



# **DETECTION OF PARKINSON' S DISEASE USING MACHING LEARNING**



**NALAIYA THIRAN PROJECT BASED LEARNING**

**on**

**PROFESSIONAL READLINES FOR INNOVATION,  
EMPLOYABILITY AND ENTREPRENEURSHIP**

**A PROJECT REPORT**

KARTHIKA M	19104078
HEMNATH	19104070
MARISELVAM	19104095
KAVIYA	19104083

**BACHELOR OF ENGINEERING**

**IN**

**COMPUTER SCIENCE AND ENGINEERING**

**HINDUSTHAN COLLEGE OF ENGINEERING AND TECHNOLOGY**

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Autonomous Institution, Affiliated to Anna University, Chennai)

**COIMBATORE – 641 032**

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# **CHAPTER 1**

## **1. INTRODUCTION**

In the present decade of accelerated advances in Medical Sciences, most studies fail to lay focus on ageing diseases. These are diseases that display their symptoms at a much advanced stage and makes a complete recovery almost improbable. Parkinson's disease (PD) is the second most commonly diagnosed neurodegenerative disorder of the brain. One could argue, that it is almost incurable and inflicts a lot of pain on the patients. All these make it quite clear that there is an oncoming need for efficient, dependable and expandable diagnosis of Parkinson's disease. The aim of this work is to compare various machine learning models in the successful prediction of the severity of Parkinson's disease and develop an effective and accurate model in order to help diagnose the disease accurately at an earlier stage which could in turn help the doctors to assist in the cure and recovery of PD Patients. For the aforementioned purpose we plan on using the Parkinson's Tele monitoring dataset which was acquired from the UCIML repository.

### **1.2 PURPOSE**

The aim of this work is to compare various machine learning models in the successful prediction of the severity of Parkinson's disease and develop an effective and accurate model in order to help diagnose the disease accurately at an earlier stage which could in turn help the doctors to assist in the cure and recovery. This project showed 90% efficiency. In our model, a huge amount of data is collected from the normal person and also previously affected person by Parkinson's disease.

## **CHAPTER 2**

### **LITRERATURE REVIEW**

#### **2.1 REFERENCE**

- L.C. Afonso et al. A recurrence plot-based approach for Parkinson's disease identification Future Gener. Compute. Syst. (2019)
- L. Moro-Velazquez et al. A forced Gaussians based methodology for the differential evaluation of Parkinson's disease by means of speech processing Biomed. Signal Process. Control (2018)
- D. Gupta et al. Optimized cuttlefish algorithm for diagnosis of Parkinson's disease Cognit. Syst. Res. (2018)
- L. Parisi et al. Feature-driven machine learning to improve early diagnosis of Parkinson's disease Expert Syst. Appl. (2018)
- Sharma et al. Diagnosis of Parkinson's disease using modified grey wolf optimization Cognit. Syst. Res. (2019)
- D. Montaña et al. A diadochokinesis-based expert system considering articulatory features of plosive consonants for early detection of Parkinson's disease Compute. Methods Programs Biomed. (2018)
- C.R. Pereira et al. Handwritten dynamics assessment through convolutional neural networks: an application to parkinson's disease identification Artif. Intell. Med. (2018)

- D. Gupta et al. Improved diagnosis of Parkinson's disease using optimized crow search algorithm Compute. Elector. Eng. (2018)
- J. Vásquez-Correa et al. Towards an automatic evaluation of the dysarthria level of patients with Parkinson's disease J. Commun. Discord. (2018)
- M. Cernak et al. Characterisation of voice quality of Parkinson's disease using differential phonological posterior features Compute. Speech Lang. (2017)
- Virika's et al. Data dependent random forest applied to screening for laryngeal disorders through analysis of sustained phonation: acoustic versus contact microphone Med. Eng. Phys. (2015)
- B. Harel et al. Variability in fundamental frequency during speech in prodromal and incipient parkinson's disease: alongitudinal case study Brain Cognit. (2004)
- C.R. Pereira et al. A new computer vision-based approach to aid the diagnosis of Parkinson's disease Compute. Methods Programs Biomed. (2016)
- J. Parkinson An essay on the shaking palsy J. Neuropsychiatry Clin Neurosci. (2002)

## **2.2 EXISTING PROBLEM**

In this section, we examine various current machine learning and deep learning methods for Parkinson disease diagnosis

**AUTHOR: Indira R.et al**

**YEAR: 2020**

Indira R. et al. (2014) have proposed an automatically machine learning approach and detected the Parkinson disease on behalf of speech/voice of the person. The author used fuzzy C-means clustering and pattern recognition based approach for the discrimination between healthy and Parkinson disease affected people. The authors of this paper have achieved 68.04% accuracy, 75.34% sensitivity and 45.83% specificity. Indira R. et al. (2014) have proposed a back propagation based approach for the discrimination between healthy and Parkinson diseases affected peoples with the help of artificial neural network. Boosting was used by filtering technique, and for data reduction principle component analysis was used

**AUTHOR: REVETT ET AL**

**YEAR:2009**

Revett et al. (2009) proposed jitter, shimmer, fundamental frequency, harmonics/noise ratios, descriptive statistics, and correlational factors (nonlinear dynamic analysis) using all 22 features, and a binary decision class ('0' is healthy and '1' is IPD decision class). The testing and training set are classified and an ROC and confusion matrix was generated to examine the accuracy of the classification process. Predict of accuracy shows 100%

**AUTHOR: SHAHABI ET AL. (2014)**

**YEAR:2014**

Shahabi et al. (2014) presented that a Genetic Algorithm (GA) and SVM were used for classification between healthy and people with Parkinson. Voice signals that 14 features were based on F0 (fundamentafrequency or pitch), jitter, shimmer and noise to harmonics ratio, which are main factors in voice signal. Results show that classification accuracy 94.50, 93.66 and 94.22 per 4, 7 and 9 optimized features respectively.

**AUTHOR: R. DAS ET AL.**

**YEAR:2010**

R. Das et al. (2010) have proposed neural networks, Data Mining Neural analysis, and regression analysis and decision trees made a comparative study on Parkinson disease data set with regard to with the Presented results of classification accuracy of 92.9%, 84.3%, 88.6% and 84.3% respectively. To the classification method was diagnosis Parkinson disease based on the SAS software. Ene M. et al. (2008) proposed a probabilistic neural network (PNN) variant to discriminate between healthy people and people with Parkinson's disease. Three PNN types are used in this classification process, related to the smoothing factor search: incremental search (IS) Monte Carlo search (MCS) and hybrid search (HS). The accuracies reaching run between 79% and 81% for new, undiagnosed patients.

## 2.3 PROBLEM STATEMENT

People with parkinsonism generally have problem of balance, difficulty in speaking or tremors in one hand. These are the common issue faced by so many people in the world, especially geriatric aged.

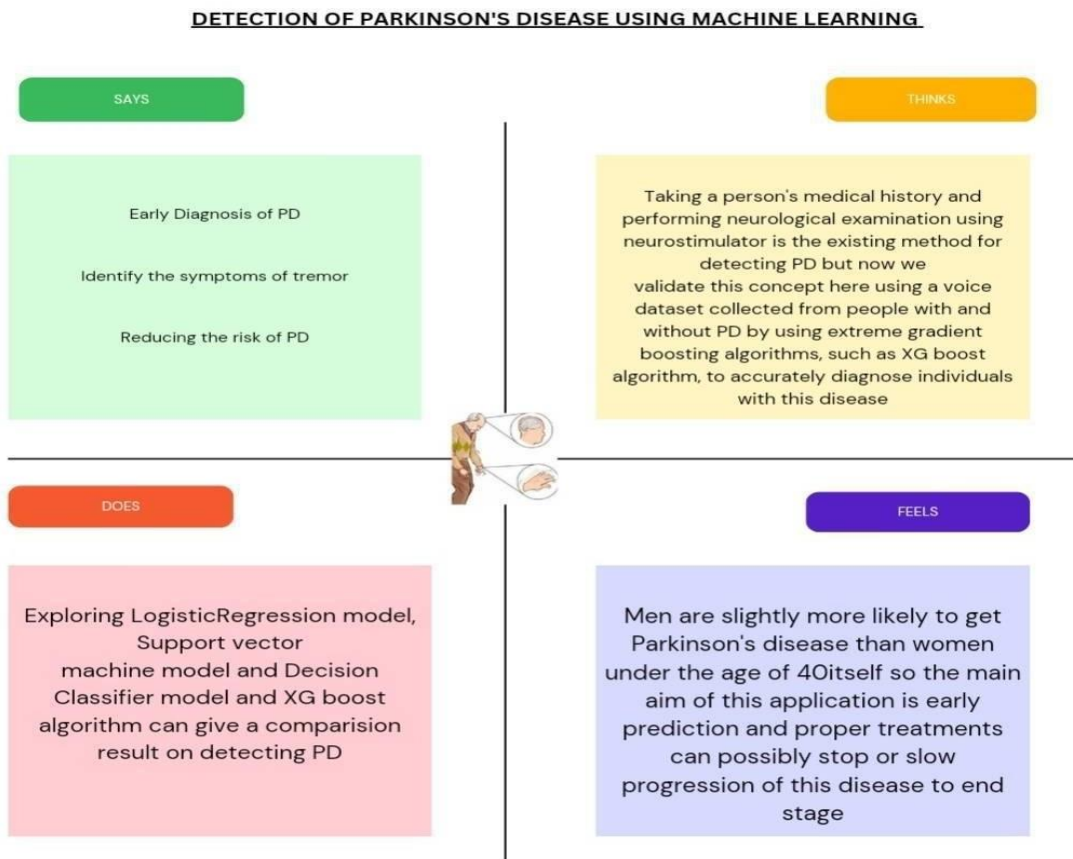
The problem that how will they know this is happening because of aging or they have Parkinson's disease is difficulty to identify. Here when the patient decides to speak and cannot produce the correct vocal sounds. Parkinson's disease is a neurodegenerative disorder that affects millions of people around the world. Parkinson's disease can affect a person's voice, causing them to speak softly or have difficulty in forming sound clearly. Speech or voice data is assumed to be 90% help full to diagnose the result. The proposed system used a data set parkinson.csv. A speech data set includes the number of voice features such as jitter, shimmer, pitch, and frequency. Different data pre-processing methods, such as data standardization technique to improve the quality of data. In the present work relevant features were then extracted using Mel Frequency Cepstral Coefficient (MFCC) algorithm. Classification is performed using a Support Vector Machine (SVM) algorithm to differentiate between healthy and people with Parkinson's disease. The outcome of the proposed system is early detection of Parkinson's disease, which may help to better diagnose the disease. Medical observations and assessment of clinical indicators, including the identification of a variety of motor symptoms, are often used to diagnose Parkinson's disease (PD). Traditional diagnostic procedures, on the other hand, may be vulnerable to subjectivity because they rely on the assessment of motions that are sometimes subtle to human sight and hence difficult to define, potentially leading to misdiagnosis. Meanwhile, early nonmotor symptoms of Parkinson's disease can be minor and be caused by a variety of other illness. As a result, these symptoms are frequently missed, making early PD diagnosis difficult.

