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Project Design Phase -II

Functional Requirements

Parkinson's Disease detection using ML

Abstract:

The Functional Requirements Document (FRD) is a formal statement of an application's functional requirements. It serves the same purpose as a contract. Here, the developers agree to provide the capabilities specified. The client agrees to find the product satisfactory if it provides the capabilities specified in the FRD.

Functional requirements capture the intended behavior of the system. This behavior may be expressed as services, tasks or functions the system is required to perform. The document should be tailored to fit a particular project's need. They define things such as system calculations, data manipulation and processing, user interface and interaction with the application.

The Functional Requirements Document (FRD) has the following characteristics −

It demonstrates that the application provides value in terms of the business objectives and business processes in the next few years.

It contains a complete set of requirements for the application. It leaves no room for anyone to assume anything which is not stated in the FRD.

It is solution independent. The ERD is a statement of what the application is to do— not of how it works. The FRD does not commit the developers to a design. For that reason, any reference to the use of a specific technology is entirely inappropriate in an FRD.

The functional requirement should include the following −

Descriptions of **data** to be entered into the system

Descriptions of **operations** performed by each screen

Descriptions of **work-flows** performed by the system

Descriptions of **system reports** or other outputs

Who can enter the **data** into the system?

How the system meets applicable **regulatory requirements?**

The functional specification is designed to be read by a general audience. Readers should understand the system, but no technical knowledge should be required to understand this document.

Functional Requirements Deliverables:

A Business Requirements Document (BRD) consists of −

Functional Requirements − A Functional Requirement may be a description of the service that the software must offer. It describes a software system or its component. A function is nothing but inputs to the software, its behavior, and outputs. It are often a calculation, data manipulation, business process, user interaction, or the other specific functionality which defines what function a system is probably going to perform. Functional Requirements describe the interactions between the system and its environment independent of its application.Be sure that any assumptions and constraints identified during the Business Case are still accurate and up to date.

- Applying the algorithms on the test data.
- Display the result with the description of having Parkinson's or not.

Non-Functional Requirements:

Non-Functional Requirements specifies the standard attribute of a software . They judge the software supported Responsiveness, Usability, Security, Portability, and other 34 non-functional standards that are critical to the success of the software. An example of a nonfunctional requirement, "how fast does the website load?" Failing to satisfy non-functional requirements may result in systems that fail to satisfy user needs.

Non-functional Requirements allow you to impose constraints or restrictions on the planning of the system across the varied agile backlogs.

- Accuracy
- Reliability
- Flexibility

Software Requirements:

1. Software:
   - Spyder
   - Google Colab
2. Operating System: Windows 10
3. Tools: Web Browser
4. Python Libraries: numpy, pandas, matplotlab, seaborn, sklearn, pickle.

Hardware Requirements:

1. RAM: 4 GB or above
2. Storage: 30 to 50 GB
3. Processor: Any Processor above 500MHz

User Interface

Our Front-End implementation is completed using HTML, CSS, JavaScript and Flask Framework in Scientific Python Development Environment (Spyder). The user interface is extremely essential for any project because everyone who tries to utilize the system for a purpose will attempt to access it using an interface. Indeed, our system also features a user interface built to facilitate users to utilize the services we provide. Where we have used HTML a terminology, utilized for creating web sites. One among the useful aspects of HTML is, it can embed programs written during a scripting language like JavaScript, which is liable for affecting the behavior and content of web pages. CSS inclusion would affect the layout and appearance of the content.

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About Detecting Parkinson's Disease Project:

In this Python machine learning project, Speech or voice data is assumed to be 90% helpful to diagnose a person for identifying the presence of disease. It is one of the most important problems that have to be detected in the early stages so that the progression rate of the disease is reduced. Many of the researchers work on different datasets to predict the disease more efficiently. In general, Persons with PD suffer from speech problems, which can be categorized into two: hypophonia and dysarthria. Hypophonia indicates a very soft and weak voice from a person and dysarthria indicates slow speech or voice, that can hardly be understood at one time and this causes damage to the central nervous system. So, most of the clinicians who treat PD patients observe dysarthria and check out to rehabilitate with specific treatments to improvise vocal intensity. Lots of researchers did work on the pre-processing data and feature selection in the past.

Business Process Model − A model of the current state of the process ("as is" model) or a concept of what the process should become ("to be" model).

Web application consists of components like user experience in front application and result prediction if present or not which is functional.

The developer needs to satisfy the user as well as the customer with the results.

Conclusion:

Parkinson's disease is the second most dangerous neurodegenerative disease which has no cure till now and to make it reduce prediction is important. In this project, we have used three various prediction models to predict the Parkinson's disease which are Machine Learning Techniques i.e. KNN, Naïve Bayes and Logistic Regression. The dataset is trained using these models and we also compared these different models built using different methods and identifies the best model that fits.

The aim is to use various evaluation metrics such as Accuracy, Precision, Recall, Specificity, F1-score, LR+, LR- and Youden score that produce the predicts the disease efficiently. We have used the Speech dataset that contains voice features of the patients.

The models are built using the five best features which were identified by feature selection.

FUTURE WORK

In future, these models can be trained with different datasets that have best features and can be predicted more accurately. If the accuracy rate increases, it can be used by the laboratories and hospitals so that it is easy to predict in early stages. This models can be also used with different medical and disease datasets. In future the work can be extended by building a hybrid model that can find more than one disease with an accurate dataset and that dataset has common features of two diseases. In future the work can extended to build a model that may extract more important features among all features in the dataset so that it produce more accuracy