PROJECT DESIGN PHASE-I
SOLUTION ARCHITECTURE

Date	01-10-2022
Team ID	PNT2022TMID28255
Project Name	Detecting Parkinson's Disease Using Machine Learning
Maximum Marks	4 Marks

PROBLEM STATEMENT:

Parkinson's disease (PD) is a neurodegenerative movement disease where the symptoms gradually develop start with a slight tremor in one hand and a feeling of stiffness in the body and it became worse over time. It affects over 6 million people worldwide. At present there is no conclusive result for this disease by non-specialist clinicians, particularly in the early stage of the disease where identification of the symptoms is very difficult in its earlier stages. The disease is majorly is said to be affecting the individuals who are living in village areas with their respective ages over 40 and 50 which outcomes itself as a reason for Parkinson's disease to occur at unexpected times. Lack of adequate knowledge poses a barrier in the provision of appropriate treatment and care for individuals with Parkinson's Disease. We had conducted a important survey between rural and urban areas in which we found that 68% of rural people from agricultural field are getting majorly affected by Parkinson's disease whereas 32% of urban people are affected by the disease with the ages over 50. We further researched and analyzed the data that was gathered from all over the network for figuring out the accurate reason for why this disease majorly affects the agricultural life. So, we found that as Parkinson's disease is believed to be caused by a combination of environmental risk factors and genetic susceptibility. As use of pesticides and Parkinson's disease have been associated, but it has not been narrowed down to specific pesticides or how the amount of exposure contributed. So most specifically, farmers are more prone to Parkinson's Disease than the general population people. The main target of this project is to develop a machine learning powered web application model with the strong building of user interface features that helps to identify and predicts the disease by the identification of
symptoms.

SOLUTION   ARCHITECTURE:

Solution architecture is the process of developing solutions based on predefined processes, guidelines and best practices with the objective that the developed solution fits within the enterprise architecture in terms of information architecture, system portfolios, integration requirements and many more.

It can then be viewed as a combination of roles, processes and documentation that are intended to address specific business needs, requirements or problems through the design and development of applications and information system.

SOLUTION ARCHITECTURE FOR DETECTION OF PARKINSON'S DISEASE

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                    │ Parkinson's disease patients│
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                    ┌─────────────────────────┐
                    │    Image preprocessing   │
                    │  ┌───────────────────┐   │
                    │  │ Improved Bilateral │   │
                    │  │       Filter       │   │
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MR Images of healthy and Parkinson's disease patients

Image preprocessing

Improved Bilateral Filter

Training set

Validation set

Test set

Data augmentation

GAN

Training set

Pre-trained Alex-Net

Modifying the last fully connected layer

Transfer learned Alex-Net

Loss computation

No

Yes

Terminat

Transfer learned the Alex-Net classifier.

Model evaluation

Accuracy