## CHAPTER 3

### IDEATION & PROPOSED SOLUTION

#### 3.1 EMPATHY MAP CANVAS

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's Behaviours and attitudes. It is a useful tool to help teams better understand their users. Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenge






## 3.2 IDEATION & BRAINSTORMING

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, our participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions.

### Step-1: Team Gathering, Collaboration and Select the Problem Statement

Template



## Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

- 🕒 10 minutes to prepare
- 🕒 1 hour to collaborate
- 👥 2-9 people recommended

[Share template feedback](#)

➔

### Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

🕒 10 minutes

A

**Team gathering**  
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

B

**Set the goal**  
Think about the problem you'll be focusing on solving in the brainstorming session.

C

**Learn how to use the facilitation tools**  
Use the Facilitation Superpowers to run a happy and productive session.

[Open article](#) ➔

1


### Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

🕒 5 minutes

PROBLEM

**How might we [your problem statement]?**  
People with parkinsonism generally have problem of balance, difficulty in speaking or tremors in one hand. These are the common issue faced by so many people in the world, especially geriatric aged.

**Key rules of brainstorming**  
To run an smooth and productive session

🗨️ Stay in topic.


💡 Encourage wild ideas.

⏸️ Defer judgment.

👂 I listen to others.

🗨️ Go for volume.

👁️ If possible, be visual.



**Need some inspiration?**  
See a high res version of this template as it looks in your work.  
[Open example](#) ➔

## Step-2: Brainstorm, Idea Listing and Grouping

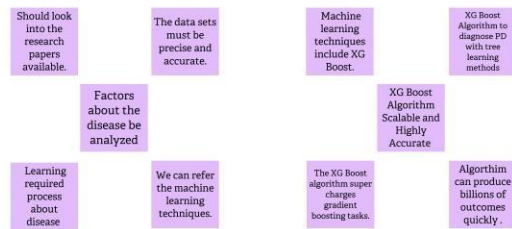
2

### Brainstorm

Write down any ideas that come to mind that address your problem statement.

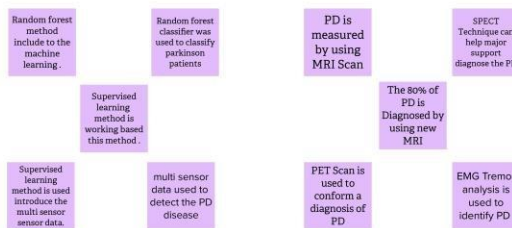
10 minutes

**TIP**  
You can select a sticky note and hit the pencil (switch to sketch) icon to start drawing!



Karthika M

Mari Selvam K



Hemanath T

Kaviya R

3

### Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

20 minutes

**TIP**  
Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mural.

#### Algorithms & Models

Adaptive Boosting TIP  
Algorithm Deep Brain  
Stimulation using Markovs  
model Linear discriminant  
Algorithm XBoost  
Algorithm

#### Sensors

VOC sensors timed up  
and go inertial sensors  
wearable sensors

#### Data Sets

Gait signal data set key  
stroke feature MRI data  
sets

#### ML Score Estimation

UDPRS score finger  
tremor quantification  
Hoen and Yahrs scale

#### Symptoms

Symptoms  
includes;Tremors ,slow  
movement,speech  
changes ,writing  
changes,Rigid changes.

#### Types

Idiopathic Parkinson's  
Vascular Parkinson's  
Drug-induced Parkinson's

#### ML Methods

Neural networks PD  
detection using nocturnal  
breathing compuer vision  
PD detection using facial  
expression.

#### Treatment Approache

Three surgical procedure  
are performed to treat the  
PD Destructive  
.Stimulation.Deep brain  
Surgery.

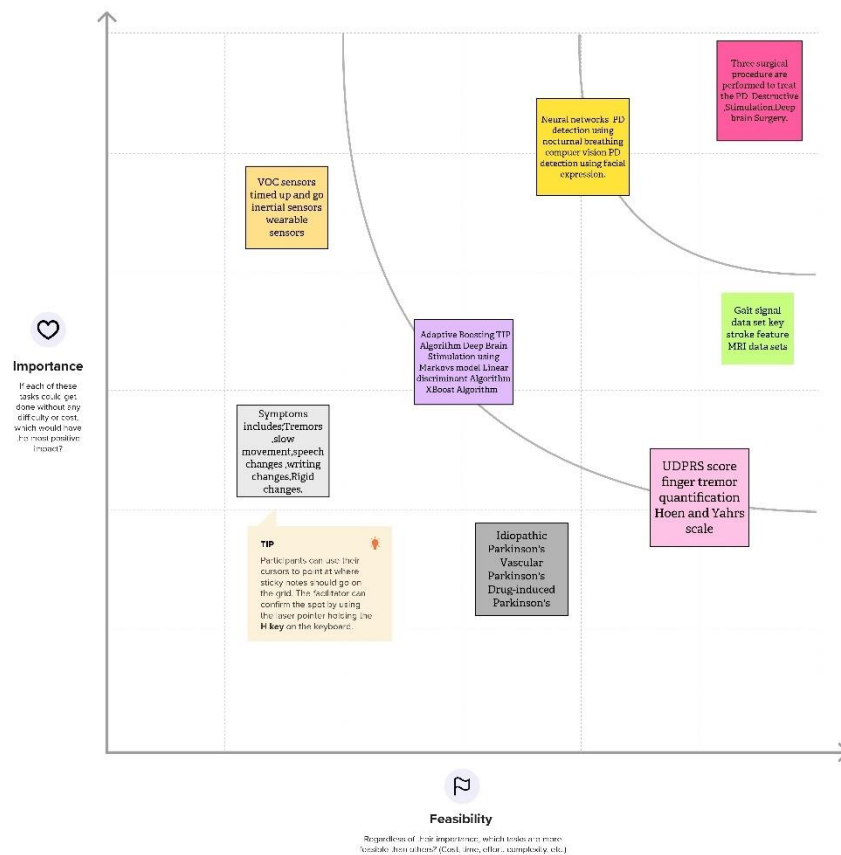
## Step-3: Idea Prioritization

4

### Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

⌚ 20 minutes



→

### After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

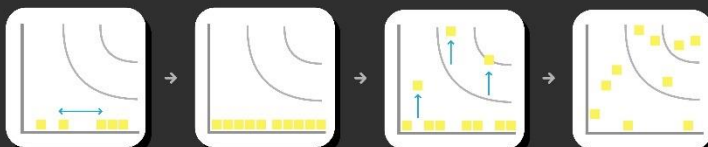
#### Quick add-ons

- A Share the mural**  
Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.
- B Export the mural**  
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.

#### Keep moving forward

- Strategy blueprint**  
Define the components of a new idea or strategy.  
[Open the template →](#)
- Customer experience journey map**  
Understand customer needs, motivations, and obstacles for an experience.  
[Open the template →](#)
- Strengths, weaknesses, opportunities & threats**  
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.  
[Open the template →](#)

[Share template feedback](#)




### 3.1 PROPOSED SOLUTION

Project team shall fill the following information in proposed solution template.


S.NO	PARAMETER	DESCRIPTION
1	Problem Statement (Problem to be solved)	Parkinson's cannot be cured; early detection along with proper medication may decrease the symptoms and will improve quality of life. We focus on predicting the disease using Random Forest classifier to automatically detect Parkinson's disease in hand-drawn images of spirals and waves.
2	Idea / Solution description.	In this project, we are using the HOG (Histogram of Oriented Gradients) which uses the image detector and processor along with the Random Forest Classifier which can automatically detect the presence of Parkinson's Disease in the hand-drawn image of the waves and spirals.
3	Novelty / Uniqueness	The histogram of oriented gradients (HOG) is a feature descriptor used in computer vision and image processing for the purpose of object detection. The technique counts occurrences of gradient orientation in localized portions of an image. Random forest in combination with this can help in the better tree building. We combining the both will help in developing the model.
4	Social Impact/ Customer Satisfaction	In the Scientific perspective, the "Early" is easy to comprehend within the Framework of Disease pathology and its manifestation, making an Economic Burden on the Health Care System, Society and the patients themselves so the Early Detection can Reduce that cost burden.
5	Business Model (Revenue Model)	This project model focuses and concentrates on reaching the patients those who are suffering from Parkinson's and taking treatment from doctors.
6	Scalability of the Solution	The nature of RF is such that convergence and numerical precision issues, which can sometimes trip up the algorithms used in logistic and linear regression, as well as neural networks, aren't so important. Because of this, you don't need to transform variables to a common scale like you might with a NN.

