

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

Group - 24-25J-103

SUPERVISOR PANNEL



Ms. Jenny

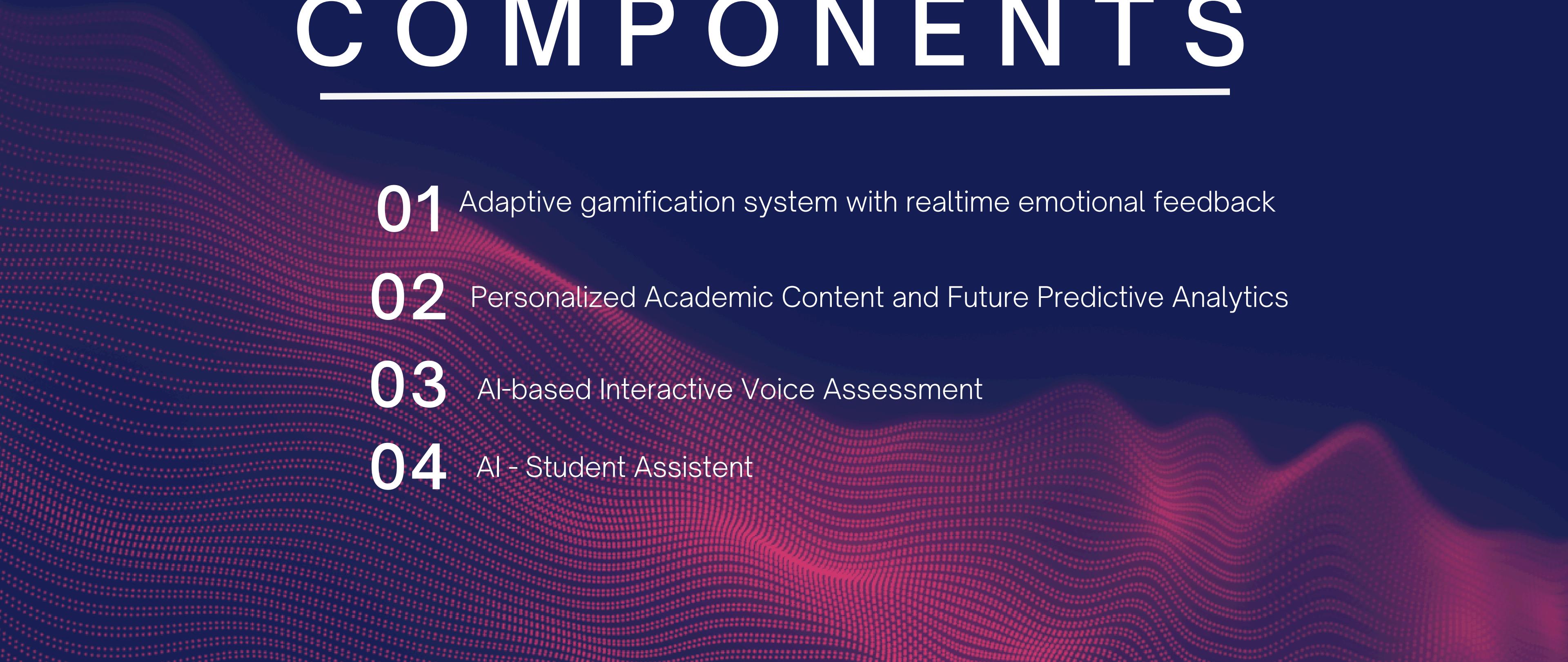
Supervisor



Ms. Dinuka

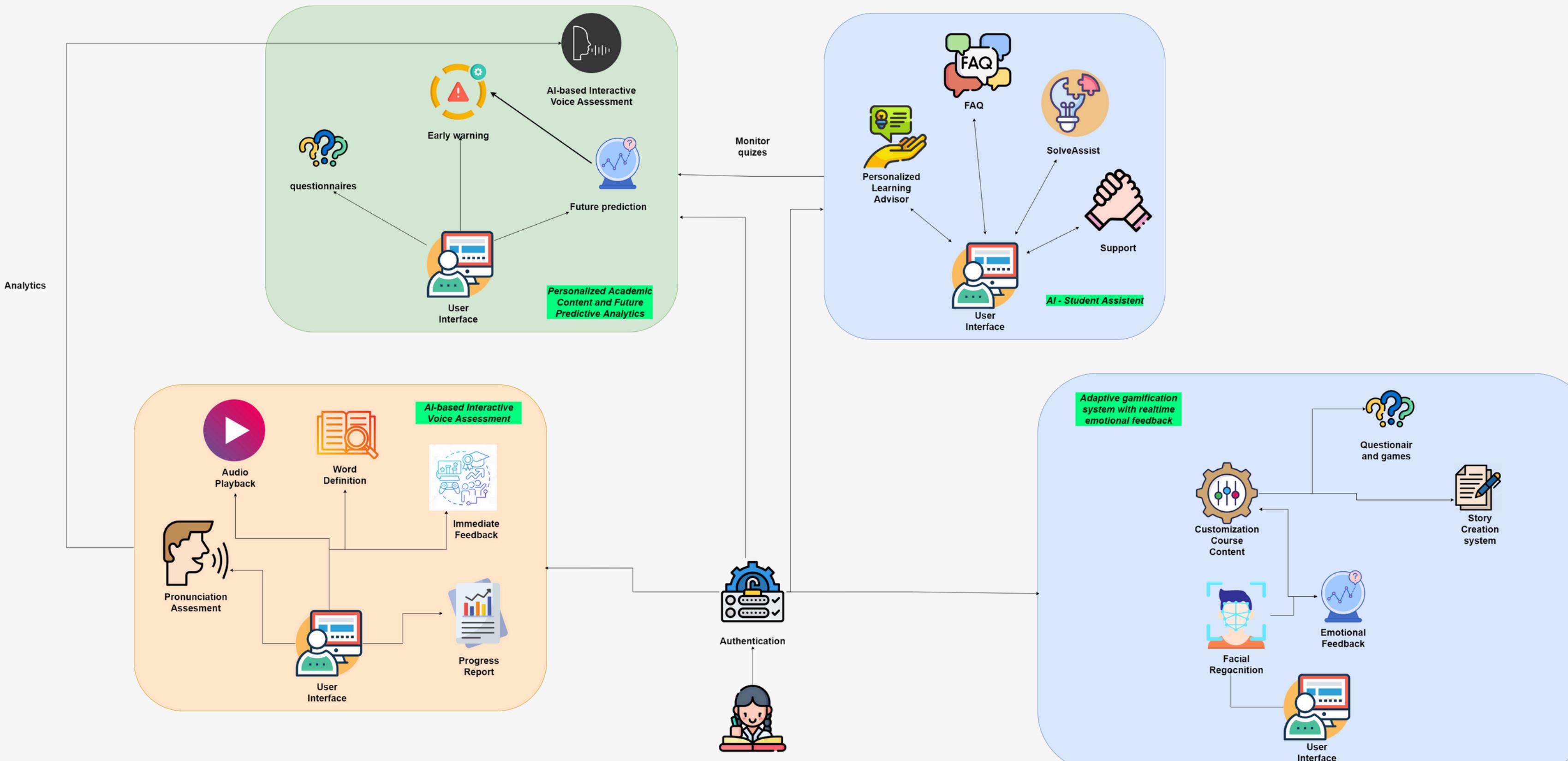
Co-Supervisor

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



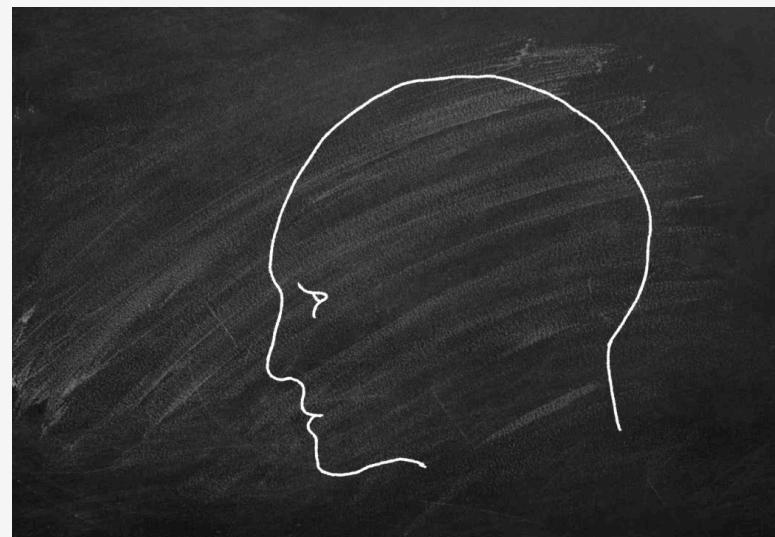
BACKGROUND

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.

03

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

02

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

04

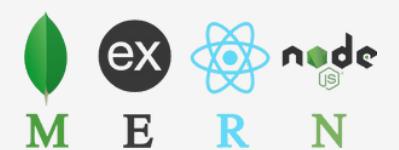
Develop a parent and educator dashboard to provide insights into the child's progress and engagement levels.



