

PERSONAL EXPENSE TRACKER APPLICATION

IBM-Project-26494-1662612957

**NALAIYA THIRAN PROJECT BASED LEARNING ON
PROFESSIONAL READLINESS FOR INNOVATION,
EMPLOYNMENT AND ENTERPRENEURSHIP**

A PROJECT

REPORT BY

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**BACHELOR OF TECHNOLOGY IN
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1. INTRODUCTION

TEAM ID : PNT2022TMID09607

INDUSTRY MENTOR : Prof Swetha

FACULTY MENTOR : Mrs. B Sandhiya

Skills Required:

IBM Cloud, HTML, Javascript, IBM Cloud Object Storage, Python- Flask, Kubernetes, Docker, IBM DB2, IBM Container Registry

a) Project Overview

- To understand the problem for to classify if it is a regression or a classification kind of problem.
- To pre-process the image by using different data pre-processing techniques.
- To implement the algorithm by using OpenCV framework and machine learning to automatically detect Parkinson's disease in hand-drawn images of spirals and waves.
- To know how to find the accuracy of the model.
- To build web application using the Flask framework that features the detection of Parkinson's Disease.

b) Purpose

You'll be able to understand the problem to classify if it is a regression or a classification kind of problem. You will be able to know how to pre-process the image by using different data pre-processing techniques. you will be able to learn how to use OpenCV and machine learning to automatically detect Parkinson's disease in hand-drawn images of spirals and waves You will be able to know how to find the accuracy of the model. You will be able to build web applications using the Flask framework.

2. LITERATURE SURVEY

a) Existing problem

Instead of going to hospital and taking MRI scan the existing problem helps the patient to detect the Parkinsons at home with the some basic values extracted from voice recording which is the simple and easiest way.

b) References

1. W. Wang, J. Lee, F. Harrou and Y. Sun, "Early Detection of Parkinson's Disease Using Deep Learning and Machine Learning," in *IEEE Access*, vol. 8, pp. 147635-147646, 2020, doi: 10.1109/ACCESS.2020.3016062.
2. Adams WR. High-accuracy detection of early Parkinson's Disease using multiple characteristics of finger movement while typing. *PLoS One*. 2017 Nov 30;12(11):e0188226. doi: 10.1371/journal.pone.0188226. PMID: 29190695; PMCID:PMC5708704.
3. L. Ali, C. Zhu, N. A. Golilarz, A. Javeed, M. Zhou and Y. Liu, "Reliable Parkinson's Disease Detection by Analyzing Handwritten Drawings: Construction of an Unbiased Cascaded Learning System Based on Feature Selection and Adaptive Boosting Model," in *IEEE Access*, vol. 7, pp. 116480-116489, 2019, doi: 10.1109/ACCESS.2019.2932037.
4. Chakraborty, Sabyasachi & Aich, Satyabrata & Jong-Seong-Sim, & Han, Eunyoung & Park, Jinse & Kim, Hee-Cheol. (2020). Parkinson's Disease Detection from Spiral and Wave Drawings using Convolutional Neural Networks: A Multistage Classifier Approach. 298-303. 10.23919/ICACT48636.2020.9061497.
5. Jahan, Nusrat & Nesa, Arifatun & Layek, Abu. (2021). Parkinson's Disease Detection Using ResNet50 with Transfer Learning. 11. 17-23.

d)Problem Statement Definition

Parkinson's disease (PD) is a common, neurodegenerative disorder, recognized by the motor symptoms of bradykinesia, tremor, rigidity, and postural impairment. At clinical onset, extensive amounts of dopaminergic neurons have already been lost. The duration of this prodromal phase is uncertain, and it is thought to include predominantly non-motor symptoms. The progressive nature and

the symptoms of PD are disabling and reduces the quality of life. Among patients affected in working

age, early cessation of employment is common, and such socioeconomic consequences of PD may contribute to an impaired quality of life.

