PROJECT DESIGN PHASE-I

PROPOSED SOLUTION

Date	28 September 2022
Team ID	PNT2022TMID28464
Project Name	Detecting Parkinson's Disease Using Machine Learning
Maximum Marks	2 Marks

Proposed Solution Template:

PROBLEM STATEMENT:

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. Parkinson's disease disorder is a brain disorder that causes unintended or uncontrollable movements, such as shaking, stiffness, and difficulty with balance and coordination. 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. It is possible to detect Parkinson's disease using the drawings alone instead of measuring the speed and pressure of the pen on paper.

IDEA/SOLUTION DESCRIPTION:

There are many ways to solve a single problem. One of those methods is those to detect the specific symptoms that are found uniquely for the parkinson's patients. This includes the detection of Parkinson's disease using the drawings alone instead of measuring the speed and pressure of the pen on paper. We can try to 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 images of spirals and waves. Another type of method is that the studies investigates signals from itsustained phonation and text dependent speech modalities for parkinson's disease screening. Parkinson disease affect vocal chord so the motion of speech is detected and evaluated. This can also be a more appropriate method to detect parkinson's.

NOVELTY/UNIQUENESS:

According to a 2017 study by Zham et al., Parkinson's can be identified by having the patient draw a spiral and then tracking the drawings. A test that includes sketching a spiral on a piece of paper could be used to identify people who are at risk of getting Parkinson's disease, according to Australian researchers. A neuro-degenerative condition called Parkinson's disease results in trembling, tight muscles, and trouble walking. The researchers created a specialised automated electronic system that measured writing speeds, pen pressures, and produced the Composite Index of Speed and Pen-pressure (CISP) score in

Parkinson's patients. All three measurements were used to determine whether a participant had Parkinson's disease or not. With this we can create a unique model specific to Parkinson.

SOCIAL IMPACT/CUSTOMER SATISFACTION:

Since it uses the machine learning model to identify these drawings based on their visual appearance (using the HOG approach), it is less prone to errors. In this research, we are utilising a Random Forest classifier and the Histogram of Oriented Gradients (HOG) image descriptor to automatically identify Parkinson's disease in hand-drawn spirals and waves which can be easily implemented. It is convenient to use. It helps to detect without cost and helps to avoid travelling and the time taken.

BUSINESS MODEL (REVENUE MODEL):

It is a welfare based project so it is made available as a free source. This can help the organization to improve their name by this welfare projects. And anyone can use and suggest it to others.

SCALABILITY OF SOLUTION:

It is a SAS (i.e.) Software as a Service model where adjustment can be made anywhere and it is flexible to change. It can be accessed simultaneously by any number of users.

TABULAR FORM:

SNO.	PARAMETER	DESCRIPTION
1	PROBLEM STATEMENT	Parkinson's disease disorder is a brain disorder that causes unintended or uncontrollable movements, such as shaking, stiffness, and difficulty with balance and coordination
2	IDEA/SOLUTION DESCRIPTION	Detection of Parkinson's disease using the drawings alone instead of measuring the speed and pressure of the pen on paper. Histogram of Oriented Gradients (HOG) image descriptor along with a Random Forest classifier to automatically detect Parkinson's disease.
3	NOVELTY/ UNIQUENESS	A test that includes sketching a spiral on a piece of paper could be used to identify people who are at risk of getting Parkinson's disease, according to Australian researchers. All three measurements were used to determine whether a participant had Parkinson's disease or not can be used for accurate measures.
4	SOCIAL IMPACT/CUSTOMER SATISFACTION	Less error. Easily implemented. Convenient to use. Cost-free. Avoids to travel. Time can be saved.
5	BUSINESS MODEL (REVENUE MODEL)	Welfare based project. Free source. Anyone can use and suggest it to others.

6	SCALABILITY OF SOLUTION		It is a SAS where adjustment can be made anywhere flexible to change, accessed by any number of users.