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

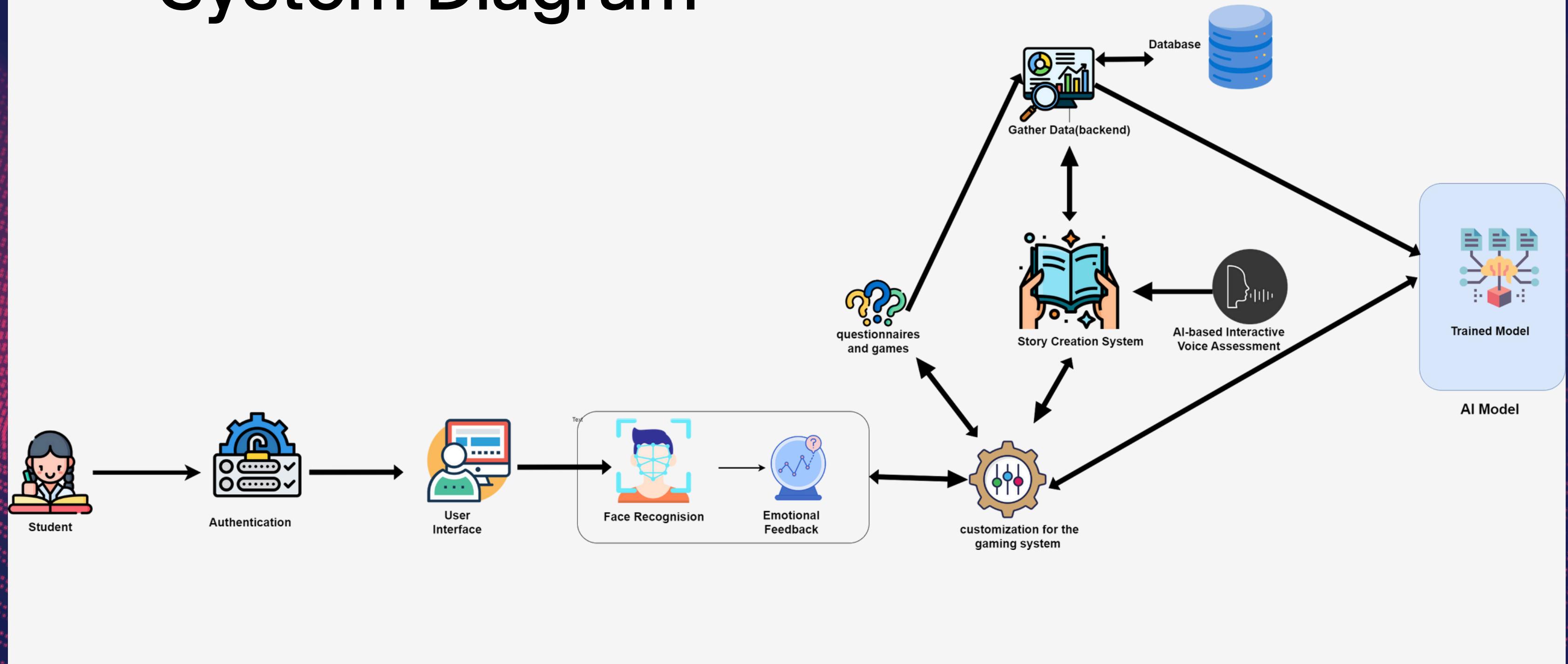
Functional Requirement

- 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 are three filter buttons: Type, People, and Modified. A list of folders is displayed, each with a dark blue folder icon and a four-digit name: 00000, 01000, 02000, 03000, 04000, 05000, 06000, 07000, 08000, and 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



Register Now



Capture Face

Mood Detected

We noticed you seem frustrated. Want to play a game to relax?

Remind me again in:

10 minutes

Dismiss

Play game

WEB RELOAD



Home + Content + Profile +

Login

Email *

Password *

Login Now

[Forgot Password?](#) [Login with Face](#)
[Don't Have an Account?](#) [Sign Up](#)

Face Login



Capture Face

DATA COLLECTION

DATA COLLECTION

Register Now



Capture Face

Username

Email

Password

Confirm Password

First Name

Last Name

Age

Phone Number

LOGIN & REGISTRATION



Login

Email *

Password *

Login Now

Forgot Password? Login with Face
Don't Have an Account? Sign Up

Face Login

Capture Face

Mood Detected

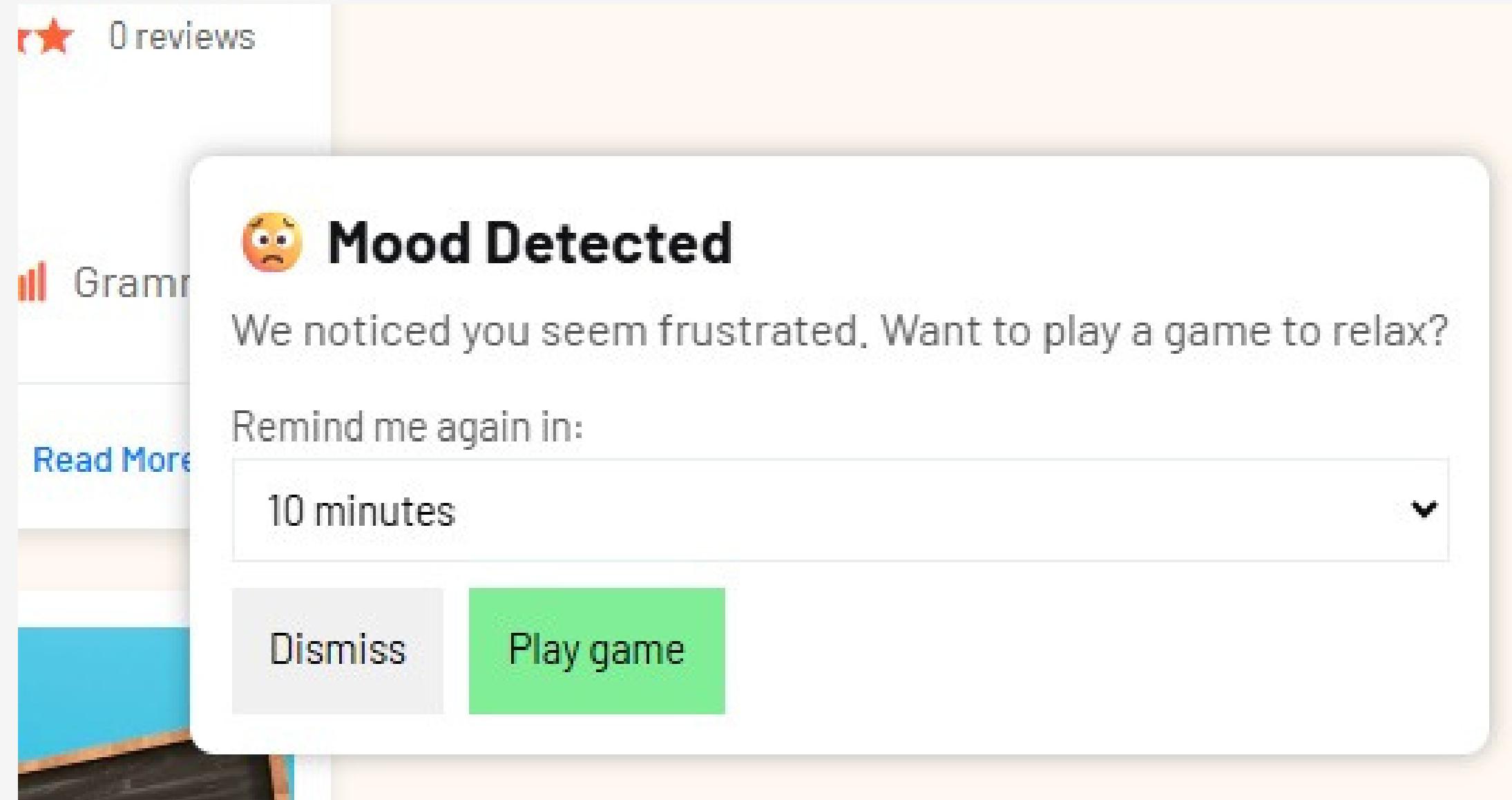
We noticed you seem frustrated. Want to play a game to relax?

Remind me again in:

10 minutes

Dismiss Play game

FACE DETECTION USING FACE NET



EMOTION DETECTION



The screenshot shows the 'Console' tab of a browser's developer tools. The output area displays the following log entries:

```
② Most frequent (last 5s): Surprised CameraCapturing.jsx:55
Most frequent (last 5s): Happy CameraCapturing.jsx:55
Most frequent (last 5s): Neutral CameraCapturing.jsx:55
```

EMOTION DETECTION TESTING



Card Flip Game Word Guess Story Viewer

The Lost Warrior

The Lost Warrior

Follow the path Search for the cries

You are a warrior waking up in a strange forest after a battle. A path lies ahead, and you hear faint cries from the woods.

Follow the path Search for the cries

Select a Story

The Lost Warrior Spy in the Shadows

The Midnight Adventure of Lila and the Moon Cat

The Crystal of Dawn

The Midnight Adventure of Lila and the Moon Cat

Lila, a curious girl who listens to the stars, hears a strange whisper one night: 'The Moon Cat is missing... Only a child of Earth can help.' A glowing silver pawprint appears on her windowsill.

Touch the pawprint Ignore it and go back to sleep

ADAPTIVE STORY TELLING SYSTEM



Word Guess

W J H G E
E A T A I

Q W E R T Y U I O P
A S D F G H J K L
ENTER Z X C V B N M DELETE

Helpful Hint for Today:
• This word has 5 letters
• This word ends with the letter E

Dismiss

Card Flip Game Word Guess Story Viewer

Vocabulary Match Game

Select two cards with the same word to match them.

CHANGE IMAGE

Moves: 0 Best Score: Infinity

RESTART



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             while True:
44                 ret, frame = video_capture.read()
45                 if self.process_current_frame:
46                     small_frame = cv2.resize(frame, (0, 0), fx=0.25, fy=0.25)
47                     rgb_small_frame = cv2.cvtColor(small_frame, cv2.COLOR_BGR2RGB)
48
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



COMPLETED COMPONENTS 100%

Data Collection

Real-time Story development system.

ML Algorithm development for face net

Feedback management system with a
personalized dashboard.