## 3.4 PROBLEM SOLUTION FIT

Problem-Solution fit canvas 2.0		Detecting Parkinson's disease using Machine		TEAM ID:PNT2022TMD09983	
Define CS, fit into CC	<b>1. CUSTOMER SEGMENT(S)</b> Who is your customer? i.e. working parents of 0-5 y.o. kids	<b>6. CUSTOMER CONSTRAINTS</b> What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.	<b>5. AVAILABLE SOLUTIONS</b> Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking	Explore AS, differentiate	
	<b>2. JOBS-TO-BE-DONE / PROBLEMS</b> Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one, explore different sides.	<b>9. PROBLEM ROOT CAUSE</b> What is the real reason that this problem exists? What is the back story behind the need to do this job? i.e. customers have to do it because of the change in regulations.	<b>7. BEHAVIOUR</b> What does your customer do to address the problem and get the job done? i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace)		
Focus on J&P, tap into BE, understand RC	<b>3. TRIGGERS</b> What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news. <b>For this project design, the implementation of the dataset is the Major trigger. Because, the data is in the image formats. If the data's are image formats the algorithm data Training is also complex</b>	<b>10. YOUR SOLUTION</b> If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality. If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.	<b>8. CHANNELS of BEHAVIOUR</b> <b>8.1 ONLINE</b> What kind of actions do customers take online? Extract online channels from #7	Extract online & offline CH of BE	
	<b>4. EMOTIONS: BEFORE / AFTER</b> How do customers feel when they face a problem or a job and afterwards? i.e. lost, insecure > confident, in control - use it in your communication strategy & design.	Detection of Parkinson disease using the spiral and wave drawing can quantify the visual appearance of these drawings and then train a machine learning model to classify them. We can use the Histogram of Oriented Gradients (HOG) image descriptor along with a Random Forest classifier to automatically detect Parkinson's disease in hand drawn image of spirals and waves.	<b>8.2 OFFLINE</b> What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development. In offline, we just use the hand drawn spirals or wave images as input and detect the disease. In offline we easily update the model (Using new data set of algorithms)		



Problem-Solution fit canvas is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 license  
 Created by Daria Nepriakhina / Amaltama.com



## **CHAPTER 4**

### **REQUIREMENT ANALYSIS**

#### **4.1 FUNCTIONAL REQUIREMENT**

Following are the functional requirements of the proposed solution

<b>FR NO:</b>	<b>Functional Requirement (Epic)</b>	<b>Sub Requirement (Story / SubTask)</b>
FR-1	User Authentication	Registration through Link ( HTML page )
FR-2	User Confirmation	Confirmation via Email
FR-3	Upload voice as input	Add voice Device or through Drive
FR-4	Microphone on	When the microphone is on it recognize the voice and return the required output.

## 4.2 NON-FUNCTIONAL REQUIREMENT

Following are the non-functional requirements of the proposed solution.

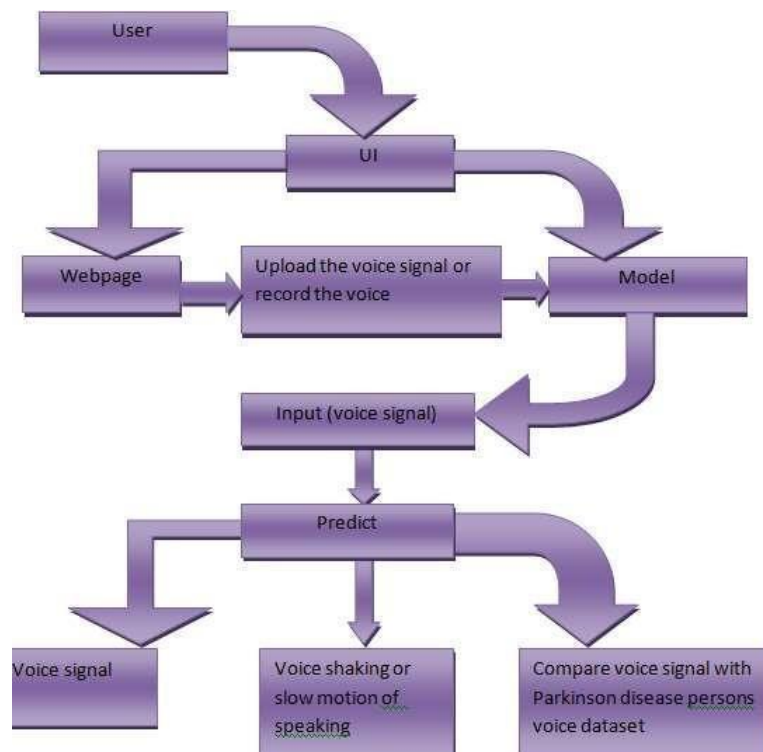
<b>FR No:</b>	<b>Non-Functional Requirement</b>	<b>Description</b>
NFR-1	Usability	This software will be easy to use for all users with minimal instructions. User experiences are assessed in amixed methods approach with patients and experts.
NFR-2	Security	The user of the system should be provided the surety that their account details are secure. The System will provide security against crosssite request forgery.
NFR-3	Reliability	This software will be operable in all conditions. Regardless of the person physically challenged(who can't speak)
NFR-4	Performance	This software will minimize the number of calculations used to perform with more accuracy and processed fast.
NFR-5	Availability	This software will be available to all operating system. While it is currently has a relatively limited role in direct patient care, its evolving role in Complex clinical decision making.
NFR-6	Scalability maximum number of clients. . The system must use higher RAM and CPU processing	This software will be enterprise s

## CHAPTER 5

### PROJECT DESIGN

#### 5.1 DATA FLOW DIAGRAM

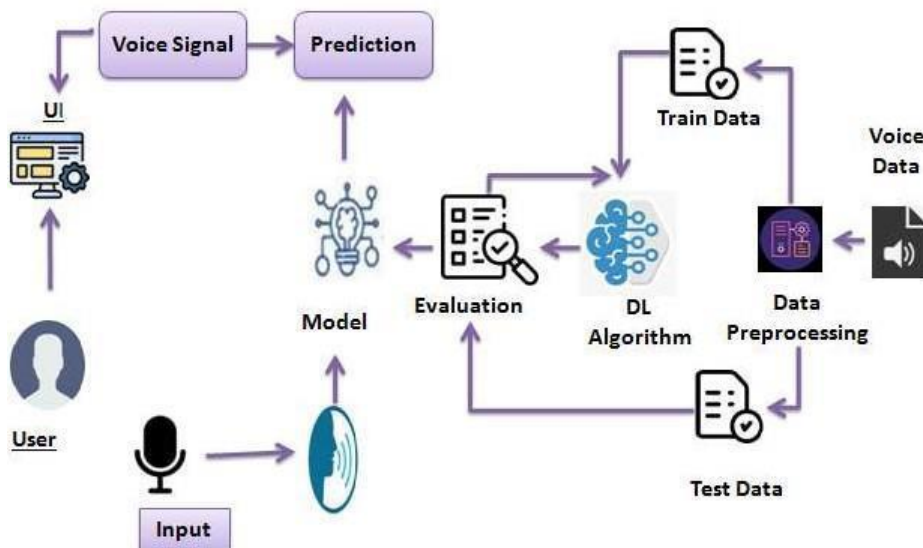
A data flow diagram shows how information flows through a process or system. This includes data input/output, data storage, and various sub processes through which data moves. DFDs are created using standardized symbols and notations to describe various entities and their relationships.





## 5.2 SOLUTION & TECHNICAL ARCHITECTURE

To present your insights and analysis, IBM Cognos Analytics offers dashboards and stories. A view that includes visualizations, such as a graph, chart, plot, table, map, or any other type of visual representation of data, can be put together. Discover trends and correlations that have an influence on your business by exploring stunning data visualizations in IBM Cognos Analytics. A display helps you keep track of events or activities quickly by displaying important data insights and analyses on one or more pages or screens.



