Sri Lanka Institute of Information Technology

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

Group - 24-25J-103

Sri Lanka Institute of
Information Technology

SUPERVISOR PANNEL

Ms. Jenny

Supervisor

Ms.Dinuka

Co-Supervisor

MAIN COMPONENTS

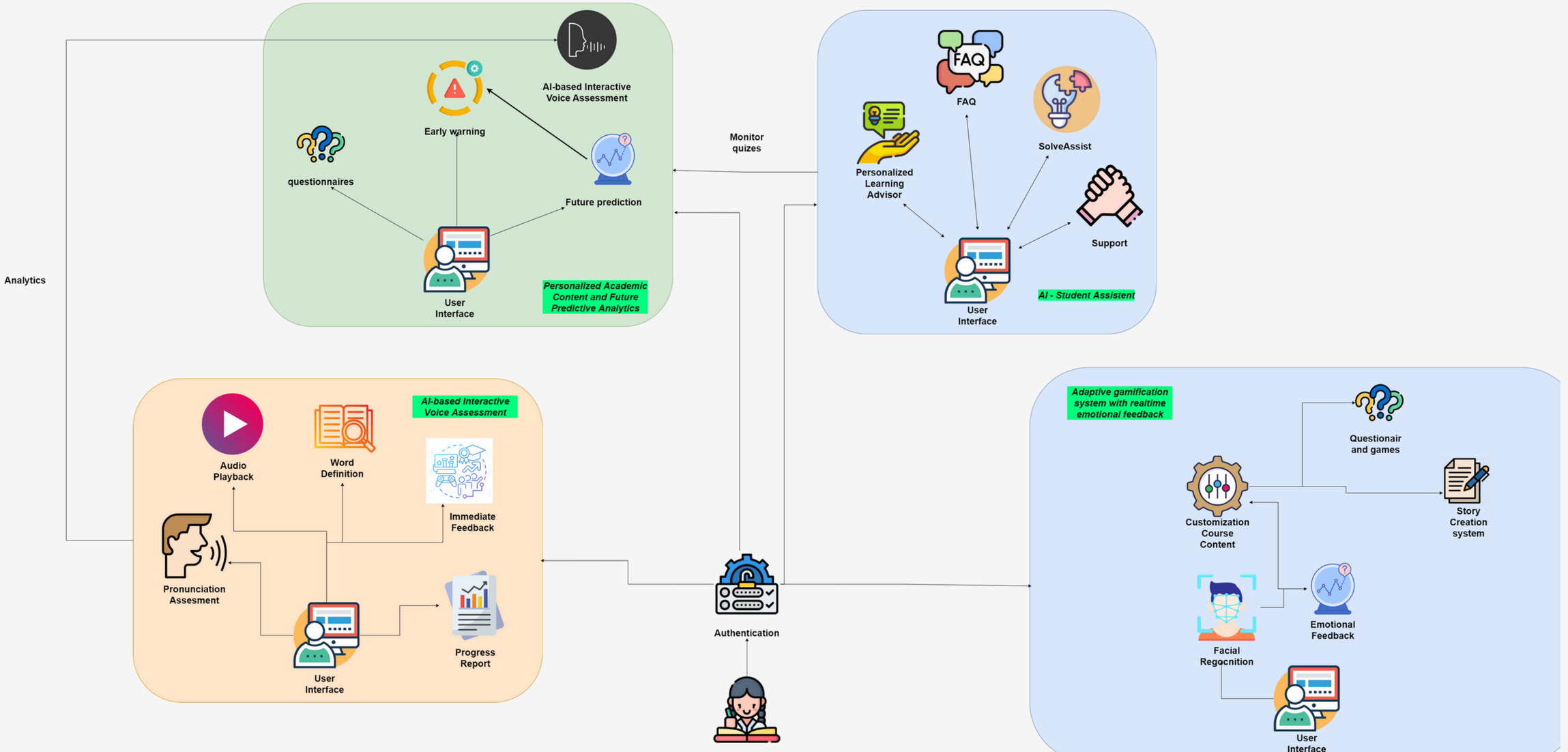
01 Adaptive gamification system with realtime emotional feedback

02 Personalized Academic Content and Future Predictive Analytics

03 AI-based Interactive Voice Assessment

04 AI - Student Assistent

OVERALL SYSTEM DIAGRAME



Sri Lanka Institute of Information Technology

ADAPTIVE GAMIFICATION SYSTEM WITH REALTIME EMOTIONAL FEEDBACK

IT21357794 Sirisena B G K D

24-25J-103

Sri Lanka Institute of Information Technology

BACKGROUND

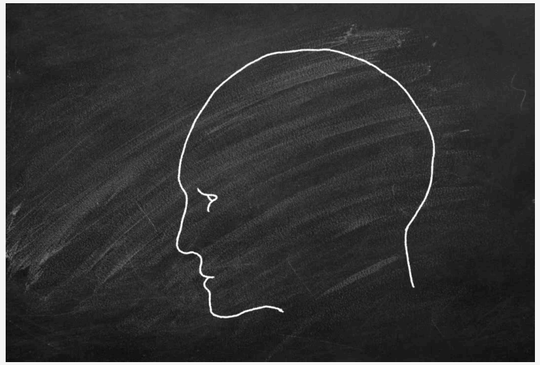
The adaptive gamification system integrates real-time emotional feedback to enhance language skills and comprehension for children aged 10-12. Utilizing AI-based facial recognition, the system detects emotions to dynamically adjust content. Features include interactive story creation, emotion-driven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

