# Architecture

**Parkonson’s disease prediction**

**Version 1.0**

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**Document Version Control**

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1 Initial Architecture – V1.0

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## Introduction

### What is an architecture design document?

The architecture design document is a technical document describing the components and specifications required to support the solution and ensure that the specific business and technical requirements of the design are satisfied.The architecture design document is a technical document describing the components and specifications required to support the solution and ensure that the specific business and technical requirements of the design are satisfied.

### Scope

This Book Recommender System web application will recommend books based on the user's interested book.

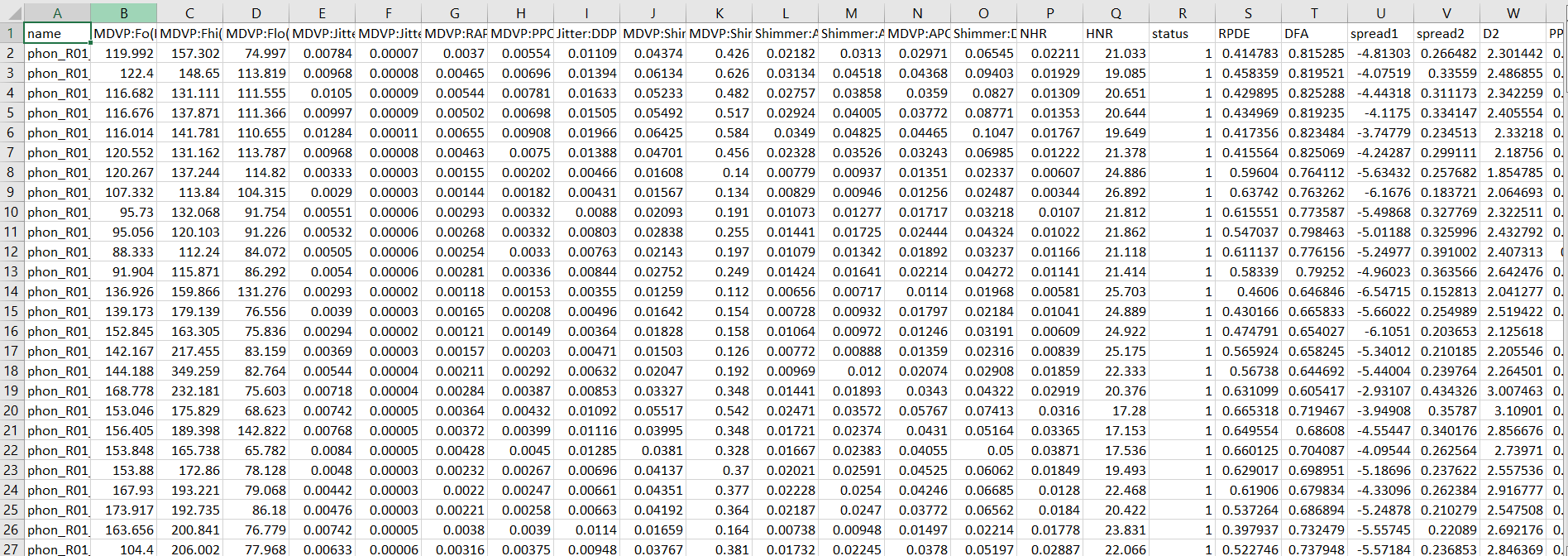
### Constraints

The Book Recommender System application must be user friendly, as automated as possible and users should not be required to know any of the workings.