## 5.3 USER STORIES

A “user narrative” is a casual, generic explanation of a software feature written from the perspective of the client or end user. A user narrative explains how a piece of work will give the client a specific of a value.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer	Login	USN-1	Entering Webpage	Enter the application	High	Sprint 1
INPUT DATA	Homepage	USN-2	Entering to the “Homepage” of the UI(Webpage)	Enter the homepage	High	Sprint 1
DATA VALIDATION	About	USN-3	I can click on the “About” to details about the Application	Get the details about the application	Low	Sprint 2
CLASSIFICATION	Begin	USN-4	As a user I can upload my voice signal from the computer.	Choose my voice recording from my device	High	Sprint 2
APP WORK	Predict	USN-5	As a user I can turn on the microphone or earphone to record my voice	Turn on the microphone or earphone for prediction	High	Sprint 3
		USN-6	Predicting by using voice signal	Can monitor voice change or voice shaking	High	Sprint 3

## CHAPTER 6

### PROJECT PLANNING & SCHEDULING

#### 6.1 SPRINT PLANNING & ESTIMATION

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	3	High	Karthika M Mari Selvam K Hemanath T Kaviya R
Sprint1		USN-2	As a user, I will receive confirmation email once I have registered for the application	2	High	Karthika M Mari Selvam K Hemanath T Kaviya R
Sprint2		USN-3	As a user, I can register for the application through Facebook	3	Low	Karthika M Mari Selvam K Hemanath T Kaviya R
Sprint2		USN-4	As a user, I can register for the application through Gmail	3	Medium	Karthika M Mari Selvam K Hemanath T Kaviya R
Sprint2	Login	USN-5	As a user, I can log into the application by entering email & password	3	High	Karthika M Mari Selvam K Hemanath T Kaviya R
Sprint3	Dashboard	USN-6	As a user, I can upload my images and get my details.	3	High	Karthika M Mari Selvam K Hemanath T Kaviya R
Sprint1	Logout	USN-7	As a user I can logout successfully.	2	Medium	Karthika M Mari Selvam K Hemanath T Kaviya R

Sprint4	Feedback	USN-8	A customer care executive, I can able to interact with all the customer and get their feedback which is used to enhance the scope of the project.	2	Medium	Karthika M Mari Selvam K Hemanath T Kaviya R
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint3	Image processing localization	USN-9	The uploaded image is pre-processed and fed into trained model.	3	High	Karthika M Mari Selvam K Hemanath T Kaviya R
Sprint4	Classification and prediction	USN-9	The model classifies and predicts the type of disease.	3	High	Karthika M Mari Selvam K Hemanath T Kaviya R
Sprint4	Report generation	USN-10	Based on the prediction of Parkinson's disease, the health care is generated to provide the feedback.	2	Medium	Karthika M Mari Selvam K Hemanath T Kaviya R

## 6.2 SPRINT DELIVERY SCHEDULE

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint1	20	6 Days	20 Oct 2022	26 Oct 2022	20	26 Oct 2022
Sprint2	20	6 Days	27 Oct 2022	02 Nov 2022	20	31 Oct 2022
Sprint3	20	6 Days	02 Nov 2022	08 Nov 2022	20	06 Nov 2022
Sprint4	20	6 Days	08 Nov 2022	14 Nov 2022	20	08 Nov 2022

## **CHAPTER 7**

### **CODING & SOLUTION**

#### **7.1 FEATURE 1**

##### **HANDWRITING TASKS IN PARKINSON'S DISEASE:**

In this study, we looked into the representativeness of a group of handwriting-related proposed features for PD detection and assessment. In particular, we classified healthy people and PD patients (PD detection), as well as mild and moderate PD patients, using a histogram and random forest algorithms (PD rating). High levels of accuracy, sensitivity, and specificity demonstrated by the implemented and evaluated methodologies demonstrated positive outcomes. These findings point to the viability of the suggested configuration for use in clinical settings to assist in diagnosing Parkinson's disease. Thus, the straightforward procedure continued after days and years.

#### **7.2 FEATURE 2**

Due to the necessity of lifting the pen from the paper's surface and repositioning it in order to continue writing, in-air movements continue to be a fascinating area of research. It is reasonable to suppose that individuals with PD would have much longer in-air times than controls due to their delay in initiating movements. The significance of the in-air manoeuvre has been stressed by and Rosenblum. Patients with PD apparently wrote in a smaller size, needed longer performance time, and exerted much less pressure to the writing surface than controls. It's interesting to note that the variance in stroke duration between groups 23 in the air was bigger than the variance in stroke duration on paper. By carefully differentiating between on-surface movement, in-air movement, and pressure and examining their respective contributions in differentiating patients with PD from healthy controls, were able to validate this. Employed a supervised machine learning support vector machine with a nonlinear radial basis function kernel to categorise samples as PD or controls. 46 An accuracy of about 90% may be attained using fundamental kinematics and pressure characteristics. 47 If the air stroke can be investigated similarly to the on-surface stroke, the question still has to be answered. It seems likely that PD patients' in-air stroke kinematic characteristics, such as velocity, acceleration, and jerk, would be different from those of healthy controls.

## **CHAPTER 8 TESTING**

### **8.1 TEST CASES**

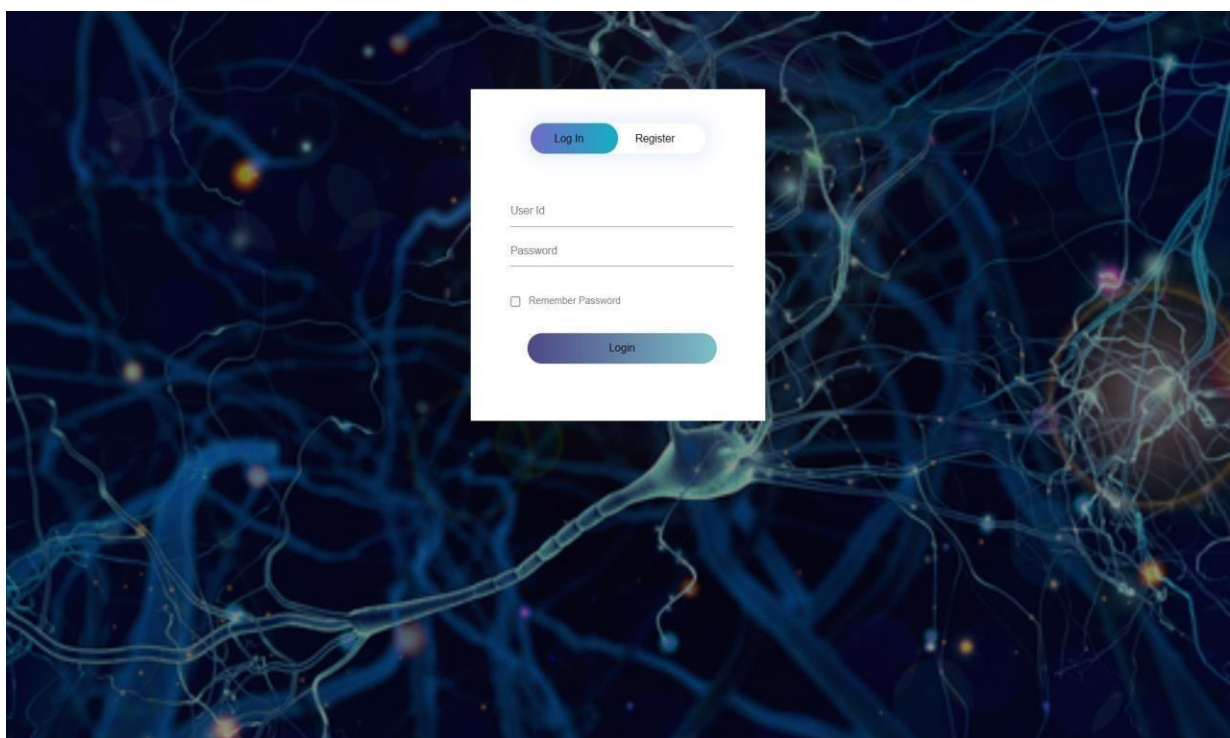
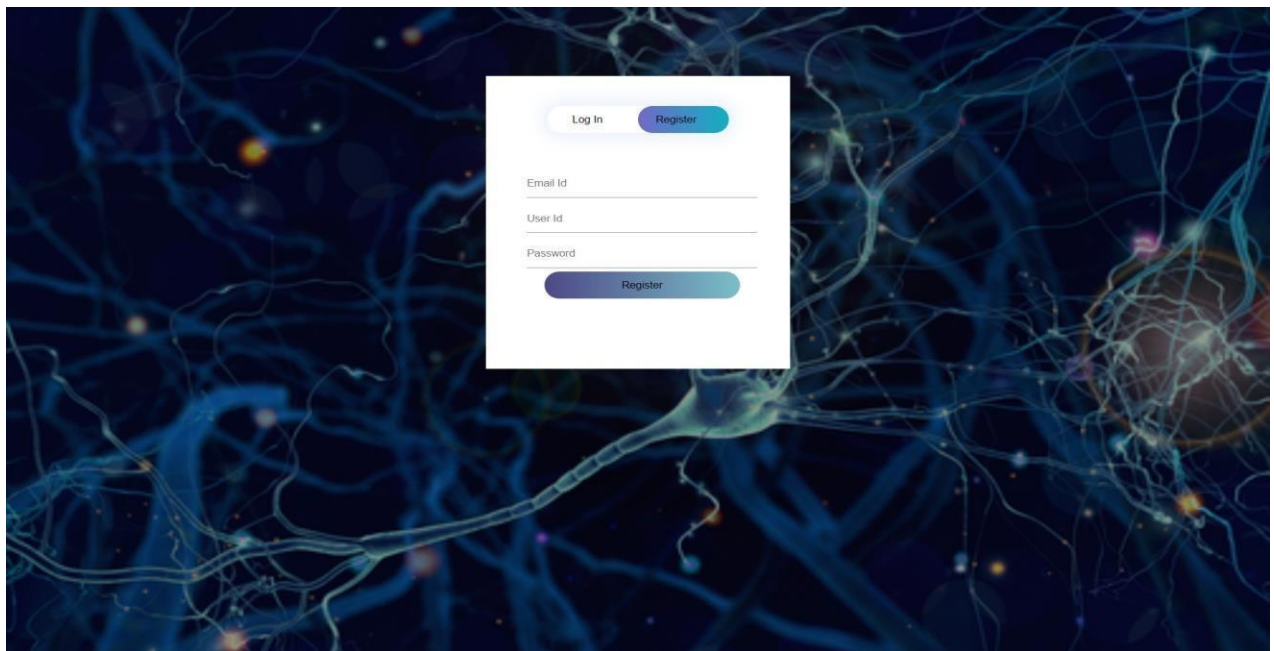
The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub-assemblies, assemblies and/or a finished product. It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner.