Sri Lanka Institute of Information Technology

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

Sri Lanka Institute of Information Technology

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 phsychologist

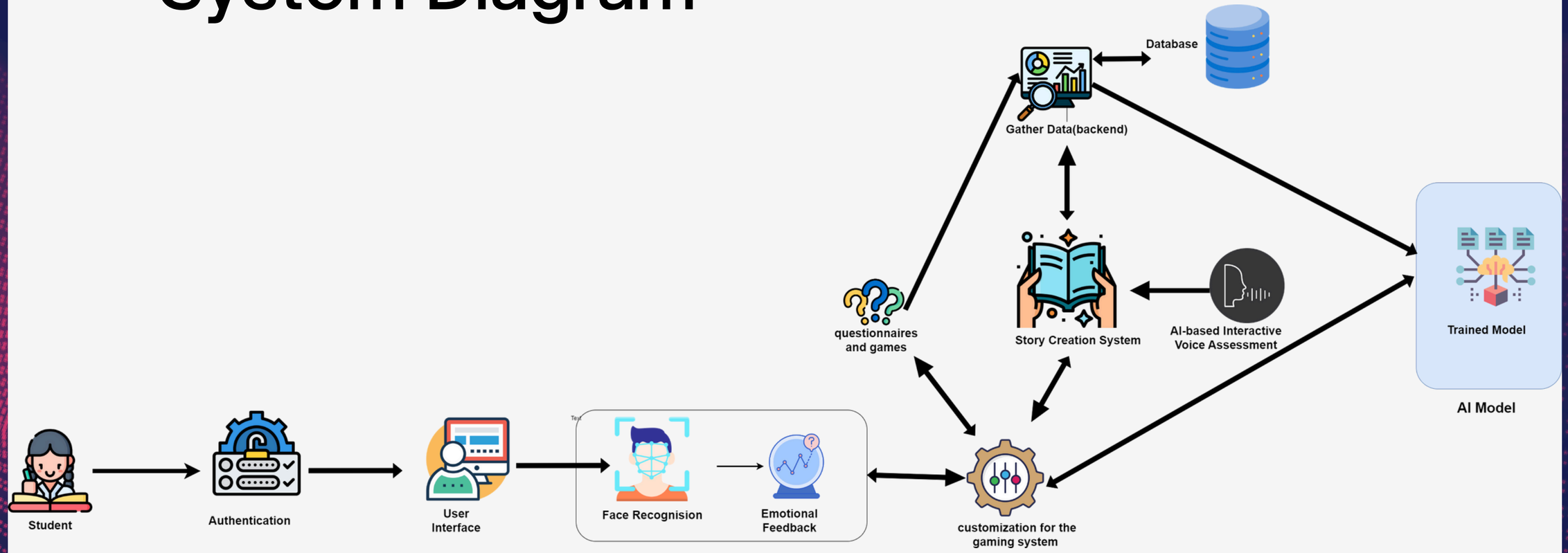
Functional Requirement

- 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



Sri Lanka Institute of Information Technology

Data Collection and Annotation

Data Collection Methods

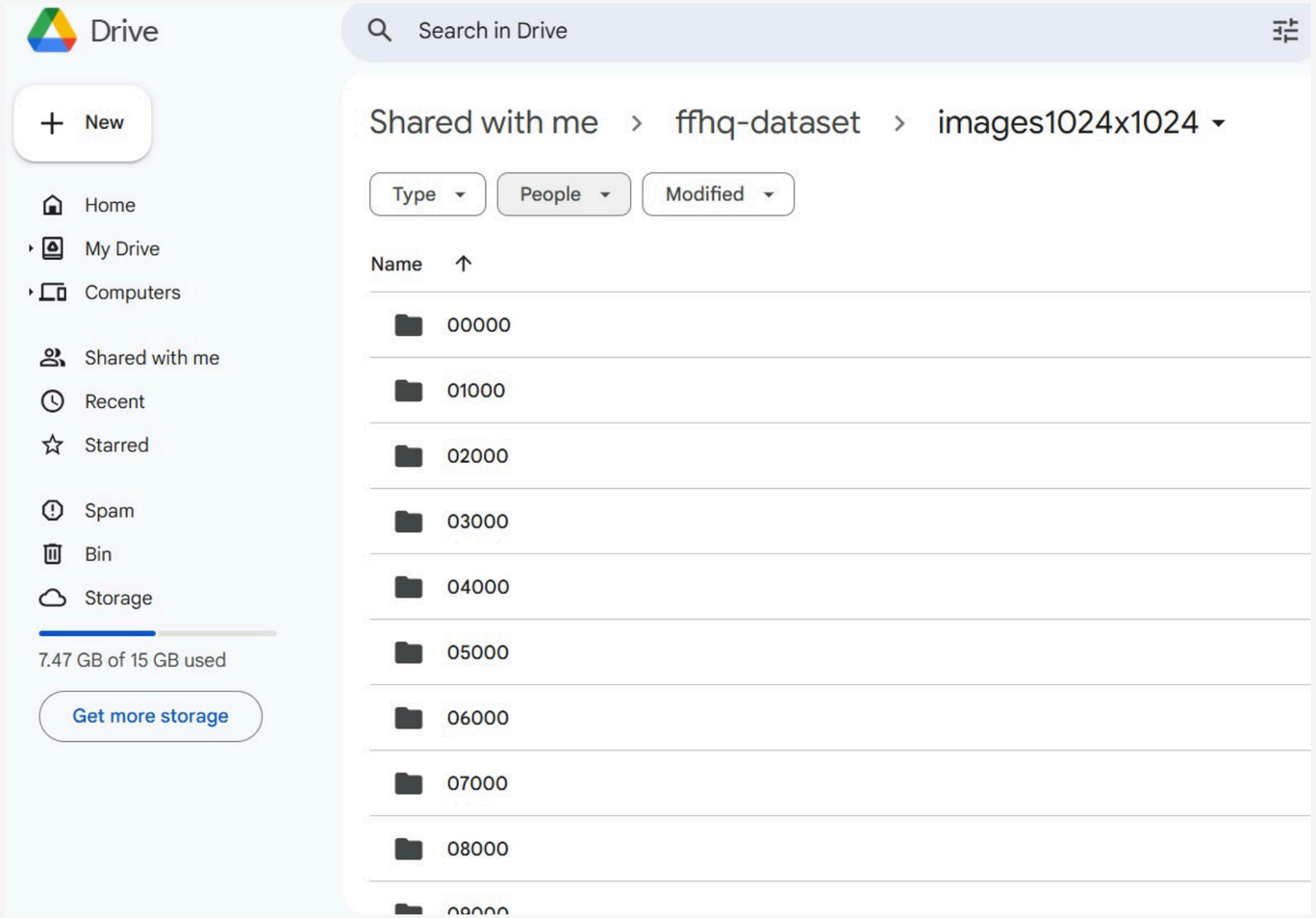
- From the students at the Regent Language Institute, Negombo
- From the External Supervisor
- online data sets

Annotation

- From the External Supervisor

REGENT LANGUAGE INTERNATIONAL

Sri Lanka Institute of Information Technology



DATA COLLECTION

IT21357794 Sirisena B G K D 24-25J-103

Sri Lanka Institute of Information Technology

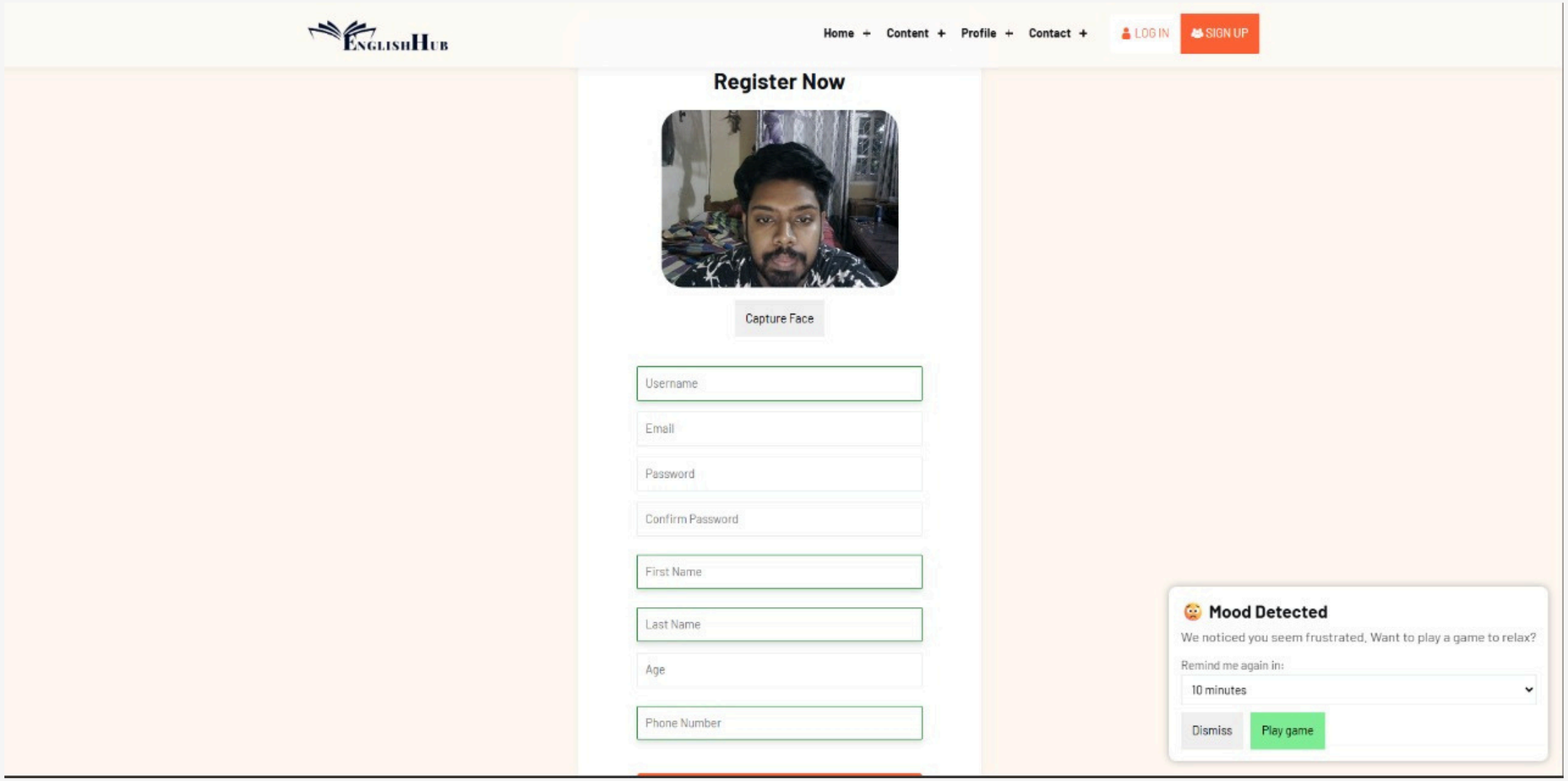
PROOF OF WORK

```
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 ('clust
er0-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": {"$oid": "67508bd3fab15080ace2db86"}, "serverHost": "cluster0-shard-00-01.s5foz.mongodb.net", "serverPort": 27017, "message": "S
tarting server monitoring"}
DEBUG:pymongo.topology:{"topologyId": {"$oid": "67508bd3fab15080ace2db86"}, "serverHost": "cluster0-shard-00-02.s5foz.mongodb.net", "serverPort": 27017, "message": "S
tarting server monitoring"}
DEBUG:pymongo.topology:{"topologyId": {"$oid": "67508bd3fab15080ace2db86"}, "serverHost": "cluster0-shard-00-00.s5foz.mongodb.net", "serverPort": 27017, "message": "S
tarting server monitoring"}
INFO:     Started server process [1816]
INFO:     Waiting for application startup.
INFO:     Application startup complete.
```