Image recognition using tensorflow

Integration.

video capturing using open cv

Data saving for face registration

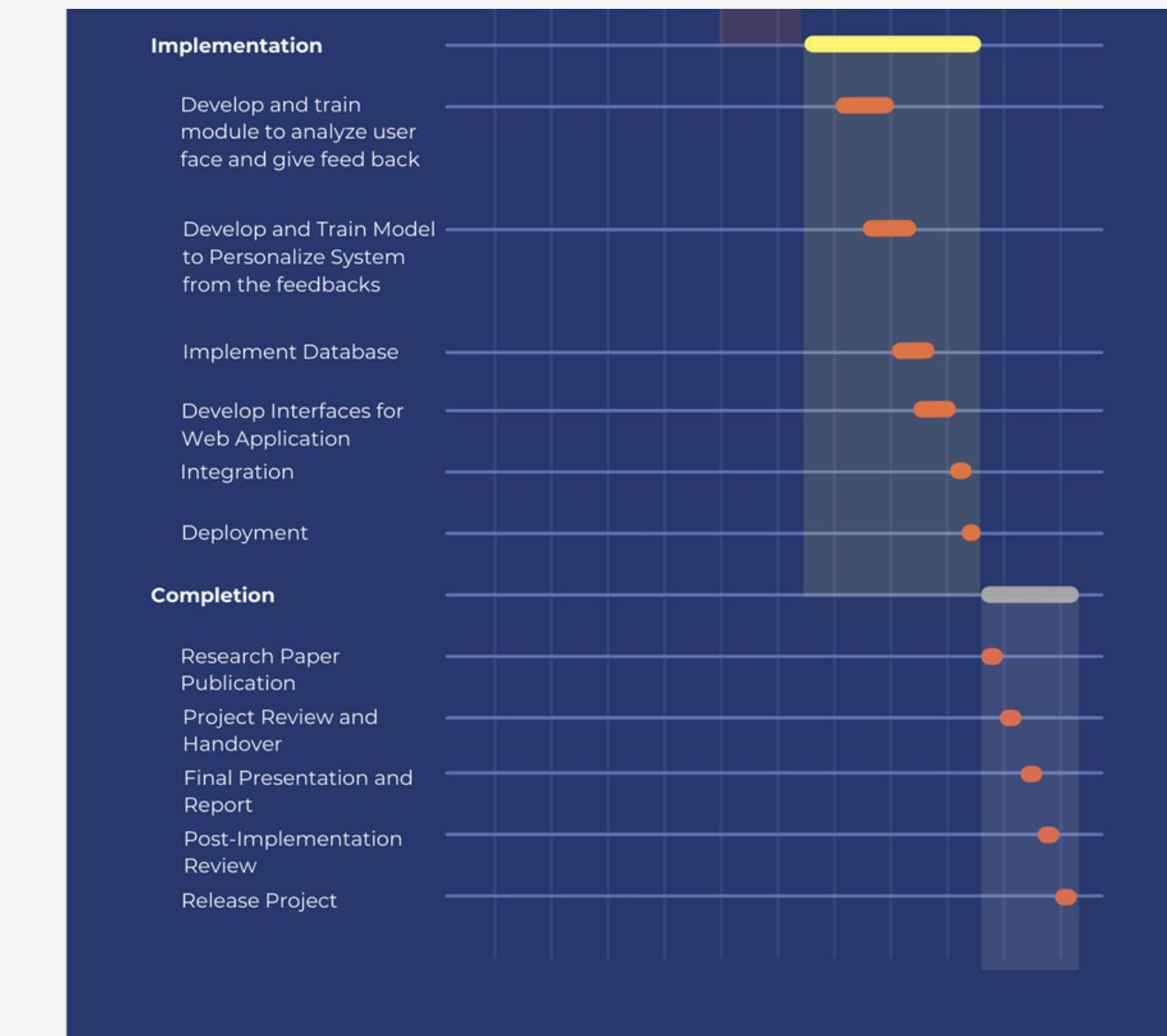
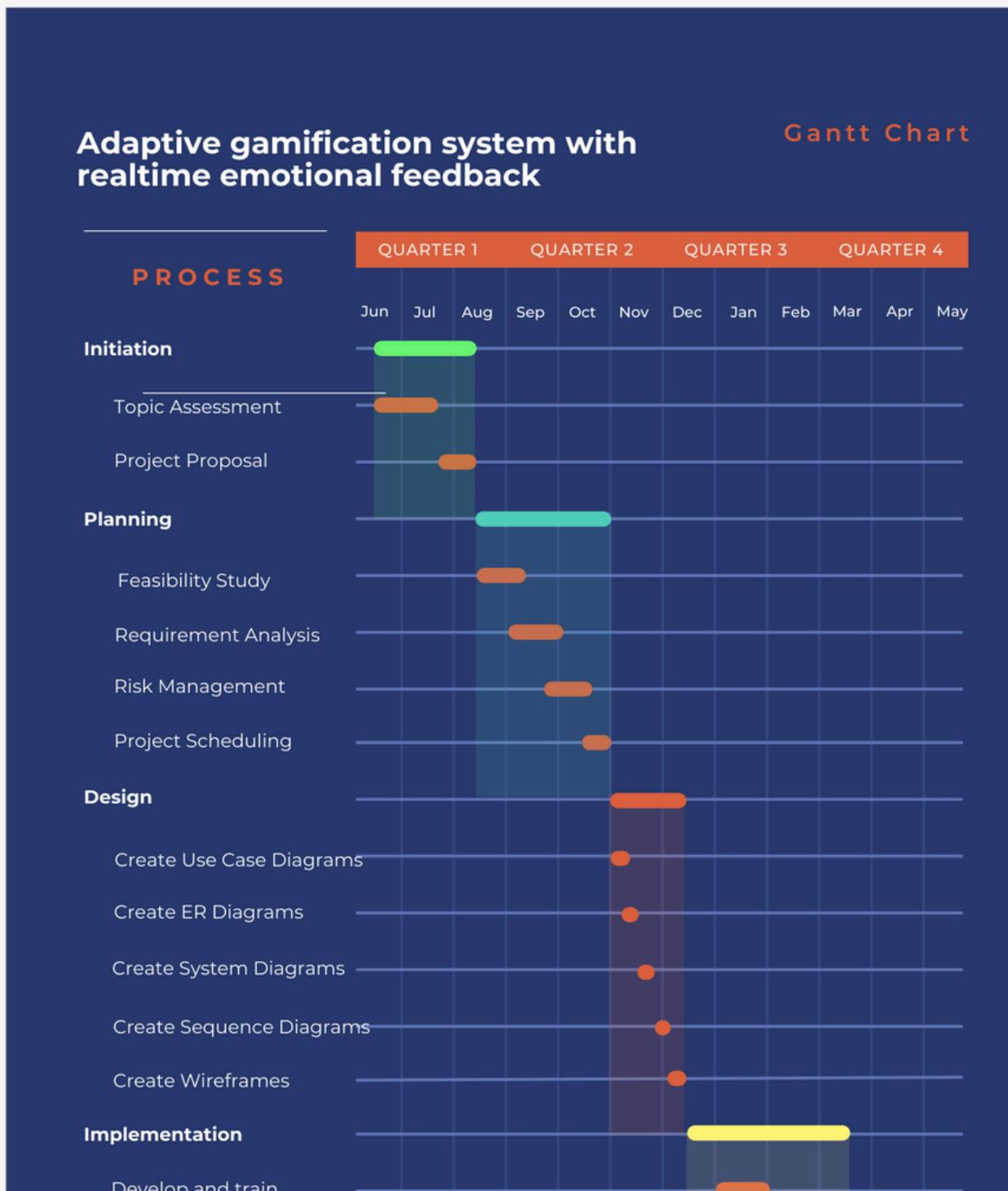
Face Accuracy checking for users

Emotion Detection

Games system development



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



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.

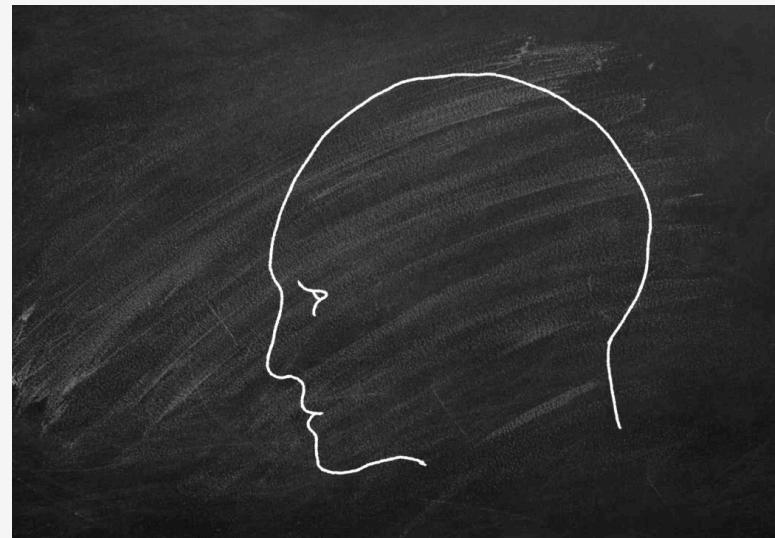
REASEARCH GAP

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

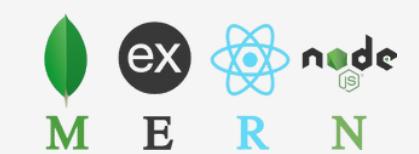
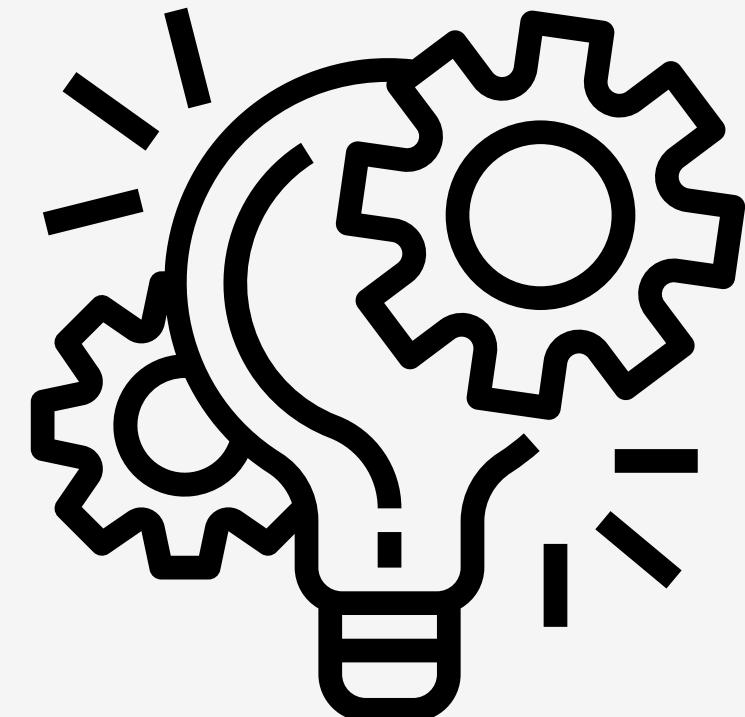
Implement real-time content adaptability, ensuring that the educational material is continuously aligned with the student's current needs.