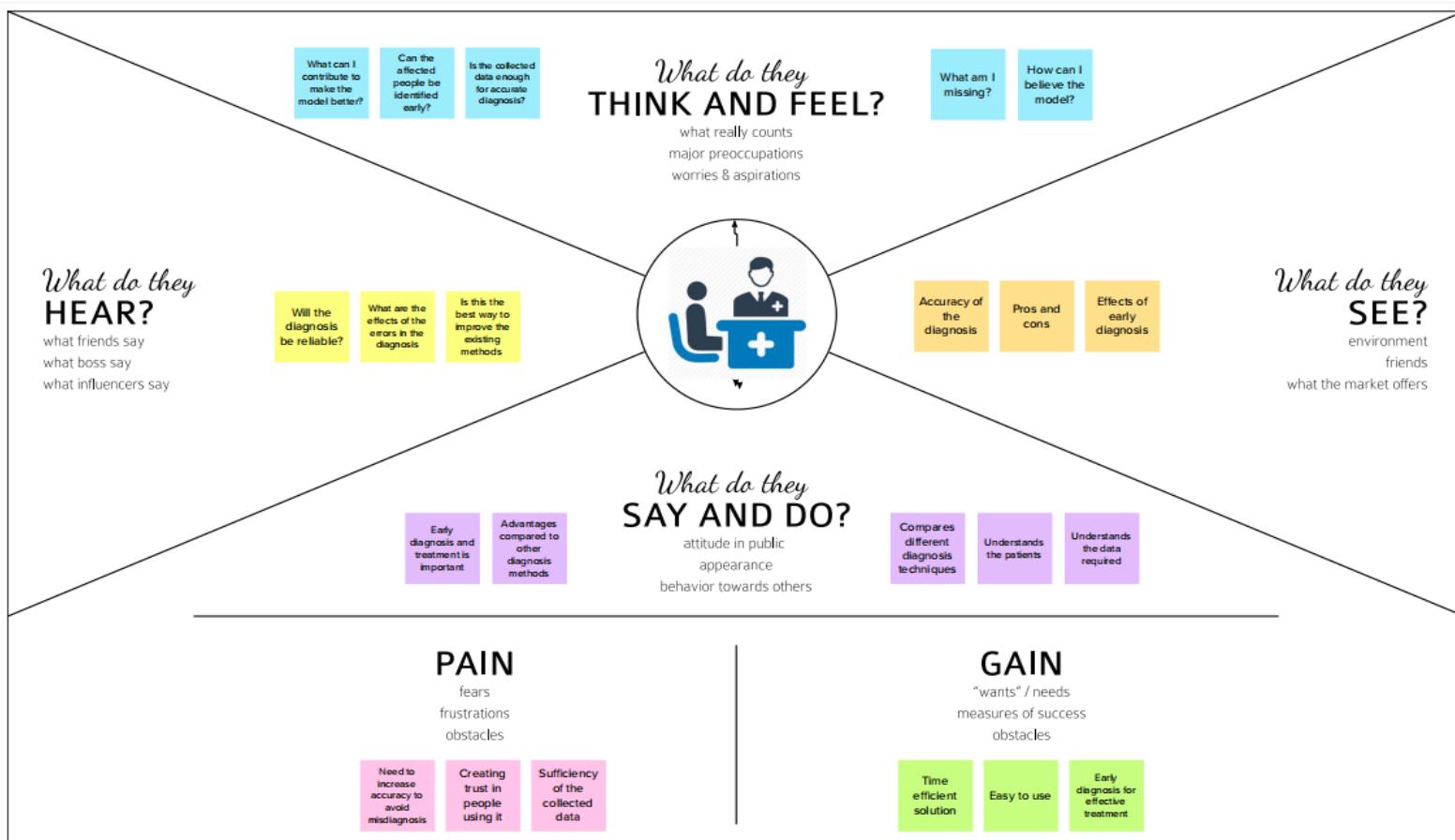
3. IDEATION & PROPOSED SOLUTION

a) 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 challenges



b) 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, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions.

Advanced Data Science

Detecting Parkinson's Disease using Machine Learning

Brainstorm & idea prioritization

Ideation phase

10 minutes to prepare
1 hour to ultimate
3-5 people recommended

Defined your challenge
A little bit of preparation goes a long way with this exercise. Here's what you need to do to get going.
[View details](#)

Define your problem statement
What problem are you trying to solve? Write your problem as a **More Righter Statement**. This will be the focus of your Brainstorm.

Prioritize

Project
To build a web application which is concerned with the machine learning for detecting the disease.

Key rule of brainstorming
To run an effective and productive session

| | |
|--------------------|----------------------|
| Keep it simple | Encourage wild ideas |
| Let go of judgment | Allow connections |
| Go for volume | Embrace the weird |

Designed by:
Surya Perumal K (TL)
Sri Channa B.J
Kabilan S
Rohith Kumar S

Brainstorm

Write down key terms that come to mind that solve your problem statement.

10 points

Issue 1 Issue 2 Issue 3 Issue 4

Group 1a

Take turns sharing your descriptive clustering similar or related material you've seen in the last 10 minutes, give each cluster a reasonable title. If a cluster is larger than 4 sticky notes, try and break it up into smaller subgroups.

10 points

| Accuracy and user action | Play factor | Value add |
|--------------------------|-------------|-----------|
| | | |
| | | |

| Screen sharing | Total 4s |
|----------------|----------|
| | |
| | |

Priorities

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

Actions



Our priorities

You can export the prioritization map as pdf or png file and share with members of your company for insight. Find it helpful.

Actions

- Share document**
Share a prioritized outcome with stakeholders using Share to invite them to view the results.
- Export document**
Export a copy of the results as PDF or CSV and include in files or email priorities.

Improving track

- Group insights**
See the responses of our users in groups.
[Open the insight](#)
- Customer opinions journey**
Understand customer needs, motivations, and needs for a specific user.
[Open the insight](#)
- Insights, audience, opportunities, filters**
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.
[Open the insight](#)

Stay update linked

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c) proposed solution

Proposed Solution:

| S.No. | Parameter | Description |
|-------|---|---|
| 1. | Problem Statement (Problems to be solved) | Dopamine, a chemical that enables brain cells to connect with one another, is disrupted in Parkinson's disease-causing brain cells. It is a degenerative central nervous system illness that impairs movement and causes tremors and rigidity. The symptoms usually emerge slowly, and as the disease worsens, non-motor symptoms become more common. The most obvious early symptoms are tremor, rigidity, slowness of movement, and difficulty with walking. |
| 2. | Idea/Solution description | The project's goal is to use the Python modules scikit-learn, numpy, pandas, and xgboost to offer a method for detecting Parkinson's illness. After loading the data, obtaining the features and labels, scaling the features, splitting the dataset, and creating an XGBClassifier, we will determine the model's correctness. The major goal of the implementation is to create a model using XGBoost that can be used to categorise a person as healthy or having Parkinson's disease. |
| 3. | Novelty/Uniqueness | A sparsity-aware split discovery technique is incorporated into the XGBoost algorithm for detecting Parkinson's disease in order to accommodate various sparsity patterns in the data. The XGBoost algorithm's out-of-core computing function maximises and optimises the use of the available disc space. |

| | | |
|----|-----------------------------------|--|
| 4. | SocialImpact/CustomerSatisfaction | <p>The likelihood of the disease progressing, limiting the impact of PD on QoL, and possibly lowering long-term treatment costs are all dependent on the early diagnosis and treatment of PD. The suggested remedy tries to use a variety of indicators to predict early Parkinson disease in patients.</p> |
| 5. | BusinessModel(RevenueModel) | <p>Keypartners:</p> <ul style="list-style-type: none"> ● Distributors ● Academia ● Platforms <p>Keyactivities:</p> <ul style="list-style-type: none"> ● Development of solutions ● Data acquisition ● Platform operation ● Clinical <p>Trials KeyResources:</p> <ul style="list-style-type: none"> ● Data ● People <p>Value Propositions:</p> <ul style="list-style-type: none"> ● Uniqueness ● Performance ● Cost <p>Customer Segments:</p> <ul style="list-style-type: none"> ● Clinics, Hospitals ● Software/platform developers |
| 6. | ScalabilityoftheSolution | <p>With various calculations, XGBooster's exactness, correctness, review, and other qualities are quite good. In terms of performance, XGBoost not only keeps up with but outperforms all those other algorithms. Real-world scale issues can be resolved using XGBoost with the least amount of resources.</p> |

