

# Educational tool for age 10-12 children to enhance language skills and comprehension

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Group - 24-25J-103

# SUPERVISOR PANNEL



**Ms. Jenny**

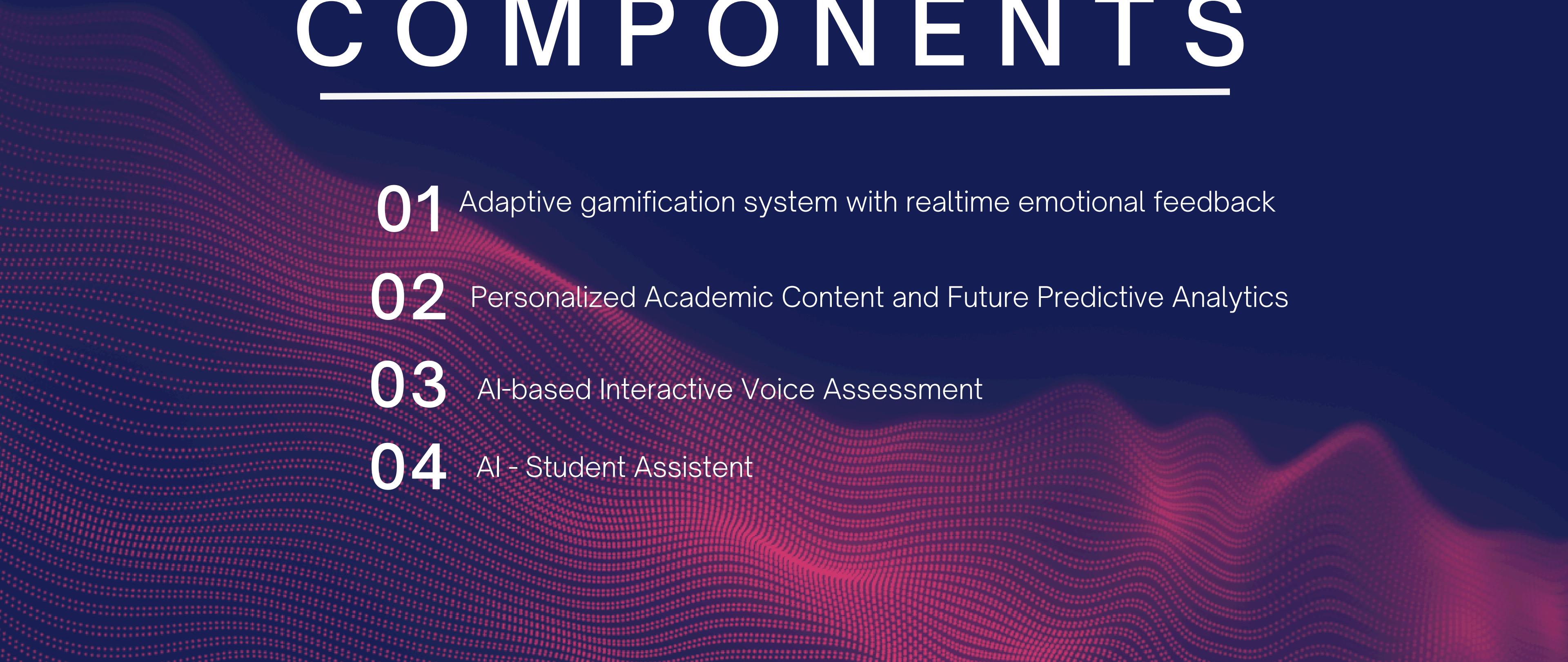
*Supervisor*



**Ms. Dinuka**

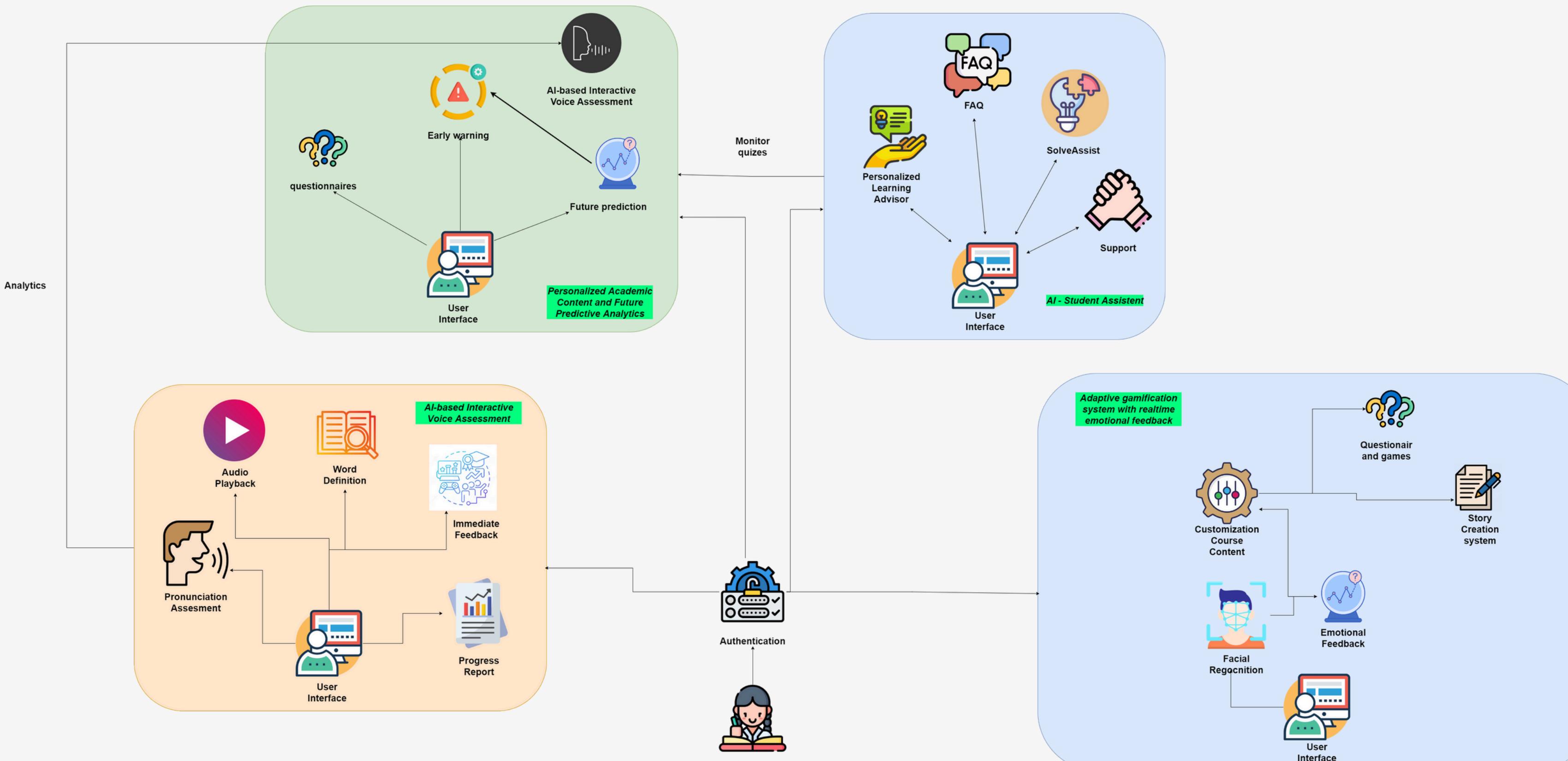
*Co-Supervisor*

# MAIN COMPONENTS



- 01** Adaptive gamification system with realtime emotional feedback
- 02** Personalized Academic Content and Future Predictive Analytics
- 03** AI-based Interactive Voice Assessment
- 04** AI - Student Assistant

# OVERALL SYSTEM DIAGRAMME





# ADAPTIVE GAMIFICATION SYSTEM WITH REALTIME EMOTIONAL FEEDBACK

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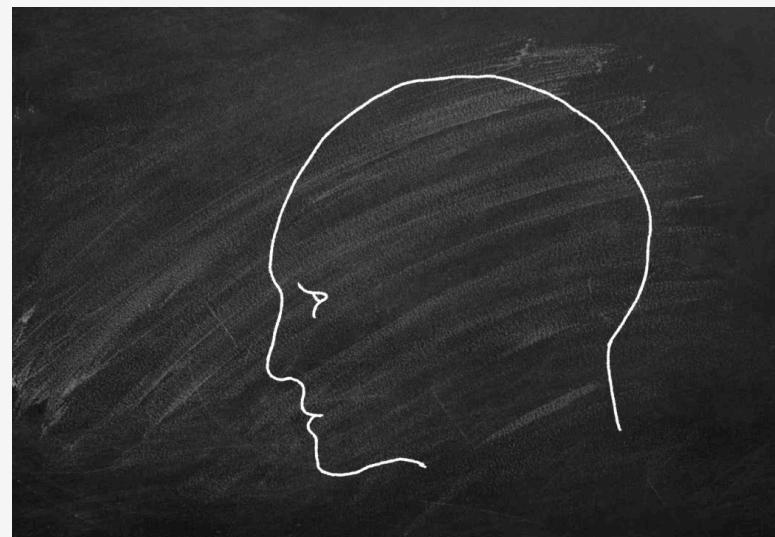
# BACKGROUND

The adaptive gamification system integrates real-time emotional feedback to enhance language skills and comprehension for children aged 10-12. Utilizing AI-based facial recognition, the system detects emotions to dynamically adjust content. Features include interactive story creation, emotion-driven content adaptation, personalized progress reports, and emotional vocabulary expansion, ensuring an engaging and personalized learning experience.

# REASEARCH GAP

Study	Real-time Emotional Feedback	Dynamic Story Creation	Emotion-Driven Content Adaptation	Personalized Progress Reports	Emotional Vocabulary Expansion	Parent and Educator Dashboard
Learning Express	✗	✗	✗	✓	✗	✗
EduVenture	✗	✓	✗	✓	✗	✗
EmotionEd	✓	✗	✗	✗	✗	✓
Proposed System	✓	✓	✓	✓	✓	✓

# RESEARCH PROBLEMS



- How can an adaptive gamification system with real-time emotional feedback enhance language skills and comprehension for children aged 10-12?
- What specific features of gamification can be integrated to effectively engage children in learning activities?
- How can the system be designed to accommodate diverse emotional and learning needs of children within this age group?
- What are the measurable improvements in language skills and comprehension as a result of using this adaptive gamification system?



# SPECIFIC OBJECTIVE

To develop an interactive story creation system that adapts to children's choices and encourages creative thinking and writing practice.



# SUB OBJECTIVES

01

Implement real-time emotional feedback using facial recognition technology to gauge emotions such as joy, confusion, or frustration.

02

Dynamically adjust story content or introduce mini-games based on the child's emotional state.

03

Generate personalized progress reports detailing reading and writing progress and emotional engagement.

04

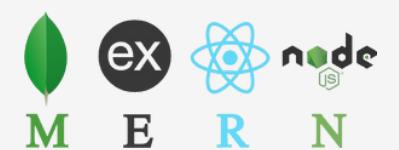
Develop a parent and educator dashboard to provide insights into the child's progress and engagement levels.



# METHODOLOGY

## TECHNOLOGIES

- Natural Language Processing (NLP): SpaCy
- Facial Recognition Technology: Microsoft Azure Face API
- AI-Based Emotional Detection: TensorFlow
- Game Design Principles: Unity
- Data Visualization Tools: Chart.js



# SYSTEM, PERSONAL, AND SOFTWARE REQUIREMENT SPECIFICATION

## Software Requirement

- Visual Studio Code
- Python
- MERN
- Git
- Azure

## Personal Requirement

- School teacher
- School children
- Parents of children
- Child psychologist

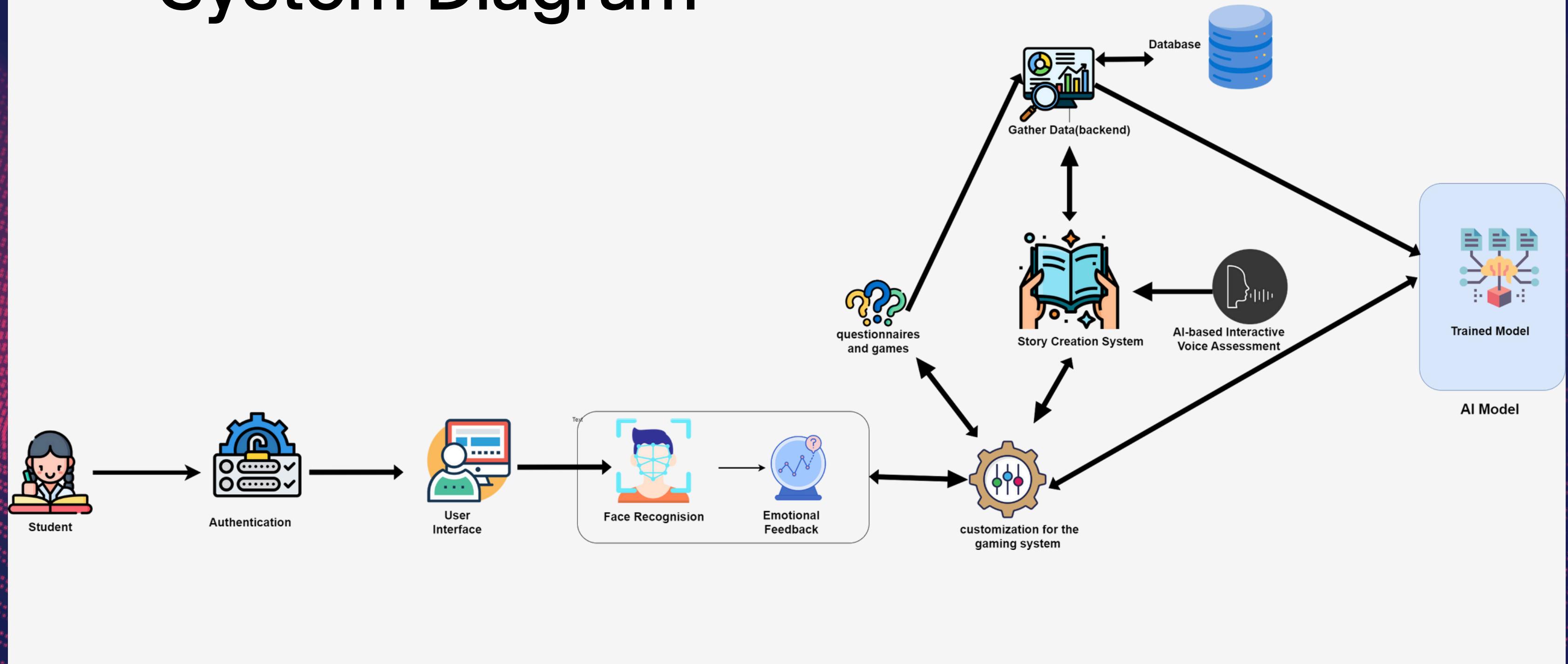
## Functional Requirement

- User Authentication
- Data Collection
- Time Tracking
- Content Personalization
- Real-time Feedback

## Non-Functional Requirement

- Performance
- Reliability and Availability
- The system must be able to handle a large number of requests

# System Diagram





# Data Collection and Annotation

## Data Collection Methods

- From the students at the Regent Language Institute, Negombo
- From the External Supervisor
- online data sets

## Annotation

- From the External Supervisor





The screenshot shows a Google Drive interface. On the left, there's a sidebar with navigation links: Home, My Drive, Computers, Shared with me, Recent, Starred, Spam, Bin, and Storage. It also displays storage usage information: 7.47 GB of 15 GB used, with a 'Get more storage' button. The main area shows a breadcrumb path: Shared with me > ffhq-dataset > images1024x1024. Below this, there are filters for Type, People, and Modified. A list of folders is displayed, each labeled with a three-digit number followed by '0000'. The folders are:

