UE20CS390A – Capstone Project Phase – 1

Project Progress Review #3

Project Title : Voice Interface for PESU using AI
Project ID : PW23_PB_01
Project Guide : Prof. Priya Badrinath
Project Team with SRN : 805_806_826_844

Abstract and Scope

Voice assistants use machine learning and natural language processing to respond to user requests.

The scope of a PESU voice assistant is vast and continues to expand as new use cases and functionalities are developed. The potential for voice assistants is limited.

1. Easier access to PESU resources
2. Get the latest information about academics
3. Detect and respond to owner only
4. Tap talk and get wherever you wish in PESU academy.
5. Personal voice assistant for students

Suggestions from Review - 2

- Suggestions and remarks given by the panel members.

- Fetching from documents: We are going to use OpenCV for extraction of table information from ISA and any PDF into CSV.

- Voice training module : Natural Language Processing (NLP) will be used to convert normal language queries into database queries.

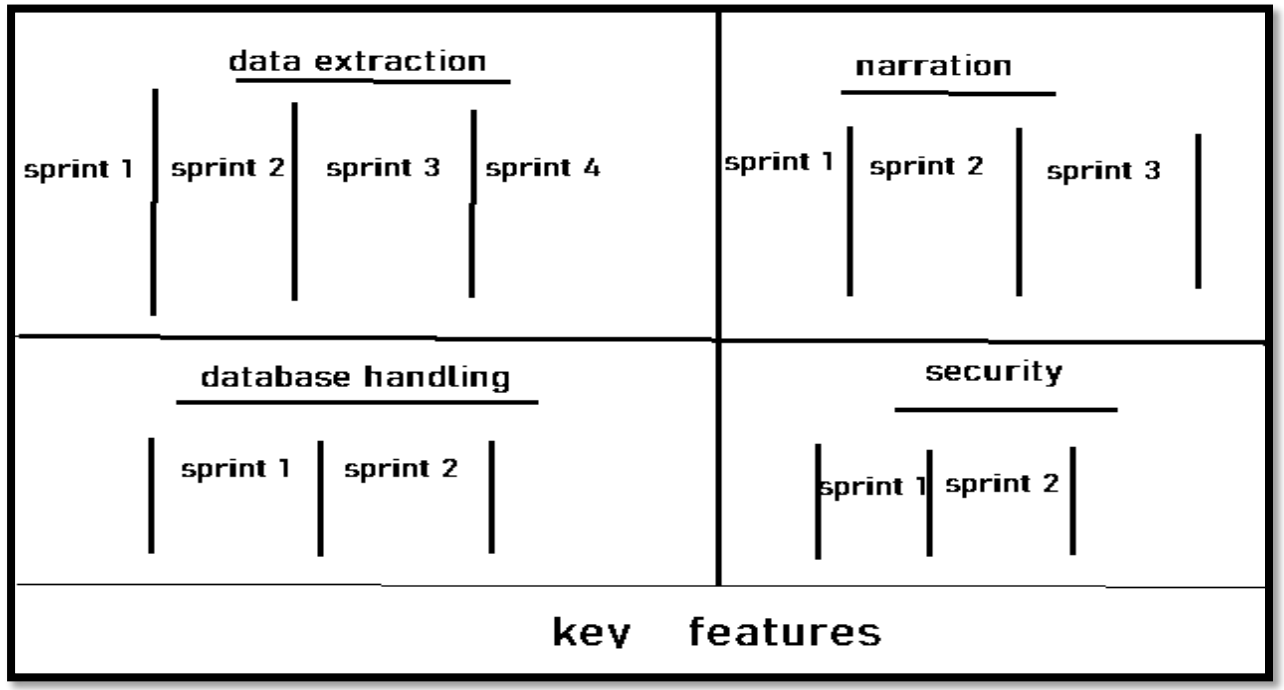
- Voice Authentication : We are going to use Gaussian Mixture Model-Universal Background Model (GMM-UBM) for voice authentication.

- Web Scraping : We are fetching the students' data from the PESU Academy using Selenium Web Drivers.