### **8.2 USER ACCEPTANCE TESTING**

User Acceptance Testing is a critical phase of any project and requires significant participation by the end user. It also ensures that the system meets the functional requirements. All test cases are run at this point to ensure that the program is right and complete. The test must be completed successfully before the program can be accepted by the customer. The customer formally approves the delivery of this system after customer workers have checked that the preliminary production statistics load is correct and that the test suite has been achieved with perfect results.

## CHAPTER 9

### RESULTS 9.1



[Home](#) [Predict](#) [Logout](#)

***Prevention is better than cure!***

***Parkinson Classifier***

NOTE: Upload an spiral or wave page drawn by the user in a white sheet

***Parkinson Classifier***

Choose...



Prediction : healthy

[Home](#) [Predict](#) [Logout](#)

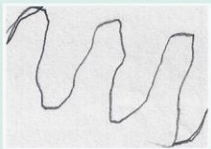
***Prevention is better than cure!***

***Parkinson Classifier***

NOTE: Upload an spiral or wave page drawn by the user in a white sheet

***Parkinson Classifier***

Choose...



Prediction : parkinson



[Home](#) [Predict](#) [Logout](#)

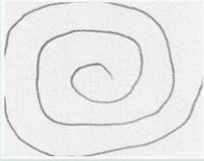
**Prevention is better than cure!**

**Parkinson Classifier**

NOTE: Upload an spiral or wave page drawn by the user in a white sheet

**Parkinson Classifier**

Choose...



Prediction : healthy

[Home](#) [Predict](#) [Logout](#)

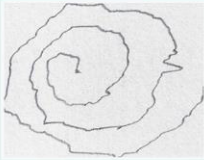
**Prevention is better than cure!**

**Parkinson Classifier**

NOTE: Upload an spiral or wave page drawn by the user in a white sheet

**Parkinson Classifier**

Choose...



Prediction : parkinson

## **CHAPTER 10**

### **10.1 ADVANTAGES 1.**

Another significant indicator of illness progression may be handwriting. 2. Only image recognition allows for the effective automatic classification of PD. 3. We created the Archimedes spiral hand-drawing dataset without the use of templates or restrictions on application scenarios. 4. Our method has an accuracy rate for Parkinson's disease categorization of roughly 89.3%. 5. Due to the lack of the use of expensive tools, the cost of the material used is quite low.

### **10.2 DISADVANTAGES 1.**

The suggested approach is the best way to blend static and dynamic handwriting traits for various tasks. 2. The method is less efficient for PD categorization than the performance of the various handwriting modalities. 3. This approach does not always yield accurate findings.

## **CHAPTER 8**

### **CONCLUSION**

Previous research only focused on a single imaging modality, such MRI or PET, or a single type of dementia, like AD. The proposed method tried to cover a wider spectrum of imaging and machine learning technologies for the diagnosis of mental diseases in order to enable researchers in the domain to swiftly identify the state of the art in the field. In order to provide patients with therapy and support as soon as possible and lessen the disease's effects, we also emphasise the importance of early Parkinson's disease prediction and detection

## CHAPTER 12

### FUTURE SCOPE

The non-invasive nature of this handwriting method makes it incredibly intriguing. Only specific figures must be drawn by the patient on a tablet. Medical decision support tools for PD identification and patient supervision can be created using this handwriting technique (after a positive diagnosis). In order to boost the accuracy of the diagnosis, it is now necessary to combine handwriting techniques based on symptoms like tremor, bradykinesia, and rigidity. In this situation, patient screening and the use of biomarkers can help to enhance healthcare. By doing so, doctors can concentrate on the patients who have the best chance of being diagnosed quickly. Early detection would enable 29 the creation of particular treatment plans for PD patients. The care of patients is crucial for tracking the development of PD.

## CHAPTER 13

### APPENDIX 13.1

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <meta http-equiv="X-UA-Compatible" content="ie=edge">
    <title>HomePage</title>
    <style>
      body{
        background-image: linear-gradient(rgba(218, 185, 231, 0.9), rgba(0,0,0,0.4)),url("https://i0.wp.com/cdn-
prod.medicalnewstoday.com/content/images/articles/321/321337/blue-neuron-on-blue-background.jpg");
        position: relative;
        background-size: cover;
        background-repeat: no-repeat;
        height: 100%;
        width: 100%;
      }
      h3{
        text-align:center;
        color:white;
      }
      .main{
        margin-top:100px;
      }
      p{
        color:white;
        text-indent:10px;
        margin:10px;
        font-size:20px;
      }
      .navbar{
        margin: 0px;
        padding:20px;

        background-color:rgb(169, 120, 159);
        opacity:0.6;
        color:black;
        font-family:'Arial',sans-serif;
        font-style: italic;
        border-radius:20px;
        font-size:25px;
      }
      a{
        color:rgb(11, 3, 21);
        float:right;
        text-decoration:none;
        font-style:normal;
        padding-right:20px;
      }
      a:hover{
        background-color:black;
        color:white;
        border-radius:15px;
```

```

        font-size:30px;
        padding-left:10px;
    }
    img{
        width:450px;
        height:400px;
        padding:25px;

    }
    img:hover{
        border-radius:100px;
        border-color:grey;
    }
    #im{
        width:1450px;
        height:700px;
        padding:25px;
    }
</style>
</head>
<body>
    <div class="navbar">
        <a href="/logout" >Logout</a>
        <a href="/upload" >Predict</a>
        <a href="/home">Home</a>
        <a>Welcome!</a>
    <br>
    </div>
    <br>
    <center><b class="pd"><font color="white" size="15" font-family="Comic Sans MS" >Detecting Parkinson Disease
using ML</font></b></center>
    <div>
    <br>
    <br>
    <center>
        <p>Parkinson's disease (PD) is a prevalent neurodegenerative disease affecting about 1% of the world population
over the age of 55 (Nussbaum and Ellis, 2003). About five million people worldwide are estimated to have PD. PD
Prevalence is expected to double by the year 2030 . Parkinson's disease (PD) patient care is limited by inadequate,
sporadic symptom monitoring, infrequent access to care, and sparse encounters with healthcare professionals leading to
poor medical decision making and sub-optimal patient health-related outcomes. Recent advances in digital health
approaches have enabled objective and remote monitoring of impaired motor function with the promise of profoundly
changing the diagnostic, monitoring, and therapeutic landscape in PD.</p>
    </center>
    <span></span>
    <span></span>
    <span></span>
    <span></span>
    <span></span>
    <span></span>

    <span></span>
    <br><br><br><br><br>
    </div>
</body>
</html>

```

<!DOCTYPE

html>

<html lang="en">

<head>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1.0">

<meta http-equiv="X-UA-Compatible" content="ie=edge">

<title>PredictionPage</title>

<style>

body{

background-image: url("https://img.freepik.com/free-vector/clean-medical-background\_53876-97927.jpg?w=2000");

position: relative;

background-size: cover;

background-repeat: no-repeat;

height: 100%;

width: 100%;

}

.main{

margin-top:100px;

}

.navbar{

margin: 0px;

padding:20px;

background-color:rgb(188, 245, 249);

opacity:0.6;

color:black;

font-family:'Roboto',sans-serif;

font-style: italic;

border-radius:20px;

font-size:25px;

}

a{

color:rgb(11, 3, 21);

float:right;

text-decoration:none;

font-style:normal;

padding-right:20px;

}

a:hover{

background-color:black;

color:white;

border-radius:15px;

font-size:30px;

padding-left:10px;

}

h1{

font-size:60px;

```
text-align:center;
color:rgb(20, 176, 204);
font-style:italic;
font-weight:bolder;
}
h2{
font-size:60px;
text-align:center;
color:rgb(17, 196, 227);
font-style:italic;
font-weight:bolder;
}
h5{
font-size:25px;
text-align:center;
color:rgb(53, 134, 152);
font-weight:bolder;
}
.upload-label{
display: inline-block;
padding: 12px 30px;
background: #90efdc;
color: #fff;
font-size: 1em;
transition: all .4s;
cursor: pointer;
}
```

```
.upload-label:hover{
background: #bacada;
color: #39D2B4;
}
.btn-pred{
display: inline-block;
padding: 12px 30px;
background: #4f8c80;
color: #fff;
font-size: 1em;
transition: all .4s;
cursor: pointer;
}
.img-preview {
width: 256px;
height: 256px;
position: relative;
border: 5px solid #F8F8F8;
```

```

    box-shadow: 0px 2px 4px 0px rgba(0, 0, 0, 0.1);
    margin-top: 1em;
    margin-bottom: 1em;
}

```

```

.img-preview>div {
    width: 100%;
    height: 100%;
    background-size: 256px 256px;
    background-repeat: no-repeat;
    background-position: center;
}

```

```

input[type="file"] {
    display: none;
}
.loader {
    border: 8px solid #f3f3f3; /* Light grey */
    border-top: 8px solid #3498db; /* Blue */
    border-radius: 50%;
    width: 50px;
    height: 50px;
    animation: spin 1s linear infinite;
}

```

```

@keyframes spin {
    0% { transform: rotate(0deg); }
    100% { transform: rotate(360deg); }
}

```