- 00000
- 01000
- 02000
- 03000
- 04000
- 05000
- 06000
- 07000
- 08000
- 09000

## DATA COLLECTION



## PROOF OF WORK

```
PS C:\Users\Kavishi\Desktop\Research> cd ml
PS C:\Users\Kavishi\Desktop\Research\ml> cd ml
PS C:\Users\Kavishi\Desktop\Research\ml\ml> python -m uvicorn main:app --reload
INFO:     Will watch for changes in these directories: ['C:\\\\Users\\\\Kavishi\\\\Desktop\\\\Research\\\\ml\\\\ml']
INFO:     Uvicorn running on http://127.0.0.1:8000 (Press CTRL+C to quit)
INFO:     Started reloader process [16016] using StatReload
DEBUG:pymongo.topology:{"topologyId": {"$oid": "67508bd3fab15080ace2db86"}, "message": "Starting topology monitoring"}
DEBUG:pymongo.topology:{"topologyId": {"$oid": "67508bd3fab15080ace2db86"}, "previousDescription": "<TopologyDescription id: 67508bd3fab15080ace2db86, topology_type: Unknown, servers: []>", "newDescription": "<TopologyDescription id: 67508bd3fab15080ace2db86, topology_type: ReplicaSetNoPrimary, servers: [<ServerDescription ('cluster0-shard-00-00.s5foz.mongodb.net', 27017) server_type: Unknown, rtt: None>, <ServerDescription ('cluster0-shard-00-01.s5foz.mongodb.net', 27017) server_type: Unknown, rtt: None>, <ServerDescription ('cluster0-shard-00-02.s5foz.mongodb.net', 27017) server_type: Unknown, rtt: None>]", "message": "Topology description changed"}
DEBUG:pymongo.topology:{"topologyId": {"$oid": "67508bd3fab15080ace2db86"}, "serverHost": "cluster0-shard-00-01.s5foz.mongodb.net", "serverPort": 27017, "message": "Starting server monitoring"}
DEBUG:pymongo.topology:{"topologyId": {"$oid": "67508bd3fab15080ace2db86"}, "serverHost": "cluster0-shard-00-02.s5foz.mongodb.net", "serverPort": 27017, "message": "Starting server monitoring"}
DEBUG:pymongo.topology:{"topologyId": {"$oid": "67508bd3fab15080ace2db86"}, "serverHost": "cluster0-shard-00-00.s5foz.mongodb.net", "serverPort": 27017, "message": "Starting server monitoring"}
INFO:     Started server process [1816]
INFO:     Waiting for application startup.
INFO:     Application startup complete.
```

ML RELOAD



```
PS C:\Users\Kavishi\Desktop\Research> cd web
PS C:\Users\Kavishi\Desktop\Research\web> npm start

Compiled with warnings.

[eslint]
src\App.js
Line 4:8:  'signIn' is defined but never used  no-unused-vars

src\components\nav\Navigation.js
Line 12:18:  'setAvatar' is assigned a value but never used
Line 14:10:  'dropdown' is assigned a value but never used
Line 41:11:  img elements must have an alt prop, either with meaningful text, or an empty string for decorative images  no-unused-vars
                                                     no-unused-vars
                                                     jsx-a11y/alt-text

src\data\navbarItems.js
Line 1:10:  'AiFillInfoCircle' is defined but never used  no-unused-vars
Line 1:28:  'AiOutlineTransaction' is defined but never used  no-unused-vars
Line 1:50:  'AiFillContacts' is defined but never used  no-unused-vars
Line 1:66:  'AiOutlineHeatMap' is defined but never used  no-unused-vars

src\services\Error.Handling.js
Line 1:8:  'React' is defined but never used  no-unused-vars
Line 2:11:  'Redirect' is defined but never used  no-unused-vars

src\services\Users.service.js
Line 97:1:  Assign instance to a variable before exporting as module default  import/no-anonymous-default-export

src\utils\EventEmitter.js
Line 3:1:  Assign instance to a variable before exporting as module default  import/no-anonymous-default-export

Search for the keywords to learn more about each warning.
To ignore, add // eslint-disable-next-line to the line before.

WARNING in [eslint]
src\App.js
Line 4:8:  'SignIn' is defined but never used  no-unused-vars
```

## WEB RELOAD



# Empower Your Learning Regardless the Differences

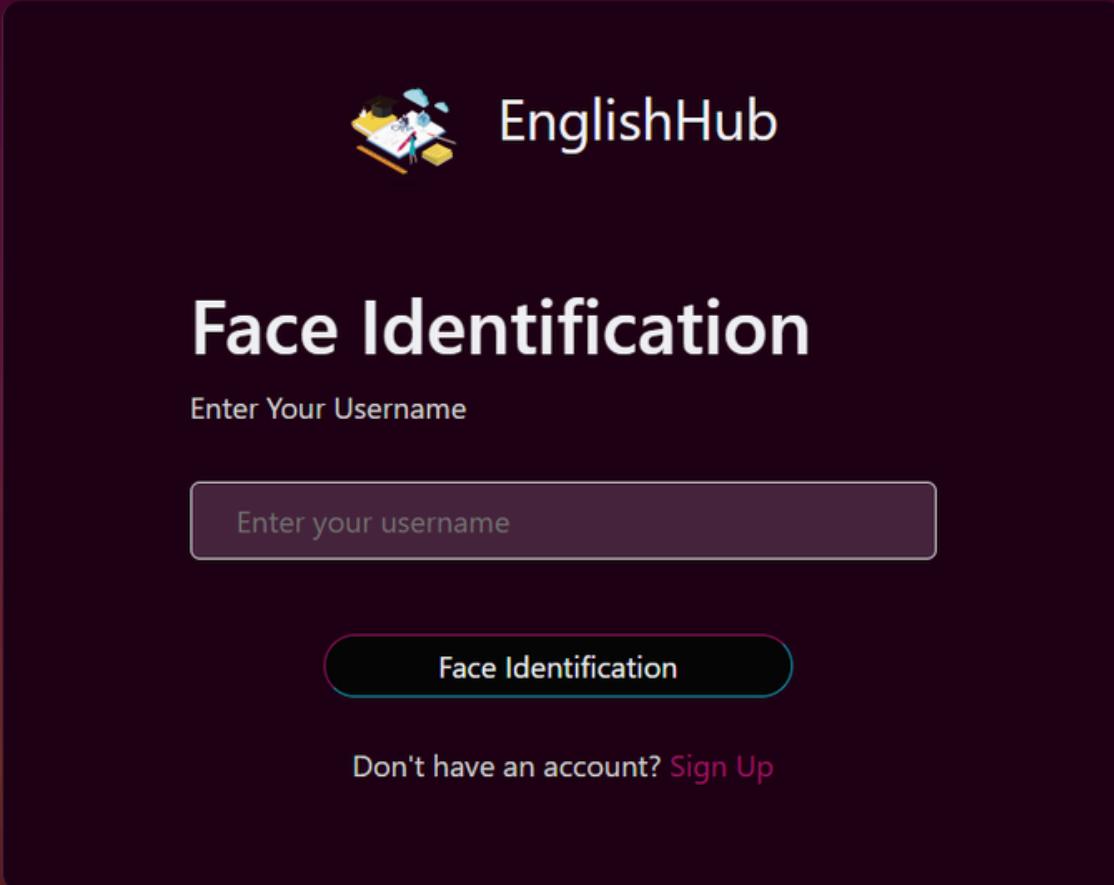
Discover a smarter way to learn. Our AI-powered platform personalizes your educational experience, helping you reach your goals faster. From curated study plans to interactive content, transform the way you acquire knowledge and skills. Join our community of learners and unlock your full potential today.

Explore Features

Get Started for Free



**WEB RELOAD**



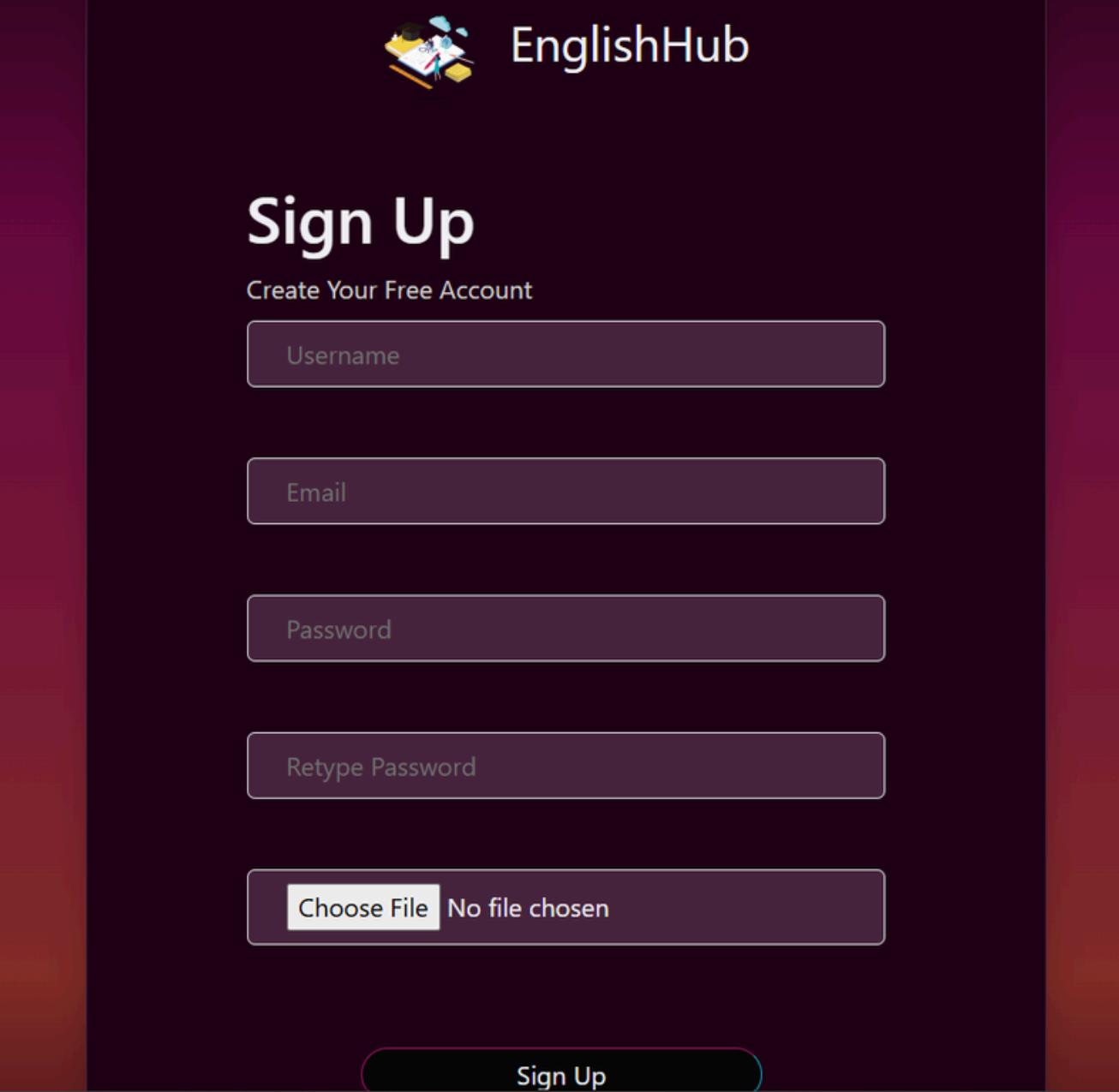
EnglishHub

## Face Identification

Enter Your Username

Face Identification

Don't have an account? [Sign Up](#)



EnglishHub

## Sign Up

Create Your Free Account

Username

Email

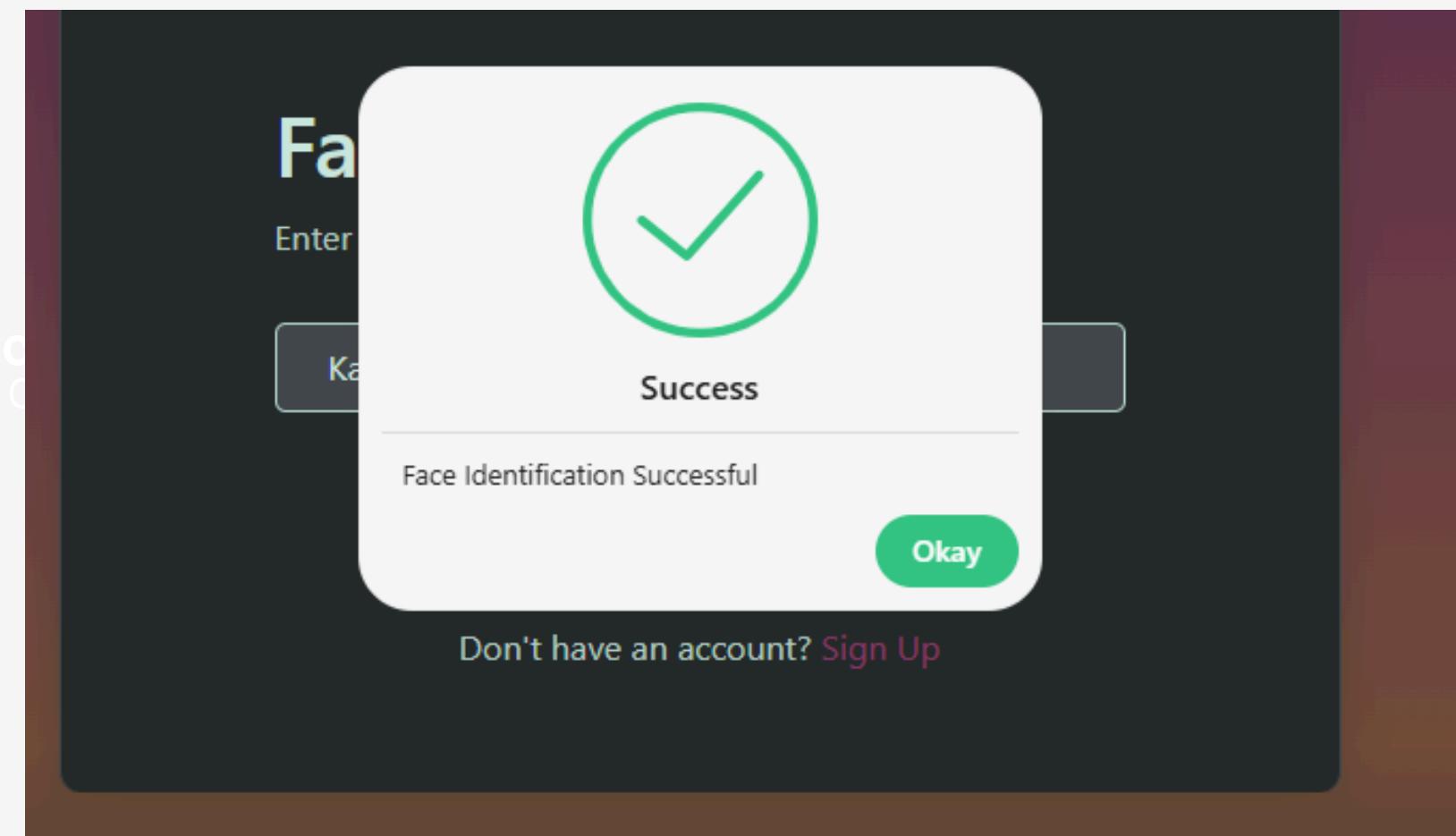
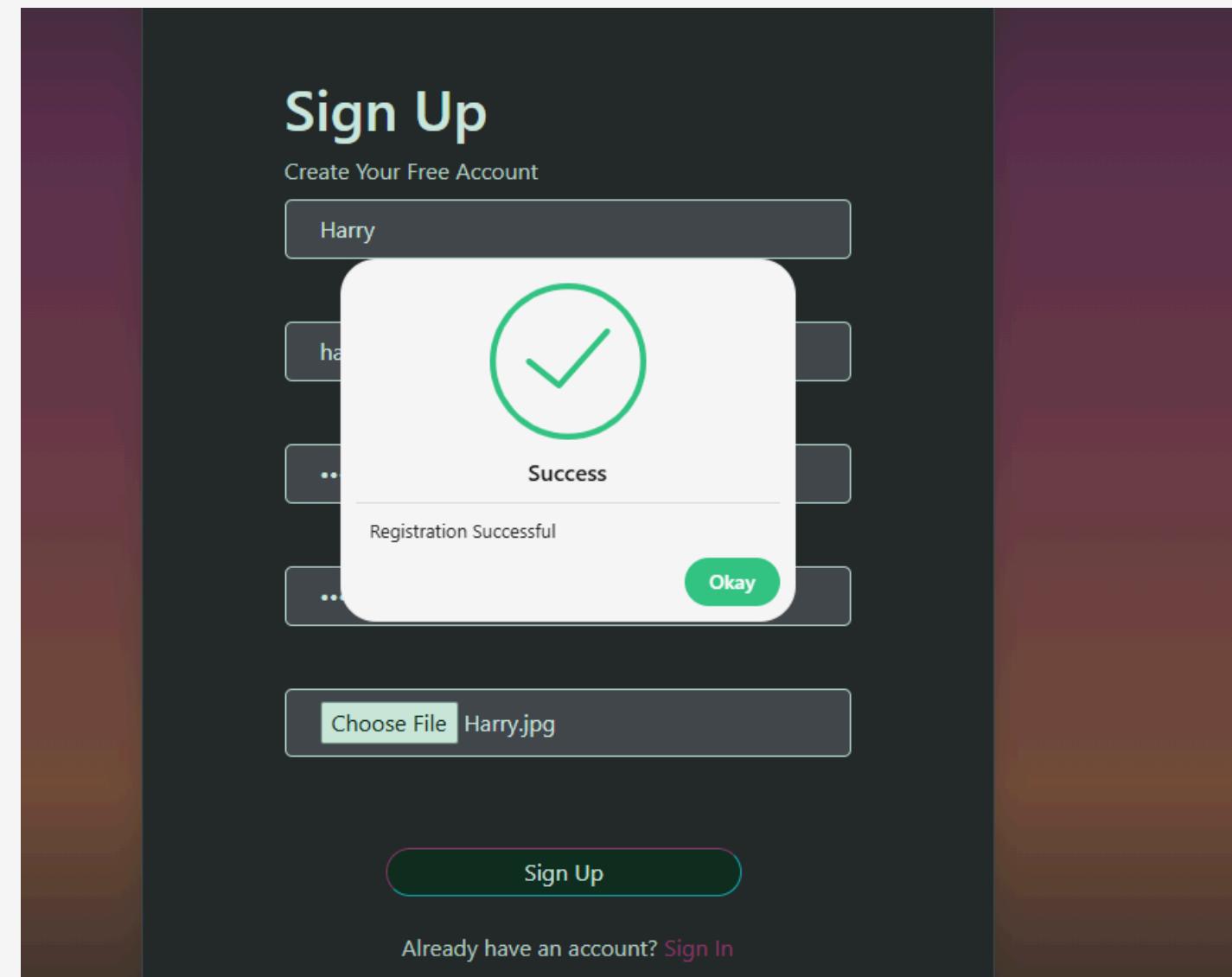
Password