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

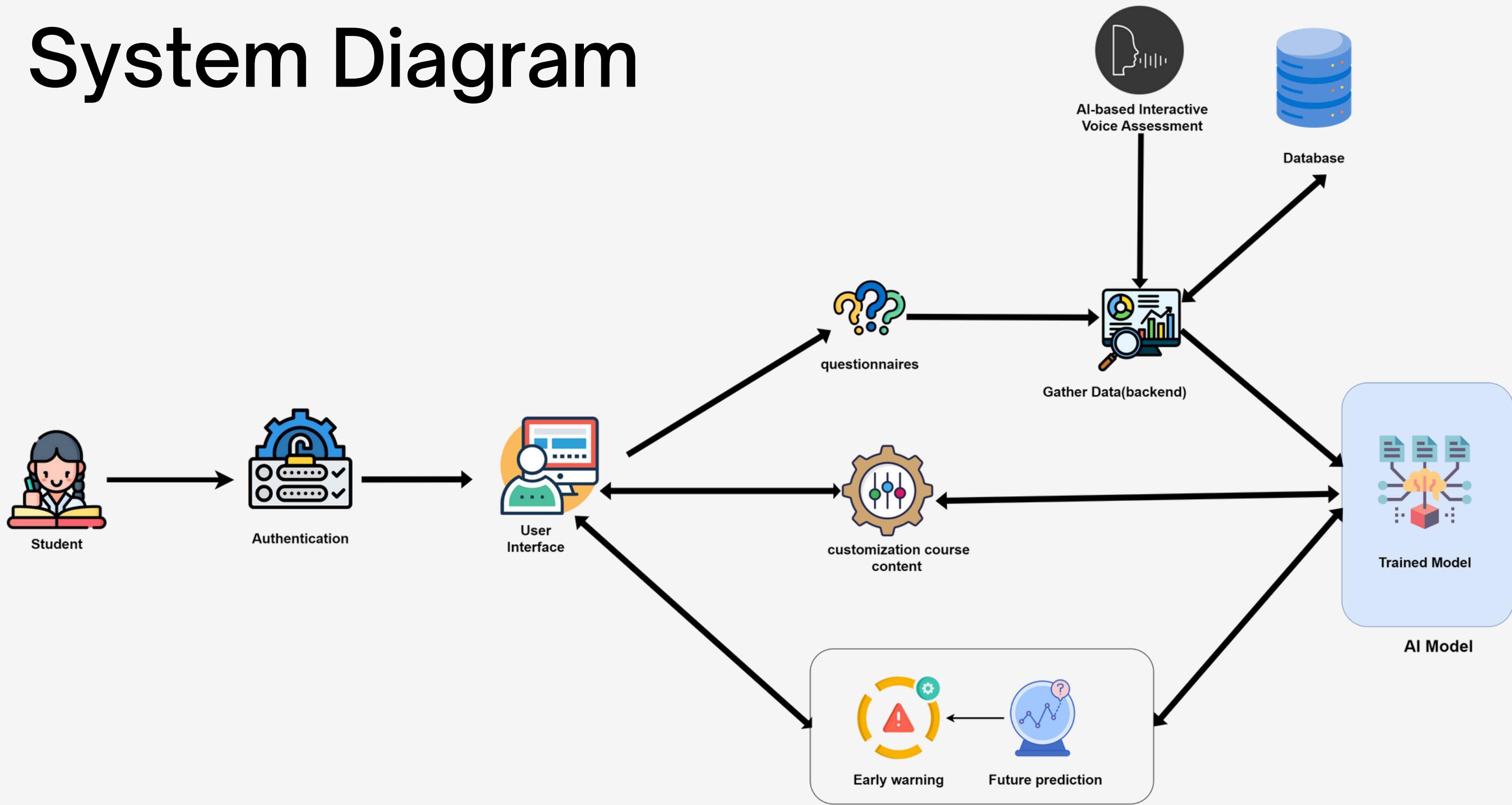
Functional Requirement

- 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

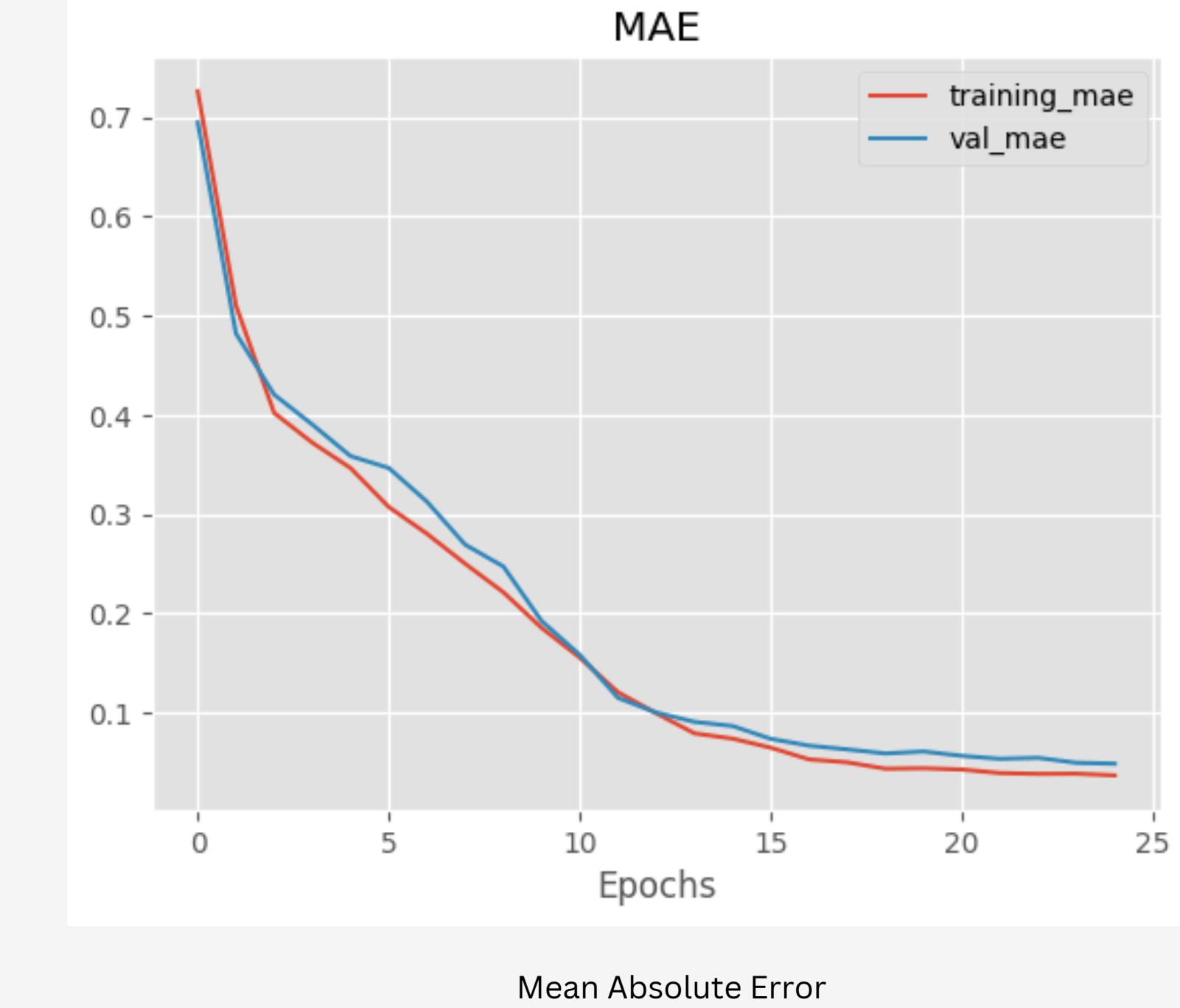
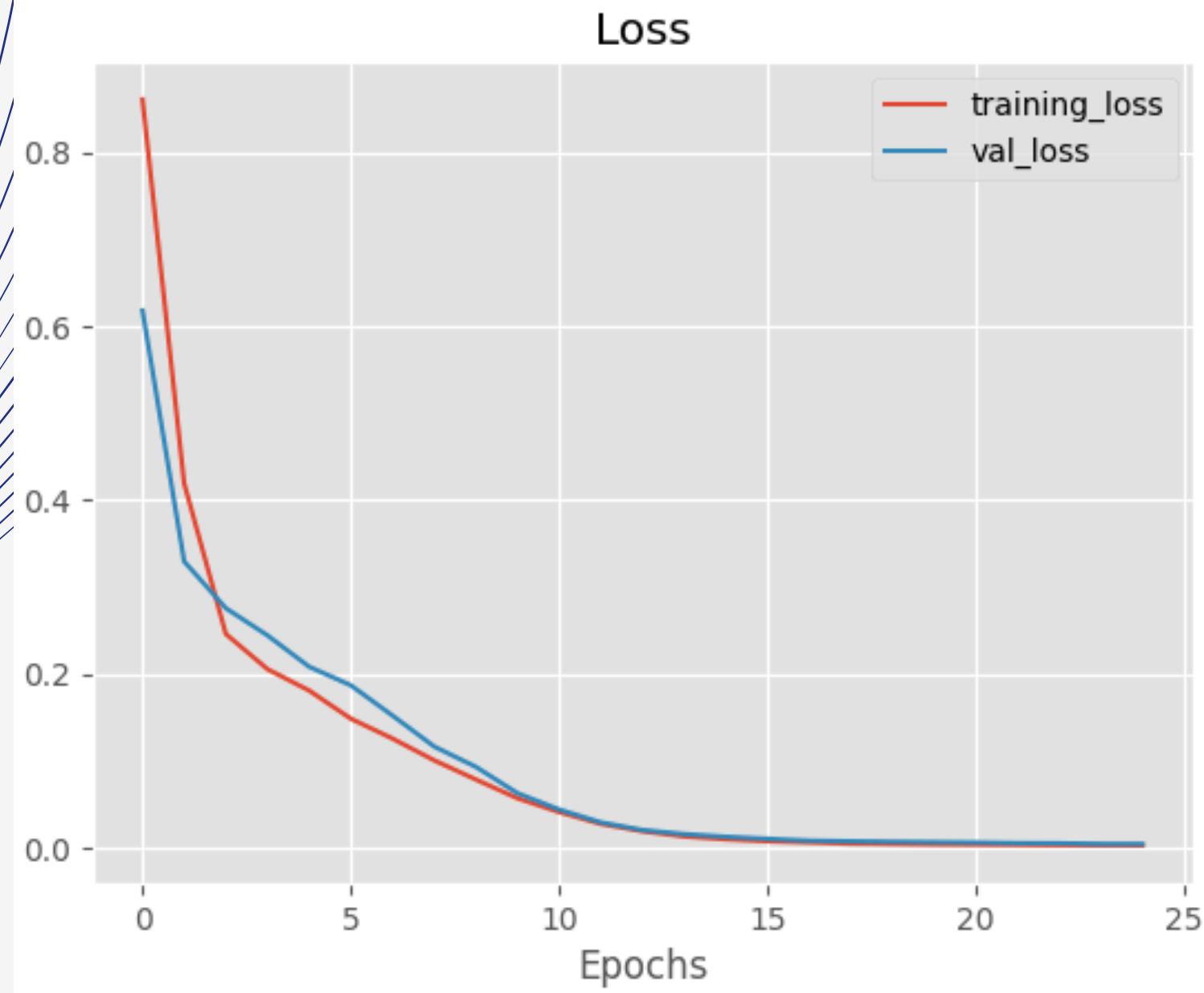
- From the students at the Regent Language Institute, Negombo
- From the External Supervisor