Design Approach

- We are following sequential and iterative design models in making of our AI trained voice assistant. (this model will help us in making the software and launch of every sprint in sequential order)

- Key features have been divided in four major components



Plan on execution of key features

Data Extraction:

- In order to, extract data from image Image has to be in good quality. That's why we are using Logistic Regression to classify image as good or bad. Accuracy of Logistic Regression model was 83%

- For Extraction of data from. We are going to use OpenCV and PY tesseract for text extraction from each cell.

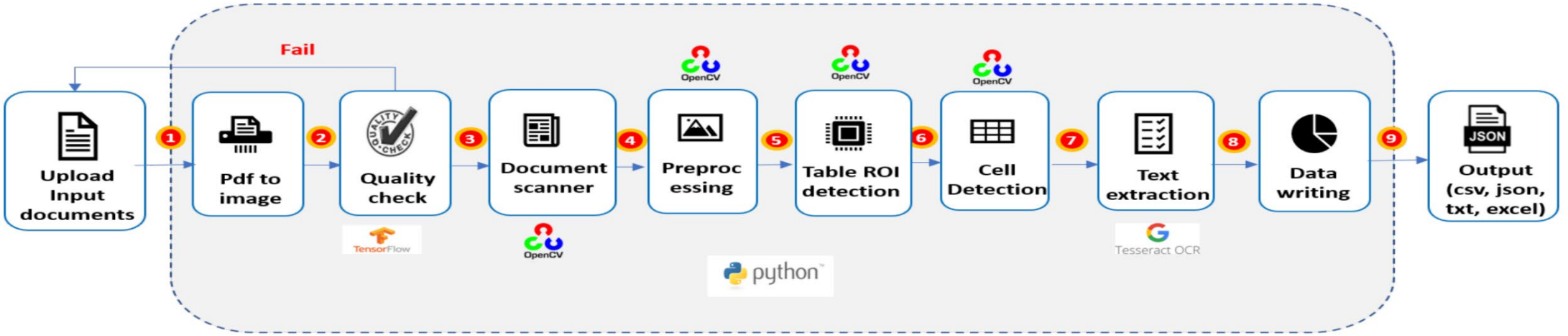
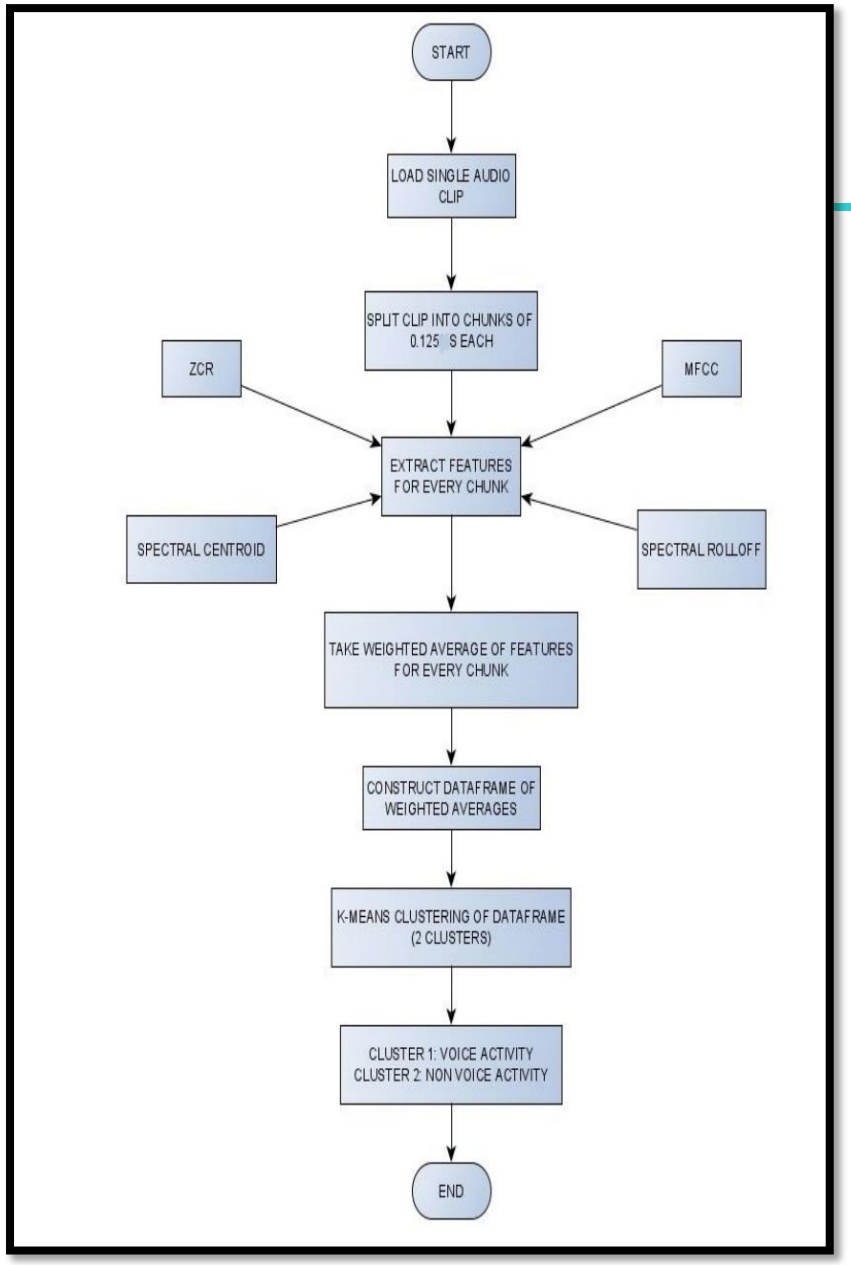


