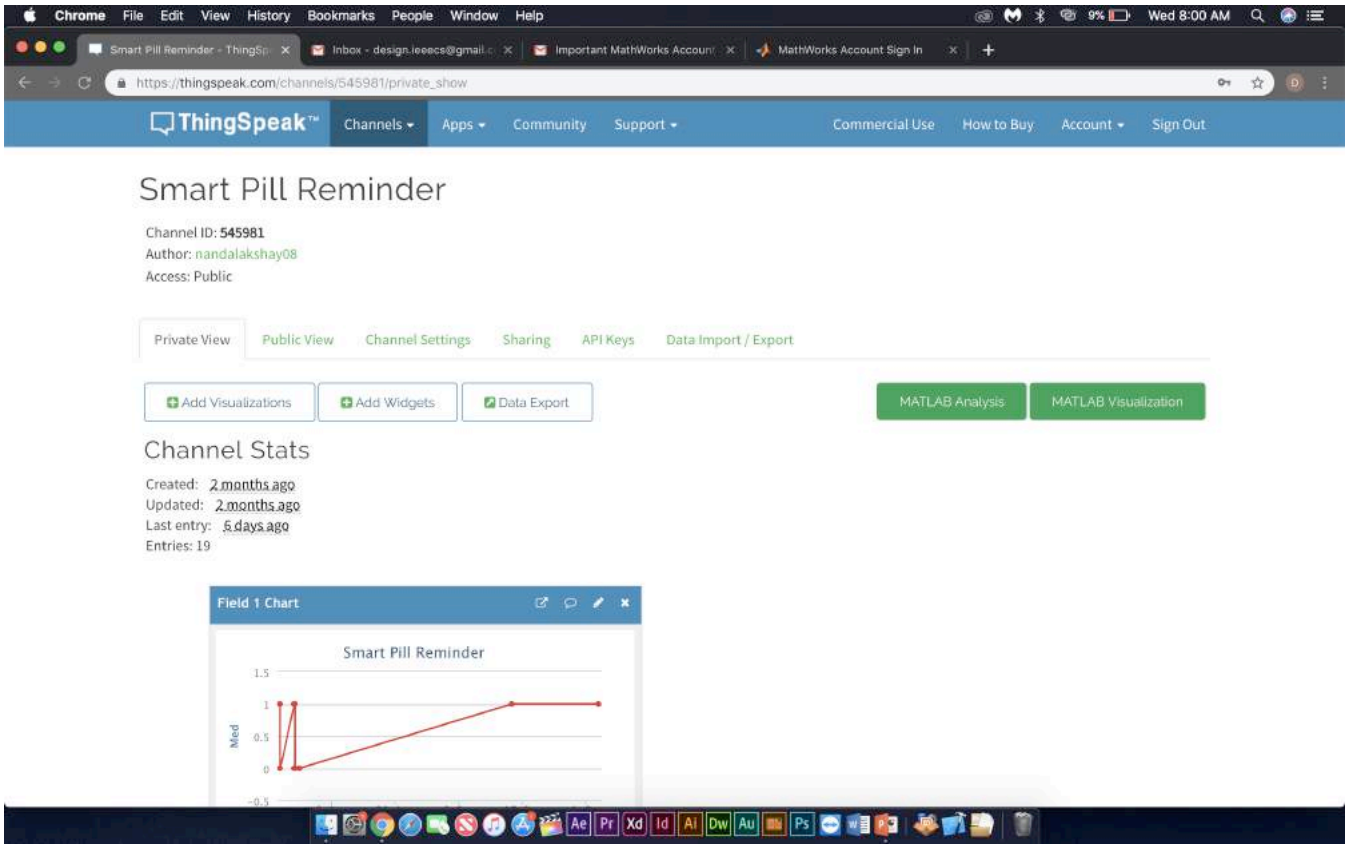

Fig 3. GSM and GPS to send location

V. CONCLUSION

Elderly individuals experience difficulty to recall the pills which they need to take. We have built up a gadget utilizing the developing innovation to enhance the prescription wellbeing and to dodge disarray in taking the tablets. This framework will diminish relative's duty towards guaranteeing the right and convenient utilization of drugs by cautioning the client to take the prescription at a specific time. Foreseeing the conduct of an elderly individual depended on past sensor action spans. Mix of detecting framework with time arrangement information preparing and empowered us to gauge how well an elderly individual can play out their day by day exercises continuously. Up until this point, the guaging procedure could appropriately gauge the health lists identified with utilization of non-electrical machines. Consequently, a portion of the essential elderly every day exercises, for example, dozing, toileting, feasting and unwinding are properly evaluated guardians and doctor's facilities by the wellbeing estimation framework. The a large portion of the electrical apparatuses use terms are predefined; approval for exercises, for example, planning sustenance is constrained. Be that as it may, extra information handling strategy, for example, sensor succession movement design examination could appropriately gauge the events of exercises, for example, getting ready breakfast, lunch, supper and tidbits. The following stage will be to devise a vigorous determining strategy incorporating exceptions in the wellbeing of old and sick individuals estimation and alarming framework. Taking everything into account,

this gadget can help and offer favorable position to the medical caretakers. The fundamental goal for this advancement is to screen the utilization of prescription admission for characteristic patients. It is useful early in the day and night yet in addition can be utilized around evening time. This gadget is controlled by utilizing Bluetooth framework, so the attendant does not require go to the individual ward to give the solution. This framework is a decent to apply in the healing facility since it can make the medical attendant activity simpler other than making the patients more agreeable to remain at the clinic.

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