ML RELOAD

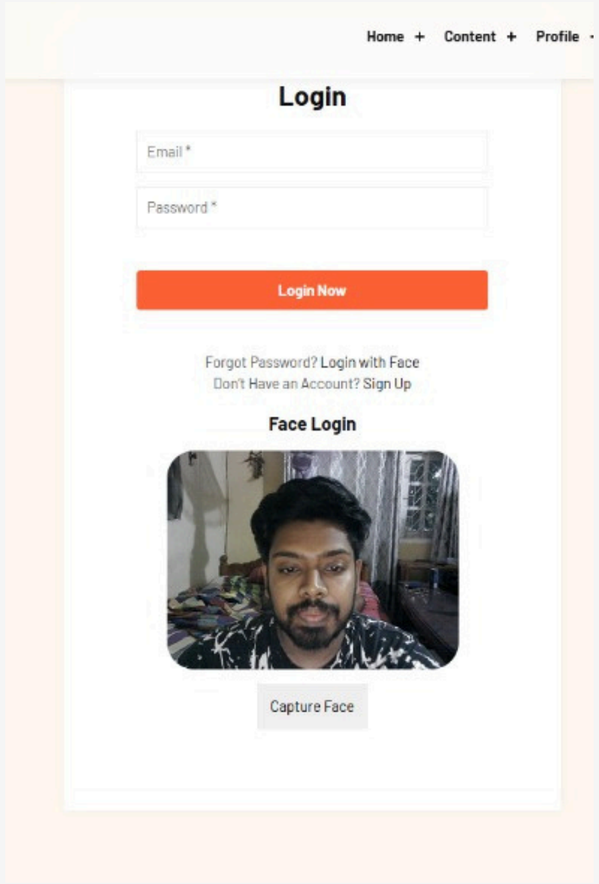
```
PS C:\Users\Kavishi\Desktop\Research> cd web
PS C:\Users\Kavishi\Desktop\Research\web> npm start

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                                                 no-unused-vars
  Line 14:10:  'dropdown' is assigned a value but never used                                                  no-unused-vars
  Line 41:11:  img elements must have an alt prop, either with meaningful text, or an empty string for decorative images  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

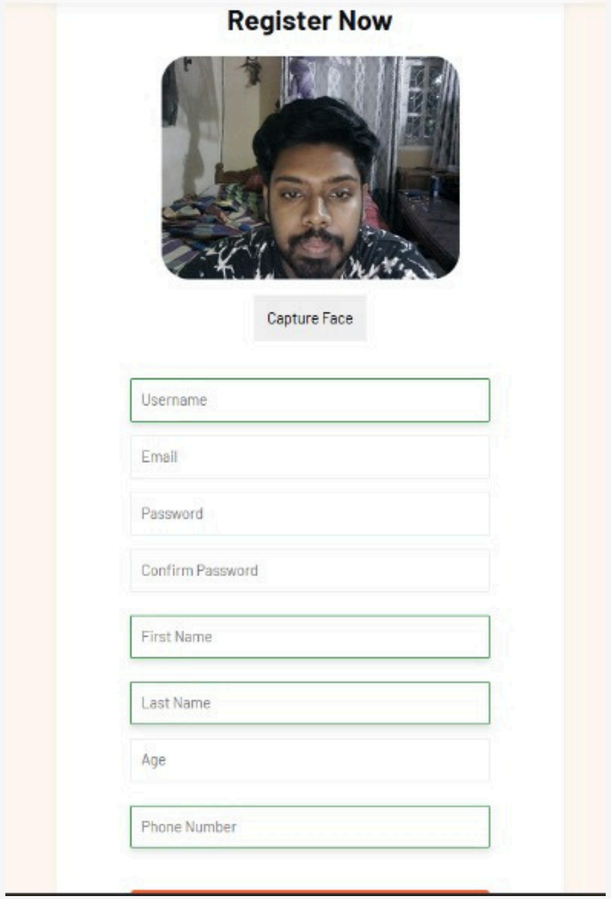

EnglishHub
Home
Content
Profile
Contact
LOG IN
SIGN UP
Register Now
Capture Face
Username
Email
Password
Confirm Password
First Name
Last Name
Age
Phone Number
Mood Detected
We noticed you seem frustrated, Want to play a game to relax?
Remind me again in:
10 minutes
Dismiss
Play game