Annotation

- From the External Supervisor



Student Level Prediction Model

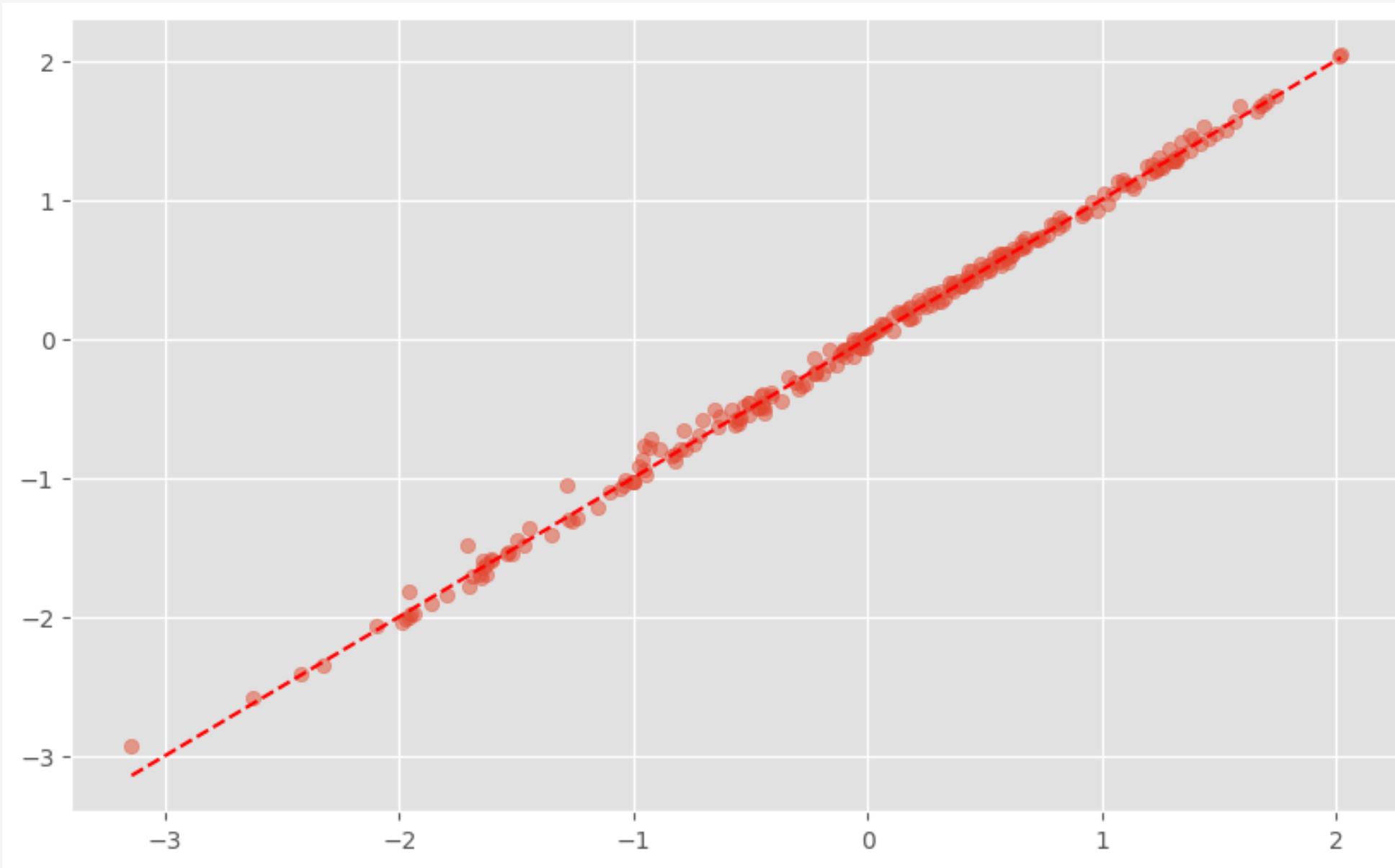




Student Level Prediction Model

```
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 }
```

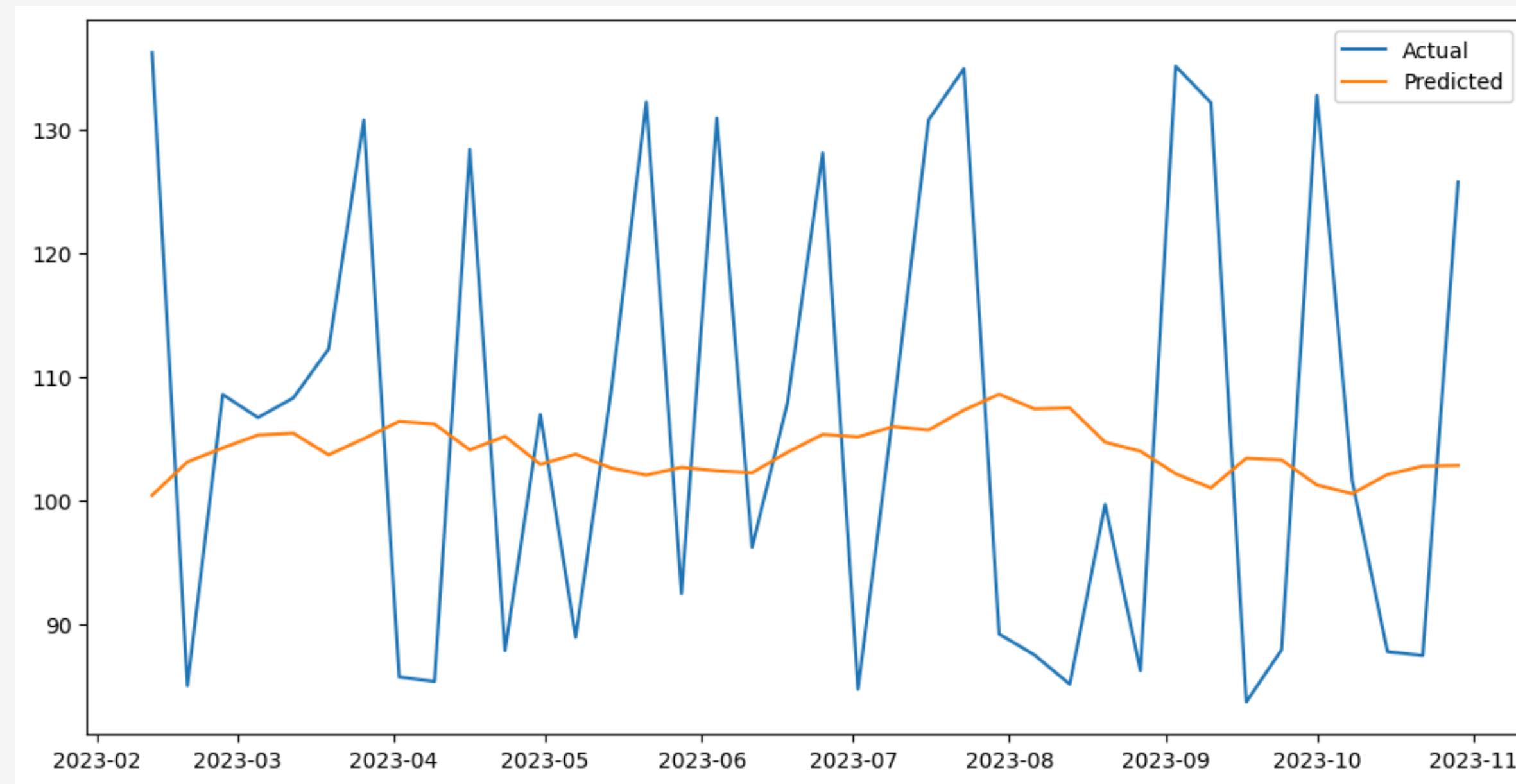
Body Cookies Headers (6) Test Results

{ } 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: 
  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



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Simple Grammar Paper 01

chiku 3/19/2025 60 mins

Recommended Age: 10 yrs Difficulty: Easy Category: grammar papers

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Question Paper

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Simple Grammar Paper 01

Recommended Age: 10 yrs | Difficulty: Easy | Total Time: 60 mins

Time Left: 59:53

1. Answer these questions (20 marks)

- Q1: What is the opposite word of hot?
- Q2: What is the opposite word of hot?
- Q3: What is the opposite word of fast?
- Q4: What is the opposite word of happy?
- Q5: What is the opposite word of night?

2. Fill in the blank with the correct grammar word (20 marks)

- Q1: _____ nice yesterday.
- Q2: She _____ a beautiful song last night.
- Q3: We _____ to the park every Sunday.
- Q4: He _____ a letter to his friend.
- Q5: They _____ a big cake for the party.