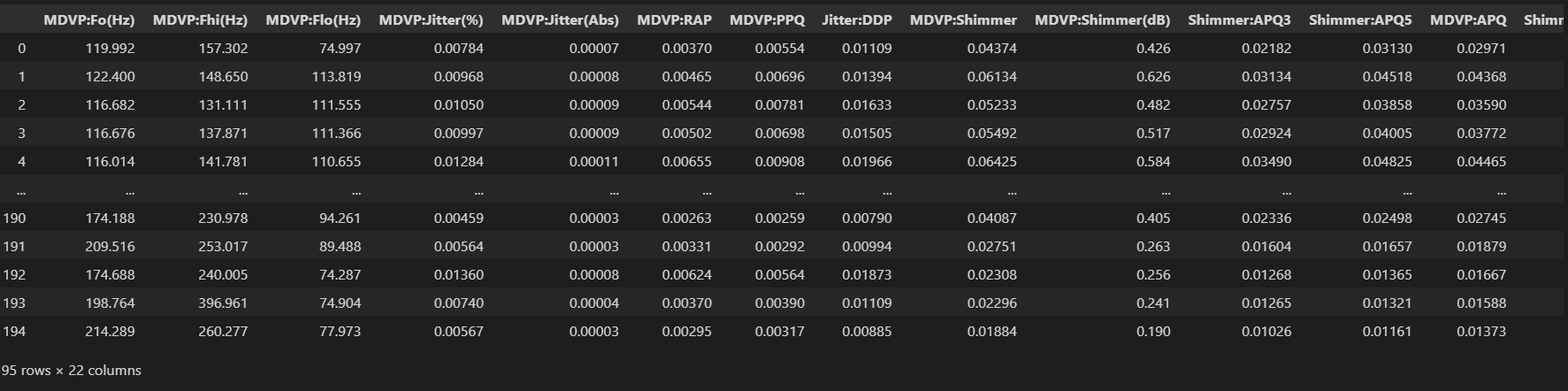
## Technical specifications

### Dataset

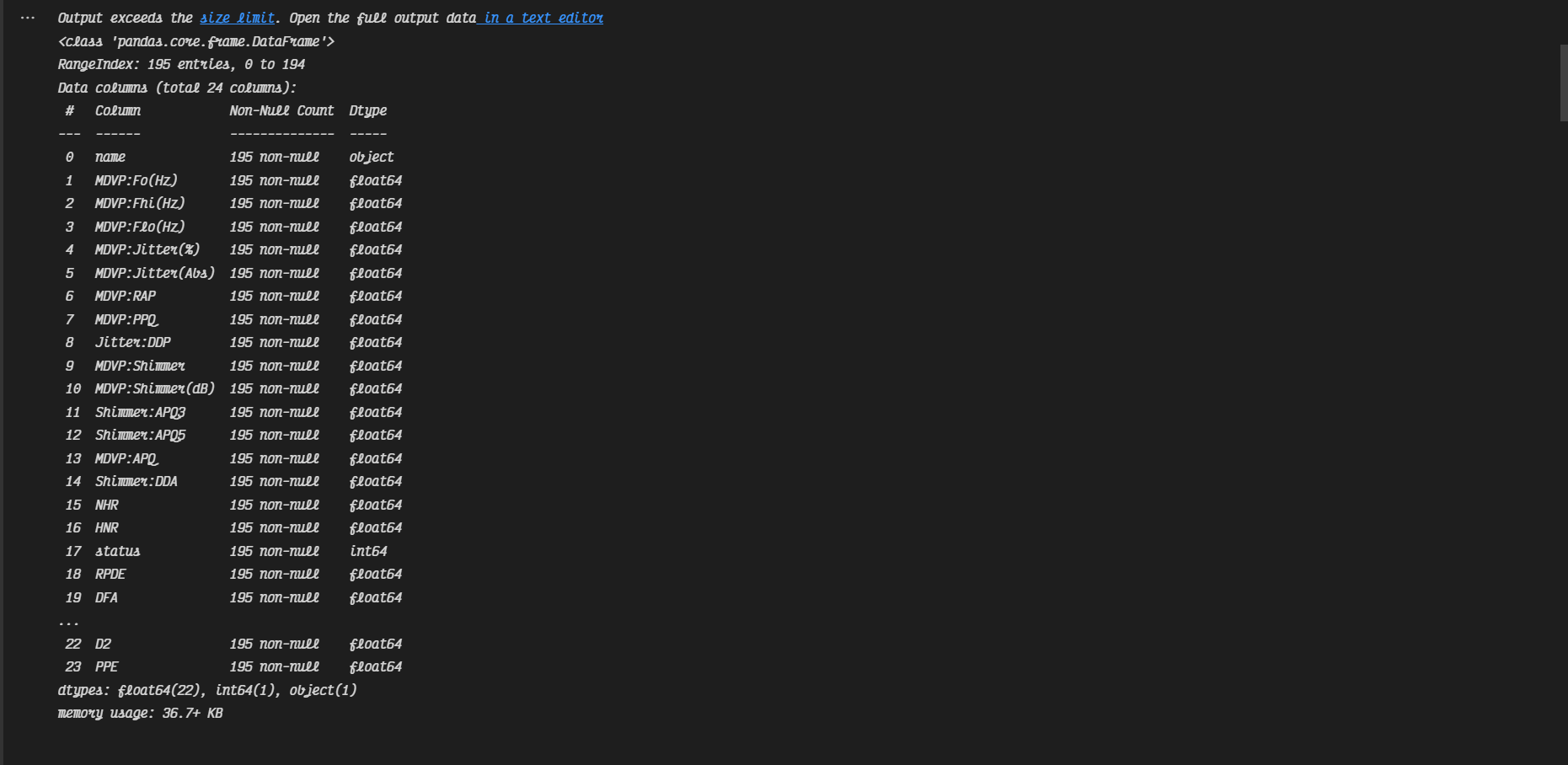
**Diagnosis table:**



**Transcrip table:**

****

**Description table:**

****

* + - 1. **Dataset overview**

**TMDVP:Fo(Hz) - Average vocal fundamental frequency  
MDVP:Fhi(Hz) - Maximum vocal fundamental frequency  
MDVP:Flo(Hz) - Minimum vocal fundamental frequency  
MDVP:Jitter(%),MDVP:Jitter(Abs),MDVP:RAP,MDVP:PPQ,Jitter:DDP - Several   
measures of variation in fundamental frequency  
MDVP:Shimmer,MDVP:Shimmer(dB),Shimmer:APQ3,Shimmer:APQ5,**

**MDVP:APQ,Shimmer:DDA - Several measures of variation in amplitude  
NHR,HNR - Two measures of ratio of noise to tonal components in the voice  
status - Health status of the subject (one) - Parkinson's, (zero) - healthy  
RPDE,D2 - Two nonlinear dynamical complexity measures  
DFA - Signal fractal scaling exponent  
spread1,spread2,PPE - Three nonlinear measures of fundamental frequency variation**

### Input schema

|  |  |  |
| --- | --- | --- |
| **Feature name** | **Null / Required** | **data type** |
| MDVP:Fo(Hz) | Required | Int |
| Jitter:DDP |  | Int |
| NHR | Required | Int |