WEB RELOAD

Sri Lanka Institute of Information Technology



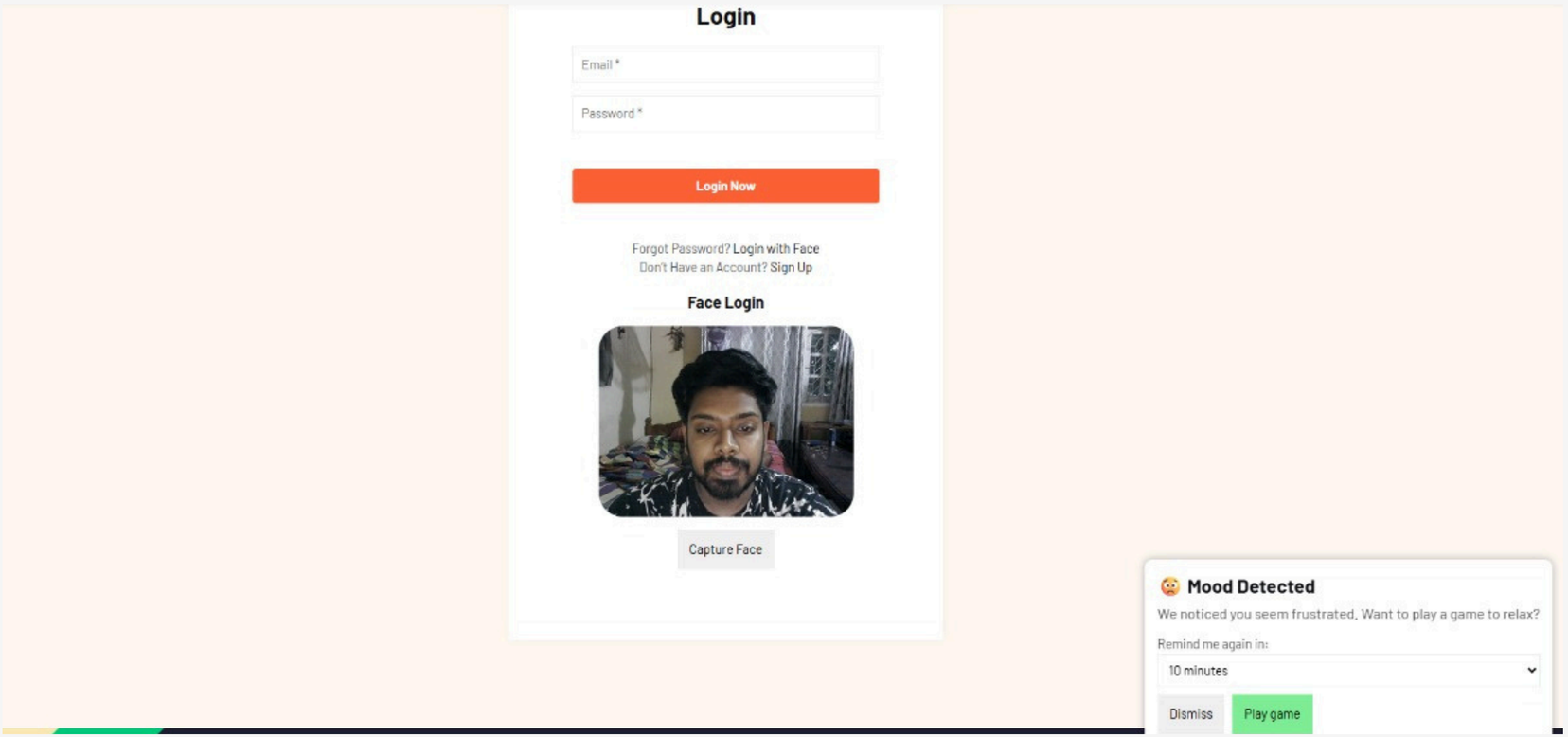
DATA COLLECTION



LOGIN & REGISTRATION

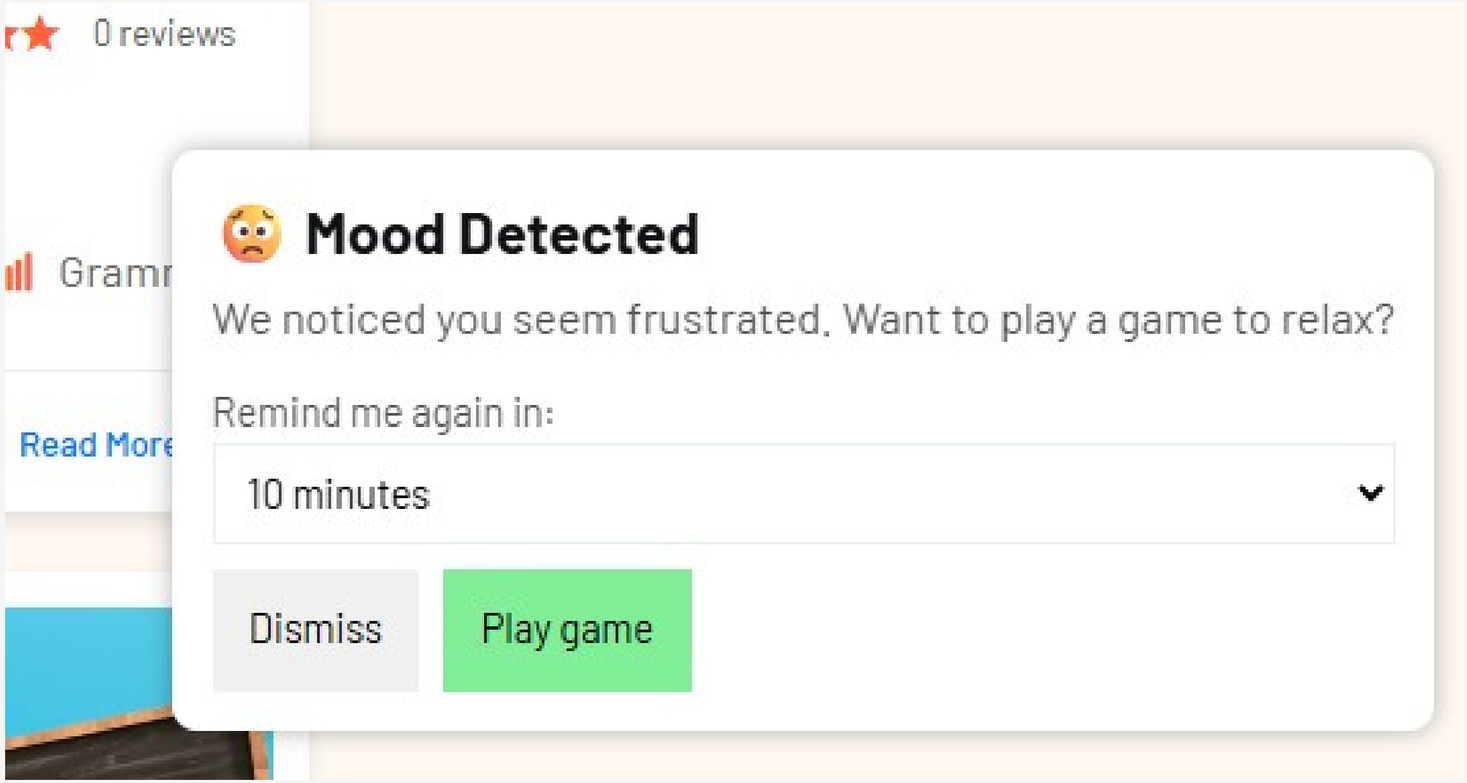
IT21357794 Sirisena B G K D 24-25J-103

Sri Lanka Institute of Information Technology



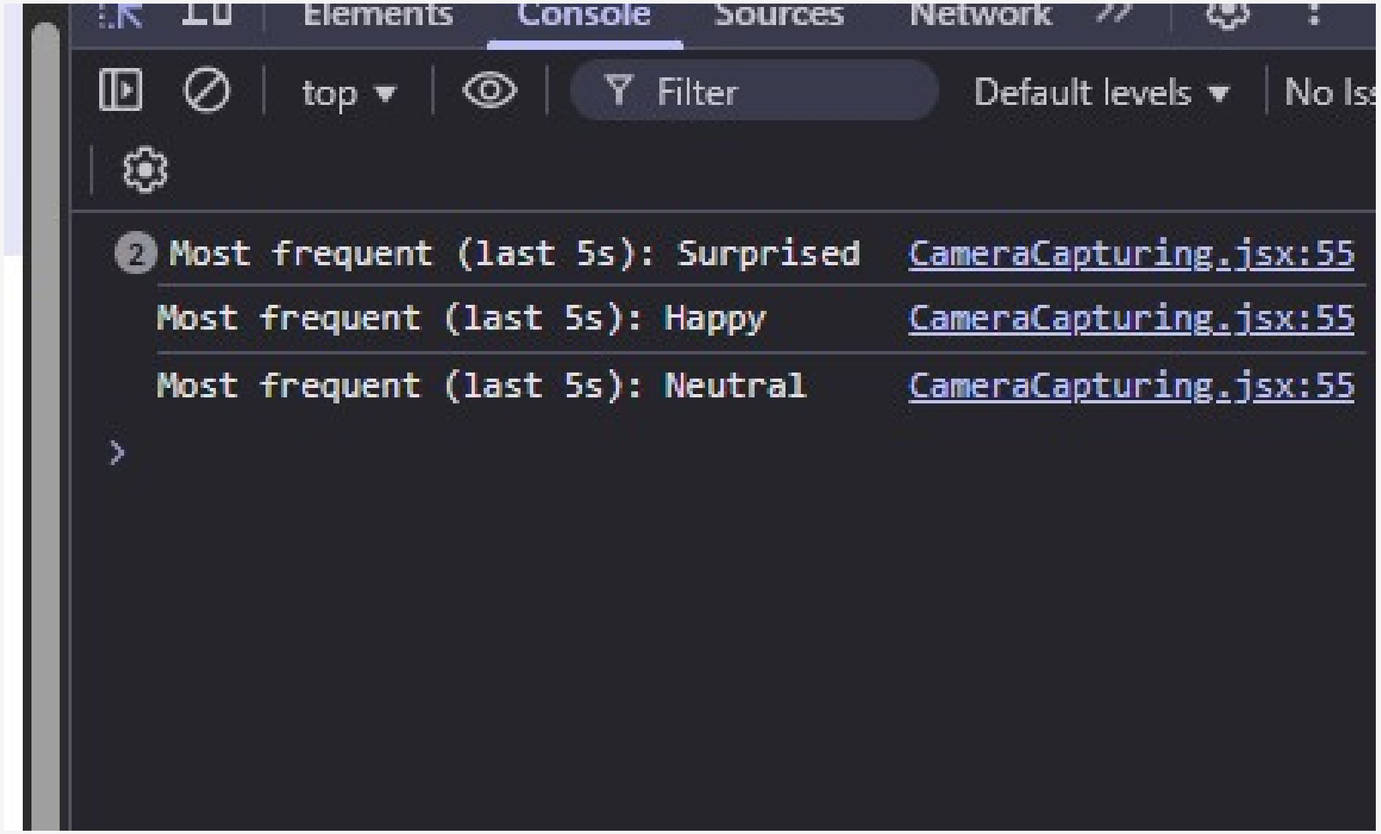
FACE DETECTION USING FACE NET

IT21357794 Sirisena B G K D 24-25J-103



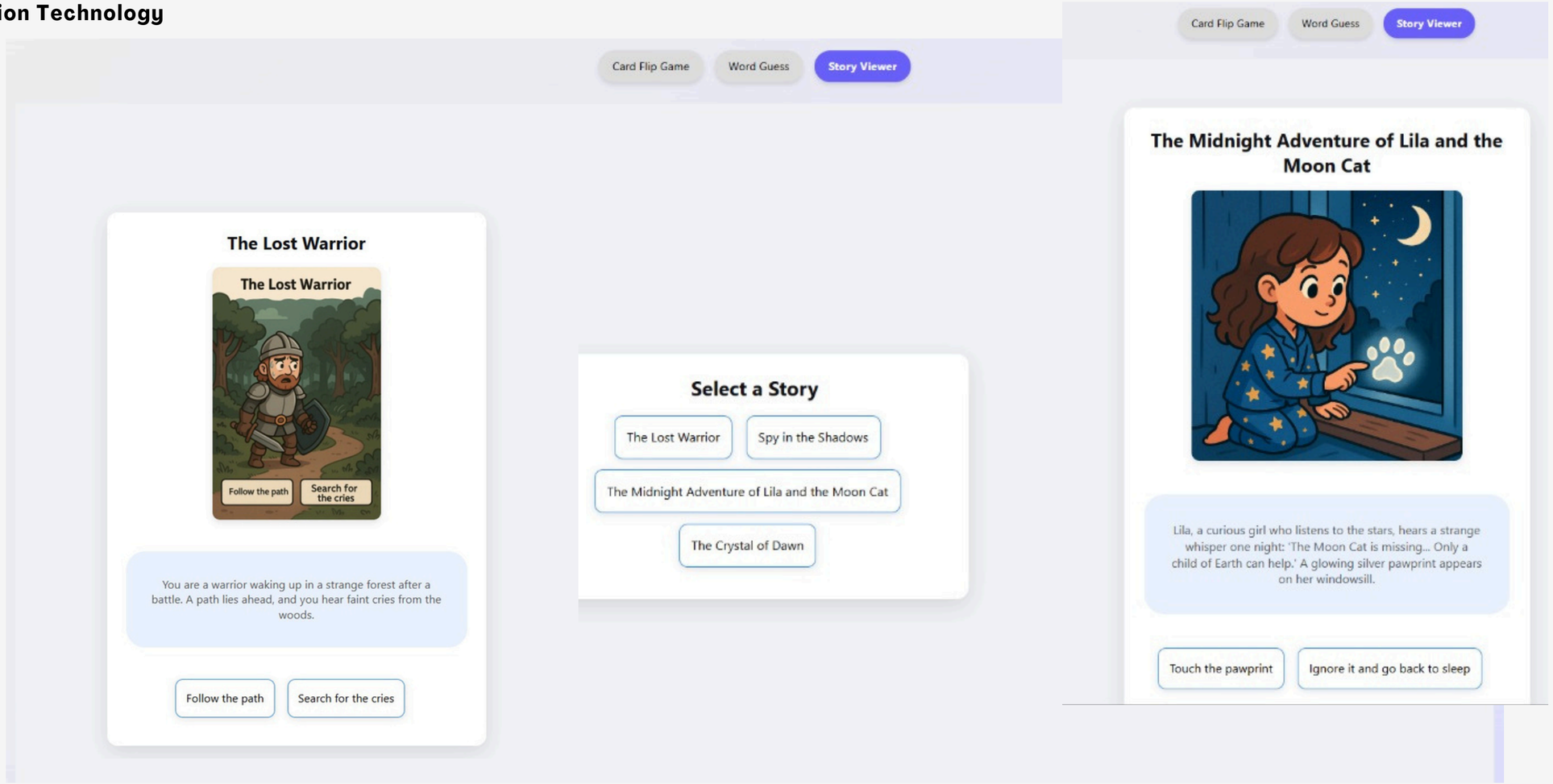
EMOTION DETECTION

IT21357794 Sirisena B G K D 24-25J-103



EMOTION DETECTION TESTING

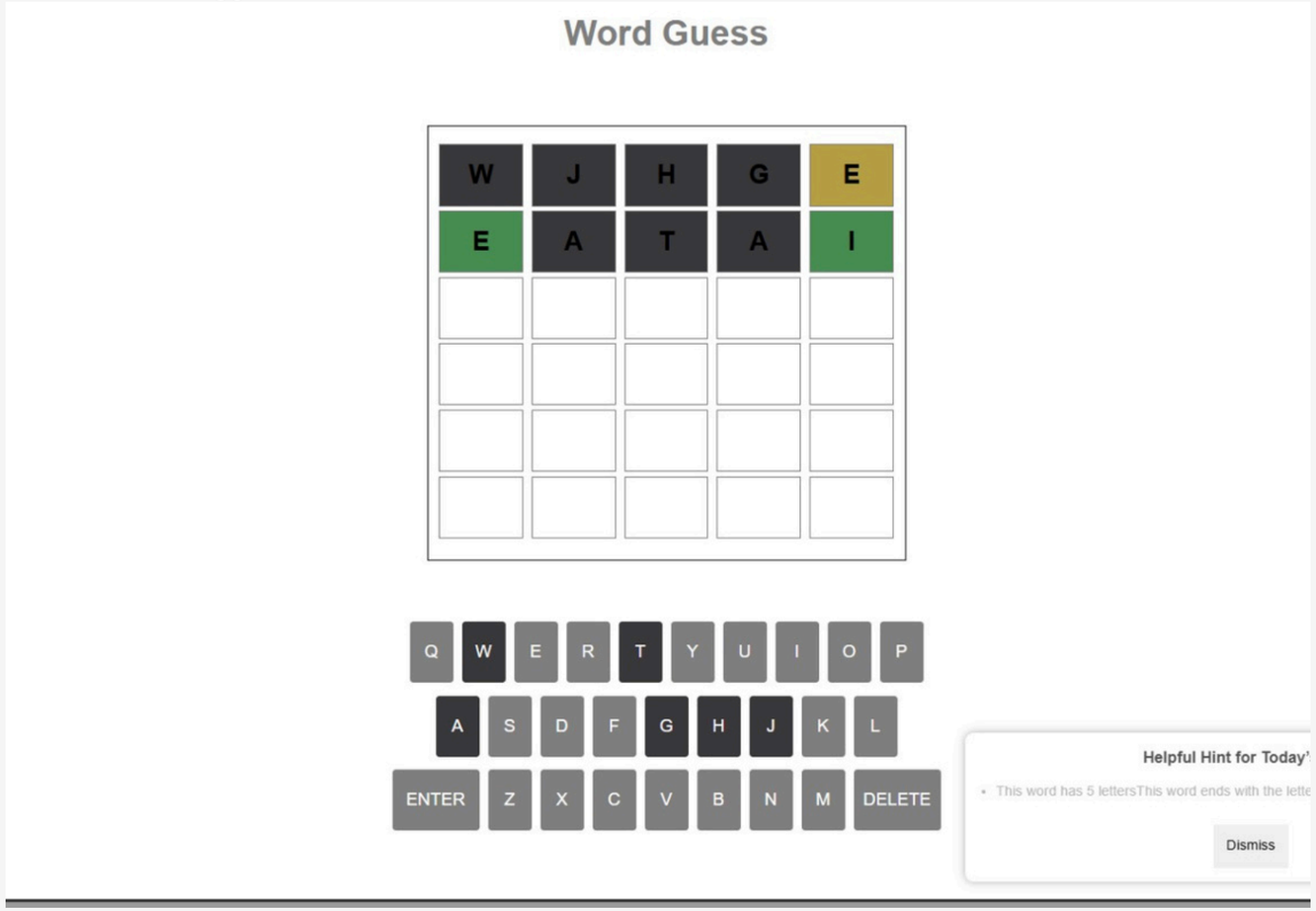
Sri Lanka Institute of Information Technology

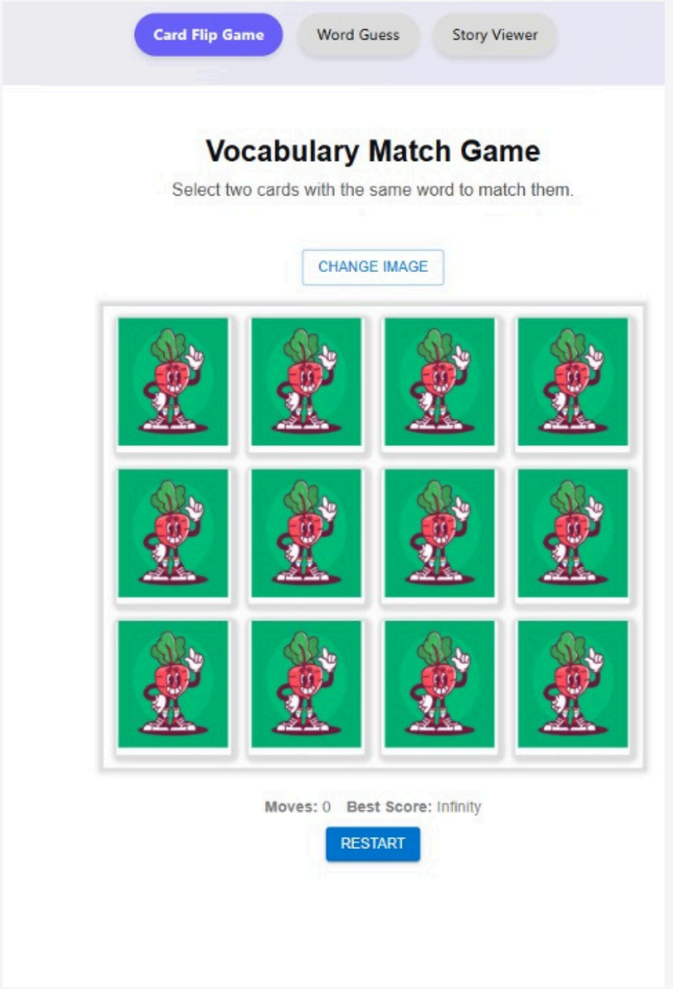


ADAPTIVE STORY TELLING SYSTEM

IT21357794 Sirisena B G K D 24-25J-103

Sri Lanka Institute of Information Technology





GAMIFICATION

api_requirements.txt | face_identification.py 1

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
76
```