```

</style>
</head>
<body>
    <div class="navbar">
        <a href="/logout" >Logout</a>
        <a href="/upload" >Predict</a>
        <a href="/home">Home</a>
        <br>
    </div>
    <h1>Prevention is better than cure!</h1>
    <h2><center>Parkinson Classifier</center></h2>
    <h5>NOTE: Upload an spiral or wave page drawn by the user in a white sheet</h5>
    <div class="container">
        <center> <div id="content" style="margin-top:2em">
            <div>

```



```

<form id="upload-file" method="post" enctype="multipart/form-data">
  <center>
    <label for="imageUpload" class="upload-label">
      Choose...
    </label>
    <input type="file" name="file" id="imageUpload" accept=".png, .jpg, .jpeg">
  </center>
</form>

<center> <div class="image-section" style="display:none;">
  <div class="img-preview">
    <div id="imagePreview">
    </div></center>
  </div>
  <center>
    <div>
      <button type="button" class="btn btn-primary btn-lg " id="btn-
predict">Predict!</button>
    </div>
  </center>
</div>

<div class="loader" style="display:none;"></div>
<h3 id="result">
  <span> </span>
</h3>
</div>
</center>
</div>
</body>
<footer>
  <script src="{{ url_for('static', filename='js/main.js') }}" type="text/javascript"></script>
</footer>
</html>

```

## OUTPUT

Welcome saranya ! Home Predict Logout

# Detecting Parkinson Disease using ML

Parkinson's disease (PD) is a prevalent neurodegenerative disease affecting about 1% of the world population over the age of 55 (Nussbaum and Ellis, 2003). About five million people worldwide are estimated to have PD. PD Prevalence is expected to double by the year 2030. Parkinson's disease (PD) patient care is limited by inadequate, sporadic symptom monitoring, infrequent access to care, and sparse encounters with healthcare professionals leading to poor medical decision making and sub-optimal patient health-related outcomes. Recent advances in digital health approaches have enabled objective and remote monitoring of impaired motor function with the promise of profoundly changing the diagnostic, monitoring, and therapeutic landscape in PD.

## PARKINSON'S DISEASE

A disease that affects nerve cells in the brain and causes tremors, poor coordination and problems walking and moving

### CAUSES & RISK FACTORS

- Both men & all ages are affected
- Parkinson's commonly develops after age 50
- Scientists have identified abnormal genes that may lead to Parkinson in some people, but there is no solid proof to show it is directly related
- Men are more likely to develop Parkinson's disease because they're more likely to experience head injury or exposure to toxins

## SYMPTOMS OF PARKINSON'S

- Slow thinking
- No facial expression
- Staring
- Difficulty swallowing
- Shaking, tremors
- Loss of control of fine hand movements
- Memory loss, dementia
- Slowed, depression
- Hallucinations
- Stooped posture
- Sleep and gait problems
- Problems with balance or walking

## Parkinson's Disease Symptoms

## Stages of Parkinson's Disease

Stage 1: Develop mild symptoms but able to go about day-to-day life

Stage 2: Symptoms such as tremors and stiffness begin to worsen, may develop poor posture or have trouble walking

Stage 3: Movement begins to slow down, loss of balance

Stage 4: Symptoms are severe and cause significant issues with day-to-day living, unable to live alone and will need care

Stage 5: Walking or standing may be impossible at this point, people at this stage are often confined to a wheelchair or bed

(A) Normal

(B) Parkinson's disease

## Brain Regions Affected by Parkinson's Disease

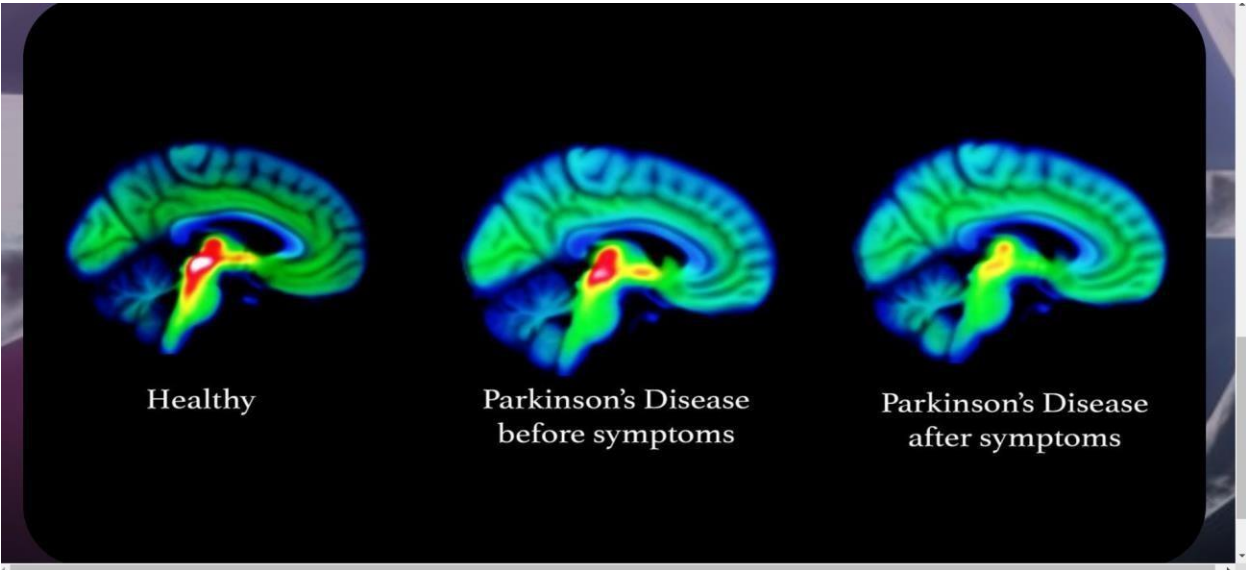
Motor Cortex

## Treatment of Motor Symptoms of Parkinson's Disease

Levodopa

Stimulus of PD

Deepbrain



```

<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<meta http-equiv="X-UA-Compatible" content="ie=edge">

<title>HomePage</title>
<style>
  body{
    background-image: linear-gradient(rgba(218, 185, 231, 0.9), rgba(0,0,0,0.4)),url("https://i0.wp.com/cdn-
prod.medicalnewstoday.com/content/images/articles/321/321337/blue-neuron-on-blue-background.jpg");
    position: relative;
    background-size: cover;
    background-repeat: no-repeat;
    height: 100%;
    width: 100%;
  }
  h3{
    text-align:center;
    color:white;
  }
  .main{
    margin-top:100px;
  }
  p{
    color:white;
    text-indent:10px;
    margin:10px;
    font-size:20px;
  }
  .navbar{
    margin: 0px;
    padding:20px;
    background-color:rgb(169, 120, 159);
    opacity:0.6;
    color:black;
    font-family:'Arial',sans-serif;
    font-style: italic;
    border-radius:20px;
    font-size:25px;
  }
  a{
    color:rgb(11, 3, 21);
    float:right;
    text-decoration:none;
    font-style:normal;
    padding-right:20px;
  }
  a:hover{
    background-color:black;
    color:white;
    border-radius:15px;
    font-size:30px;
    padding-left:10px;
  }
  img{
    width:400px;
    height:350px;
    padding:25px;
  }
  img:hover{
    border-radius:100px;
    border-color:grey;
  }
  #im{

```

```

        width:1450px;
        height:700px;
        padding:25px;
    }

</style>
</head>
<body>
    <div class="navbar">
        <a href="/logout" >Logout</a>
        <a href="/upload" >Predict</a>
        <a href="/home">Home</a>
        <a>Welcome!</a>
        <br>
    </div>
    <br>
    <center><b class="pd"><font color="white" size="15" font-family="Comic Sans MS" >Detecting Parkinson Disease using
ML</font></b></center>
    <div>
        <br>
        <br>
        <center>
            <p>More than 10 million people are living with Parkinson's Disease worldwide, according to the Parkinson's Foundation.
While Parkinson's cannot be cured, early detection along with proper medication can significantly improve symptoms and quality
of life</p>
            <p>The researchers found that the drawing speed was slower and the pen pressure is lower among Parkinson's patients. One
of the indications of Parkinson's is tremors and rigidity in the muscles, making it difficult to draw smooth spirals and waves.</p>
            </center>
            <span></span>
            <span></span>
            <span></span>
            <span></span>
            <span></span>
            <span></span>
            <span></span>
            <br><br><br><br><br>
        </div>
    </body>

```

```

<html>
<head>
    <title>PARKINSON'S DISEASE </title>
    <link rel = "stylesheet" href="{ { url_for('static',filename='css/style.css') } } ">
</head>

```

```

<body>
  <div class="hero">
    <div class="form-box">
      <div class="button-box">
        <div id="btn"></div>
        <button type="button" class="toggle-btn" onclick="login()">Log In</button>
        <button type="button" class="toggle-btn" onclick="register()">Register</button>
      </div>
      <form id="login" class="input-group" action="/form_login" method="post">
        <input type="text" class="input-field" placeholder="User Id" name="userid" required>
        <input type="text" class="input-field" placeholder="Password" name="pwd" required>
        <input type="checkbox" class="check-box"><span>Remember Password</span>
        <button type="submit" class="submit-btn" value="Login">Login</button>
      </form>
      <h6 class="err">{{ info }}</h6>
      <form id="register" class="input-group" action="/form_reg" method="post">
        <input type="email" class="input-field" placeholder="Email Id">
          <input type="text" class="input-field" placeholder="User Id" name="userid" required>
          <input type="text" class="input-field" placeholder="Password" name="pwd" required>
          <button type="submit" id="sub" class="submit-btn">Register</button>
        </form>
        <h6 class="err">{{ info }}</h6>
      </div>
    </div>
    <script>
      var x = document.getElementById("login")
      var y = document.getElementById("register")
      var z = document.getElementById("btn")
      function register(){
        x.style.left = "-400px";
        y.style.left = "50px";
        z.style.left = "110px";
      }
      function login(){
        x.style.left = "50px";
        y.style.left = "450px";
        z.style.left = "0px";
      }
    </script>
  </body>
</html>

```