Retype Password

Choose File | No file chosen

Sign Up

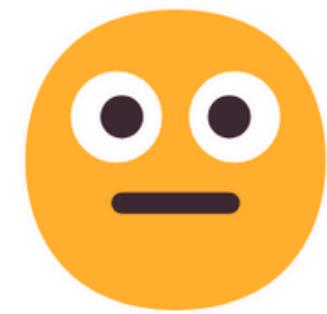
## LOGIN & REGISTRATION



## FACE DETECTION USING FACE NET



## EMOTION DETECTION



Detected Emotion: **neutral**

[To Dashboard](#)

### Emotion-Based Content Suggestions

[Play Game](#)



Snake Game



Minecraft Game

### YouTube Shorts



[Poppy and the Magic Word | Bedtime Stories for Kids | A Fun Children's Story About Being Polite](#)

Little Moonbeam



[Goodnight Forest Animals 🌳 Calming Bedtime Stories for Babies and Toddlers with Relaxing Music](#)

Sleepy Sprouts Bedtime Stories



The screenshot shows a personalized dashboard interface. On the left, a dark vertical sidebar contains a three-line menu icon, a house icon, a document icon, and a person icon. The main area features a user profile box with a blue circular icon containing a white 'c', the email 'chiku@gmail.com', and a smaller repeat of the email. In the top right corner of the main area are a user icon and a 'Logout' button. Below the profile is a section titled 'Activity Progress' enclosed in a light gray box. This section lists three lessons: 'Lesson 1: Introduction to English Language' (Basics in alphabet), 'Lesson 2: Common Phrases' (Basic Phrase types), and 'Lesson 3: Pronunciation' (Word Pronouncing). The background of the main area has a subtle grid pattern.

Activity Progress

Lesson 1: Introduction to English Language  
Basics in alphabet

Lesson 2: Common Phrases  
Basic Phrase types

Lesson 3: Pronunciation  
Word Pronouncing

## PERSONALIZED DASHBOARD



The screenshot shows a web application interface. At the top right is a user icon and a "Logout" button. On the far left is a vertical dark sidebar with icons for a menu, home, edit, and search. The main content area has a header "Questionnaire" and a breadcrumb "Home / Questionnaire". Below this is a section titled "Your Preview" with a "Beginner Level" section containing text about simple addition and subtraction. Another section titled "Intermediate Level" contains text about mixed operations with small numbers. A central modal window titled "Are You Feeling Bored?" asks if the user is bored and offers to take them to another screen for fun activities. The modal has two buttons: "No, I'm Fine" and "Yes, I'm Bored".

## EMOTION TRACKING



The screenshot shows a game interface titled "Welcome to the Game". The interface includes a "How to Play" section with instructions: "Use Mouse to move the camera", "Use Arrow Keys to move", and "Press ESC to exit camera lock". Below this are two buttons: "Start Game" (white background) and "Exit Game" (red background). To the left of the main window, there is a sidebar with navigation links: "Home / Questions", "Your Previous Games", "Your Student Profile", "Beginner", "Simple addition", "Intermediate", and "Mixed operations". The top of the screen shows a browser toolbar with various tabs and icons.

## GAMIFICATION



```
api_requirements.txt      face_identification.py 1 X
ml > ml > face_identification.py > FaceRecognition > run_recognition
18     class FaceRecognition:
37         def run_recognition(self, input_username):
43
44             while True:
45                 ret, frame = video_capture.read()
46                 if self.process_current_frame:
47                     small_frame = cv2.resize(frame, (0, 0), fx=0.25, fy=0.25)
48                     rgb_small_frame = cv2.cvtColor(small_frame, cv2.COLOR_BGR2RGB)
49
50             # Detect faces
51             self.face_locations = face_recognition.face_locations(rgb_small_frame)
52             self.face_encodings = face_recognition.face_encodings(rgb_small_frame, self.face_locations)
53
54             self.face_names = []
55             for face_encoding in self.face_encodings:
56                 matches = face_recognition.compare_faces(self.known_face_encodings, face_encoding)
57                 name = 'Unknown'
58                 confidence = 'Unknown'
59
60                 face_distances = face_recognition.face_distance(self.known_face_encodings, face_encoding)
61                 best_match_index = np.argmin(face_distances)
62
63                 if matches[best_match_index]:
64                     name = self.known_face_names[best_match_index]
65                     confidence = face_confidence(face_distances[best_match_index])
66
67                     # Extract the base name (without extension) for comparison
68                     recognized_name = os.path.splitext(name)[0]
69                     self.face_names.append(f'{recognized_name} ({confidence})')
70                     print(recognized_name+'---'+input_username)
71
72                     # Compare with the input username
73                     if recognized_name == input_username:
74                         detected = True
75                         break # Exit the Loop if a match is found
```

## ACCURACY CHECKING



```
const emotionEmojis = {  
    happy: "😊",  
    sad: "😢",  
    angry: "😡",  
    surprised: "😮",  
    neutral: "😐",  
    fearful: "😱",  
    disgusted: "🤢",  
};  
  
const gameList = [  
    { title: "Snake Game", image: "https://cdn.content.play123.com/game-images/snake_xl.jpg" },  
    { title: "Minecarft Game", image: "https://www.minecraft.net/content/dam/games/minecraft/game-characters/Free-Trial_Featured-Image-0" }  
];  
  
useEffect(() => {  
    const interval = setInterval(() => {  
        if (currentEmotion && currentEmotion !== stableEmotion) {  
            setStableEmotion(currentEmotion);  
            fetchYouTubeShorts(currentEmotion);  
        }  
    }, 10000);
```

## EMOTION READING



## COMPLETED COMPONENTS 75%

Data Collection

ML Algorithm development for face net

Image recognition using tensorflow

video capturing using open cv

Data saving for face registration

Face Accuracy checking for users

Emotion Detection

Games system development (Half done)

## FUTURE DEVELOPMENT 50%

Real-time Story development system.

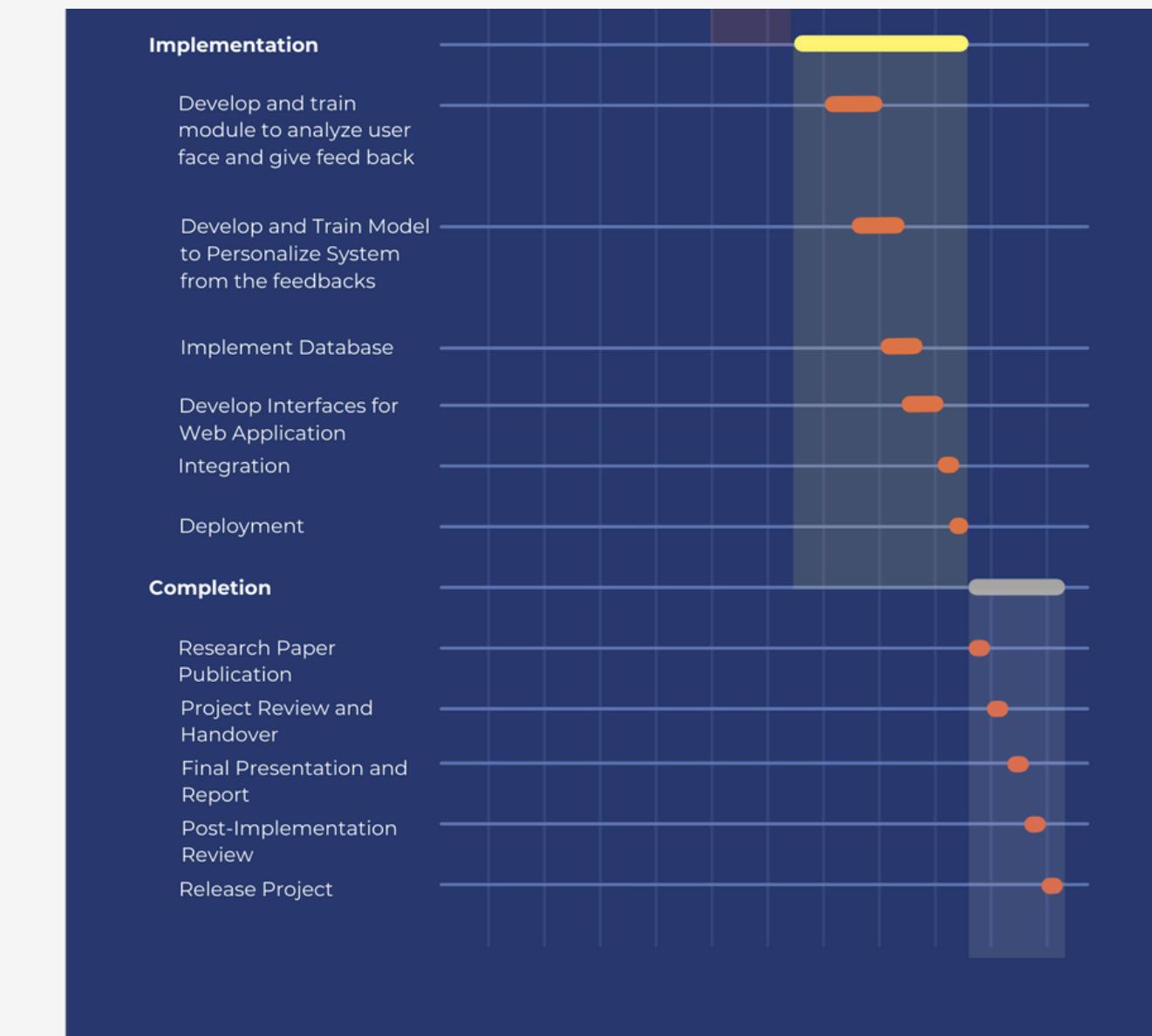
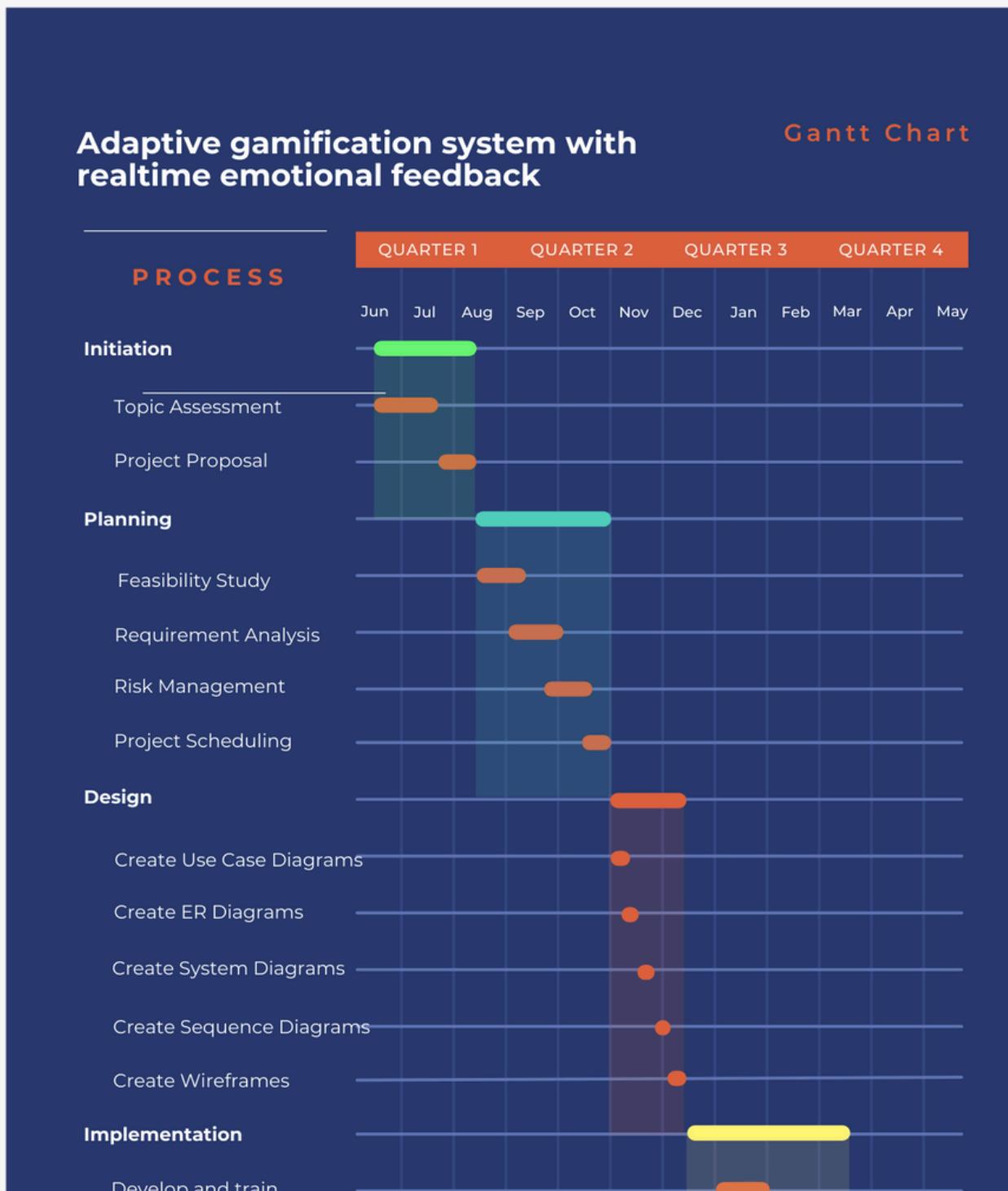
Games system development. (Remaining Half)

Feedback management system with a personalized dashboard.