ACCURACY CHECKING

Sri Lanka Institute of Information Technology

COMPLETED COMPONENTS 100%

Data Collection

ML Algorithm development for face net

Image recognition using tenserflow

video capturing using open cv

Data saving for face registration

Face Accuracy checking for users

Emotion Detection

Games system development

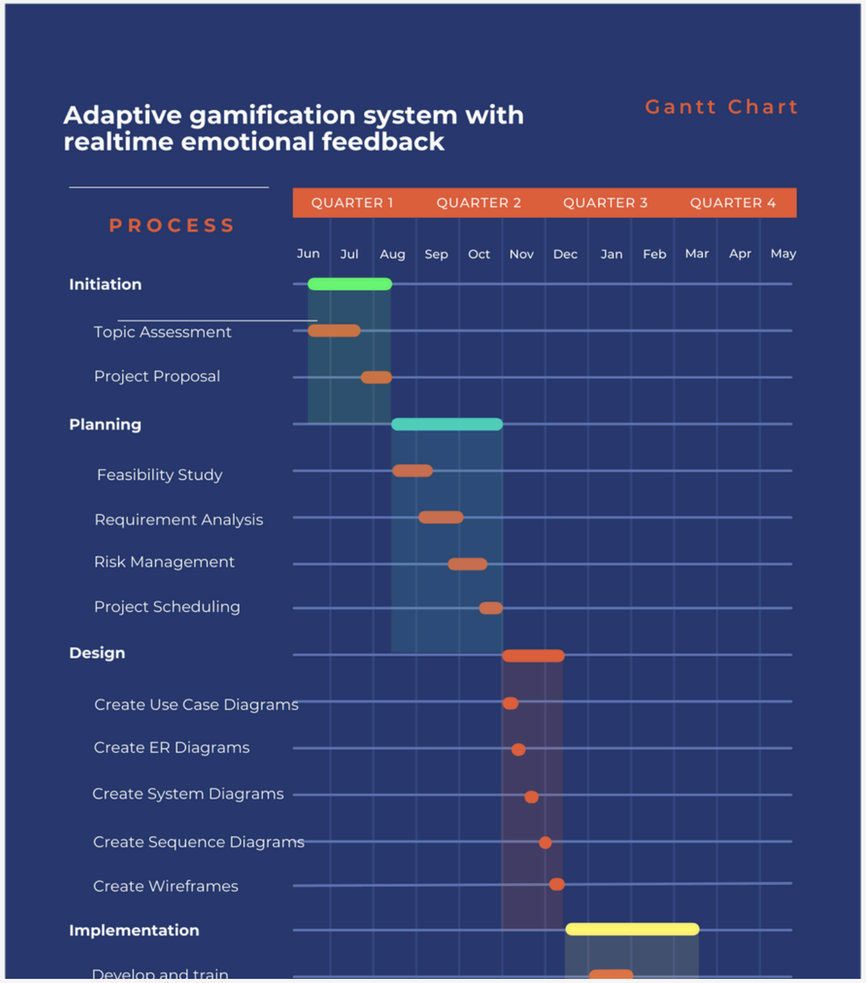
Real-time Story development system.

