


# Ideation Phase

## Brainstorm & Idea Prioritization Template

Team ID	PNT2022TMID24632
Project Name	Project - Detecting Parkinson's Disease using Machine Learning
Maximum Marks	4 Marks

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



## Brainstorm & idea prioritization

DETECTING PARKINSON'S DISEASE USING MACHINE LEARNING

🕒 10 minutes to prepare  
🕒 1 hour to collaborate  
👤 2-8 people recommended

Parkinson's disease is a nervous system disorder that affects movement. The disease is progressive and is marked by five different stages. Although I am aware of the disease, I had not heard of the geometric drawing test. There is a 2017 paper, Distinguishing Different Stages of Parkinson's Disease Using Composite Index of Speed and Pen-Pressure of Sketching a Spiral, by Zham et al. The researchers found that the drawing speed was slower and the pen pressure lower among Parkinson's patients — this was especially pronounced for patients with a more acute/advanced forms of the disease.

One of the symptoms of Parkinson's is tremors and rigidity in the muscles, making it harder to draw smooth spirals and waves. Joao Paulo Polador, a Brazilian Ph.D student postulated that it might be possible to detect Parkinson's disease using the drawings alone rather than having to measure the speed and pressure of the pen on paper.

Reducing the requirement of tracking pen speed and pressure:

1. Eliminates the need for additional hardware when performing the test.
2. Makes it far easier to automatically detect Parkinson's.

Hence, the idea of this project - to build a deep learning system to take an image of a spiral/wave test and to tell if the corresponding person is suffering from Parkinson's disease or not.

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### 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

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**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.


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### Define your problem statement

🕒 5 minutes

The project aims at presenting a solution for Parkinson's disease detection using Spiral Drawings and CNN. The main idea behind the implementation is to classify a person as Healthy or having Parkinson's disease by looking at the Spiral Drawing made by the person. The Spiral Drawing created by a healthy person will look almost similar to a standard spiral shape. However, a spiral drawn by a person with Parkinson's disease will highly deviate from a perfect spiral shape and look distorted due to slow motor movements and decreased coordination between hand and brain. One of the indications of Parkinson's is tremors and rigidity in the muscles, making it difficult to draw smooth spirals and waves. It is possible to detect Parkinson's disease using the drawings alone. Our goal is to quantify the visual appearance of HOG-Histogram of Oriented Gradients method of these drawings image descriptor along with a Random Forest classifier to automatically detect Parkinson's disease in hand-drawn images of spirals and waves.



#### Key rules of brainstorming

To run a smooth and productive session

- 🗣️ Stay in topic.
- 💡 Encourage wild ideas.
- ⏸️ Defer judgment.
- 👂 Listen to others.
- 🗳️ Go for volume.
- 👁️ If possible, be visual.

PROBLEM

How might we are going to predict the disease accurately?

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

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**Brainstorm**  
Write down any ideas that come to mind that address your problem statement.  
🕒 10 minutes

Predict within the limited time

User Friendly

System should have help services

Medications should be listed once if disease is predicted

System should predict the disease accurately

Website should be easily accessible

Accurately classify images as healthy and affected

System should not crash inbetween prediction

System should predict faster

Gather required resources for predicting the disease

Comparing with the previous solutions

Images should be uploaded clearly

Try to improve the previous/ existing solutions

The final prediction should be precise and understandable to the users

System should be trustable

It should be understandable by normal patients

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**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 can break it up into smaller sub-groups.  
🕒 20 minutes

Accurately classify images as healthy and affected

resource gathering for predicting the disease

available for all users

Predicting in faster way

checking the accuracy with other implementations

Medications should be listed after prediction of disease

It should be worthy for all patients

It should be trusted

user friendly

## Step-3: Idea Prioritization

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**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

Importance

If each of these tasks could get done without any difficulty or cost, which would have the most positive impact?

Accurately classify images as healthy and affected

Precise and Clear Display of Final prediction

Images should be uploaded clearly

User Friendly

System should be trustable

System should predict faster