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c) Problem Solution Fit

| | | |
|---|--|--|
| <p>1. CUSTOMER SEGMENT(S)</p> <p>Cs</p> <ul style="list-style-type: none"> Parkinson's disease is a progressive disorder that affects the nervous system and the parts of the body controlled by the nerves. Parkinson's patient have symptoms of Tremor, Slowed movement (bradykinesia), Rigid muscles, Writing changes, Impaired posture and balance, Loss of automatic movements, Speech changes. | <p>6. CUSTOMER</p> <p>CC</p> <ul style="list-style-type: none"> Accurate prediction of disease. Early prediction of the disease. | <p>5. AVAILABLE SOLUTIONS</p> <p>AS</p> <ul style="list-style-type: none"> The physician takes a medical history and does a physical examination. Performs a neurological examination, testing agility, muscle tone, gait and balance. PET and MRI scan also used by doctor for classification. In Machine learning field Several algorithms are proposed for classification. |
| <p>2. JOB-S-TO-BE-DONE / PROBLEMS</p> <p>J&P</p> <ul style="list-style-type: none"> Parkinson patient have problem of rigid muscles and writing changes. We have to collect the drawing of normal and parkinson patients. Using the drawing, we have to detect the presence of parkinson disease by applying necessary algorithm. | <p>3. PROBLEM ROOT CAUSE</p> <p>RC</p> <ul style="list-style-type: none"> Lack of data New to field of study | <p>7. BEHAVIOUR</p> <p>BE</p> <ul style="list-style-type: none"> Random forests are preferred over decision trees is that they are stable and are low variance models. They also overcome the problem of overfitting present in decision trees. Since they use bootstrapped data and random set of features, they ensure diversity and robust performance. They are immune to curse of dimensionality as they do not consider all the features at one time for individual trees. The main disadvantage of random forests is their lack of interpretability. |
| <p>3. TRIGGERS</p> <p>TR</p> <ul style="list-style-type: none"> Parkinson disease are easy to treat if we detect in early stage. Provide more efficient algorithm to detect the parkinson disease in its early stage. <p>4. EMOTIONS: BEFORE / AFTER</p> <p>EM</p> <p>Before:</p> <ul style="list-style-type: none"> Does not know about outcome of prediction. <p>After:</p> <ul style="list-style-type: none"> Got idea to detect parkinson disease in early stage. Certain about prediction and to take necessary | <p>10. YOUR SOLUTION</p> <p>SL</p> <ul style="list-style-type: none"> The project aims at presenting a solution for parkinson's disease detection using suitable machine learning algorithms. Algorithms such as random forest and decision trees are used for disease prediction. We will load the dataset into dataframe and get the feature and label ,preprocess the data and classify it. | <p>8. CHANNELS OF BEHAVIOUR</p> <p>CH</p> <p>8.1 Online:</p> <ul style="list-style-type: none"> If we use online channels, then the Customer can check their result with online comparison using our platform. <p>8.2 Offline:</p> <ul style="list-style-type: none"> offline channels If the disease predicted then the customer need to go to Hospital for Treatment in offline mode. |

Define CS, fit into

Focus on J&P, tap into BE, understand

Identify strong TR & EM

Explore AS,

Focus on J&P, tap into BE, understand

Extract online & offline CH of BE

4. REQUIREMENT ANALYSIS

a. Functional requirements

| FR No. | Functional Requirement (Epic) | SubRequirement(Story/Sub-Task) |
|--------|----------------------------------|--|
| FR-1 | Analyzing Symptoms | <p>Stiffness in muscles</p> <p>Rigidity and slowness in body movements</p> <p>Breaking of voice and shivering in tone</p> <p>Difficulty with walking</p> <p>Emotional and behavioral changes</p> <p>Dementia and depression</p> |
| FR-2 | Collecting voice dataset | <p>Speech and voice recordings of the patient is collected.</p> <p>Various voice parameters are measured.</p> |
| FR-3 | Working on database | <p>Voice recording is measured against the parameters.</p> <p>Data is preprocessed and dependent variables are found.</p> <p>Data is split into train and test data.</p> <p>Training and testing is done and the model is evaluated.</p> |
| FR-4 | Applying SVM algorithm | <p>SVM finds a hyper-plane that creates a boundary between the types of data.</p> <p>We plot each data item in the dataset in an N-dimensional space.</p> <p>The algorithm tries to find the optimal hyperplane which can be used to classify dataset into healthy person or persons suffering from Parkinson.</p> |

| | | |
|------|-------------------------------|--|
| FR-5 | Providing insights of dataset | <p>Raw data collection and sharing of data and systems are essential factors in hospital management.</p> <p>According to these data appropriate measures can be taken. Providing dataset without error.</p> <p>or.</p> <p>Providing treatment for the patients who are suffering from Parkinson.</p> |
|------|-------------------------------|--|

| FR No. | Non-Functional Requirement | Description |
|--------|----------------------------|---|
| NFR-1 | Usability | Usable systems are straightforward to use by as many people as possible, both in case of either end users or administrators to view the hospital records when needed. |
| NFR-2 | Security | Patient identification: To recognize and analyze the patient perfectly. |
| NFR-3 | Reliability | Understanding the current trend and working on it to solve the problem in an efficient manner. Being software as a service, HMS is highly resilient to any technology disruptions, downtime, or crashes experienced by other technology systems. |
| NFR-4 | Performance | Response time: Providing acknowledgment in minimal time about the patient information. Comfortability: To ensure that the guidelines and accessibilities are followed. |

| | | |
|-------|---------------------|---|
| NFR-5 | Availability | Better coordination with the hospital management to provide all its resources accessible when needed. Accessibility of all medical facilities. |
| NFR-6 | Scalability | Make sure that the work is done in more efficient way with the appropriate resources. Make complex decisions understandable with proper data. |