Fig. 1: Table extraction pipeline

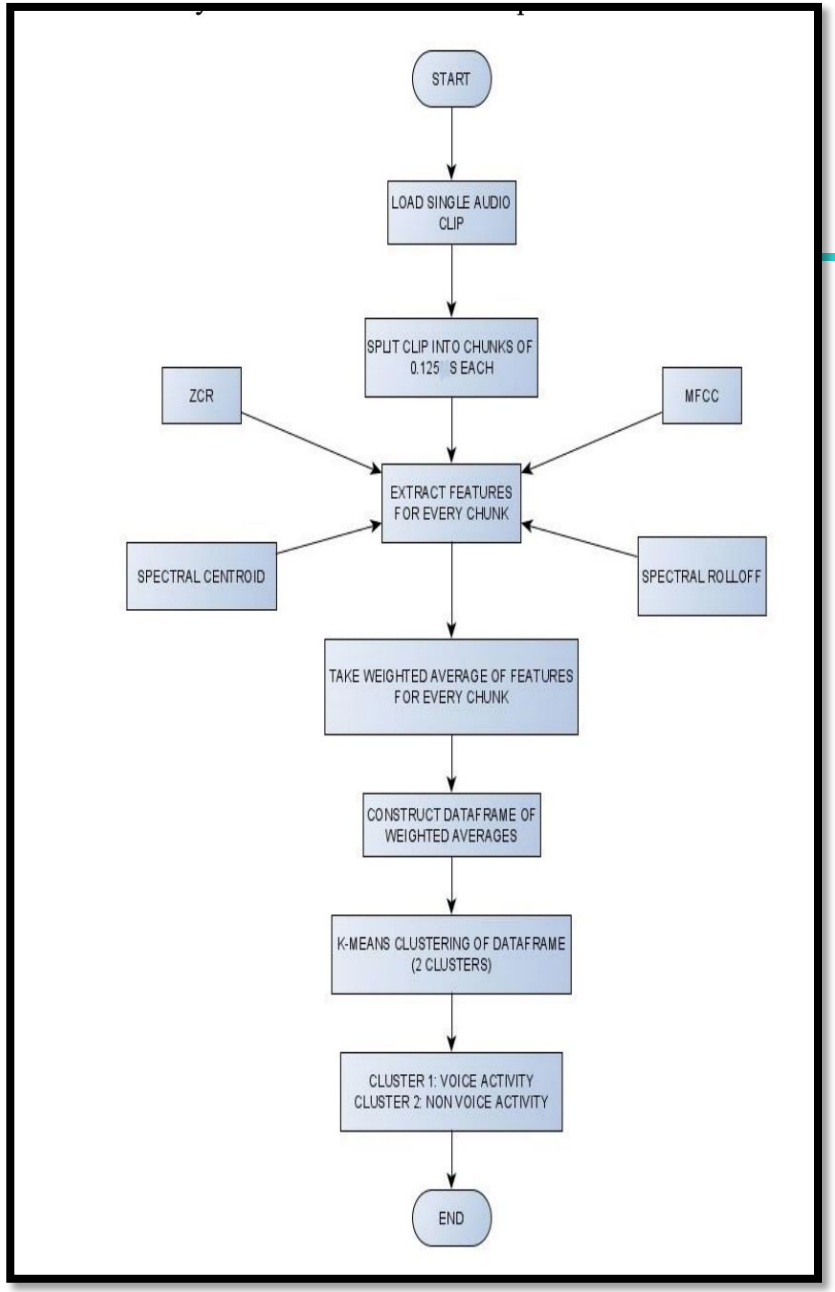


Plan on execution of key features

- Working model is simple, audio is broken down into .125 seconds clip, fed to feature extraction algorithm
- Then, weights are added and passed to KNN, KNN classifies as human voice and non human voice

Audio Features : -

- Mel-Frequency Cepstral Coefficients
- Spectral Roll – Off
- Spectral Centroid
- Zero Crossing Rate



Plan on execution of key features

What do these features tell us

1. The pitch of the sound: Spectral Centroid and MFCCs can help identify the pitch or fundamental frequency of the sound.

2. The timbre of the sound: MFCCs can help to identify the timbre or quality of the sound, such as whether it is a voice, a musical instrument or noise.

3. The rhythmic structure of the sound: Zero Crossing Rate can help to identify the rhythmic structure of the sound, such as how often it repeats.

4. The overall shape and texture of the sound: Spectral Roll-Off and Spectral Centroid can help identify the overall shape and texture of the sound, such as whether it has a lot of high-pitched or low-pitched frequencies.

Voice Authentication of Students

- Gaussian mixture models (GMM) : It involves modelling the probability distribution of the spectral features of a person's voice and comparing it to the distribution of known speakers.

Converting Voice into Intents and Arguments :

Natural Language Processing (NLP) will be used to convert normal language queries into database queries by leveraging various techniques such as :

- **Tokenization**
- **Part-of-speech tagging**
- **Named entity recognition**
- **Query generation**
- **Query execution**

Database handling :

- Data handling is important in ensuring the integrity of research data since it addresses concerns related to confidentially, security, and preservation/retention of research data. Proper planning for data handling can also result in efficient and economical storage, retrieval, and disposal of data. In the case of data handled electronically, data integrity is a primary concern to ensure that recorded data is not altered, erased, lost or accessed by unauthorized users.

- We are going to use PESU database so that all content is already encrypted , safe and secure

Web Scraping

- To do web scarping we are using Python libraries that is Selenium Web Driver to extract the students data from the web (PESU Academy)
- Selenium is a software tool designed specifically for automating the testing of web applications.
- It can also be used as a web scraper to extract data from websites.