| Spread1 | Required | int |
| PPE |  | Int |

* + 1. **User Input Requirements**

Users must give input ,and the disease will be predicted.

### Logging

We should be able to log every activity done by the user.

* The System identifies at what step logging required
* The System should be able to log each and every system flow.
* Developers can choose logging methods. You can choose database logging/ File logging as well.
* System should not be hung even after using so many loggings. Logging just because we can easily debug issues so logging is mandatory to do.
  + 1. **Deployment**



## Technology Stack

|  |  |
| --- | --- |
| **Frontend** | Html, CSS, Javascript, JQuery |
| **Backend** | Python, Flask |
| **Database** | Cassandra |
| **Machine Learning** | SK Learn |
| **Deployment** | Heroku |

* 1. **Proposed Solution**

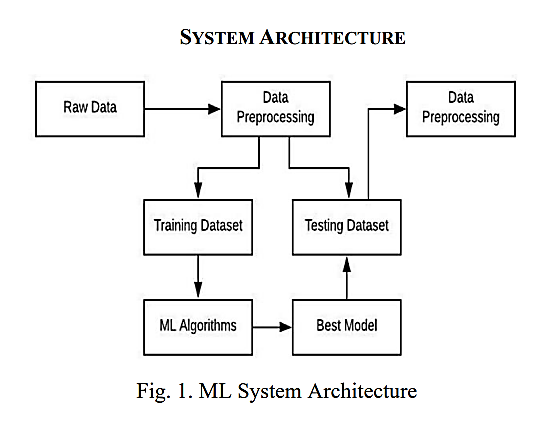
In multi disease model prediction, it is possible to predict more than one disease at a time. So user no need to traverse many models to predict the diseases. It will reduce time and also due to predicting multiple diseases at a time there is a chance of reducing mortality rate.