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)

- Q1: According to the paragraph, who is the owner of Max?
- Q2: What does Max love to play with?
- Q3: Where does Max run around?
- Q4: What does Lily do every morning for Max?
- Q5: What kind of dog is Max?

4. Rearrange the words to make a correct sentence (20 marks)

- Q1: park / go / to / we / on / Sunday / every.
- Q2: my / favorite / I / go / to / food.
- Q3: reading / enjoys / books / she.
- Q4: birthday / her / today / is.
- Q5: blue / sky / the / is.

5. Write a short answer (18 marks)

- Q1: What is your name?
- Q2: How old are you?
- Q3: What is your favorite color?
- Q4: What is the name of your school?
- Q5: What do you want to be when you grow up?

Submit Answers

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Our Website www.sachintha.sasara.com

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Map showing Negombo area with various landmarks like St. Mary's Church, Negombo Bus Terminal, Negombo Docks, Negombo Fort, Negombo Lake, etc.

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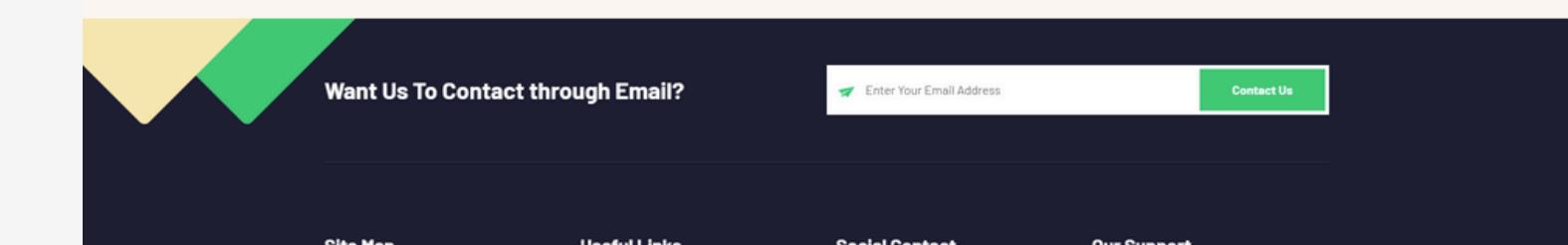
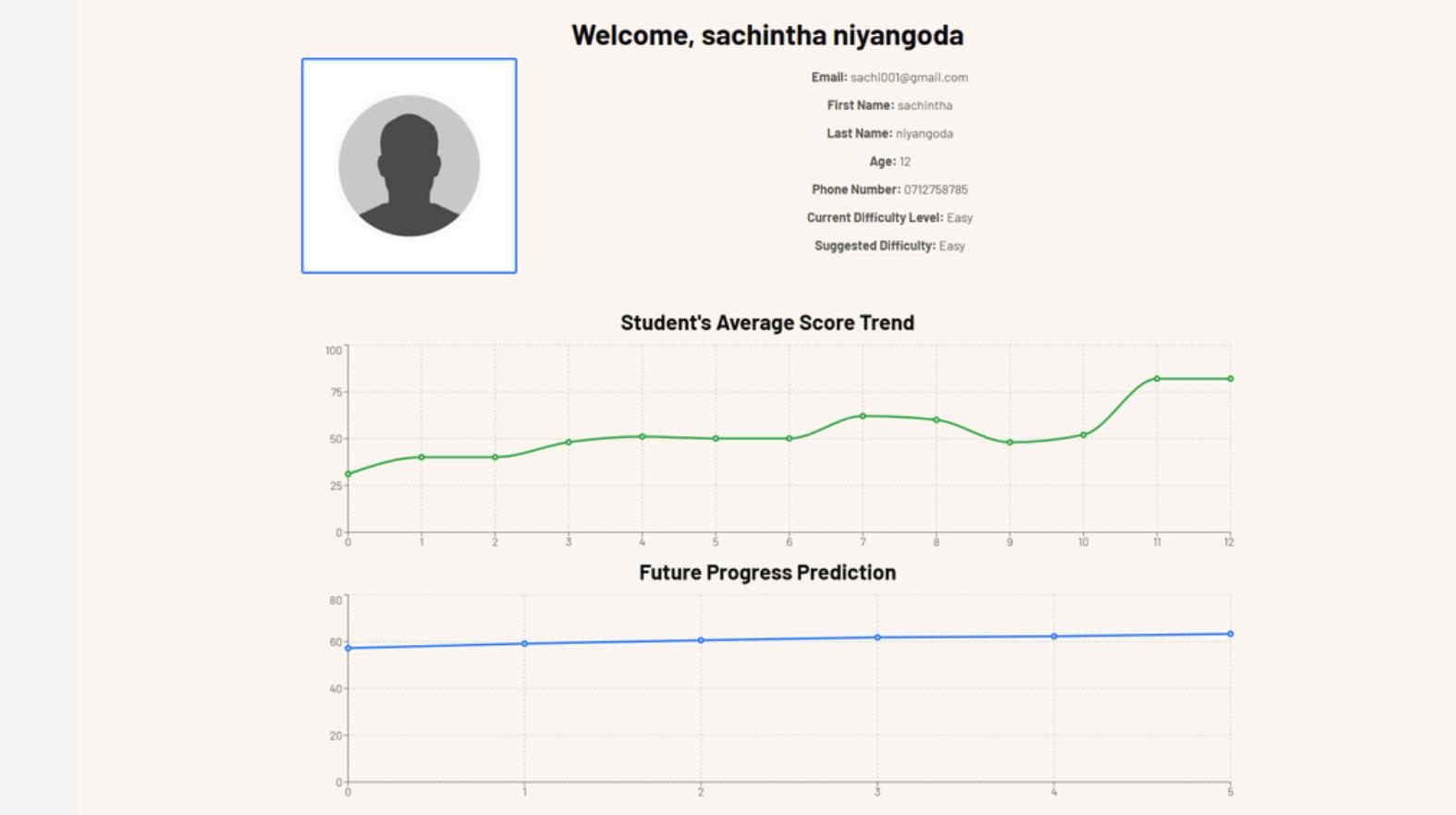
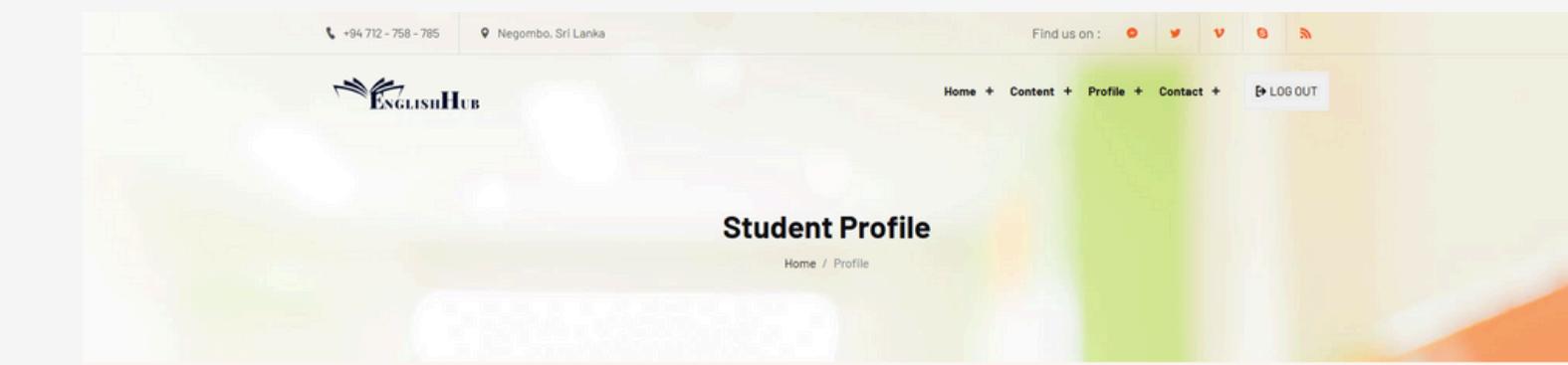
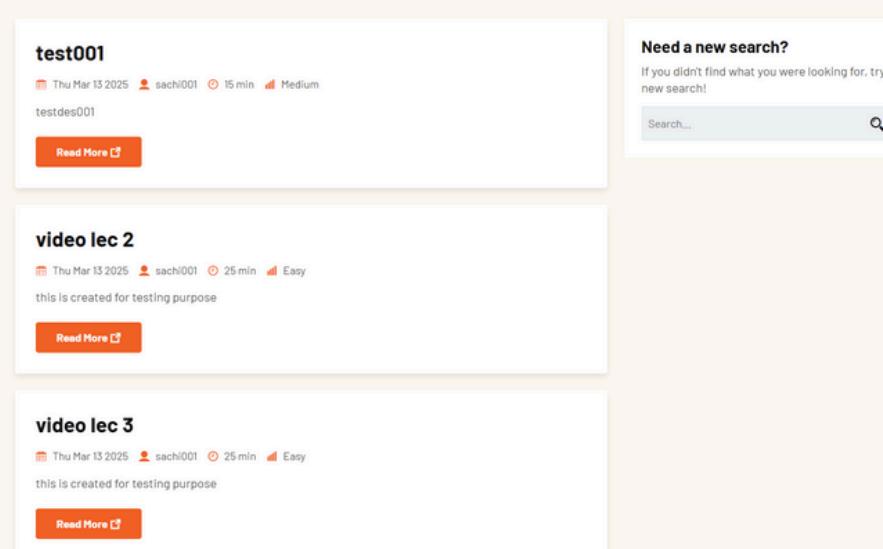
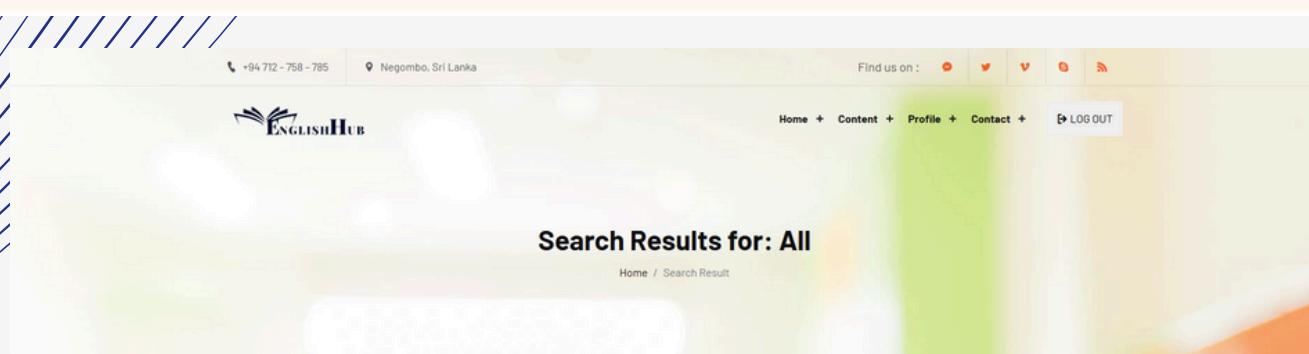
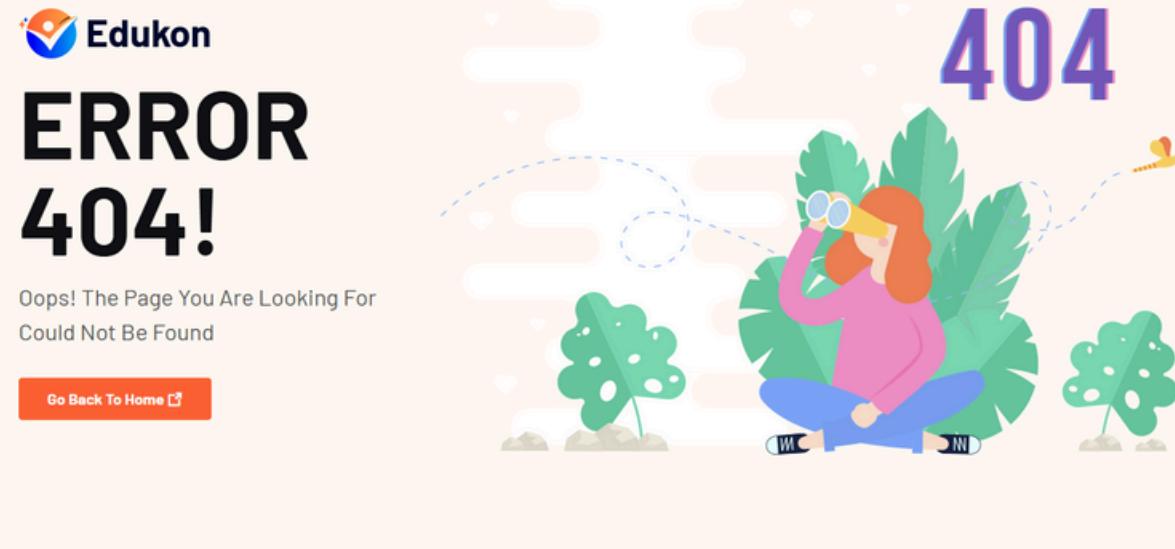
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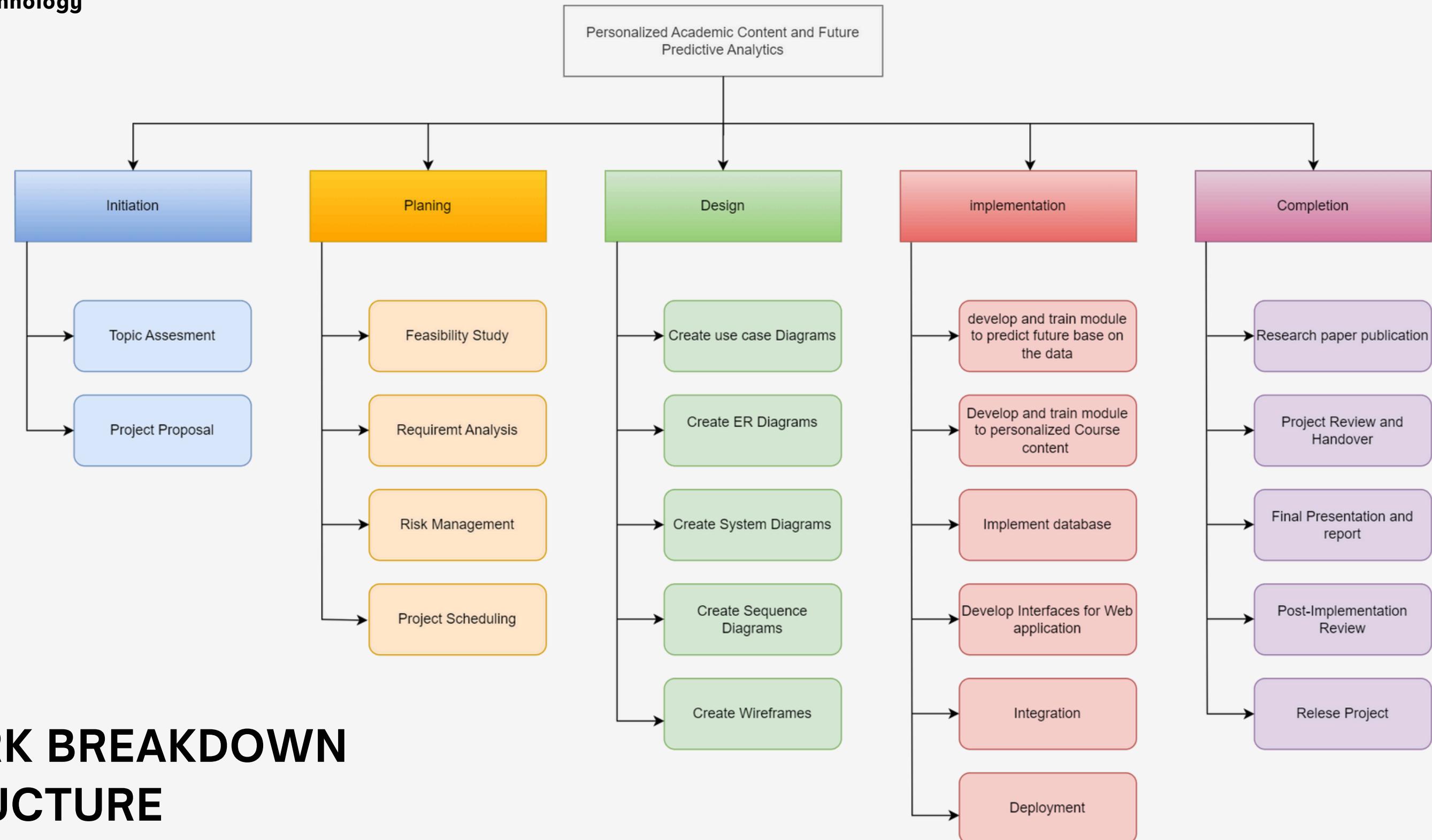
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Proof of work