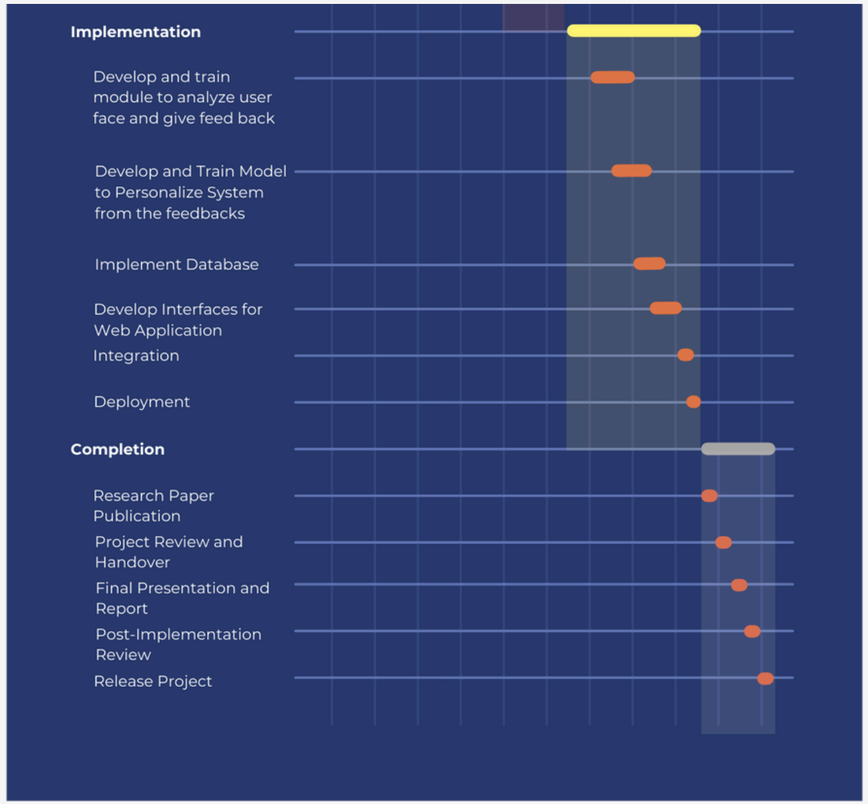
Feedback management system with a personalized dashboard.

Integration.

Sri Lanka Institute of Information Technology

GANNT CHART





IT21357794 Sirisena B G K D 24-25J-103

Sri Lanka Institute of Information Technology

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.

Sri Lanka Institute of Information Technology

PERSONALIZED ACADEMIC CONTENT AND FUTURE PREDICTIVE ANALYTICS

IIT21194962 Niyangoda S A N S H

24-25J-103

Sri Lanka Institute of
Information Technology

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.

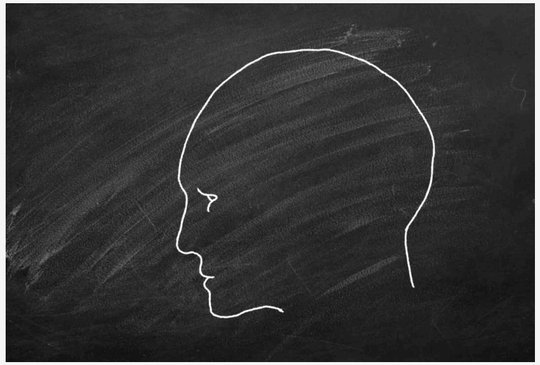
Sri Lanka Institute of Information Technology

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

Sri Lanka Institute of Information Technology

SYSTEM, PERSONAL, AND SOFTWARE REQUIREMENT SPECIFICATION

Software Requirement

- Tensorflow
- Python
- MERN
- VsCode

Personal Requirement

- School teacher
- School children
- Parents of children

Functional Requirement

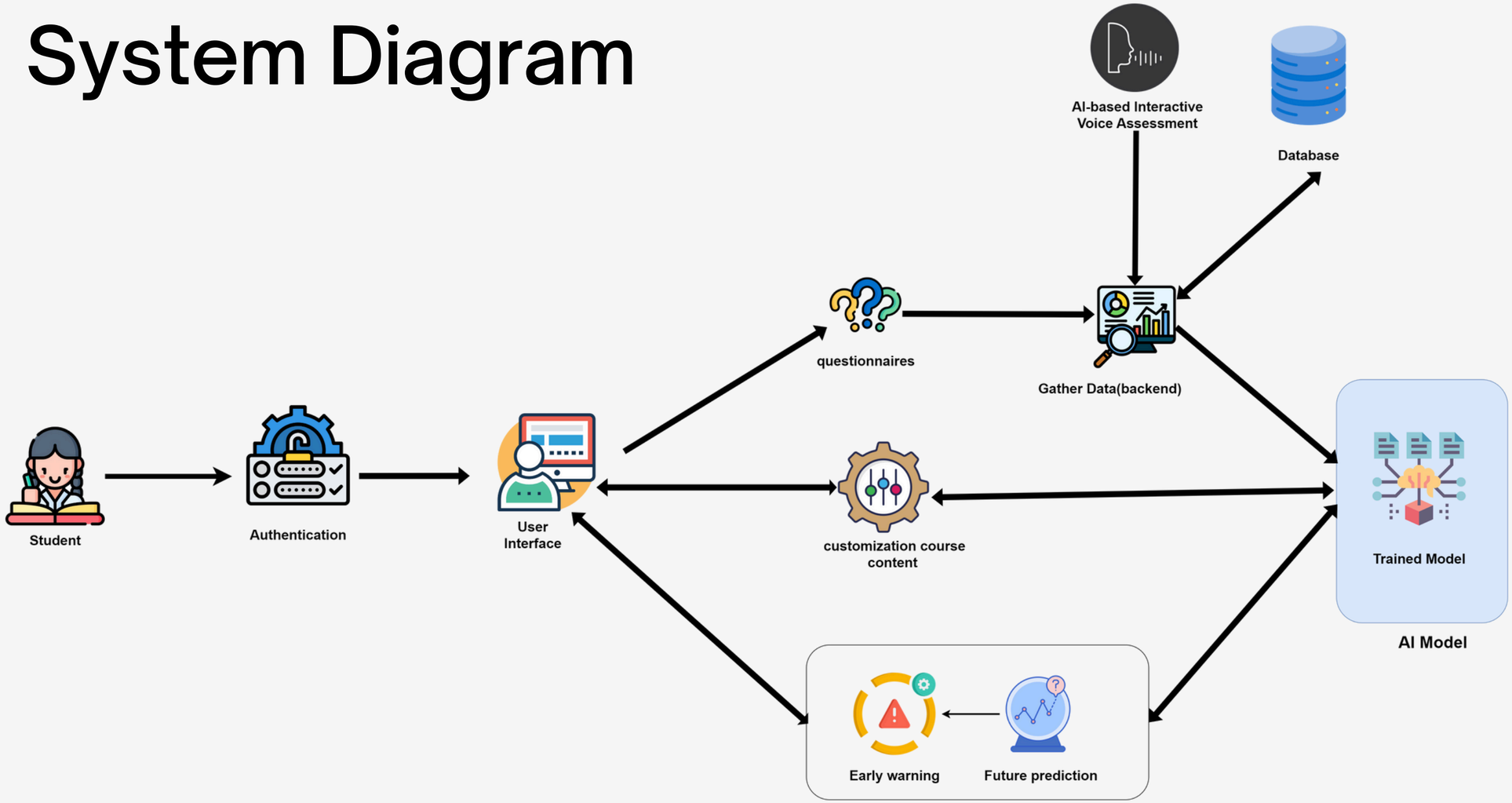
- User Authentication
- Data Collection
- Predictive Analytics
- Content Personalization
- Real-time Feedback