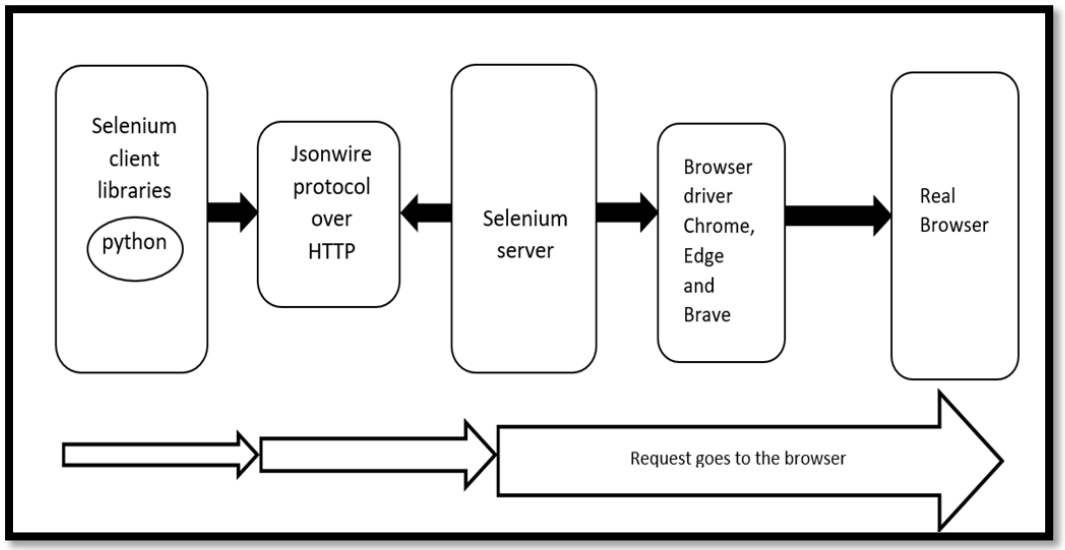


Fig-Web Scraping using Selenium.

Security :

- For Encryption We are planning to use **RSA** Encryption Algorithm with **SALTING**

Proposed Methodology / Approach

- We are designing different algorithms that will be used to make the AI assistant more user friendly and to make query generation via voice models easier.

Design Description

Add as many slides as required to cover the following aspects:

1. Master class diagram
2. ER Diagram
3. User Interface Diagrams/ Use Case Diagrams
4. Report Layouts
5. External Interfaces

Technologies Used

- Python
- Flask
- OpenCV
- Tessraract
- PostgreSQL

Project Demo

my.csv

```
Date & Day,Course Code,Course Title
27/03/2023,,
"",UP21BP241A,Pharmaceutical Organic Chemistry – II
Monday,,
28/03/2023,,
"",UP21BP242A,Physical Pharmaceutics – I
Tuesday,,
29/03/2023,,
"",UP21BP243A,Pharmaceutical Microbiology
Wednesday,,
30/03/2023,,
"",UP21BP244A,Pharmaceutical Engineering
Thursday,,
31/03/2023,,
"",UP21BP121A,Communication Skills
Friday,,
01/04/2023,,
"",UP21BP131B,Computer Applications in Pharmacy
Saturday,,
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
(PESU) aryagirigoudar@Aryas-MacBook-Air PESU_scrape %
How can I help you? Whats my Name
Speaking..
Your Name is Arya Girigoudar
How can I help you? Whats my CGPA
Speaking..
Your CGPA is 8.0
How can I help you?
```

```
C:\Users\Administrator\AppData\Local\Temp\ipykernel_11048\1
  driver = webdriver.Edge("C:\Driver\msedgedriver.exe")

My Courses
Select Semester
null
Sem-6
Sem-5
Sem-3
Sem-4

Course Code Course Title Course Type Status Action
UE20CS336
Digital Forensics EC Enrolled
UE20CS346
Information Security EC Enrolled
UE20CS351
Cloud Computing CC Enrolled
UE20CS352
Object Oriented Analysis & Design with Java CC Enrolled
UE20CS353
Compiler Design CC Enrolled
```

Project Progress

What is the project progress so far?

- We have finalized what to use
- We just have to improve our Algorithms to match our Level

What is the percentage completion of the project?

- Roughly 40 %

References

Provide references pertaining to your research according to IEEE format.

Example:

G. Eason, B. Noble, and I. N. Sneddon, “On certain integrals of Lipschitz-Hankel type involving products of Bessel functions,” Phil. Trans. Roy. Soc. London, vol. A247, pp. 529–551, April 1955. *(references)*

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Any other information

Provide any other information you wish to add on.

Note: Changes can be made in the template, with the consent of the guide for inclusion of any other information.

Thank You