b. Non Functional Requirements

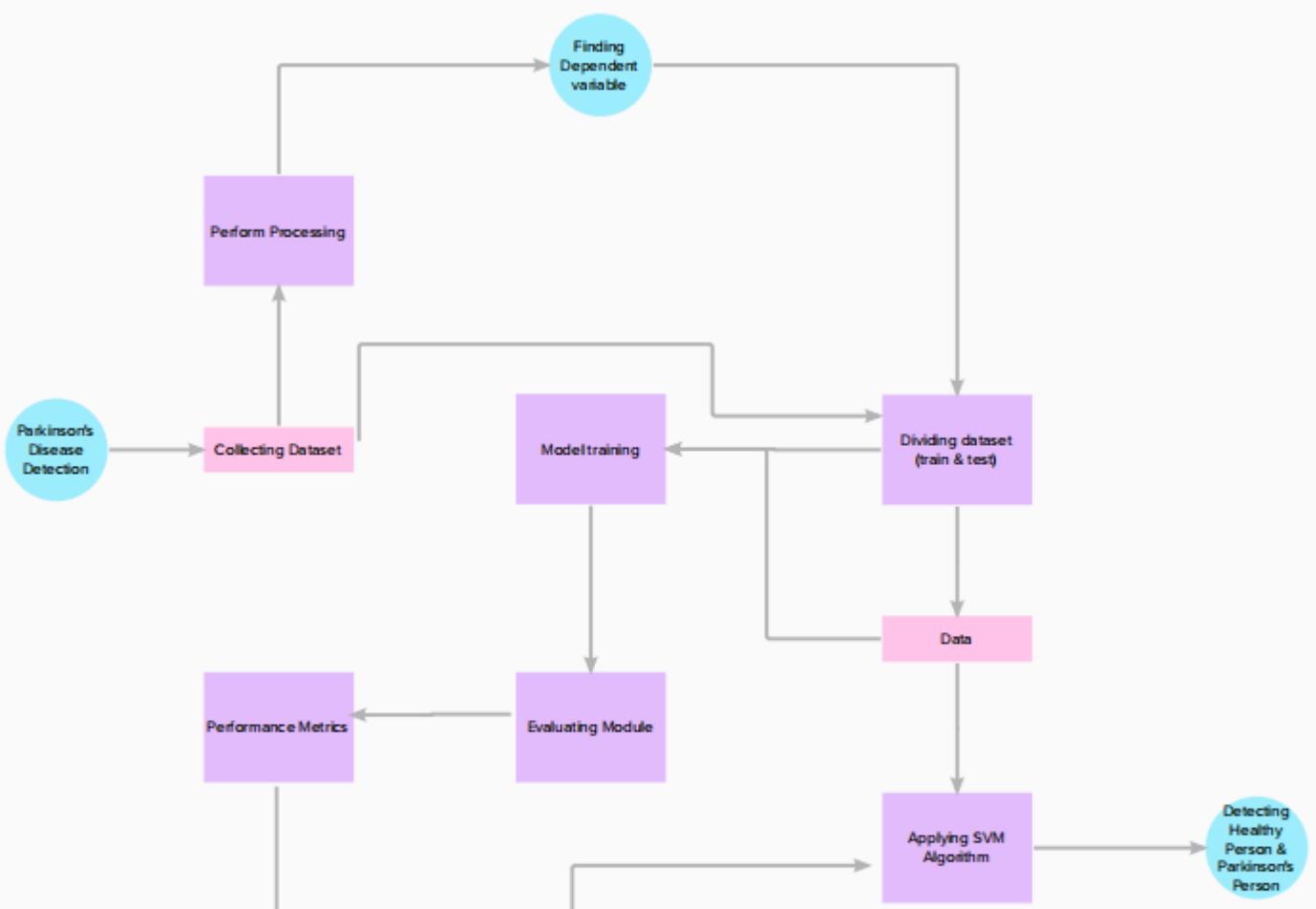
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5. PROJECT DESIGN

a) Data Flow Diagrams

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



b) Solution & Technical Architecture

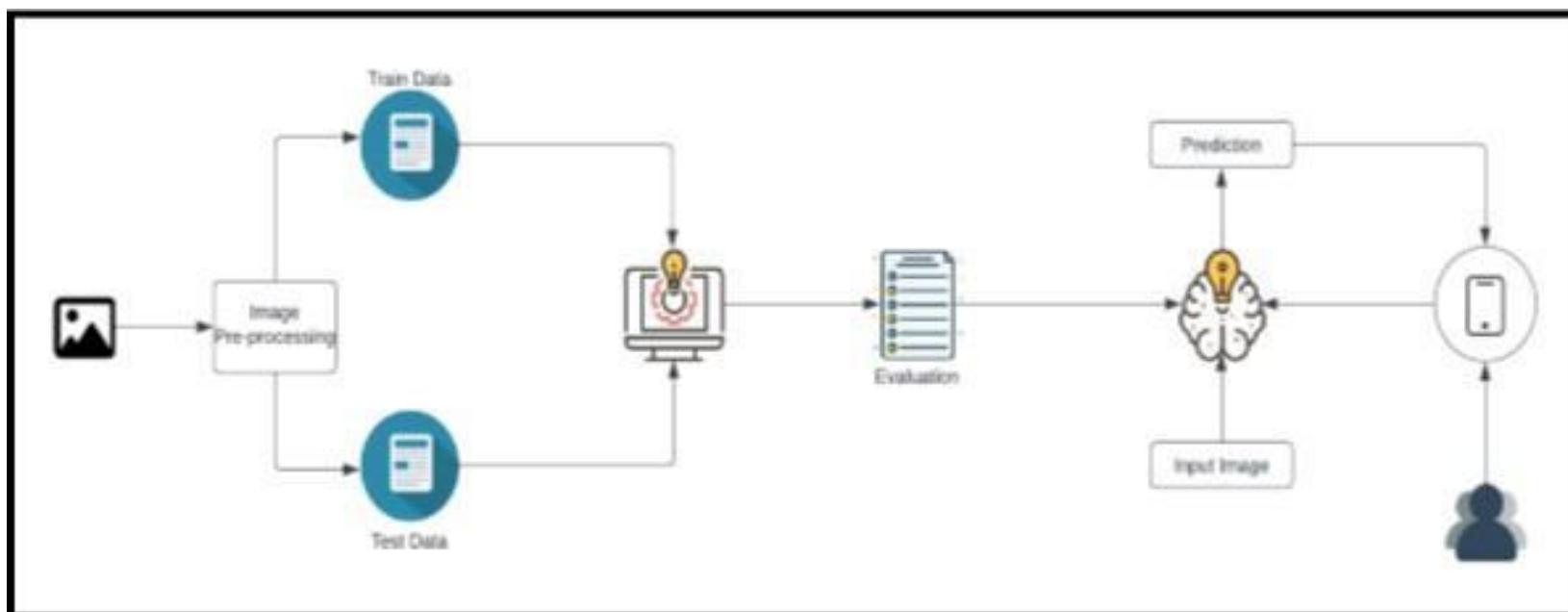
Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

Find the best tech solution to solve existing business problems.

Describe the structure, characteristics, behaviour, and other aspects of the software to project stakeholders.

Define features, development phases, and solution requirements.

Provide specifications according to which the solution is defined, managed, and delivered.



Technical Architecture:

The deliverable shall include the technological stack as well as the required details in both the tables.