Integration.



# GANNT CHART



# REFERENCES

- D'Mello, S. K., & Kory, J. (2015). A review and meta-analysis of multimodal affect detection systems. *ACM Computing Surveys (CSUR)*, 47(3), 1-36.
- Baker, R. S., D'Mello, S. K., Rodrigo, M. M. T., & Graesser, A. C. (2012). Better to be frustrated than bored: The incidence, persistence, and impact of learners' cognitive-affective states during interactions with three different computer-based learning environments. *International Journal of Human-Computer Studies*, 68(4), 223-241.
- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, 77(1), 81- 112.
- Brackett, M. A., & Rivers, S. E. (2014). Transforming students' lives with social and emotional learning. *International Handbook of Emotions in Education*, 368-388.
- Desforges, C., & Abouchaar, A. (2003). The impact of parental involvement, parental support, and family education on pupil achievements and adjustment: A literature review. Department for Education and Skills.
- Hirsh-Pasek, K., Zosh, J. M., Golinkoff, R. M., Gray, J. H., Robb, M. B., & Kaufman, J. (2015). Putting education in “educational” apps: Lessons from the science of learning. *Psychological Science in the Public Interest*, 16(1), 3-34.



# PERSONALIZED ACADEMIC CONTENT AND FUTURE PREDICTIVE ANALYTICS

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# BACKGROUND

- Existing educational systems leverage machine learning and personalized content but often lack real-time adaptability and early intervention predictive analytics.
- Most systems adjust educational content based on current performance metrics without robust forecasting capabilities.
- Additionally, existing systems broadly focus on multiple age groups and subjects, often overlooking specific needs of Academic English learners aged 10-12.

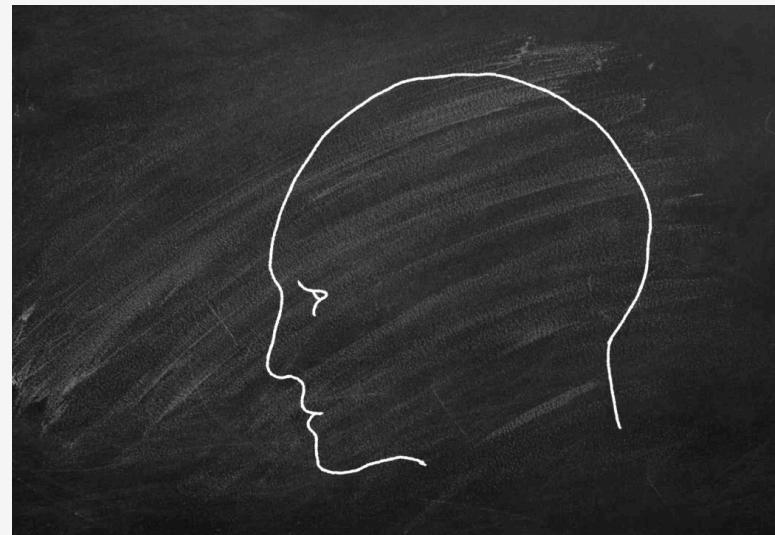
# REASEARCH GAP

Project 1 - Akçapınar, G., Hasnine, M. N., Majumdar, R., Flanagan, B., Ogata, H. (2019). Developing an earlywarning system for spotting at-risk students by using eBook interaction logs.

Project 2 - Nimy, E., Mosia, M., Chibaya, C. (2023). Identifying At-Risk Students for Early Intervention  
 project 3 - Knewton (existing System)

Study	Customize Course content	NLP answer analyzer	Future Predictive Analytics	Early Warning Risk Student	Alignment with School Syllabus
Project 1	✗	✗	✗	✓	✗
Project 2	✗	✗	✓	✓	✗
Project 3	✓	✗	✗	✗	✗
Proposed System	✓	✓	✓	✓	✓

# RESEARCH PROBLEMS



- How does personalized content impact learning outcomes in children aged 10-12?  
addressing individual strengths and weaknesses, promoting better engagement
- Can predictive analytics effectively identify at-risk students before noticeable declines in performance  
analyzing patterns and predicting trends, spot who might need extra help
- What role does real-time data play in educational content adaptation?  
immediate adjustments to the learning material, each student needs at that moment
- What advantages does dynamic difficulty scaling offer over traditional static content delivery?  
provides challenges appropriate to the student's current capability



# SUB OBJECTIVES

**01**

Develop and implement a data collection framework that respects privacy and accurately captures necessary metrics and NLP model

**02**

Create predictive models that forecast learning trajectories and identify needs for early intervention.

**03**

Design personalized learning content that adapts dynamically to the student's progress.

**04**

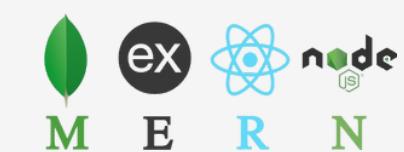
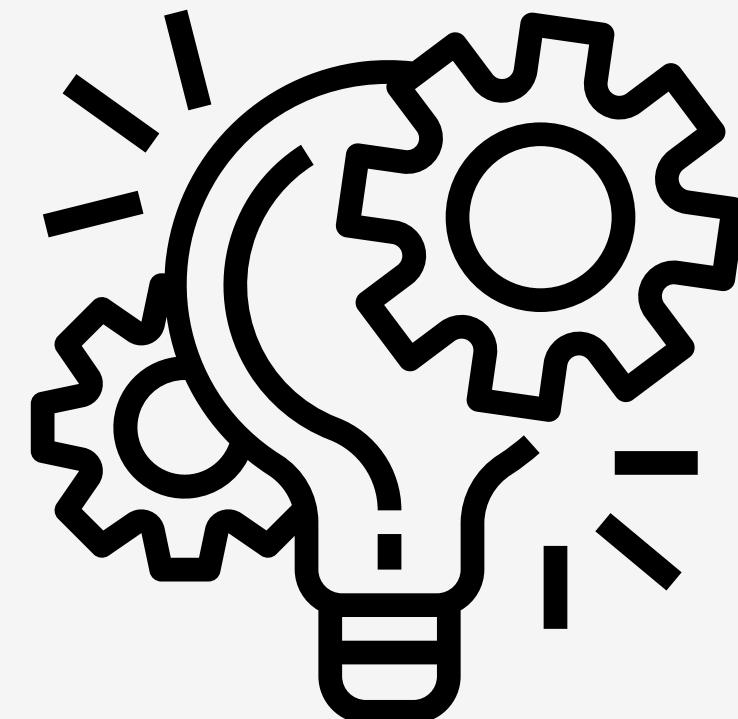
Implement real-time content adaptability, ensuring that the educational material is continuously aligned with the student's current needs.



# METHODOLOGY

## TECHNOLOGIES

MERN  
Tensorflow  
Python  
AWS/Google Cloud/Azure  
Git



# SYSTEM, PERSONAL, AND SOFTWARE REQUIREMENT SPECIFICATION

## Software Requirement

- Tensorflow
- Python
- MERN
- VsCode

## Personal Requirement

- School teacher
- School children
- Parents of children

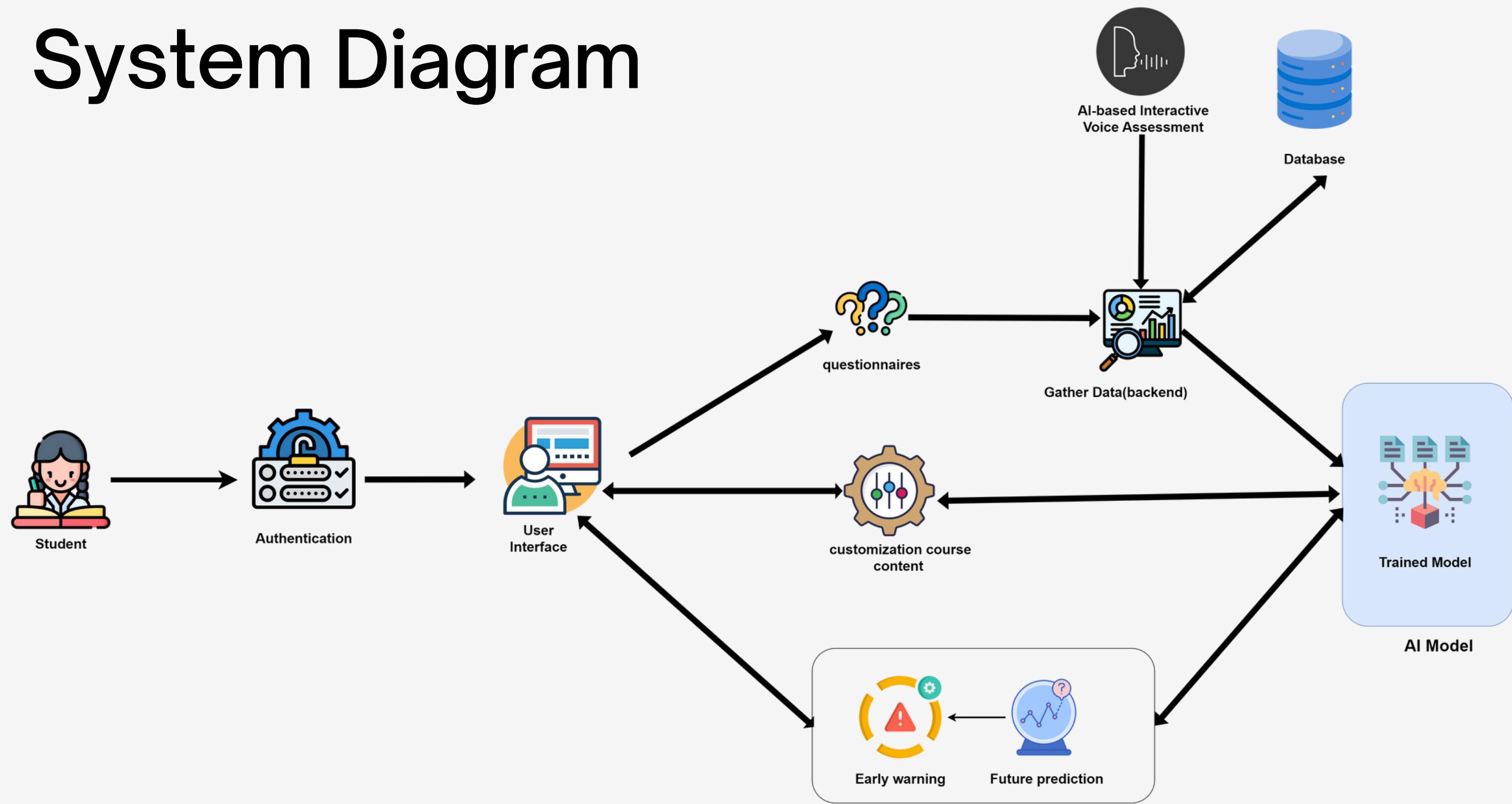
## Functional Requirement

- User Authentication
- Data Collection
- Predictive Analytics
- Content Personalization
- Real-time Feedback

## Non-Functional Requirement

- Performance
- Reliability and Availability
- The system must be able to handle a large number of requests

# System Diagram





# Data Collection and Annotation

## Data Collection Methods

- From the students at the Regent Language Institute, Negombo
- From the External Supervisor

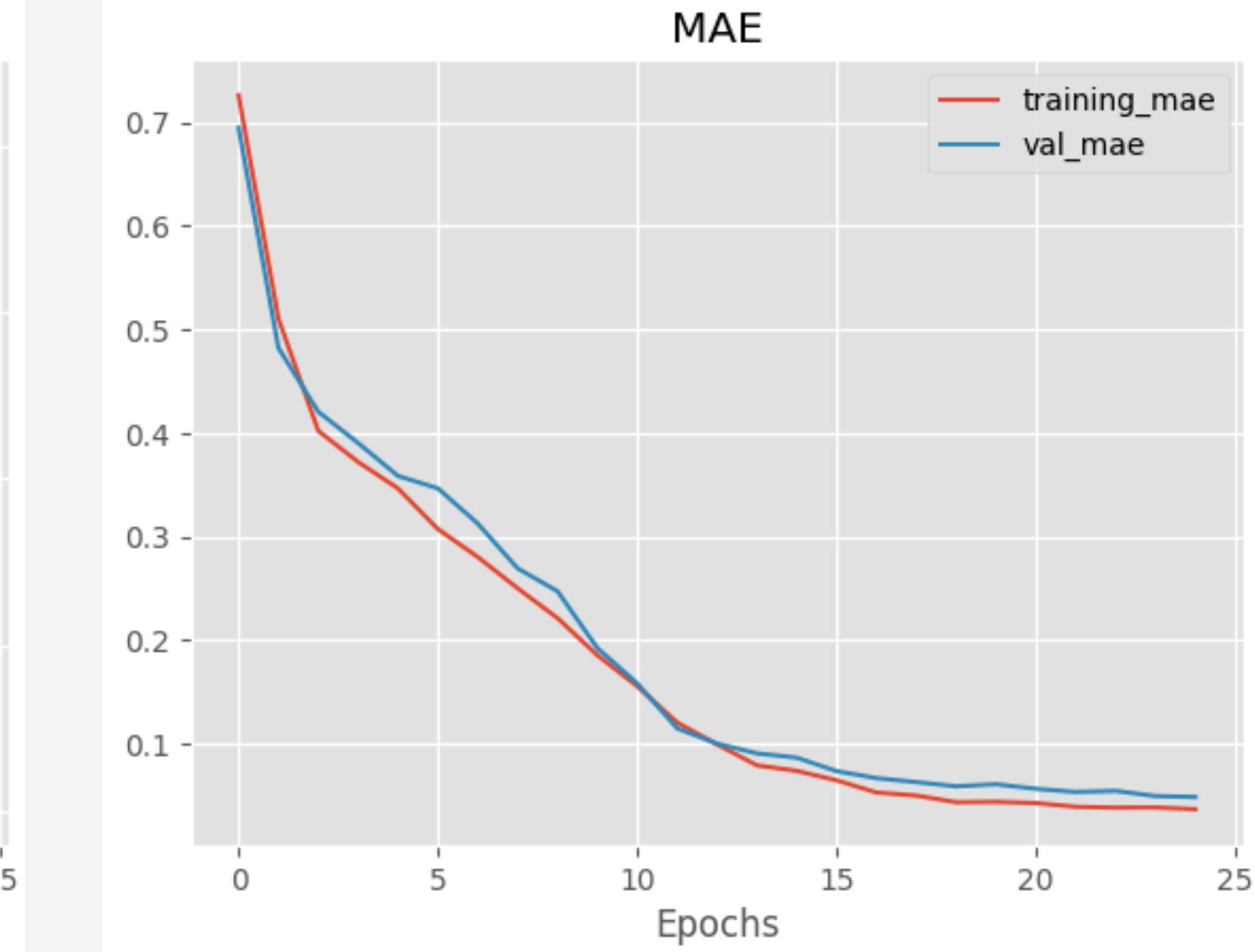
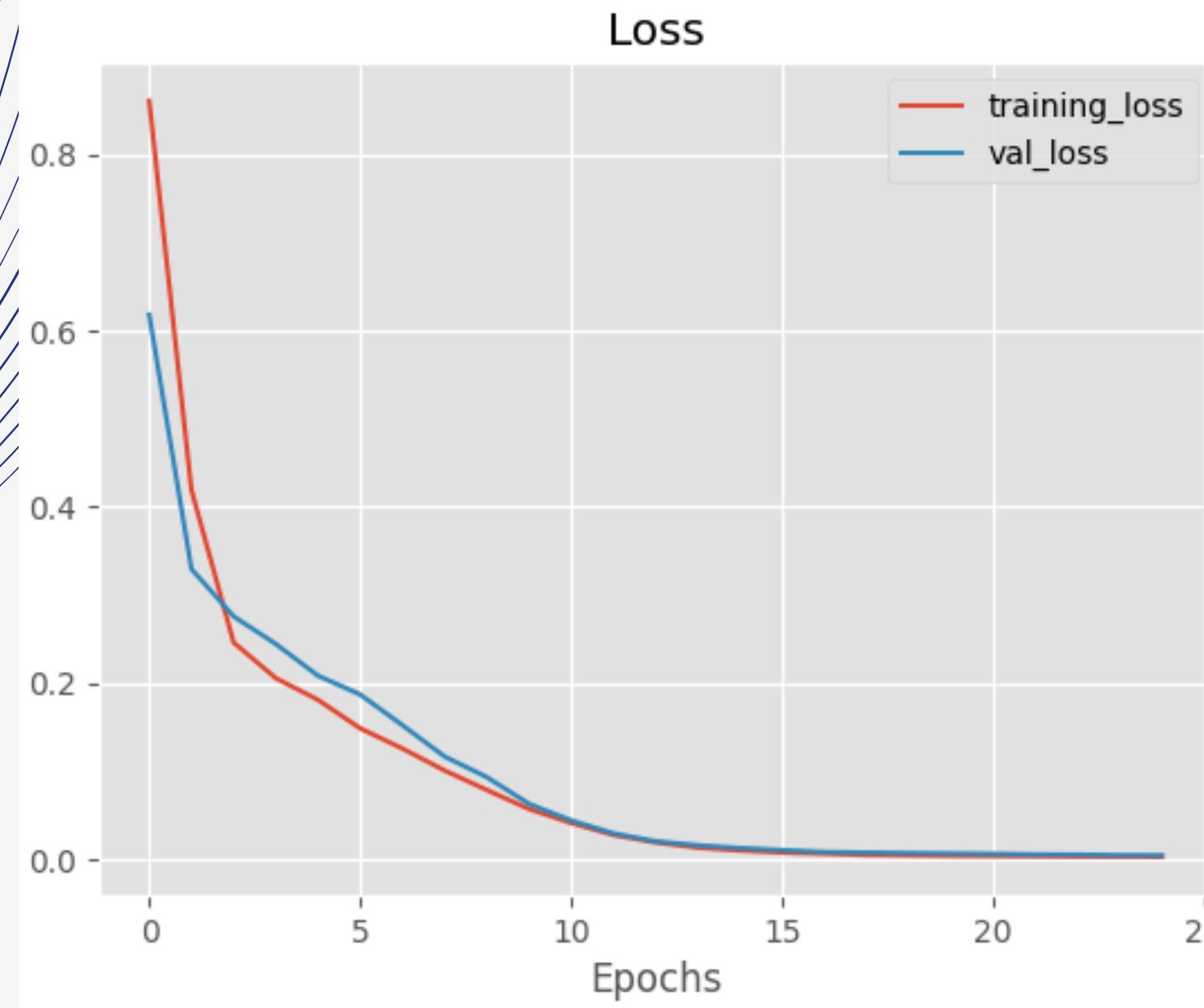
## Annotation