## Data pre-processing workflow

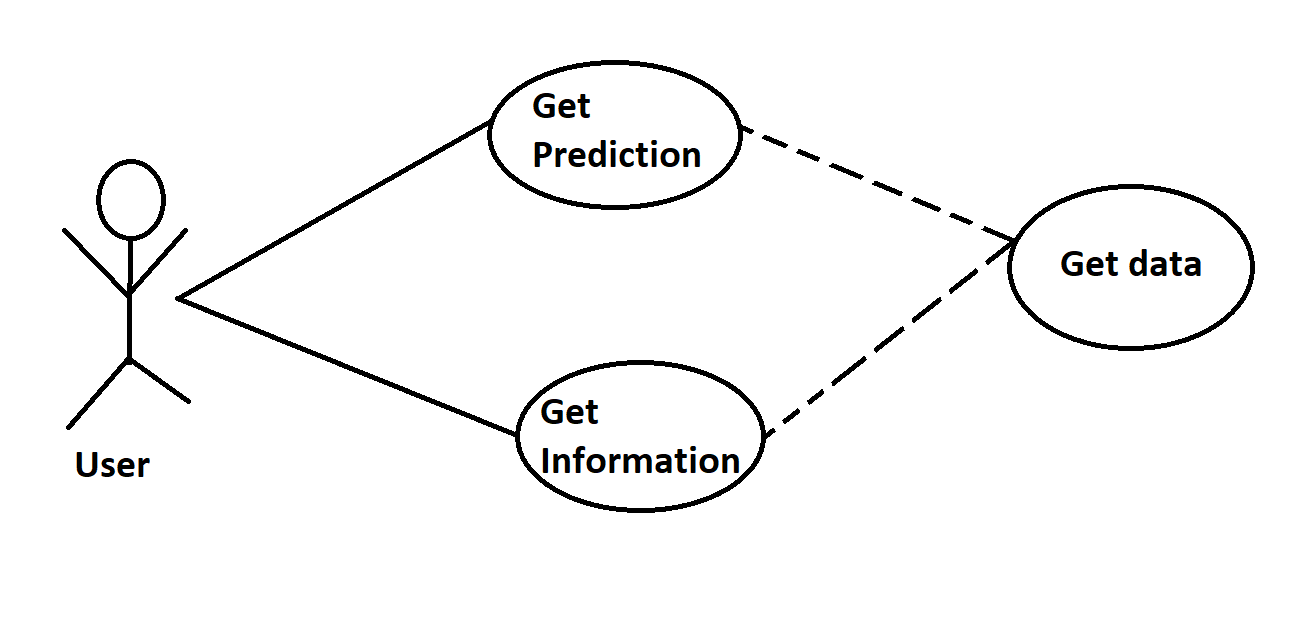
In data pre-processing the following steps are taken.

* **Create tags:** by combining feature columns we are creating tags.
* **Apply Stemming:** in tags we are applying stemming so the model will learn reliably. Ex: applying stepping on `dancing`,`danced` will become `danc`
* **Remove Stop Words:** in tags we are removing stop words like `the`, `and` etc… so, learning accuracy will increase.

## **Model training/validation workflow**



* 1. **User I/O workflow**

****

* 1. **Test cases**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr No** | **User Input** | **Output** | **Test Result** |
|  |  |  |  |
| 1 | Statistical Learning Theory | 1. Nature of Statistical Learning Theory 2. Machine Learning for Hackers 3. Statistical Decision Theory' 4. Pattern Classification 5. Neural Networks | PASS |

## Work-flow implementation

## 

## 10.Key performance indicators (KPI)

Baseline Model: Logistic Regression, since this is a classification problem.

Actual model: LSTMs.

● Number of times a patient visits the hospital.

● Time between symptom onset and detection of illness/visit to hospital.

● Immunity of patient varies.

● Vaccines the patient .

● prediction depicts the model credibility.