```

<html lang="en">

```

```

<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <meta http-equiv="X-UA-Compatible" content="ie=edge">
  <title>Predict</title>
  <link href="https://cdn.bootcss.com/bootstrap/4.0.0/css/bootstrap.min.css" rel="stylesheet">
  <script src="https://cdn.bootcss.com/popper.js/1.12.9/umd/popper.min.js"></script>
  <script src="https://cdn.bootcss.com/jquery/3.3.1/jquery.min.js"></script>
  <script src="https://cdn.bootcss.com/bootstrap/4.0.0/js/bootstrap.min.js"></script>
  <link href="{{ url_for('static', filename='css/main.css') }}" rel="stylesheet">
  <style>
    .bar
    {
      margin: 0px;
      padding:20px;
    }
  </style>

```

```

        background-color:rgb(169, 223, 241);
        opacity:0.6;
        color:black;
        font-family:'Roboto',sans-serif;
        font-style: italic;
        border-radius:20px;
        font-size:25px;
    }
    a{
        color:grey;
        float:right;
        text-decoration:none;
        font-style:normal;
        padding-right:20px;
    }
    a:hover{
        background-color:black;
        color:white;
        border-radius:15px;
        font-size:30px;
        padding-left:10px;
    }
    body{
        background-image: url("https://img.freepik.com/free-vector/clean-medical-background_53876-97927.jpg?w=2000");
        position: relative;
        background-size: cover;
        background-repeat: no-repeat;
        height: 100%;
        width: 100%;
    }
    h1{
        font-size:40px;
        text-align:center;
        color:rgb(20, 176, 204);
        font-style:italic;
        font-weight:bolder;
    }

```

```

    h2{
        font-size:35px;
        text-align:center;
        color:rgb(17, 196, 227);
        font-style:italic;
        font-weight:bolder;
    }
    h5{
        font-size:25px;
        text-align:center;
        color:rgb(53, 134, 152);
        font-weight:bolder;
    }
</style>
</head>
<body>
    <div class="bar">
        <a href="/logout" >Logout</a>

```

```

        <a href="/upload" >Predict</a>
        <a href="/home">Home</a>
        <br>
    </div>
    <h1>Prevention is better than cure!</h1>
    <h2><center>Parkinson Classifier</center></h2>
    <h5>NOTE: Upload an spiral or wave page drawn by the user in a white sheet</h5>
    <div class="container">
        <center> <div id="content" style="margin-top:2em">{% block content %}{% endblock %}</div></center>
    </div>
</body>

<footer>
    <script src="{ { url_for('static', filename='js/main.js') } }" type="text/javascript"></script>
</footer>
</html>

```

```

<!DOCTYPE html>
<html lang="en">
    <head>
        <meta charset="UTF-8">
        <meta name="viewport" content="width=device-width, initial-scale=1.0">
        <meta http-equiv="X-UA-Compatible" content="ie=edge">
        <title>HomePage</title>
        <style>
            body{
                background-image: linear-gradient(rgba(218, 185, 231, 0.9), rgba(0,0,0,0.4)),url("https://i0.wp.com/cdn-
prod.medicalnewstoday.com/content/images/articles/321/321337/blue-neuron-on-blue-background.jpg");
                position: relative;
                background-size: cover;
                background-repeat: no-repeat;
                height: 100%;
                width: 100%;
            }
            h3{
                text-align:center;
                color:white;
            }
            .main{
                margin-top:100px;
            }
            p{
                color:white;
                text-indent:10px;
                margin:10px;
                font-size:20px;
            }
            .navbar{
                margin: 0px;
                padding:20px;
                background-color:rgb(169, 120, 159);
                opacity:0.6;
                color:black;
                font-family:'Arial',sans-serif;
                font-style: italic;
                border-radius:20px;
                font-size:25px;
            }
            a{
                color:rgb(11, 3, 21);
            }

```

```

float:right;
text-decoration:none;
font-style:normal;
padding-right:20px;
}
a:hover{
background-color:black;
color:white;
border-radius:15px;
font-size:30px;
padding-left:10px;
}
img{
width:400px;
height:350px;
padding:25px;

}
img:hover{
border-radius:100px;
border-color:grey;
}
#im{
width:1450px;
height:700px;
padding:25px;
}
</style>
</head>
<body>
<div class="navbar">
<a href="/logout" >Logout</a>
<a href="/upload" >Predict</a>
<a href="/home">Home</a>
<a>Welcome!</a>
<br>
</div>
<br>
<center><b class="pd"><font color="white" size="15" font-family="Comic Sans MS" >Detecting Parkinson Disease using
ML</font></b></center>
<div>
<br>
<br>
<center>
<p>More than 10 million people are living with Parkinson’s Disease worldwide, according to the Parkinson’s Foundation.
While Parkinson’s cannot be cured, early detection along with proper medication can significantly improve symptoms and quality
of life</p>
<p>The researchers found that the drawing speed was slower and the pen pressure is lower among Parkinson’s patients. One
of the indications of Parkinson’s is tremors and rigidity in the muscles, making it difficult to draw smooth spirals and waves.</p>
</center>
<span></span>
<span></span>
<span></span>
<span></span>
<span></span>
<span></span>
<span></span>
<br><br><br><br><br>
</div>
</body>

```



</html>

```
<html>
  <head>
    <title>PARKINSON'S DISEASE </title>
    <link rel = "stylesheet" href="{{ url_for('static',filename='css/style.css')}} ">
  </head>
  <body>
    <div class="hero">
      <div class="form-box">
        <div class="button-box">
          <div id="btn"></div>
          <button type="button" class="toggle-btn" onclick="login()">Log In</button>
          <button type="button" class="toggle-btn" onclick="register()">Register</button>
        </div>

        <form id="login" class="input-group" action="/form_login" method="post">
          <input type="text" class="input-field" placeholder="User Id" name ="userid" required>
          <input type="text" class="input-field" placeholder="Password" name="pwd" required>
          <input type="checkbox" class="check-box"><span>Remember Password</span>
          <button type="submit" class="submit-btn" value="Login">Login</button>
        </form>
        <h6 class="err">{{ info }}</h6>
        <form id="register" class="input-group" action="/form_reg" method="post">
          <input type="email" class="input-field" placeholder="Email Id">
          <input type="text" class="input-field" placeholder="User Id" name ="userid" required>
          <input type="text" class="input-field" placeholder="Password" name="pwd" required>
          <button type="submit" id = "sub" class="submit-btn" >Register</button>
        </form>
        <h6 class="err">{{ info }}</h6>
      </div>
    </div>
    <script>
      var x = document.getElementById("login")
      var y = document.getElementById("register")
      var z = document.getElementById("btn")
      function register(){
        x.style.left = "-400px";
        y.style.left = "50px";
        z.style.left = "110px";
      }
      function login(){
        x.style.left = "50px";
        y.style.left = "450px";
        z.style.left = "0px";
      }
    </script>
  </body>
</html>
```

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <meta http-equiv="X-UA-Compatible" content="ie=edge">
    <title>PredictionPage</title>
    <style>
      body{
```

```

        background-image:
url("https://images.creativemarket.com/0.1.0/ps/6189315/1820/1214/m1/fpnw/wm1/dzrx62h86ilgel8q1meaokwa8tb26gwc6ea3
vrpxmmf14wdpom9wpt1zznfi7dut-.jpg");
        position: relative;
        background-size: cover;
        background-repeat: no-repeat;
        height: 100%;
        width: 100%;
    }
    .main{
        margin-top:100px;
    }
    .navbar{
        margin: 0px;
        padding:20px;
        background-color:rgb(188, 245, 249);
        opacity:0.6;
        color:black;
        font-family:'Roboto',sans-serif;
        font-style: italic;
        border-radius:20px;
        font-size:25px;
    }
    a{
        color:rgb(11, 3, 21);
        float:right;
        text-decoration:none;
        font-style:normal;
        padding-right:20px;
    }
    a:hover{
        background-color:black;
        color:white;
        border-radius:15px;
        font-size:30px;
        padding-left:10px;
    }
    h1{
        font-size:60px;
        text-align:center;
        color:rgb(20, 176, 204);
        font-style:italic;
        font-weight:bolder;
    }
    h2{
        font-size:60px;
        text-align:center;
        color:rgb(17, 196, 227);
        font-style:italic;
        font-weight:bolder;
    }
    h5{
        font-size:25px;
        text-align:center;
        color:rgb(53, 134, 152);
        font-weight:bolder;
    }
    .upload-label{
        display: inline-block;
        padding: 12px 30px;
        background: #90efdc;
        color: #fff;
        font-size: 1em;
        transition: all .4s;
    }