- From the External Supervisor





# Student Level Prediction Model



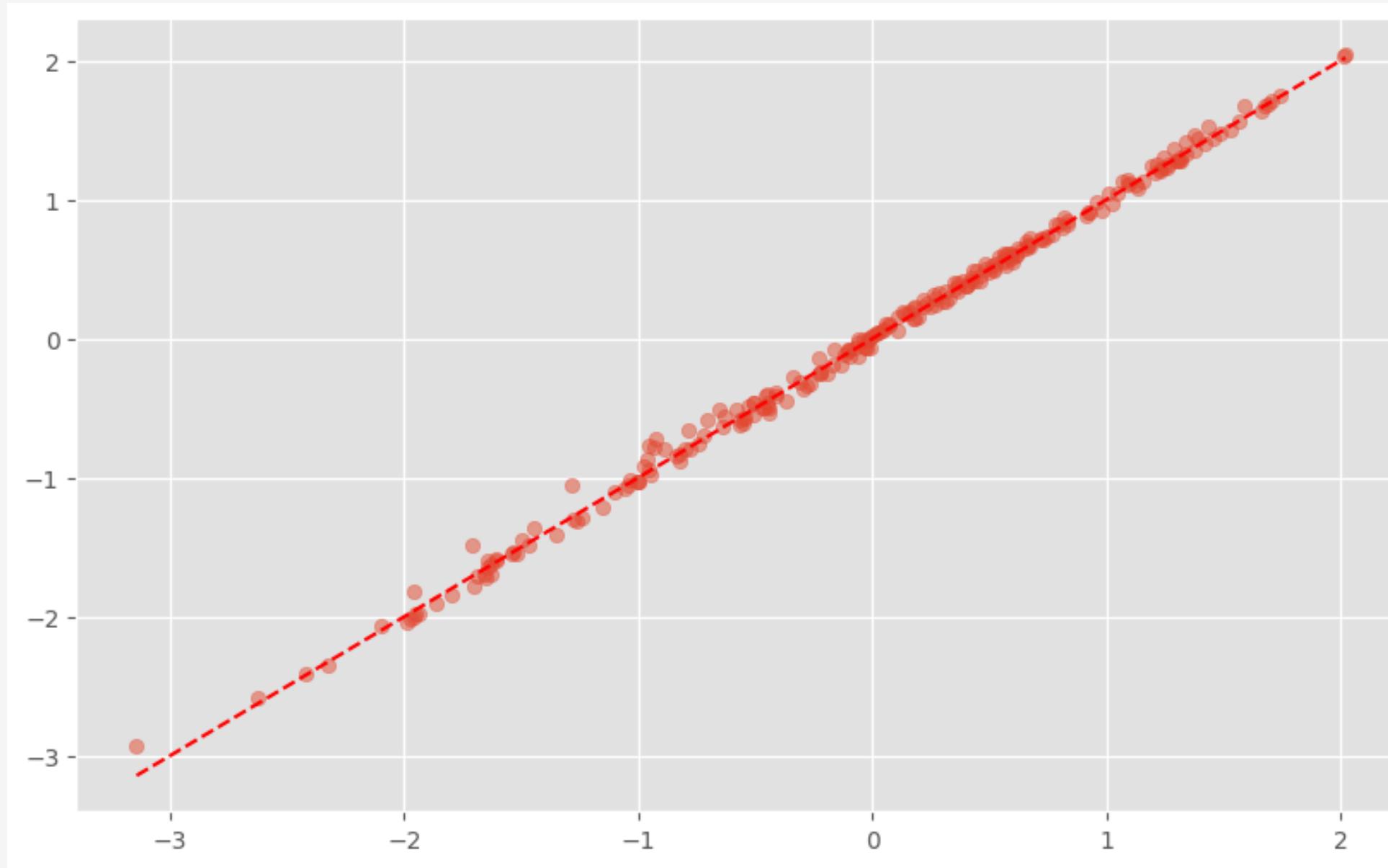
Mean Absolute Error



# Student Level Prediction Model

```
Epoch 13/25
7/7 ━━━━━━━━ 0s 24ms/step - loss: 0.0188 - mae: 0.1020 - val_loss: 0.0204 - val_mae: 0.1080
Epoch 14/25
7/7 ━━━━━━━━ 0s 22ms/step - loss: 0.0202 - mae: 0.1052 - val_loss: 0.0139 - val_mae: 0.0856
Epoch 15/25
7/7 ━━━━━━━━ 0s 22ms/step - loss: 0.0127 - mae: 0.0801 - val_loss: 0.0125 - val_mae: 0.0835
Epoch 16/25
7/7 ━━━━━━━━ 0s 16ms/step - loss: 0.0101 - mae: 0.0737 - val_loss: 0.0091 - val_mae: 0.0718
Epoch 17/25
7/7 ━━━━━━━━ 0s 22ms/step - loss: 0.0059 - mae: 0.0555 - val_loss: 0.0083 - val_mae: 0.0688
Epoch 18/25
7/7 ━━━━━━━━ 0s 24ms/step - loss: 0.0063 - mae: 0.0577 - val_loss: 0.0073 - val_mae: 0.0650
Epoch 19/25
7/7 ━━━━━━━━ 0s 23ms/step - loss: 0.0058 - mae: 0.0543 - val_loss: 0.0071 - val_mae: 0.0586
Epoch 20/25
7/7 ━━━━━━━━ 0s 23ms/step - loss: 0.0038 - mae: 0.0420 - val_loss: 0.0064 - val_mae: 0.0614
Epoch 21/25
7/7 ━━━━━━━━ 0s 24ms/step - loss: 0.0042 - mae: 0.0453 - val_loss: 0.0060 - val_mae: 0.0554
Epoch 22/25
7/7 ━━━━━━━━ 0s 12ms/step - loss: 0.0045 - mae: 0.0445 - val_loss: 0.0052 - val_mae: 0.0560
Epoch 23/25
7/7 ━━━━━━━━ 0s 13ms/step - loss: 0.0031 - mae: 0.0406 - val_loss: 0.0045 - val_mae: 0.0485
Epoch 24/25
7/7 ━━━━━━━━ 0s 21ms/step - loss: 0.0031 - mae: 0.0410 - val_loss: 0.0046 - val_mae: 0.0525
Epoch 25/25
7/7 ━━━━━━━━ 0s 12ms/step - loss: 0.0034 - mae: 0.0403 - val_loss: 0.0039 - val_mae: 0.0452
```

# Student Level Prediction Model



trained data and untrained data



# Student Level Prediction Model

POST http://127.0.0.1:5000/predict

Params Authorization Headers (8) Body Scripts

none  form-data  x-www-form-urlencoded  raw  file

```
10
11     "resources_score" :1200,
12     "minutes_spent":800,
13     "quiz_score" : 1.5
14
15 }
16 }
```

Body Cookies Headers (6) Test Results

{ } JSON ▾ ▷ Preview ⚡ Visualize ▾

```
1 {
2     "performance_score": 1826.5955810546875
3 }
```

POST http://127.0.0.1:5000/predict

Params Authorization Headers (8) Body Scripts

none  form-data  x-www-form-urlencoded  raw  file

```
6
7     "resources_score" :510,
8     "minutes_spent":450,
9     "quiz_score" : 1.0
10
11 }
```

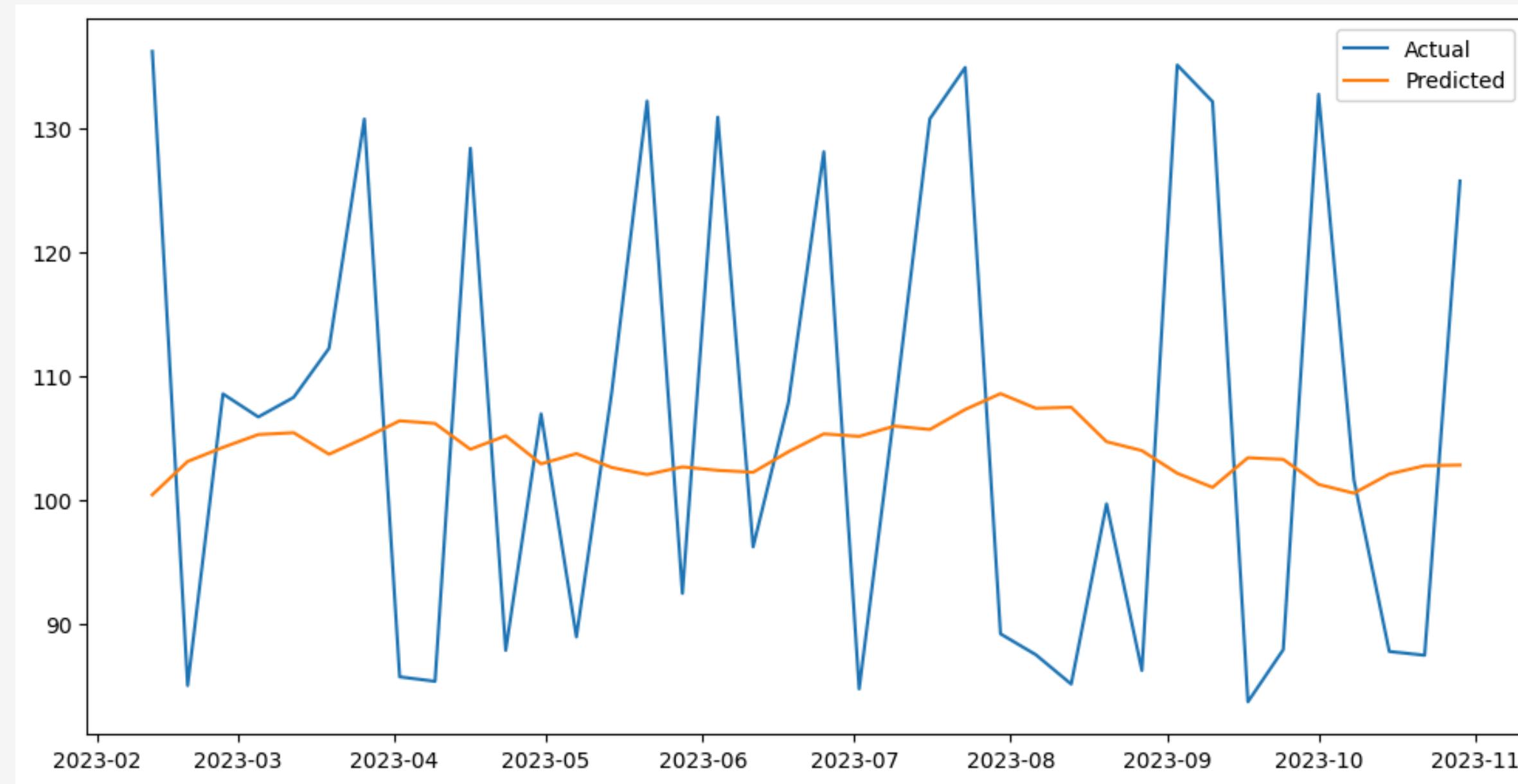
Body Cookies Headers (6) Test Results

{ } JSON ▾ ▷ Preview ⚡ Visualize ▾

```
1 {
2     "performance_score": 543.9866333007812
3 }
```

Outputs according to student performance

# Student Future Level Forecast



Actual Value and predicted model



# Student Future Level Forecast

```
→ Epoch 1/8
5/5 5s 146ms/step - loss: 0.1233 - val_loss: 0.1505
Epoch 2/8
5/5 1s 26ms/step - loss: 0.0508 - val_loss: 0.0539
Epoch 3/8
5/5 0s 29ms/step - loss: 0.0437 - val_loss: 0.0518
Epoch 4/8
5/5 0s 26ms/step - loss: 0.0370 - val_loss: 0.0686
Epoch 5/8
5/5 0s 35ms/step - loss: 0.0383 - val_loss: 0.0847
Epoch 6/8
5/5 0s 26ms/step - loss: 0.0377 - val_loss: 0.0673
Epoch 7/8
5/5 0s 26ms/step - loss: 0.0304 - val_loss: 0.0538
Epoch 8/8
5/5 0s 26ms/step - loss: 0.0294 - val_loss: 0.0503
```



# Student Future Level Forecast

```
[11]: sco = [70.64236
,70.87656
,71.41518
,72.34864
,71.97105
,72.88421
,73.13409
,74.2997,
76.0223,
77.38632,
77.38632,
78.1109
]
print(np.array(sco).reshape(-1,1).shape)

forecast_values(np.array(sco).reshape(-1,1),8)

(12, 1)
/usr/local/lib/python3.11/dist-packages/sklearn/utils/validation.py:11: UserWarning: X contains NaN values.
  warnings.warn(
1/1 ██████████ 1s 517ms/step
array([[74.378876],
       [74.74228 ],
       [75.20334 ],
       [75.69177 ]], dtype=float32)
```

none form-data x-www-form-urlencoded raw

```
2 //average score
3 "scores": [30.64236
4 ,40.87656
5 ,31.41518
6 ,32.34864
7 ,41.97105
8 ,42.88421
9 ,53.13409
10 ,54.2997,
11 56.0223,
12 57.38632,
13 52.38632,
14 54.1109
```

Body Cookies Headers (6) Test Results

{ } JSON ▾ ▷ Preview ⚡ Visualize ▾

```
1 {
2   "performance_score": [
3     54.405704498291016,
4     55.89969253540039,
5     56.86830520629883,
6     58.860599517822266,
7     60.75442886352539
8   ]
```

student level forecasting



# Web Application UI's

Proof of work

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Sri Lanka Institute of  
Information Technology

# Web Application UI's

## Proof of work



Sri Lanka Institute of  
Information Technology

# Web Application UI's

## Proof of work

The screenshot shows the EnglishHub website's 'Available Papers' page. At the top, there is a search bar and a 'Paper List' sidebar containing links to 'Simple Grammar Paper 01' and 'Simple Grammar Paper 02'. Below this, two paper thumbnails are displayed: 'Simple Grammar Paper 01' and 'Simple Grammar Paper 02'. Each thumbnail includes a user icon, the date '3/19/2025', and a duration of '60 mins'. The main content area features a large image of a person holding a book, with the text 'Available Papers' overlaid.