COMPLETED COMPONENTS 100%

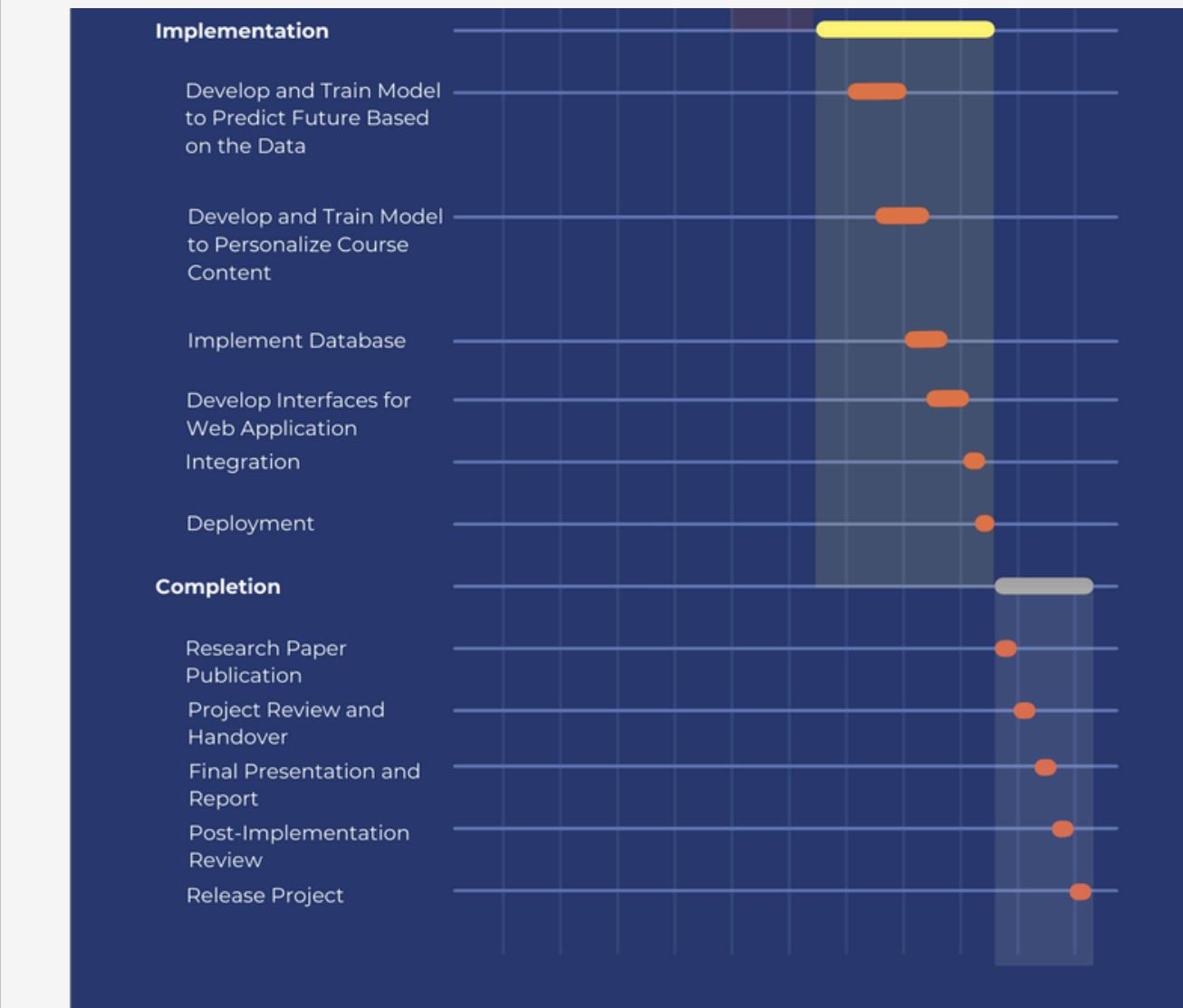
- Data Collection - 100%
- NLP Model for get answer correction for paper
- student level prediction model
- student future level forecast
- UI implementation - User and Admin
- Backend Implementation
- Integrate with other members parts
- Attach Thisra's NLP model for papers