```

```

        cursor: pointer;
    }

    .upload-label:hover{
        background: #bacada;
        color: #39D2B4;
    }
    .btn-pred{
        display: inline-block;
        padding: 12px 30px;
        background: #4f8c80;
        color: #fff;
        font-size: 1em;
        transition: all .4s;
        cursor: pointer;
    }
    .img-preview {
        width: 256px;
        height: 256px;
        position: relative;
        border: 5px solid #F8F8F8;
        box-shadow: 0px 2px 4px 0px rgba(0, 0, 0, 0.1);
        margin-top: 1em;
        margin-bottom: 1em;
    }

    .img-preview>div {
        width: 100%;
        height: 100%;
        background-size: 256px 256px;
        background-repeat: no-repeat;
        background-position: center;
    }

    input[type="file"] {
        display: none;
    }
    .loader {
        border: 8px solid #f3f3f3; /* Light grey */
        border-top: 8px solid #3498db; /* Blue */
        border-radius: 50%;
        width: 50px;
        height: 50px;
        animation: spin 1s linear infinite;
    }

    @keyframes spin {
        0% { transform: rotate(0deg); }
        100% { transform: rotate(360deg); }
    }

</style>
</head>
<body>
    <div class="navbar">
        <a href="/logout" >Logout</a>
        <a href="/upload" >Predict</a>
        <a href="/home">Home</a>
        <br>
    </div>
    <h1>Prevention is better than cure!</h1>
    <h2><center>Parkinson Classifier</center></h2>

```

```

<h5>NOTE: Upload an spiral or wave page drawn by the user in a white sheet</h5>
<div class="container">
  <center> <div id="content" style="margin-top:2em">
    <div>
      <form id="upload-file" method="post" enctype="multipart/form-data">
        <center>
          <label for="imageUpload" class="upload-label">
            Choose...
          </label>
          <input type="file" name="file" id="imageUpload" accept=".png, .jpg, .jpeg">
        </center>
      </form>

      <center> <div class="image-section" style="display:none;">
        <div class="img-preview">
          <div id="imagePreview">
        </div></center>

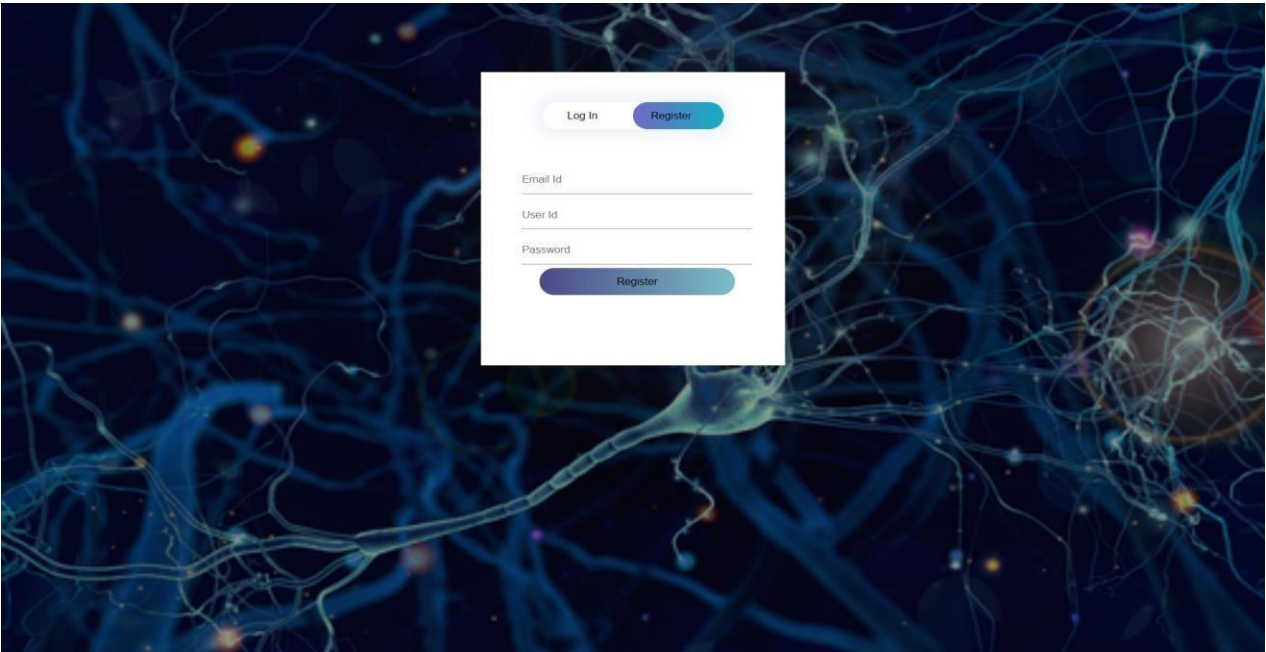
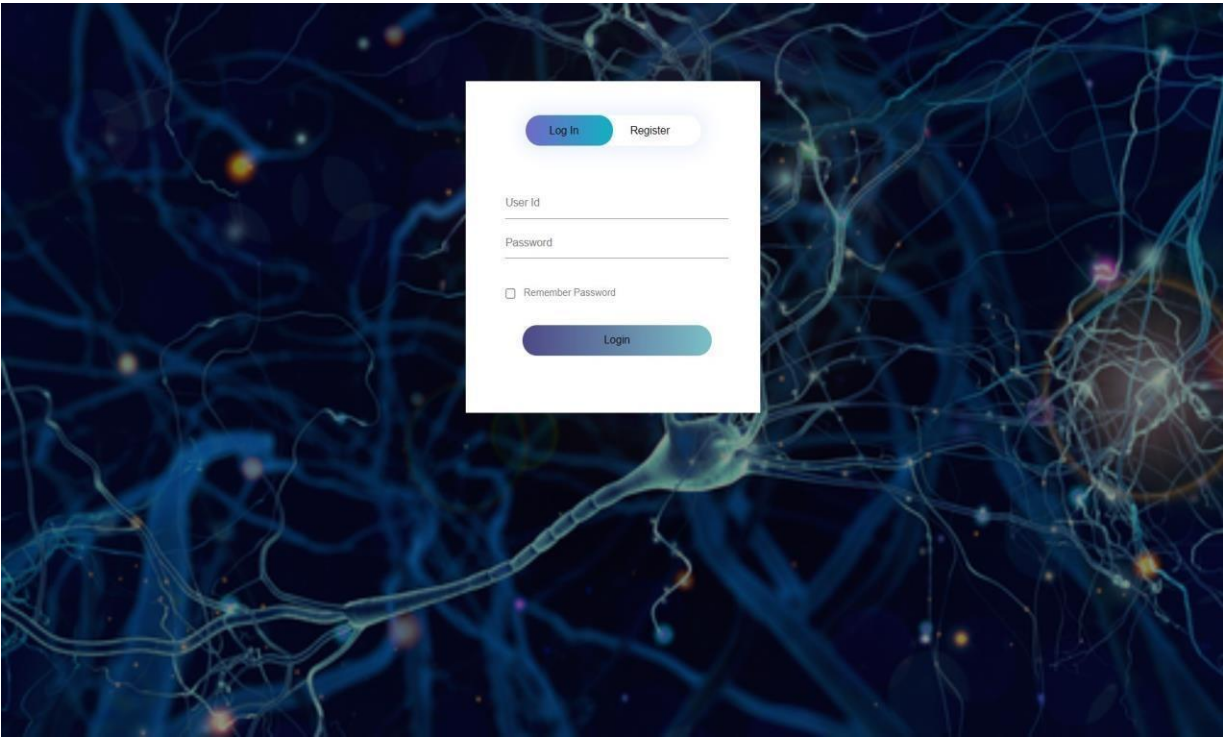
      </div>

      <center>
        <div>
          <div>
            <button type="button" class="btn btn-primary btn-lg " id="btn-predict">Predict!</button>
          </div>
        </div>
      </center>
    </div>

    <div class="loader" style="display:none;"></div>
    <h3 id="result">
      <span> </span>
    </h3>
  </div>
</center>
</div>
</body>
<footer>
  <script src="{{ url_for('static', filename='js/main.js') }}" type="text/javascript"></script>
</footer>
</html>

```

## OUTPUT



[Home](#) [Predict](#) [Logout](#)

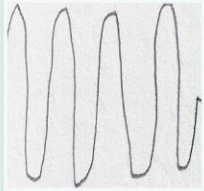
**Prevention is better than cure!**

**Parkinson Classifier**

NOTE: Upload an spiral or wave page drawn by the user in a white sheet

**Parkinson Classifier**

Choose...



Prediction : healthy

[Home](#) [Predict](#) [Logout](#)

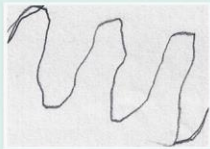
**Prevention is better than cure!**

**Parkinson Classifier**

NOTE: Upload an spiral or wave page drawn by the user in a white sheet

**Parkinson Classifier**

Choose...



Prediction : parkinson

[Home](#) [Predict](#) [Logout](#)

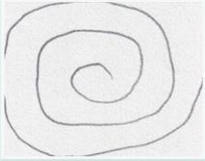
**Prevention is better than cure!**

**Parkinson Classifier**

NOTE: Upload an spiral or wave page drawn by the user in a white sheet

**Parkinson Classifier**

Choose...



Prediction : healthy

[Home](#) [Predict](#) [Logout](#)

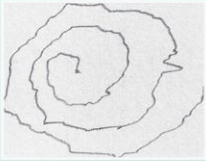
**Prevention is better than cure!**

**Parkinson Classifier**

NOTE: Upload an spiral or wave page drawn by the user in a white sheet

**Parkinson Classifier**

Choose...



Prediction : parkinson