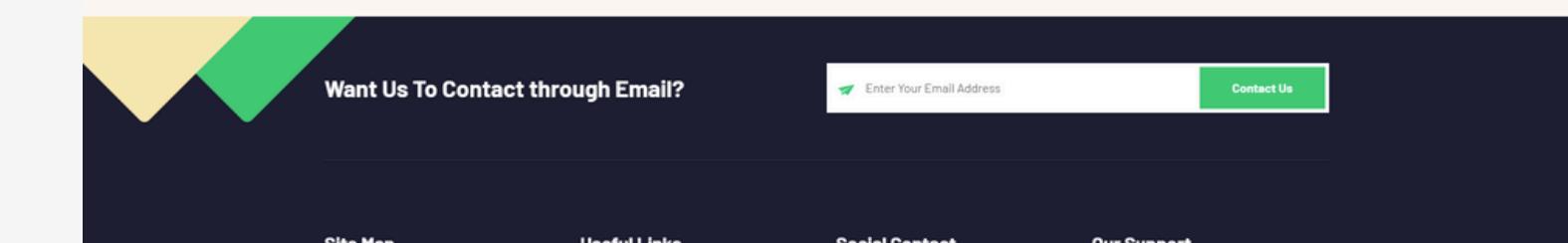
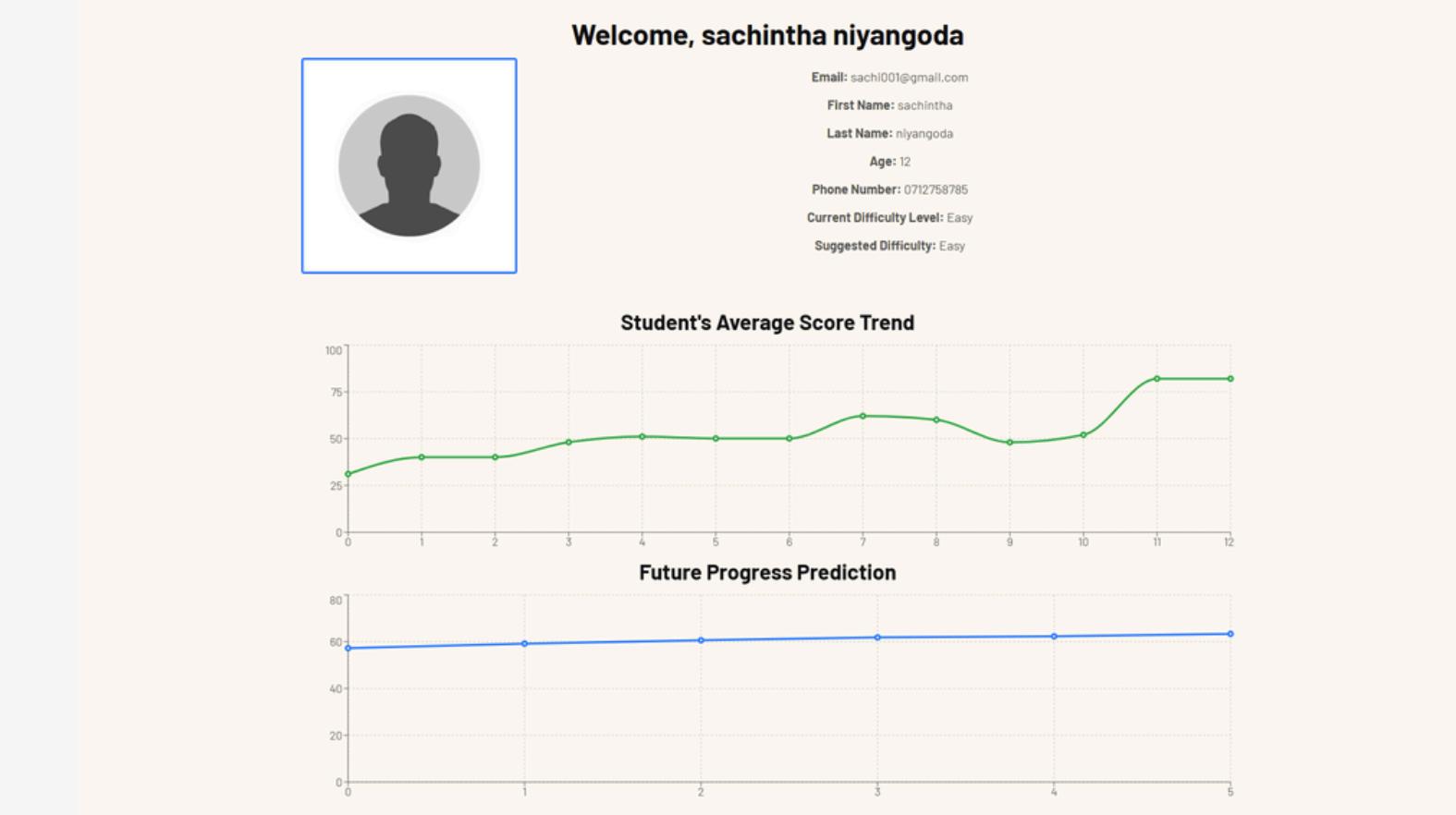
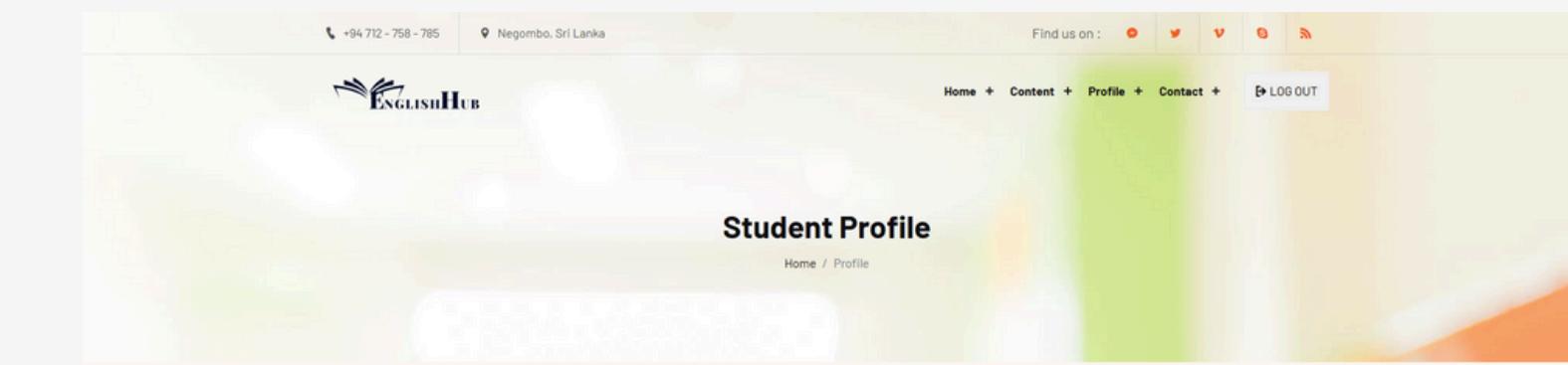
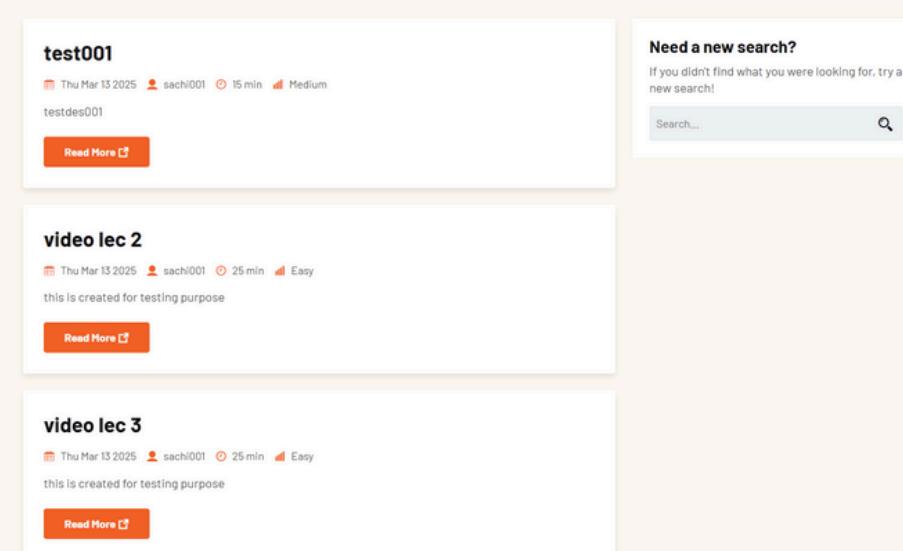
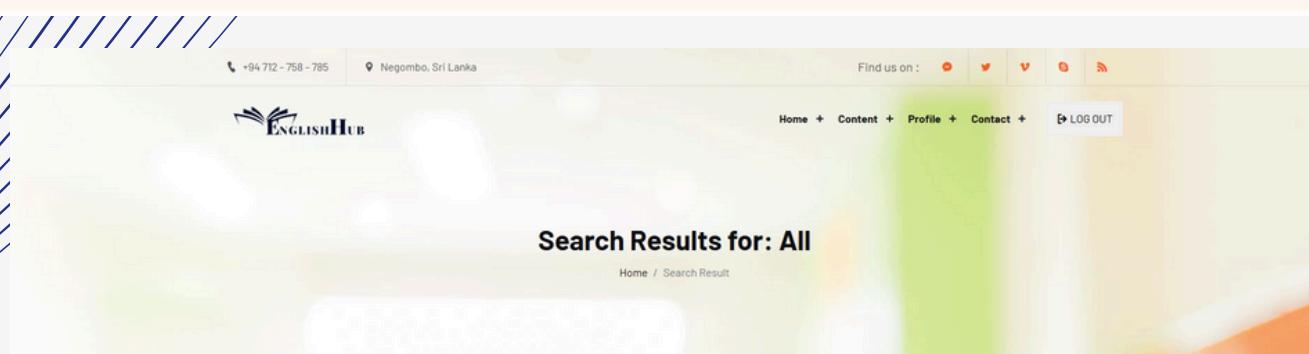
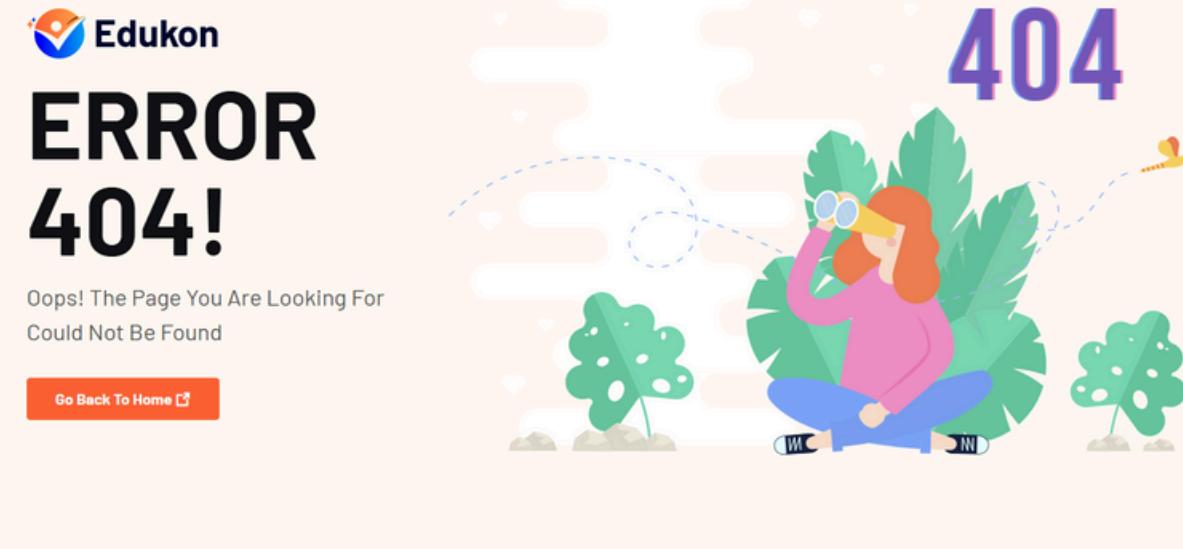
The screenshot shows the 'Simple Grammar Paper 01' quiz interface. At the top, it displays the paper title, recommended age (10 yrs), difficulty (Easy), and total time (60 mins). A timer indicates 59:53 left. The quiz consists of five sections: 1. Answer these questions (20 marks), 2. Fill in the blank with the correct grammar word (20 marks), 3. Lily has a small puppy named Max. Max loves to play with a ball and run around the garden. Every morning, Lily feeds Max and takes him for a walk. Max is very friendly and loves to meet new people. (20 marks), 4. Rearrange the words to make a correct sentence (20 marks), and 5. Write a short answer (18 marks). Each section contains several questions with input fields for answers.

The screenshot shows the contact us section of the website. It features a map of Negombo, Sri Lanka, with various landmarks labeled. To the right, there are four contact details boxes: 'Office Address' (Negombo, Sri Lanka), 'Phone Number' (+94 712-758-785), 'Send Email' (sachintha.hasaranga@gmail.com), and 'Our Website' (www.sachintha.hasaranga.com). Below the map, a form is provided for users to fill out their name, email, subject, and message, with a 'Send Our Message' button at the bottom.