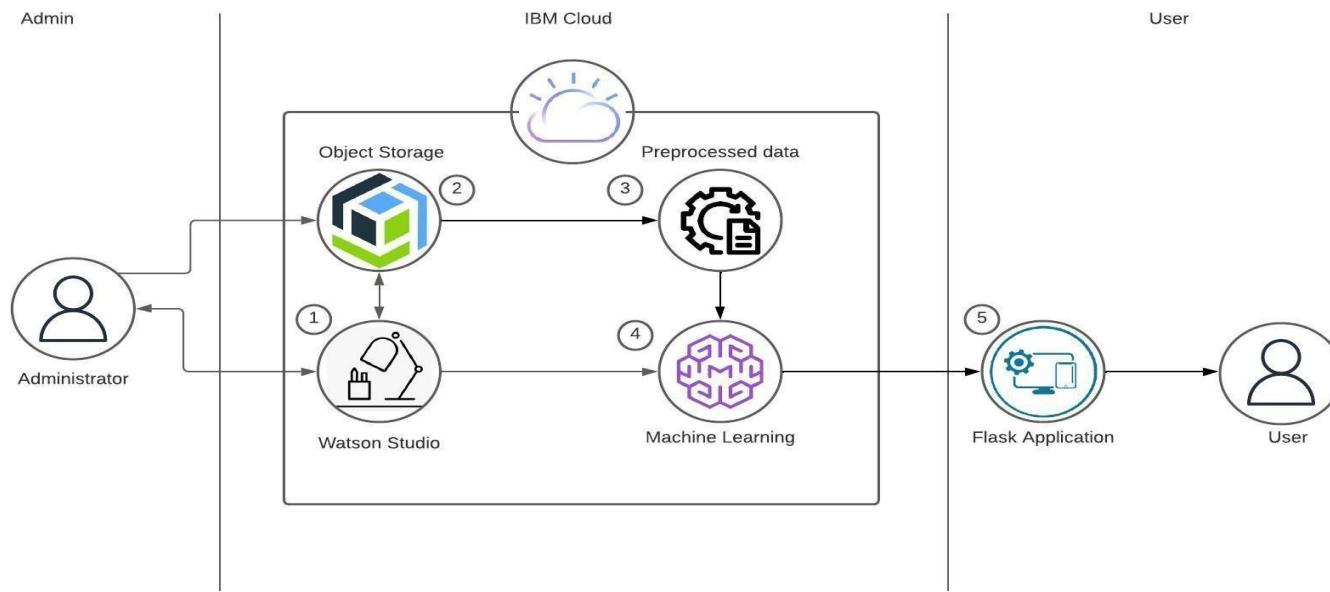


Table-1 : Components & Technologies:

| S.No | Component | Description | Technology |
|------|---------------------|---|--------------------------|
| 1. | User Interface | How the user interacts with the application e.g. Web UI | HTML, CSS, Python flask. |
| 2. | Application Logic-1 | Register and Login page | HTML, CSS, Python flask. |
| 3. | Application Logic-2 | Home Page | HTML, CSS. |
| 4. | Application Logic-3 | Test vital page | HTML, CSS, Python flask. |

| | | | |
|-----|---------------------------------|--|---|
| 5. | Database | Data Type, Configurations, etc. | MySQL. |
| 6. | Cloud Database | Database Service on Cloud | IBM Database. |
| 7. | File Storage | File Storage requirements | IBM Cloud Object Storage |
| 8. | External API-1 | Purpose of External API used in the application | IBM API Connect. |
| 9. | External API-2 | Purpose of External API used in the application | NIL |
| 10. | Machine Learning Model | Train the classification model using the Random forest classification algorithm. | IBM Watson Studio. |
| 11. | Infrastructure (Server / Cloud) | Application Deployment on Local System / Cloud. | Local Server Configuration: Local System. Cloud Server Configuration:IBM Watson |

| S.No | Characteristics | Description | Technology |
|------|--------------------------|--|---|
| 1. | Open-Source Frameworks | List the open-source frameworks used | Python Flask, Jupyter Notebook, Tensorflow, and Python libraries. |
| 2. | Security Implementations | List all the security/access controls implemented, use of firewalls, etc. | Through Password, Email Confirmation. |
| 3. | Scalable Architecture | Justify the scalability of architecture (3 – tier, Micro-services) | Python Libraries. |
| 4. | Availability | Justify the availability of applications (e.g. use of load balancers, distributed servers, etc.) | IBM Watson MachineLearning. |
| 5. | Performance | Design Considerations for the performance of the application (number of requests per sec, use of Cache, use of CDNs), etc. | Flask. |

Table-2: Application Characteristics:

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c) User Stories

The purpose of a user story is to articulate how a piece of work will deliver a particular value back to the customer. Note that "customers" don't have to be external end users in the traditional sense, they can also be internal customers or colleagues within your organization who depend on your team.

User stories are a few sentences in simple language that outline the desired outcome. They don't go into detail. Requirements are added later, once agreed upon by the team.

| User Type | Functional Requirement (Epic) | User Story Number | User Story / Task | Acceptance criteria | Priority | Release |
|-----------|-------------------------------|-------------------|---|--|----------|----------|
| Customer | Login | USN-1 | Entering Web page | Enter the application | High | Sprint 1 |
| | Homepage | USN-2 | Entering to the "Homepage" of the UI (Webpage) | Enter the homepage | High | Sprint 1 |
| | About | USN-3 | I can click on the "About" to details about the Application | Get the details about the application | Low | Sprint 2 |
| | Begin | USN-4 | As a user I can get my voice signal values from the computer. | Choose my voice Recording from my Device and extract the values | High | Sprint 2 |
| | Predict | USN-5 | As a user I can turn on the microphone or earphone to record my voice and extract needed values from it | Turn on the microphone or earphone to record the voice and extract values from the recording | High | Sprint 3 |
| | | USN-6 | Predicting by using voice signal values | Can monitor change in voice or voice shaking and predict parkinsons disease | High | Sprint 3 |

6. PROJECT PLANNING & SCHEDULING

a. Sprint planning and estimation

Sprint planning and Estimation is done by the entire team during Sprint Planning Meeting. The objective of the Estimation would be to consider the User Stories for the Sprint by Priority and by the Ability of the team to deliver during the Time Box of the Sprint.

| User Type | Functional Requirement (Epic) | User Story Number | User Story / Task | Acceptance criteria | Priority | Release |
|-----------|-------------------------------|-------------------|---|--|----------|----------|
| Customer | Login | USN-1 | Entering Web page | Enter the application | High | Sprint 1 |
| | Homepage | USN-2 | Entering to the “Homepage” of the UI (Webpage) | Enter the homepage | High | Sprint 1 |
| | About | USN-3 | I can click on the “About” to details about the Application | Get the details about the application | Low | Sprint 2 |
| | Begin | USN-4 | As a user I can get my voice signal values from the computer. | Choose my voice Recording from my Device and extract the values | High | Sprint 2 |
| | Predict | USN-5 | As a user I can turn on the microphone or earphone to record my voice and extract needed values from it | Turn on the microphone or earphone to record the voice and extract values from the recording | High | Sprint 3 |
| | | USN-6 | Predicting by using voice signal values | Can monitor change in voice or voice shaking and predict parkinsons disease | High | Sprint 3 |

6. PROJECT PLANNING & SCHEDULING

a . Sprint Planning & Estimation

Sprint planning and Estimation is done by the entire team during Sprint Planning Meeting. The objective of the Estimation would be to consider the User Stories for the Sprint by Priority and by the Ability of the team to deliver during the Time Box of the Sprint.