Non-Functional Requirement

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

IIT21194962 Niyangoda S A N S H 24-25J-103

System Diagram



Sri Lanka Institute of Information Technology

Data Collection and Annotation

Data Collection Methods

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

Annotation

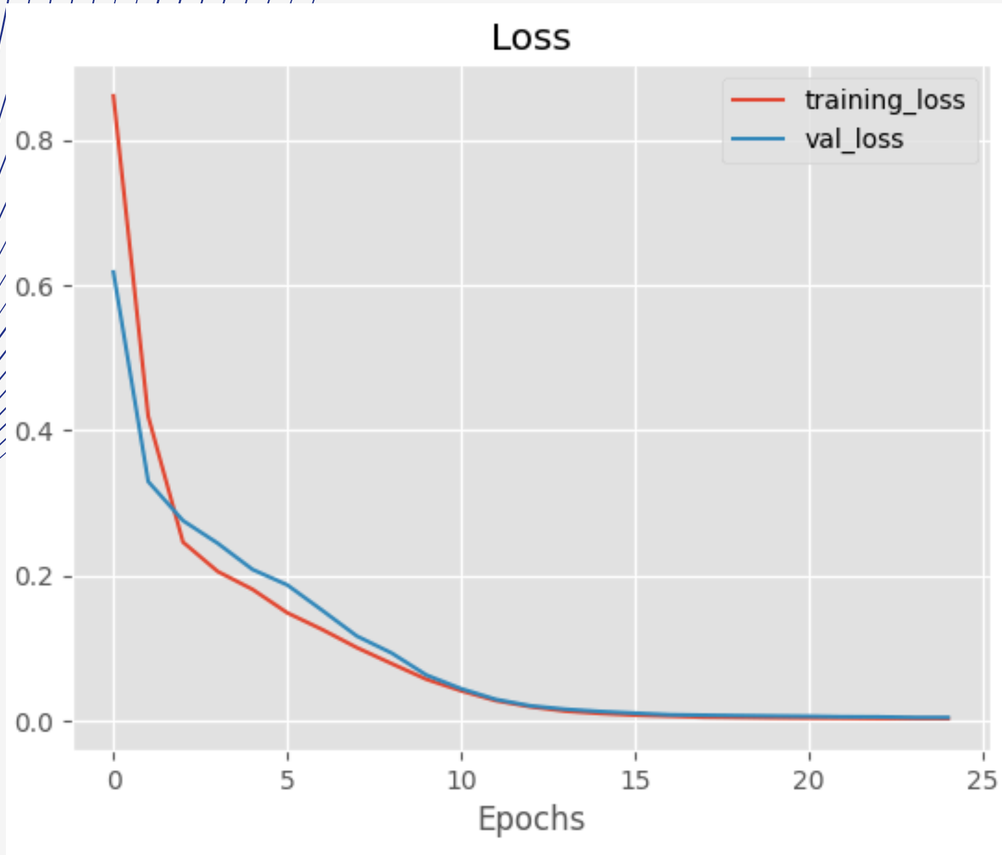
- From the External Supervisor

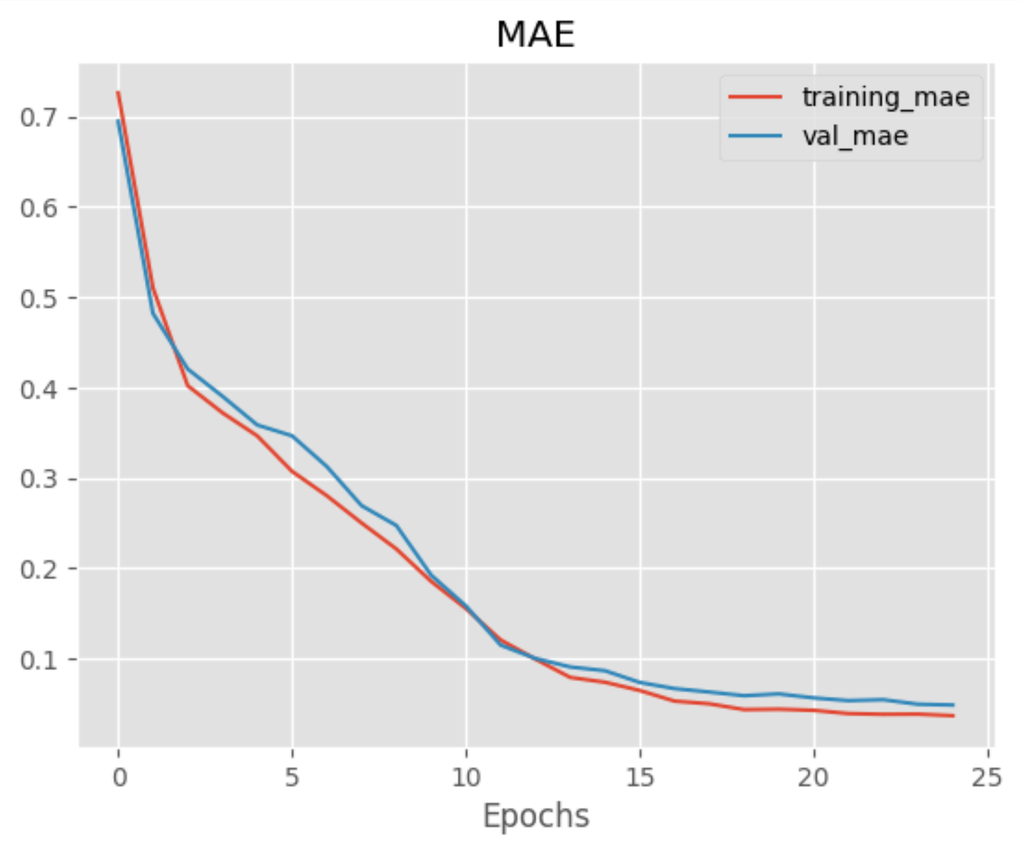
REGENT LANGUAGE INTERNATIONAL

Sri Lanka Institute of Information Technology

Proof of work

Student Level Prediction Model





Mean Absolute Error

Sri Lanka Institute of Information Technology

Proof of work

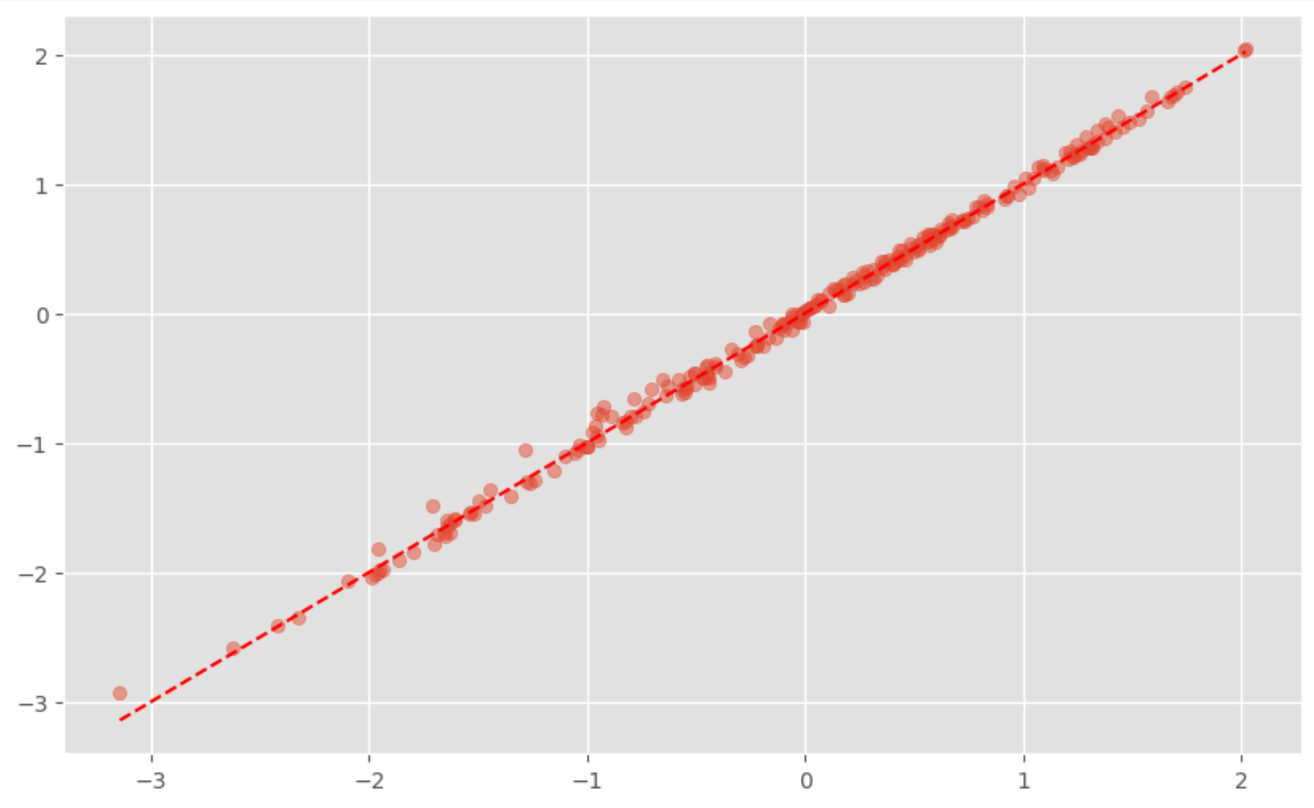
Student Level Prediction Model

```
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
```