# Web Application UI's

Proof of work





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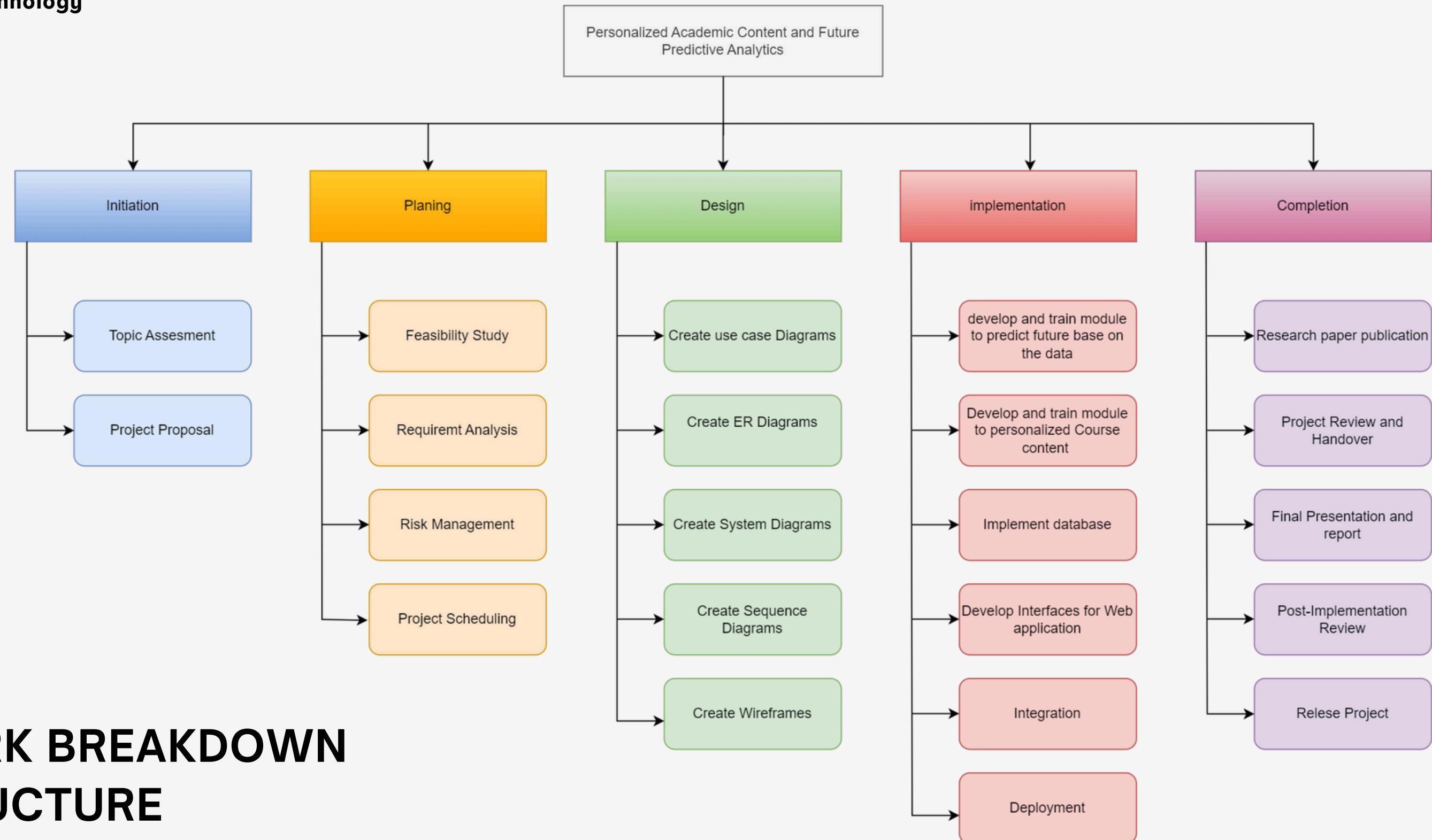
## COMPLETED COMPONENTS

- Data Collection - 95%
- NLP Model for get answer correction for paper
- student level prediction model
- student future level forecast
- UI implementation - User and Admin
- Backend Implementation

66

## FUTURE DEVELOPMENT

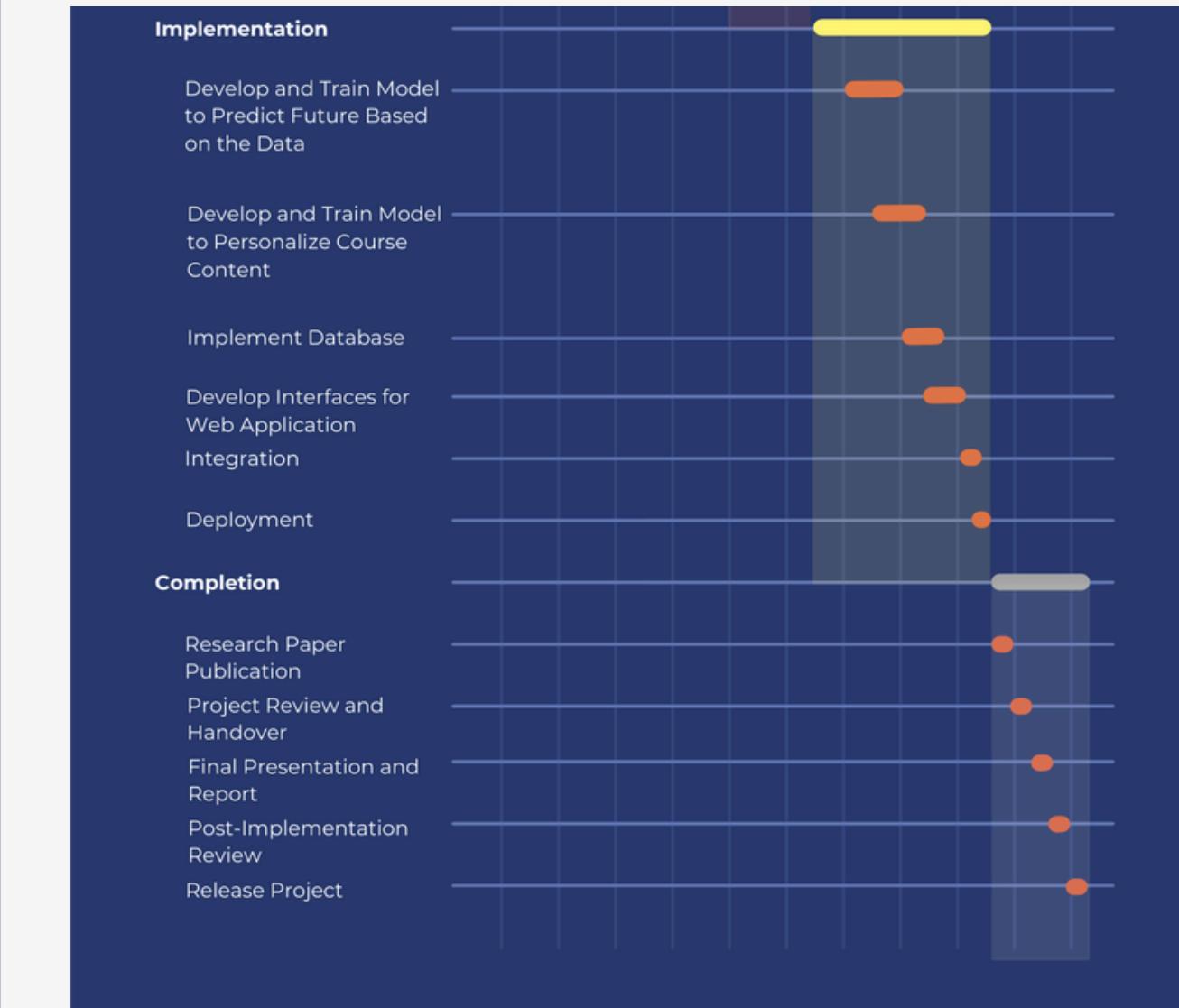
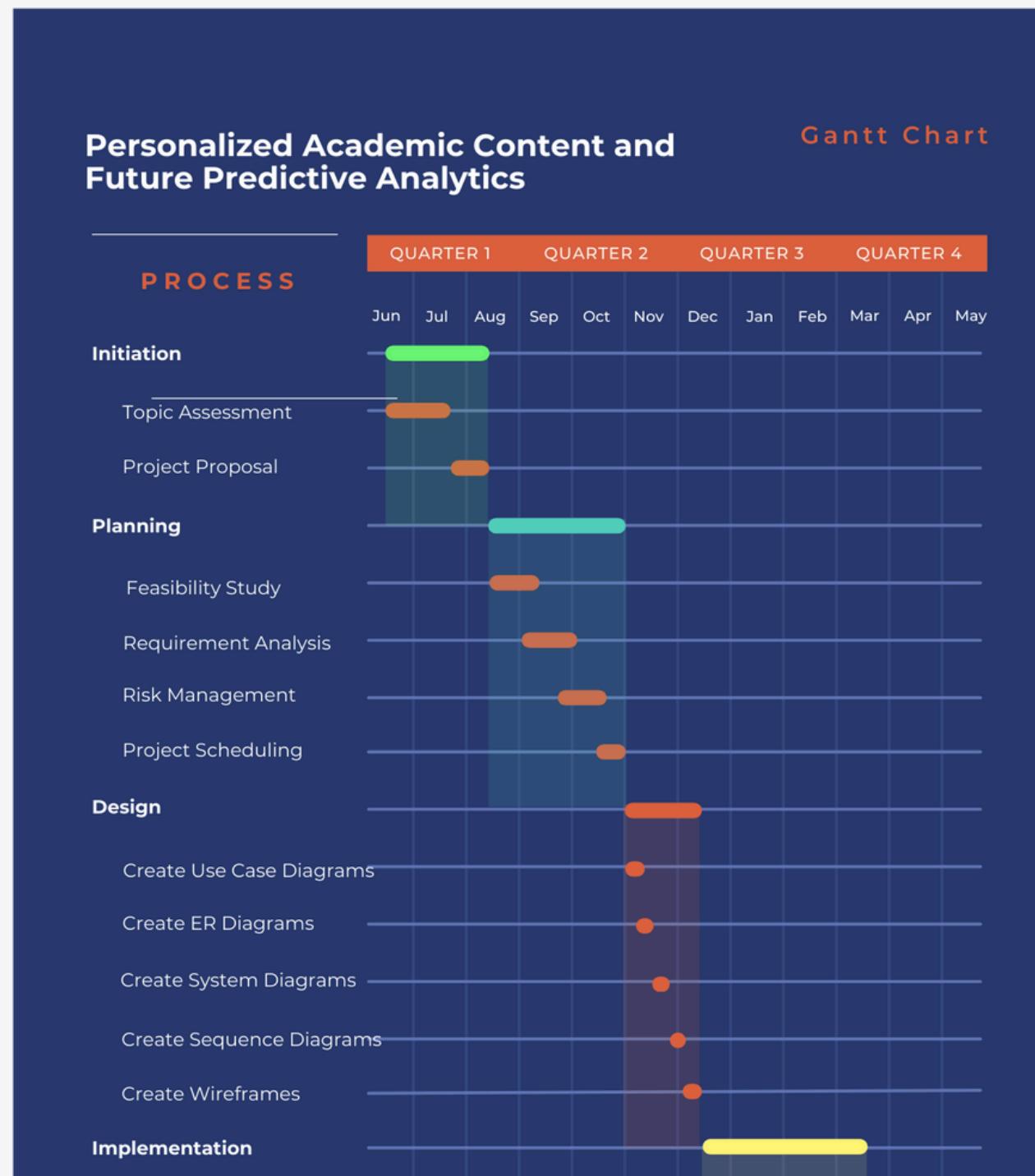
- Integrate with other members parts
- attach Thisra's NLP model for papers



## WORK BREAKDOWN STRUCTURE



# GANNT CHART





# REFERENCES

- . Akçapınar, G., Hasnine, M. N., Majumdar, R., Flanagan, B., Ogata, H. (2019). Developing an earlywarning system for spotting at-risk students by using eBook interaction logs. *Smart Learning Environments*, 6, 1-15. <https://doi.org/10.1186/s40561-019-0083-4>
- Adnan, M., Habib, A., Ashraf, J., Mussadiq, S., Raza, A. A., Abid, M., Bashir, M., Khan, S. U. (2021). Predicting at-risk students at different percentages of course length for early intervention using machine learning models. *IEEE Access*, 9, 7519-7539.
- Nimy, E., Mosia, M., Chibaya, C. (2023). Identifying At-Risk Students for Early Intervention—A Probabilistic Machine Learning Approach. *Applied Sciences*, 13, 3869. <https://doi.org/10.3390/app13063869>
- Er, E. (2012). Identifying at-risk students using machine learning techniques: A case study with IS 100. *International Journal of Machine Learning and Computing*, 2, 476. <https://doi.org/10.7763/IJMLC.2012.V2.171>



# AI - LISTNING ACTIVITIES

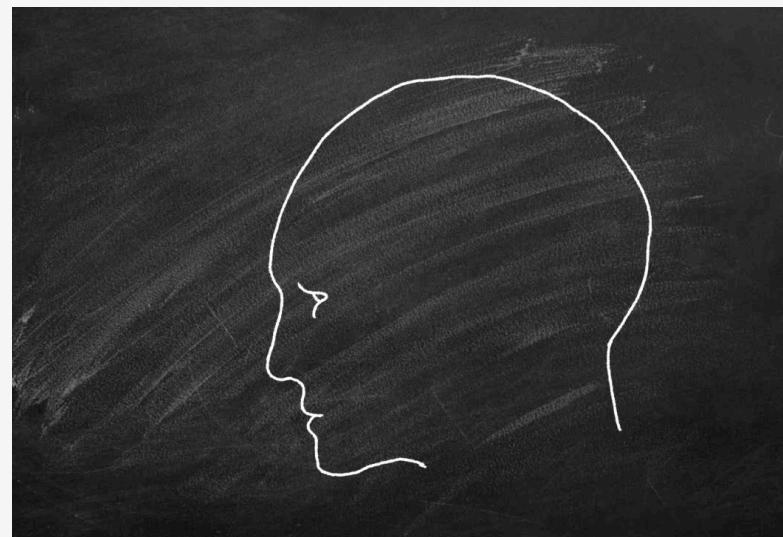
---



# BACKGROUND

- Focus on enhancing listening and comprehension skills.
- Interactive listening activities with recorded conversations.
- Students answer questions related to the audio.
- Automatic evaluation of student responses for accuracy.
- Encourages critical thinking and language development.

# RESEARCH PROBLEMS



- Accuracy of Speech Recognition in Evaluating Student Responses
- Impact of Student Engagement and Learning Outcomes
- Effectiveness of Audio Content in Enhancing Listening and Comprehension Skills
- Adapting Listening Activities to Different Learning Paces and Styles



# SUB OBJECTIVES

01

Question Collection for Main  
Listening Activities and Practice  
Sessions

02

Machine Learning Model for Answer  
Similarity Check for Listening Activity

03

Create a Model for Check Student's  
Pronounsiation

04

Create a child-friendly interface to  
enhance learning accessibility and  
interest

# METHODOLOGY

## SYSTEM, PERSONAL, AND SOFTWARE REQUIREMENT SPECIFICATION

### Software Requirement

- Tensorflow
- Python
- MERN
- NLTK



### Personal Requirement

- School teacher
- School children



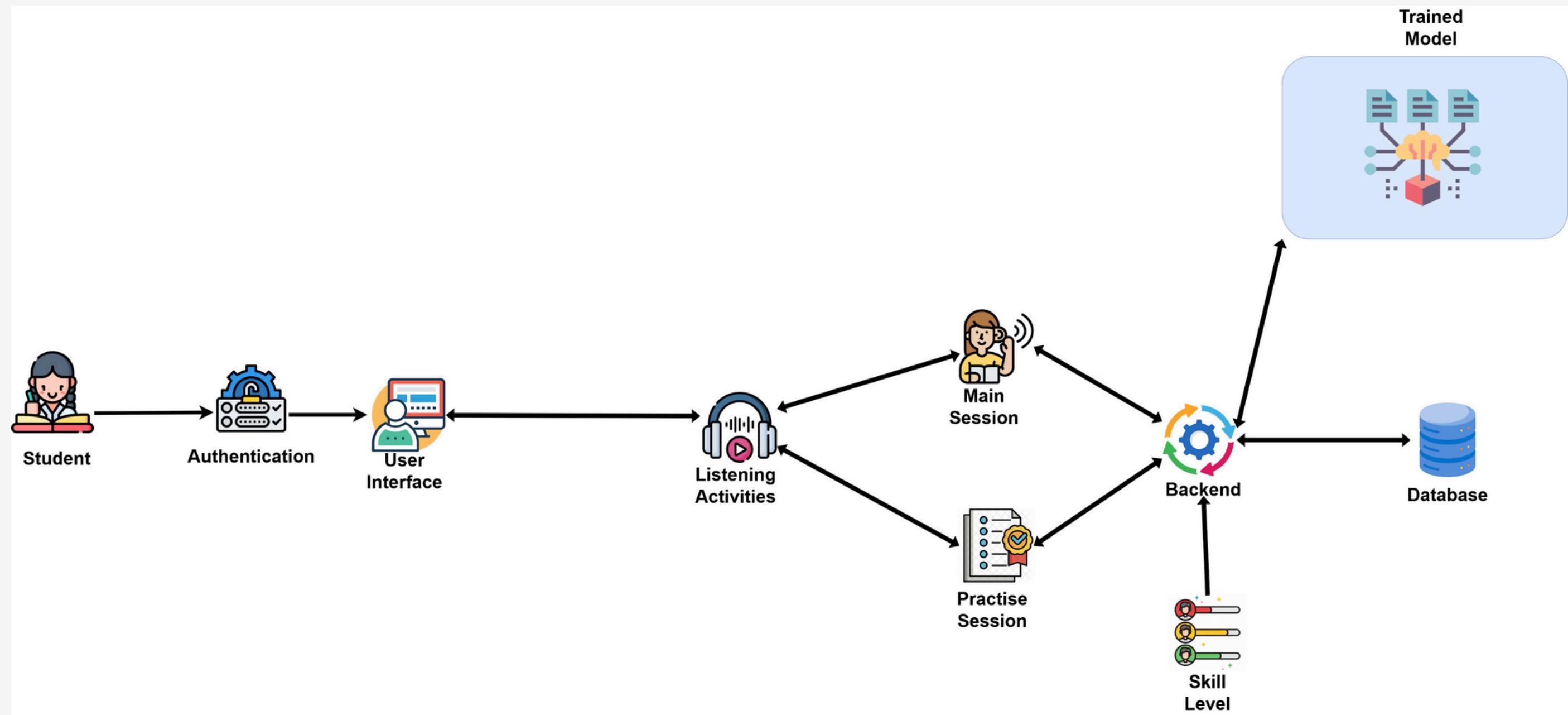
### Functional Requirement

- Natural Language Understanding
- Relevance and Knowledge Delivery
- Study and Personalized Advice
- Learning Enhancement
- Child-Friendly Design