| Sprint | Functional Requirement (Epic) | User Story Number | User Story / Task | Story Points | Priority | Team Members |
|---------------|--|--------------------------|--|---------------------|-----------------|---------------------|
| Sprint-1 | Registration | USN-1 | As a user, I can register for the application by entering my username, email, password, contact number and confirming my password. | 5 | High | TM-1 TM-2 |
| Sprint-1 | Login | USN-2 | As a user, I can enter the username and password after registration for login | 5 | High | TM-1 TM-2 |
| Sprint-2 | Dashboard | USN-3 | As a user, I can register for the application through Gmail and see the details in Dashboard | 10 | Low | TM-3TM-4 |
| Sprint-1 | Details about | USN-4 | As a user, I can register for the application through Gmail | 5 | Medium | TM-1 TM-2 |
| Sprint-1 | Login and repeated | USN-5 | As a user, I can log into the application by entering email and password | 5 | High | TM-1 TM-2 |
| Sprint-2 | Web page details | USN-6 | As a user I must extract certain values from the recorded voice and fill the form to detect Parkinsons Disease | 10 | High | TM-3 TM-4 |
| Sprint-3 | Upload the voice signal extracted details in the web application | USN-7 | As a user I must receive a correct predicted output | 20 | High | TM-1 TM-2 |
| Sprint-4 | Provide efficient customer support | USN-8 | As a user, I need to get support from developers in case of queries and failure of service provided | 10 | Medium | TM-3 TM-4 |
| Sprint-4 | Overview the entire process. Take all the responsibility and act bridge between users and developers | USN-9 | We need to satisfy the customer needs in an efficient way and make sure any sort of errors are fixed | 10 | High | TM-3 TM-4 |

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b. Sprint Delivery Schedule

Sprint delivery schedule is a schedule prepared with timelines within which a particular task should be completed.

| Sprint | Total Story Points | Duration | Sprint Start Date | Sprint End Date (Planned) | Story Points Completed (as on Planned End Date) | Sprint Release Date (Actual) |
|----------|--------------------|----------|-------------------|---------------------------|---|------------------------------|
| Sprint-1 | 20 | 6 Days | 24 Oct 2022 | 29 Oct 2022 | 20 | 29 Oct 2022 |
| Sprint-2 | 20 | 6 Days | 31 Oct 2022 | 05 Nov 2022 | 20 | 05 Nov 2022 |
| Sprint-3 | 20 | 6 Days | 07 Nov 2022 | 12 Nov 2022 | 20 | 12 Nov 2022 |
| Sprint-4 | 20 | 6 Days | 14 Nov 2022 | 19 Nov 2022 | 20 | 14 Nov 2022 |

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ii. Board

iii. Road Map

| Branding, building, and setting up the activity for the process | Enter How do customers initially become aware of this process? | Enter What do people expect before and before the beginning of the process? | Engage In the core moments in the process, what happens? | Exit What do people typically expect from the process, last? |
|--|--|--|---|---|
|  Step 1 What does the person (or group) typically experience? |  What do people think about the process?  What do people think about the process?  What do people think about the process?  What do people think about the process?  What do people think about the process?  What do people think about the process?  What do people think about the process?  What do people think about the process? |  What do people expect before and before the beginning of the process?  What do people expect before and before the beginning of the process? |  |  |
|  Interactions What interactions do they have at each step along the way? <ul style="list-style-type: none"> • Propose ideas or ask for information • Present ideas or ask them • Transfer ideas or ask for help • Think about what shift of handshakes or physical objects, tools they used? |  What interactions do they have at each step along the way?  What interactions do they have at each step along the way? | | | |
|  Goals & motivations At each step, what does a person's primary goal or motivation? ("Help me..." or "Help or avoid...")? |  What are the primary goals and motivations?  What are the primary goals and motivations? | | | |
|  Positive moments What key values a typical person feel especially productive, fun, and inspiring, delightful, or exciting? |  What are the positive moments? | | | |
|  Negative moments What key values a typical person feel frustrating, confusing, negative, and/or uninteresting? |  What are the negative moments? | | | |
|  Areas of opportunity How might we make each step better? What ideas do we have? What can often be improved? |  What are the areas of opportunity? | | | |

7. CODING & SOLUTIONING

i. Python App:

Base.html

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<meta http-equiv="X-UA-Compatible" content="IE=edge">
<meta name="viewport" content="width=device-width, initial-scale=1">
<title>Parkinson Disease Detection</title>
<link rel="stylesheet"
      href="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.css">
<link rel="stylesheet" href="{{ url_for('static', filename='css/styles1.css') }}">
</head>
<body>
<nav class="navbar navbar-expand-lg navbar-light bg-light">
<div class="collapse navbar-collapse">
<ul class="navbar-nav ml-auto">
<li class="nav-item">
<a class="nav-link" href="{{ url_for('home') }}>Home</a>
</li>
{%
  if not logged_in:
%}
<li class="nav-item">
<a class="nav-link" href="{{ url_for('login') }}>Login</a>
</li>
<li class="nav-item">
<a class="nav-link" href="{{ url_for('register') }}>Register</a>
</li>
{%
  endif
%}
```

```
</li>
</ul>
</div>
</nav>
{% block content %}
{% endblock %}
</body>
</html>
```

Base1.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>Parkinson Disease Detection</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">
</head>
<body>
<nav class="navbar navbar-dark bg-dark">
<div class="container">
<a class="navbar-brand" href="#">Parkinson Disease Detection</a>
<!--<button class="btn btn-outline-secondary my-2 my-sm-0"
type="submit">Help</button>-->
</div>
</nav>
<div class="container">
<div id="content" style="margin-top:2em">{{ block_content }}<%
endblock %></div>
```

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

index.html

```
{% extends
"base1.html"
%} {% block
content %}

<center><h2>Parkinson Disease Detection</h2>
</center>
<center>
<div>
<form id="upload-file" method="post" enctype="multipart/form-data">
<label for="imageUpload" class="upload-label">
Upload image
</label>
<input type="file" name="file" id="imageUpload" accept=".png, .jpg, .jpeg">
</form>
<div class="image-section" style="display:none;">
<div class="img-preview">
<div id="imagePreview">
</div>
</div>
<div>
<button type="button" class="btn btn-primary btn-lg " id="btn
predict">Predict!</button>
</div>
</div>
<div class="loader" style="display:none;"></div>
<h3 id="result">
<span> </span>
</h3>
```

```
</div>
</center>
{%
  endblock %}
```