WORK BREAKDOWN STRUCTURE



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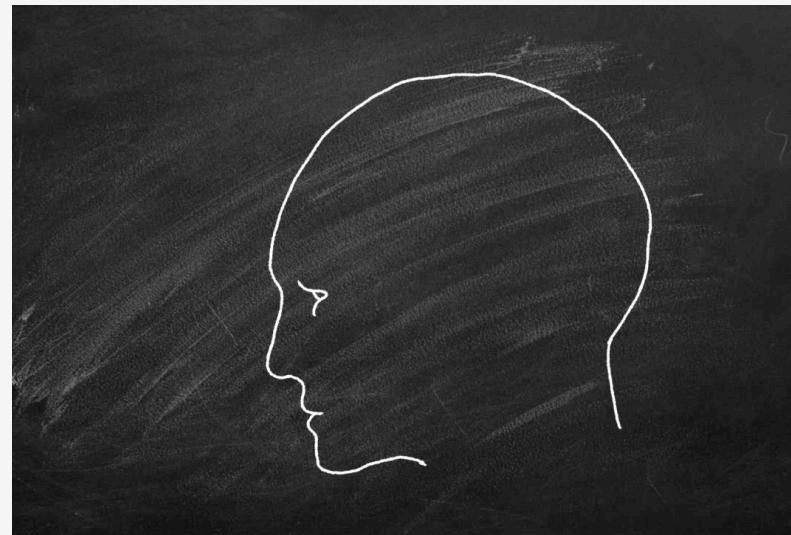
AI - LISTENING ACTIVITIES



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



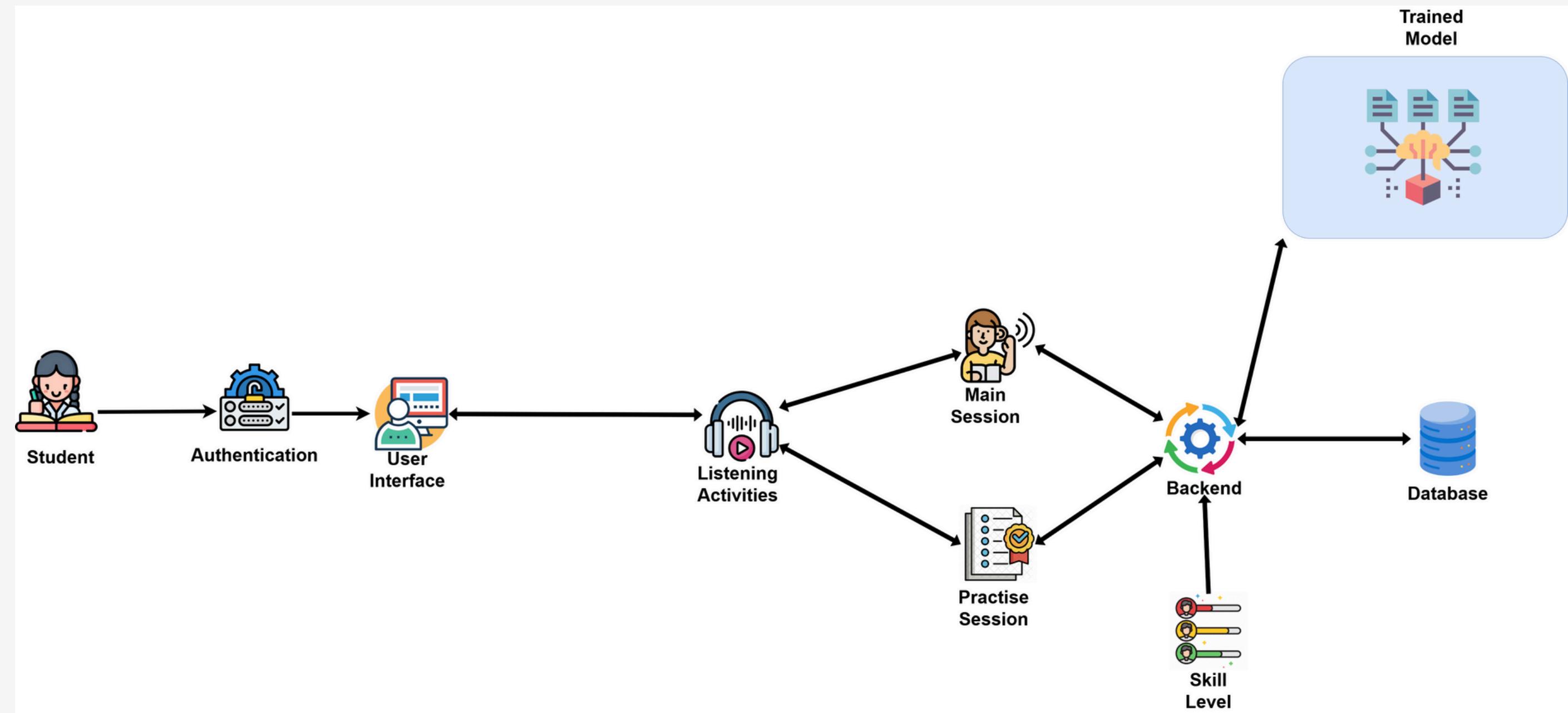
Functional Requirement

- 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> █
```



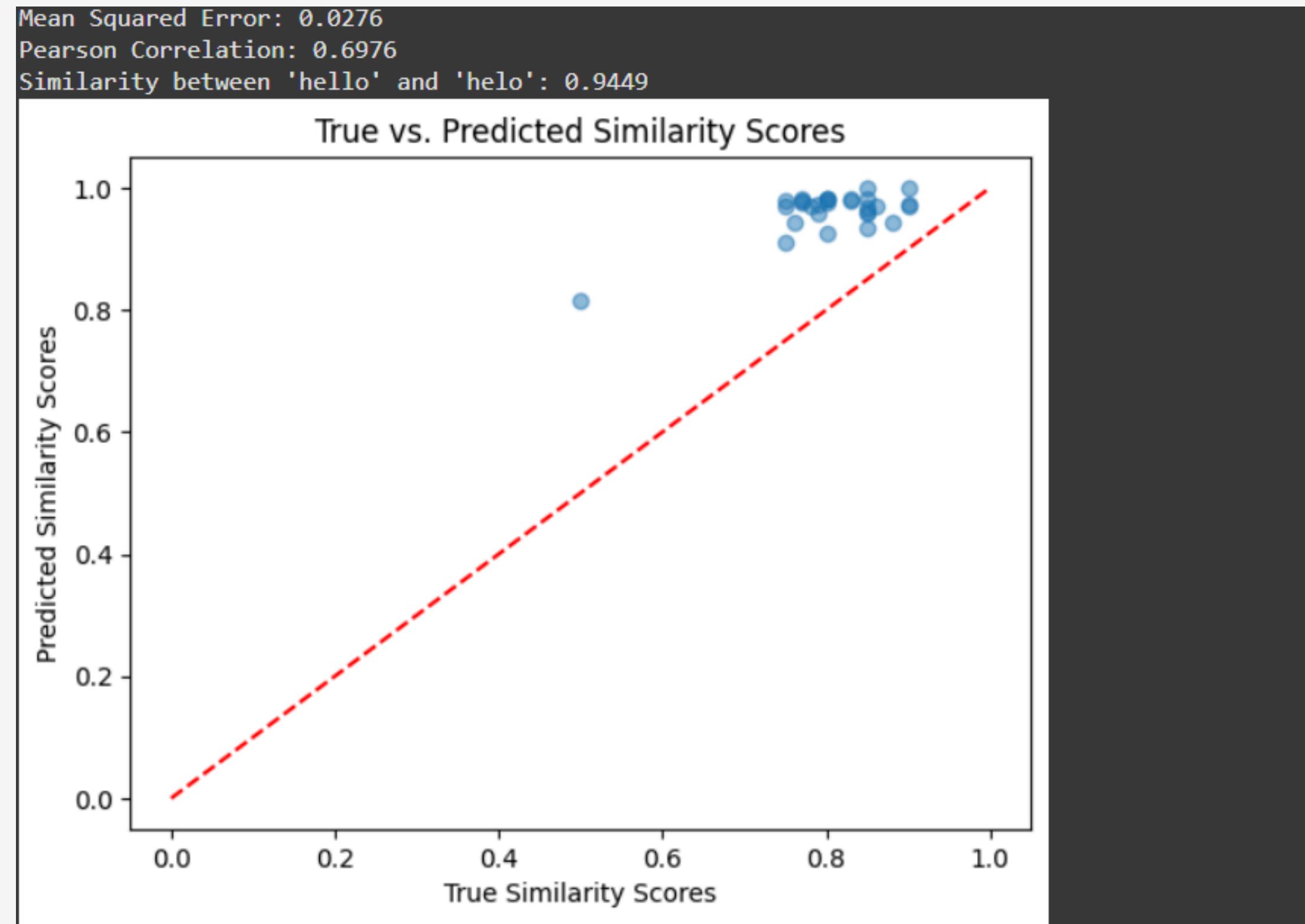
Prevoiuse Results

```
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



COMPLETED COMPONENTS 100%

- Data Collection - 100%
- Improved the Accuracy of the model
- UI implementation - 100%
- Backend Implementation
- Data Collection -100%
- Integrate with other members parts



WORK BREAKDOWN STRUCTURE



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- [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.

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