### Non-Functional Requirement

- Performance
- Reliability and Availability
- Accessibility

# System Diagram





# Data Collection and Annotation

## Data Collection Methods

- From the students at the Regent Language Institute, Negombo
- From the External Supervisor

## Annotation

- From the External Supervisor



## Prevoiuse Results

```
Test Predictions: [0.95188403 0.82827616]
Test Loss (MSE): 0.05522859410356091
Test MAE: 0.19008009433746337
Test MSE: 0.05522859410356091
Test R2: 0.9999999999999998
PS C:\SLIIT\4th Year\Research\similarity_model>
```

```
Test Ground Truth: [0.85 0.7 0.78 0.65 0.8 ]
Test Loss (MSE): 0.037866019860783855
Test MAE: 0.17525903606414794
Test MSE: 0.037866019860783855
Test R2: 0.07156103269282593
Test Accuracy: 20.00%
PS C:\SLIIT\4th Year\Research\similarity_model>
```



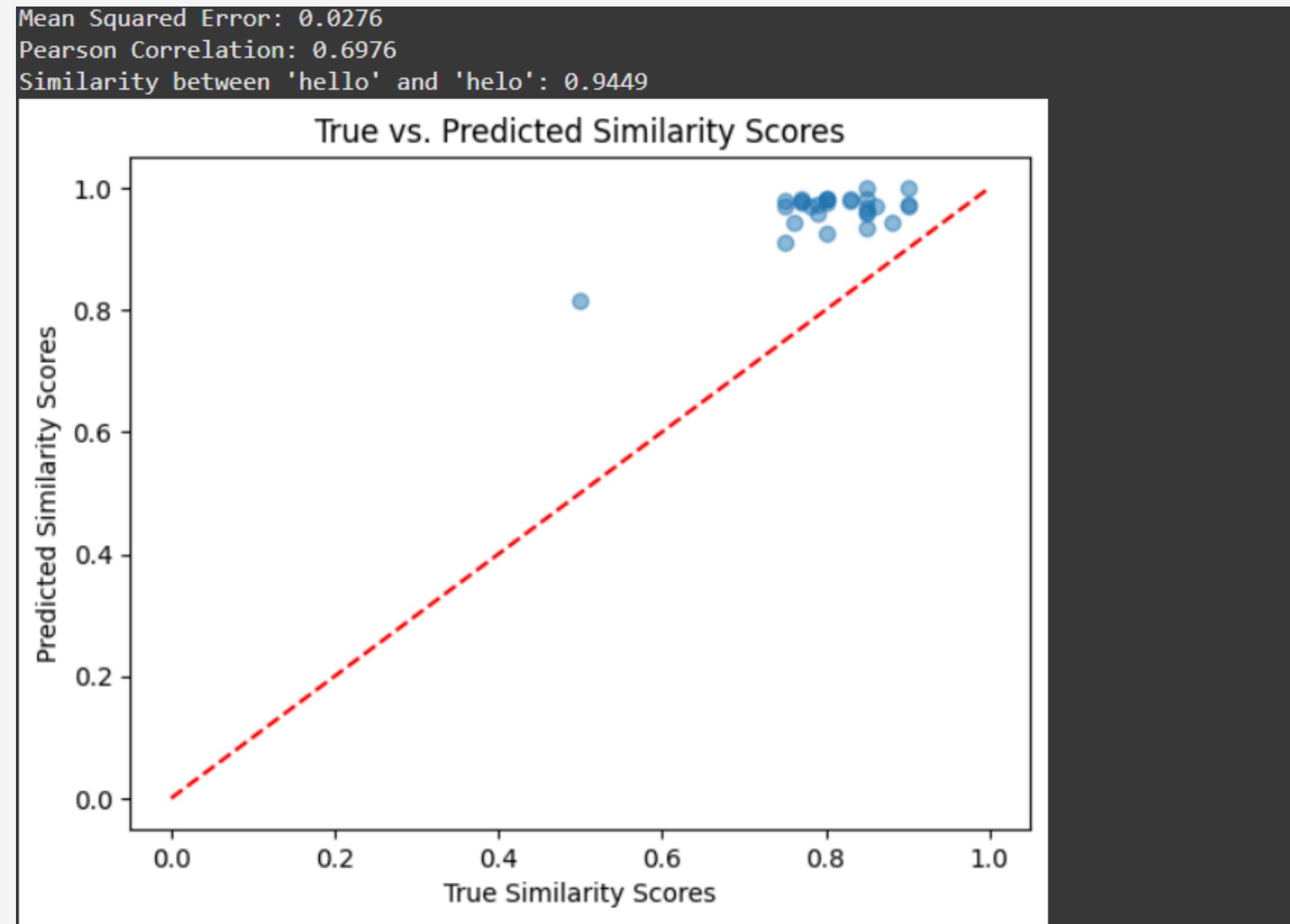
## Prevoiuse Results

```
Test Predictions: [0.95188403 0.82827616]
Test Ground Truth: [0.9 0.5]
Test Loss (MSE): 0.05522859410356091
Test MAE: 0.19008009433746337
Test MSE: 0.05522859410356091
Test R2: 0.9999999999999998
Test Accuracy (within ±0.1): 50.00%
PS C:\SLIIT\4th Year\Research\similarity_model>
```

```
55/55 [=====] - 840s 14s/step - loss: 0.1215 - mae: 0.3025
Epoch 2/5
55/55 [=====] - 819s 15s/step - loss: 0.1015 - mae: 0.2761
Epoch 3/5
55/55 [=====] - 822s 15s/step - loss: 0.0849 - mae: 0.2488
Epoch 4/5
55/55 [=====] - 839s 15s/step - loss: 0.0725 - mae: 0.2285
Epoch 5/5
55/55 [=====] - 831s 15s/step - loss: 0.0637 - mae: 0.2123
Model saved as 'similarity_model'
1/1 [=====] - 9s 9s/step
Test Predictions: [0.99926794 0.6062396 ]
Test Loss (MSE): 0.010570489630753525
Test MAE: 0.10275377631187438
Test MSE: 0.010570489630753525
Test R2: 0.9999999999999996
```



## New Results





66

## COMPLETED COMPONENTS

- Data Collection - 95%
- Improved the Accuracy of the model
- UI implementation - 80%
- Backend Implementation

## FUTURE DEVELOPMENT

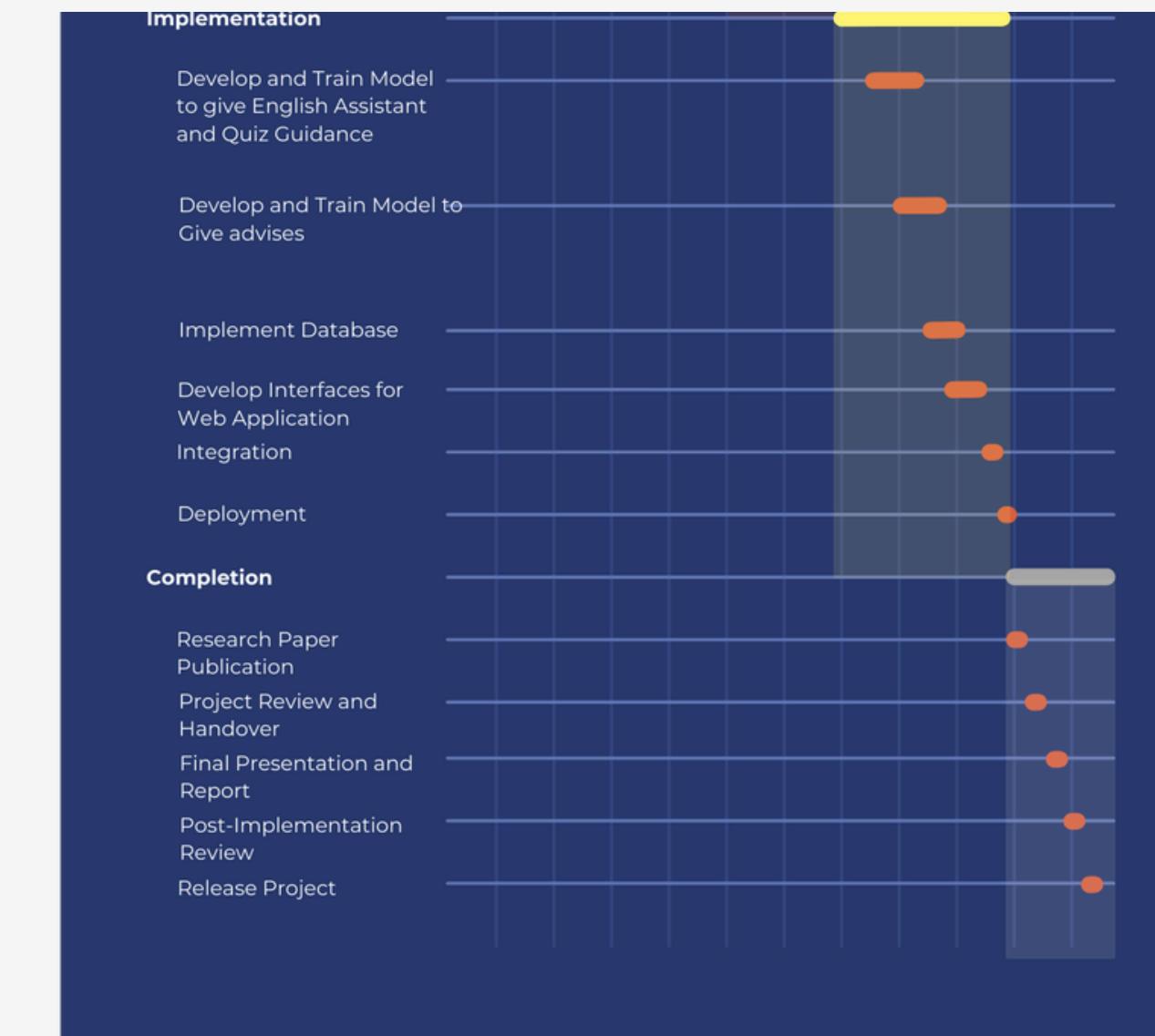
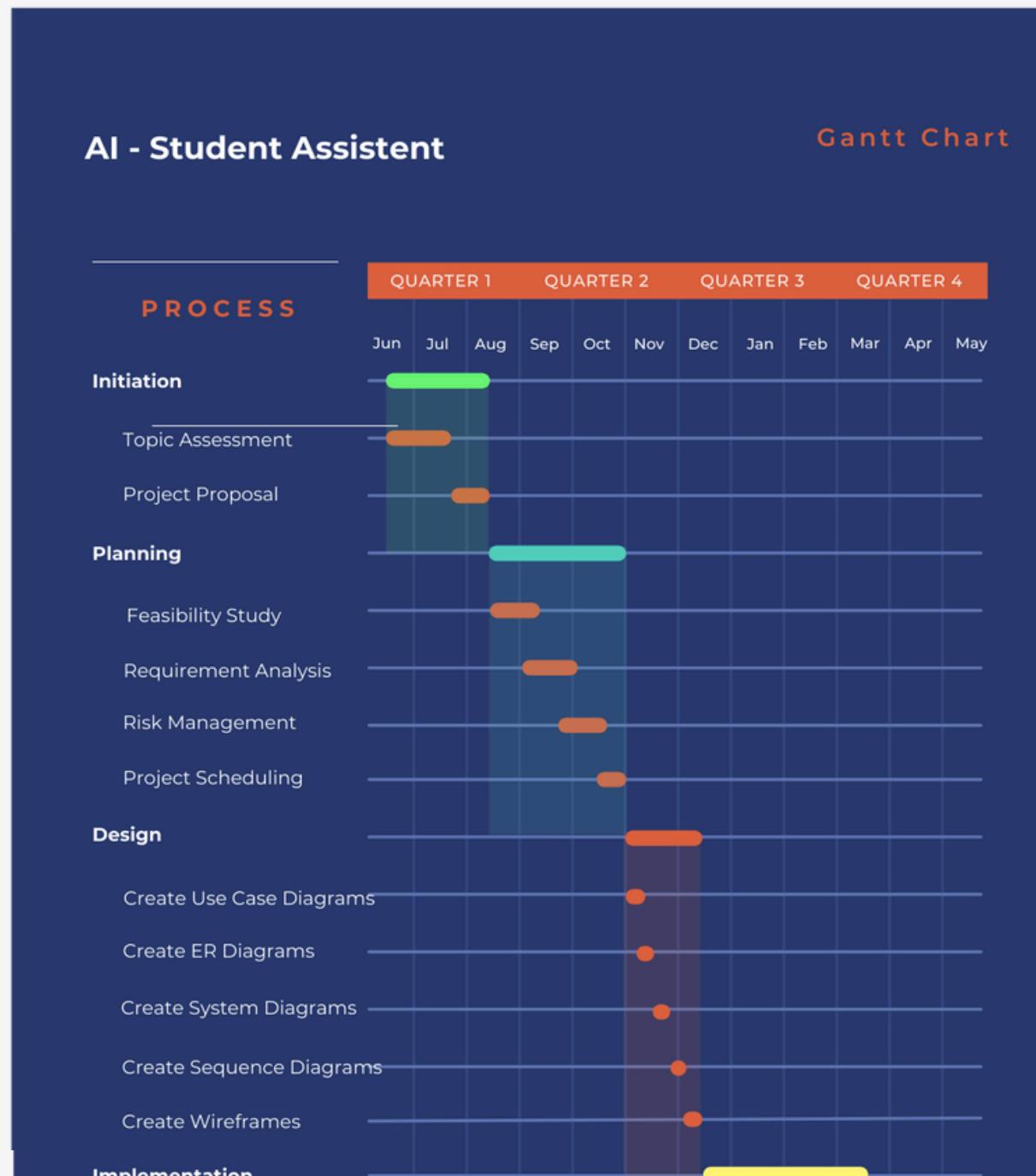
- Data Collection -100%
- Integrate with other members parts



## WORK BREAKDOWN STRUCTURE



# GANNT CHART



# REFERENCES

- [1] "Learning Spanish with Duolingo: How Well Does It Work?" - 2023 Conference on Language Learning Technologies, August 15-19, 2023, Barcelona, Spain.
- [2] "The Implementation of ELLLO Web-Based Application in Teaching Listening at MA Al-Ikhlas Ujung Bone" - 2024 International Conference on Education Technology, March 10-13, 2024, Jakarta, Indonesia
- [2] "The Implementation of ELLLO Web-Based Application in Teaching Listening at MA Al-Ikhlas Ujung Bone" - 2024 International Conference on Education Technology, March 10-13, 2024, Jakarta, Indonesia
- [3] "The Role of BBC Learning English Podcasts in Developing Speaking Skills Among EFL Learners" - 2023 International Conference on Language and Communication, September 20-23, 2023, London, UK.
- [5] "Enhancing Listening Skills and Learning Specific Language with Transcription Activities Using Lyrics Training" - 2024 International Conference on Language Learning Technologies, June 15-18, 2024, Madrid, Spain.

# THANK YOU