Index1.html

```
{%
  extends
  "base.html"
%}
{%
  block content %}
<div class="box">
<h1>Parkinson Detection</h1><br><br>
<a href="{% url_for('login') %}" class="btn btn-primary btn-block
btn-large">Login</a>
<a href="{% url_for('register') %}" class="btn btn-secondary btn-block btn
large">Register</a>
</div>
```

```
{%
  endblock %}login.html
```

```
{%
  extends
  "base.html"
%}
{%
  block content %}
<div class="box">
```

```
<h1>Login</h1>
{%
  with messages = get_flashed_messages() %
}
{%
  if messages %
}
{%
  for message in messages %
}
<p>{{ message }}</p>
{%
  endfor %
}
{%
  endif %
}
{%
  endwith %
}
<form action="{% url_for('login') %}" method="post">
<input type="text" name="email" placeholder="Email" required="required"/>
<input type="password" name="password" placeholder="Password"
required="required"/>
<button type="submit" class="btn btn-primary btn-block btn-large">Let me
in.</button>
</form>
```

```
</div>
{%
  endblock %
}
register.html
{%
  extends
  "base.html"
%
}
{%
  block content %
}
<div class="box">
<h1>Register</h1>
<form action="{{ url_for('register') }}" method="post">
<input type="text" name="name" placeholder="Name" required="required" />
<input type="email" name="email" placeholder="Email" required="required" />
<input type="password" name="password" placeholder="Password" required="required" />
<button type="submit" class="btn btn-primary btn-block btn-large">Sign me up.</button>
</form>
</div>
{%
  endblock %
}
Main.css
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;
}
.upload-label{
display: inline-block;
padding: 12px 30px;
background: #541690;
color: #fff;
font-size: 1em;
transition: all .4s;
cursor: pointer;
}
.upload-label:hover{
background: #34495E;
color: #541690;
}
.loader {
border: 8px solid #34495E; /* Light grey */
border-top: 8px solid #34495E; /* Blue */
border-radius: 50%;
width: 50px;
height: 50px;
animation: spin 1s linear infinite;
}
@keyframes spin {
0% { transform: rotate(0deg); }
100% { transform: rotate(360deg); }
}
```

Styles.css

```
*,  
*:before,  
*:after {
box-sizing: border-box;
}
```

```
html {  
font-size: 18px;  
line-height: 1.5;  
font-weight: 300;  
color: #333;  
font-family: "Nunito Sans", sans-serif;  
}  
body {  
margin: 0;  
padding: 0;  
height: 100vh;  
background-color: #ecf0f9;  
background-attachment: fixed;  
}  
.large {  
font-size: 3rem;  
}  
.content {  
display: flex;  
margin: 0 auto;  
justify-content: center;  
align-items: center;  
flex-wrap: wrap;  
max-width: 1500px;  
}  
p.overview {  
font-size: 12px;  
height: 200px;  
width: 100%;  
overflow: hidden;  
text-overflow: ellipsis;  
}  
.heading {  
width: 100%;  
margin-left: 1rem;  
font-weight: 900;
```

```
font-size: 1.618rem;
text-transform: uppercase;
letter-spacing: 0.1ch;
line-height: 1;
padding-bottom: 0.5em;
margin-bottom: 1rem;position: relative;
}
.heading:after {
display: block;
content: "";
position: absolute;
width: 60px;
height: 4px;
background: linear-gradient(135deg, #1a9be6, #1a57e6);
bottom: 0;
}
.description {
width: 100%;
margin-top: 0;
margin-left: 1rem;
margin-bottom: 3rem;
}
.card {
color: inherit;
cursor: pointer;
width: calc(33% - 3rem);
min-width: calc(33% - 3rem);
height: 400px;
min-height: 400px;
perspective: 1000px;
margin: 1rem auto;
position: relative;
}
@media screen and (max-width: 800px) {
.card {
width: calc(50% - 3rem);
```

```
}
```

```
}
```

```
@media screen and (max-width: 500px) {
```

```
.card {
```

```
width: 100%;
```

```
}
```

```
}
```

```
.front, .back {
```

```
display: flex;
```

```
border-radius: 6px;
```

```
background-position: center;
```

```
background-size: cover;
```

```
text-align: center;
```

```
justify-content: center;
```

```
align-items: center;
```

```
position: absolute;
```

```
height: 100%;
```

```
width: 100%;
```

```
-webkit-backface-visibility: hidden;backface-visibility: hidden;
```

```
transform-style: preserve-3d;
```

```
transition: ease-in-out 600ms;
```

```
}
```

```
.front {
```

```
background-size: cover;
```

```
padding: 2rem;
```

```
font-size: 1.618rem;
```

```
font-weight: 600;
```

```
color: #fff;
```

```
overflow: hidden;
```

```
font-family: Poppins, sans-serif;
```

```
}
```

```
.front:before {
```

```
position: absolute;
```

```
display: block;
```

```
content: ";
```

```
top: 0;
```

```
left: 0;
right: 0;
bottom: 0;
background: linear-gradient(135deg, #1a9be6, #1a57e6);
opacity: 0.25;
z-index: -1;
}
.card:hover .front {
transform: rotateY(180deg);
}
.card:nth-child(even):hover .front {
transform: rotateY(-180deg);
}
.back {
background: #fff;
transform: rotateY(-180deg);
padding: 0 2em;
}
.card:hover .back {
transform: rotateY(0deg);
}
.card:nth-child(even) .back {
transform: rotateY(180deg);
}
.card:nth-child(even):hover .back {
transform: rotateY(0deg);
}
.button {
transform: translateZ(40px);
cursor: pointer;
-webkit-backface-visibility: hidden;
backface-visibility: hidden; font-weight: bold;
color: #fff;
padding: 0.5em 1em;
border-radius: 100px;
font: inherit;
```

```
background: linear-gradient(135deg, #1a9be6, #1a57e6);
border: none;
position: relative;
transform-style: preserve-3d;
transition: 300ms ease;
}
.button:before {
transition: 300ms ease;
position: absolute;
display: block;
content: "";
transform: translateZ(-40px);
-webkit-backface-visibility: hidden;
backface-visibility: hidden;
height: calc(100% - 20px);
width: calc(100% - 20px);
border-radius: 100px;
left: 10px;
top: 16px;
box-shadow: 0 0 10px 10px rgba(26, 87, 230, 0.25);
background-color: rgba(26, 87, 230, 0.25);
}
.button.delete-button {
background-color: rgba(230, 87, 230, 0.25);
background: linear-gradient(135deg, #e61a46, #e61a1a);
}
.button.delete-button:before {
background-color: rgba(230, 87, 230, 0.25);
box-shadow: 0 0 10px 10px rgba(230, 87, 230, 0.25);
}
.button:hover {
transform: translateZ(55px);
}
.button:hover:before {
transform: translateZ(-55px);
}
```

```
.button:active {  
    transform: translateZ(20px);  
}  
.button:active:before {  
    transform: translateZ(-20px);  
    top: 12px;  
    top: 12px;  
}  
.container.add { margin-top: 40px;  
margin-bottom: 20px;  
}  
.rating {  
color: #E4BB23;  
}  
.review {  
font-style: italic;  
}  
.movie_gens {  
font-size: 11.5px;  
}  
.title {  
font-weight: bold;  
}  
.release_date {  
font-weight: normal;  
}
```

Main.js

```
$(document).ready(function  
() {  
// Init  
$('.image-section').hide();  
$('.loader').hide();  
$('#result').hide();  
// Upload Preview  
function readURL(input) {  
if (input.files && input.files[0]) {
```

```
var reader = new FileReader();
reader.onload = function (e) {
  $('#imagePreview').css('background-image', 'url(' + e.target.result + ')');
  $('#imagePreview').hide();
  $('#imagePreview').fadeIn(650);
}
reader.readAsDataURL(input.files[0]);
}

$( "#imageUpload" ).change(function () {
  $('.image-section').show();
  $('#btn-predict').show();
  $('#result').text("");
  $('#result').hide();
  readURL(this);
});
// Predict
$('#btn-predict').click(function () {
  var form_data = new FormData($('#upload-file')[0]); // Show loading animation
  $(this).hide();
  $('.loader').show();
  // Make prediction by calling api /predict
  $.ajax({
    type: 'POST',
    url: '/predict',
    data: form_data,
    contentType: false,
    cache: false,
    processData: false,
    async: true,
    success: function (data) {
      // Get and display the result
      $('.loader').hide();
      $('#result').fadeIn(600);
    }
  });
});
```

```
$('#result').text(' Result: ' + data);
console.log('Success!');
},
});
});
});
});
```

Main.py

```
import
pickle
import sklearn
from flask import Flask, render_template,request,redirect,url_for,flash
from flask_bootstrap import Bootstrap
from flask_sqlalchemy import SQLAlchemy
from sqlalchemy.orm import relationship
from flask_wtf import FlaskForm
from werkzeug.utils import secure_filename
from wtforms import StringField, SubmitField,FloatField,IntegerField
from wtforms.validators import DataRequired
from werkzeug.security import
generate_password_hash,check_password_hash
import os
import cv2
from skimage import feature
from flask_login import
login_user,logout_user,LoginManager,UserMixin,current_user,login_required
app = Flask(__name__)
app.config['SECRET_KEY'] = '8BYkEfBA6O6donzWlSihBXox7C0sKR6b'
app.config['SQLALCHEMY_DATABASE_URI']='sqlite:///database.db'
app.config['SQLALCHEMY_TRACK_MODIFICATIONS'] = False
db = SQLAlchemy(app)
Bootstrap(app)
login_manager = LoginManager()
login_manager.init_app(app)
class users(UserMixin,db.Model):
    id =
    db.Column(db.Integer,primary_key=True)
    email= db.Column(db.String(200),nullable=False)
```

```
password = db.Column(db.String(300),nullable=False)
name = db.Column(db.String(100),nullable=False)
@login_manager.user_loader
def user_load(id):
    return users.query.get(int(id))
@app.route("/")
def home():
    return render_template("index1.html")
@app.route("/register",methods=['GET','POST'])
def register():
    if request.method == 'POST':
        if users.query.filter_by(email=request.form['email']).first():
            flash('User already registered')
            return redirect(url_for('login'))
        else:
            password =
                generate_password_hash(request.form['password'],method="pbkdf2:sha256",
                salt_length=8)
            user = users(
                email = request.form['email'],
                password = password,
                name = request.form['name']
            )
            db.session.add(user)
            db.session.commit()
            return redirect(url_for('home'))
        return render_template('register.html')
@app.route("/login",methods=['GET','POST'])
def login():
    if request.method == 'POST':
        email= request.form['email']
        password = request.form['password']
        k=users.query.filter_by(email=email).first()
        if not k:
            flash('User not registered')
            return redirect(url_for('login'))
```

```
elif check_password_hash(k.password,password):
    login_user(k)
    return redirect(url_for('model'))
else:
    flash('Wrong password')
    return redirect(url_for('login'))
    return render_template('login.html')
@app.route("/logout")
def logout():
    logout_user()
    return redirect(url_for('home'))
@app.route("/parkinson")
def model(): return render_template('index.html')
def quantify_image(image):
    features = feature.hog(image, orientations=9,
                           pixels_per_cell=(10,10), cells_per_block=(2,2), transform_sqrt=True, block_norm="L1")
    return features
@app.route('/predict', methods=['GET', 'POST'])
def upload():
    if request.method == 'POST':
        f = request.files['file'] # requesting the file
        basepath = os.path.dirname(os.path.realpath('__file__')) # storing the file
        directory
        filepath = os.path.join(basepath, "uploads", f.filename) # storing the file in
        uploads
        folder
        f.save(filepath)
        image = cv2.imread(filepath)
        image = cv2.cvtColor(image, cv2.COLOR_BGR2GR
```

PNT2022TMID09607

10. ADVANTAGES & DISADVANTAGES

Advantages:

- Major advantage of this tool is that it helps to detect the Parkinsons disease from home.
- It is also easy to use and is quicker to detect Parkinsons disease.
- It can also be performed in any place and everywhere.

Disadvantages:

- The person's who doesn't able to speak cannot detect Parkinsons using this tool

1 . CONCLUSION

Parkinson's disease has been plaguing humans for thousands of years and was described in detail

in ancient medical writings. Early sufferers from its effects were treated with varying results by a variety of plant-based treatments, some of which are still in use today. With the discovery of dopamine in the twentieth century and the subsequent development of dopamine replacement therapy, plus surgical techniques such as deep brain stimulation (DBS), many of the debilitating symptoms are now successfully treated—at least for a time. The hope is to find the cause of PD, along with treatments that stop the disease from progressing. Of particular interest, PD research is uncovering what may turn out to be a common pathophysiologic mechanism underlying dementia and PD. For now, healthcare providers must continue to educate themselves about currently available treatments and hope for better alternatives in the near future.

1. FUTURE

- The tool can be made more accurate by adding even more algorithms.
- The tool can be not only detected by voice also by image and also Gait detection.
- Can add and get more personal information and past medical information.
- Can add more security and authentication.

2. APPENDIX

Code Github Link : <https://github.com/IBM-EPBL/IBM-Project-35311-1660283318>