Sri Lanka Institute of Information Technology

Proof of work

Student Level Prediction Model

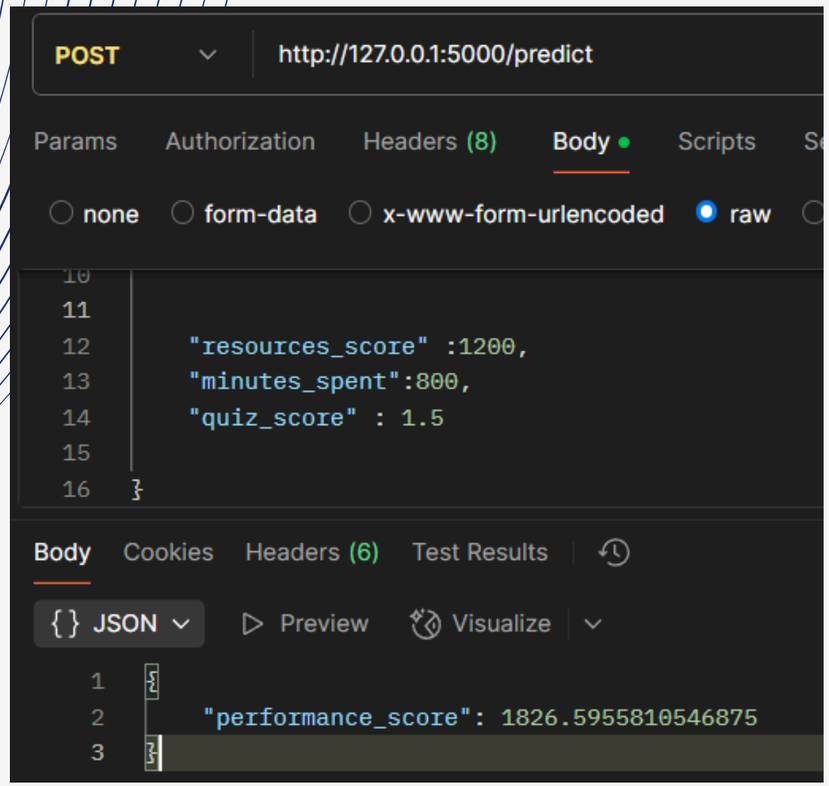


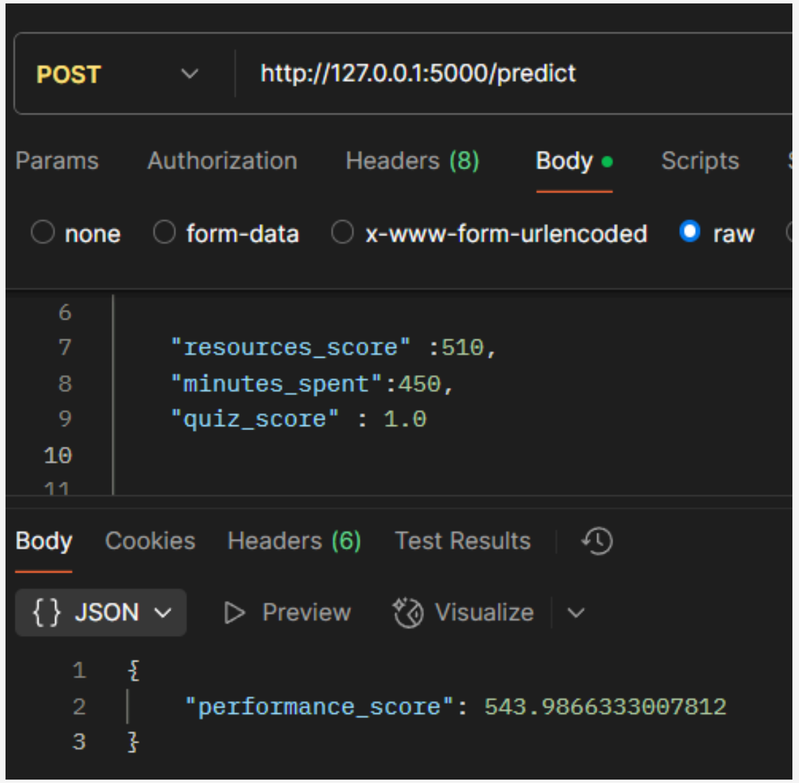
trained data and untrained data

Sri Lanka Institute of Information Technology

Proof of work

Student Level Prediction Model



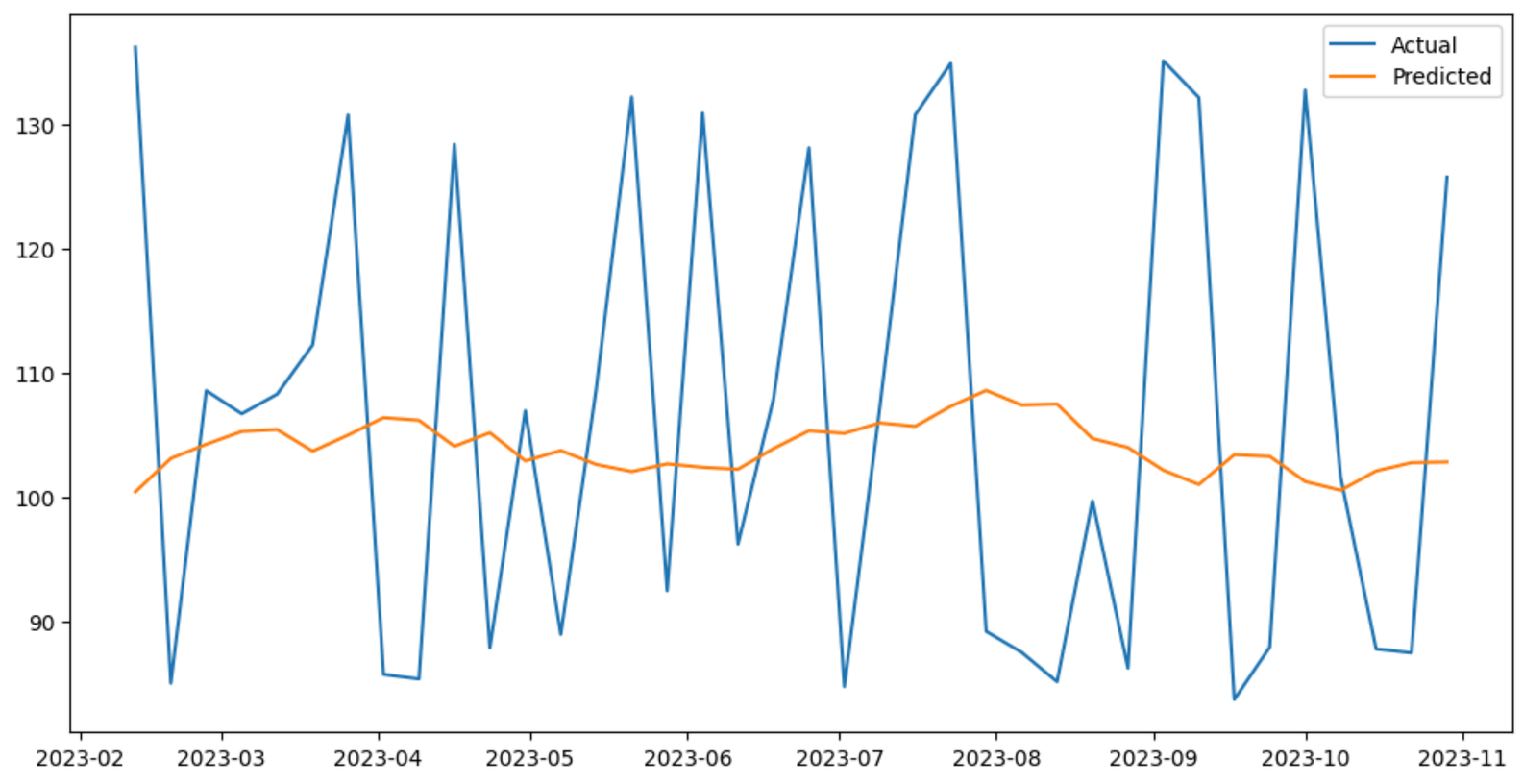


Outputs according to student performance

Sri Lanka Institute of Information Technology

Proof of work

Student Future Level Forecast



Actual Value and predicted model

Sri Lanka Institute of Information Technology

Proof of work

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
```

Sri Lanka Institute of Information Technology

Proof of work

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)

     forcast_values(np.array(sco).reshape(-1,1),8)
```

```
(12, 1)
/usr/local/lib/python3.11/dist-packages/sklearn/utils/val
  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   //avarage 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

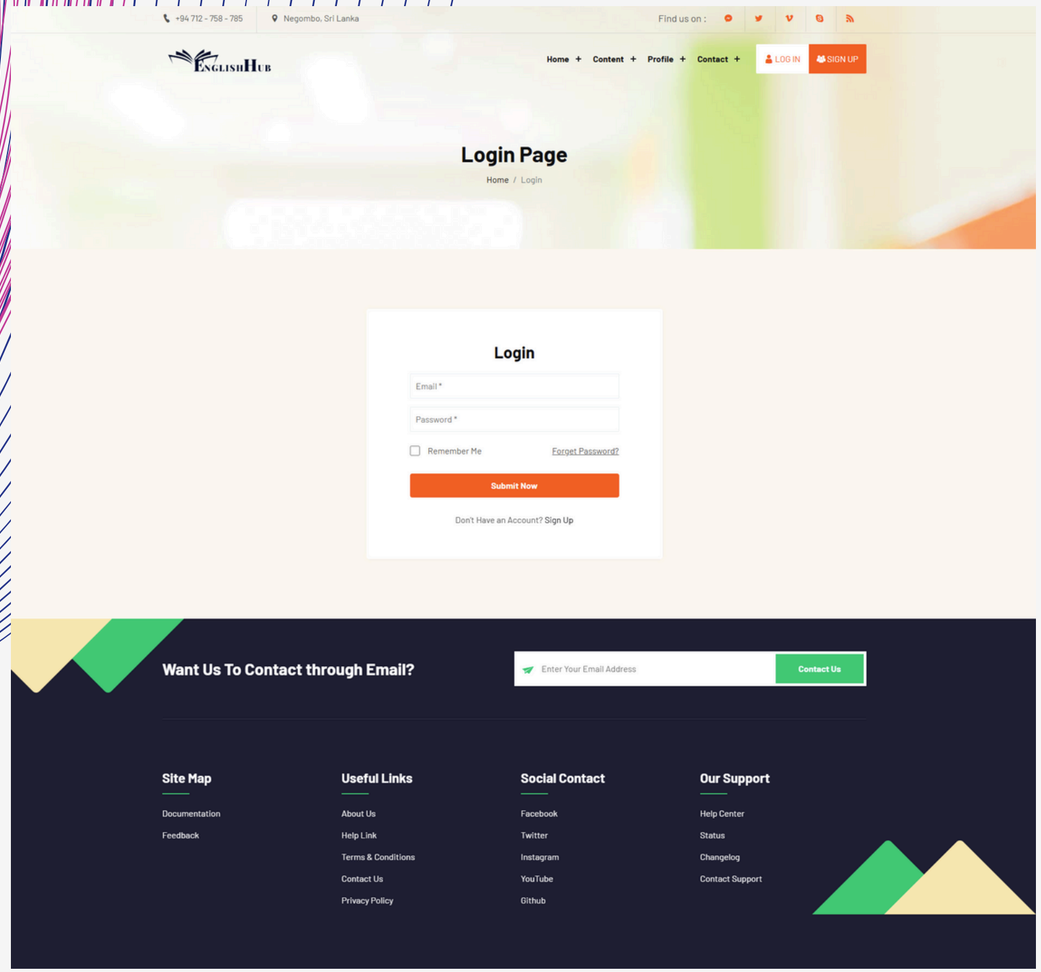
```
1  {
2      "performance_score": [
3          54.405704498291016,
4          55.89969253540039,
5          56.86830520629883,
6          58.860599517822266,
7          60.75442886352539
8      ]
```

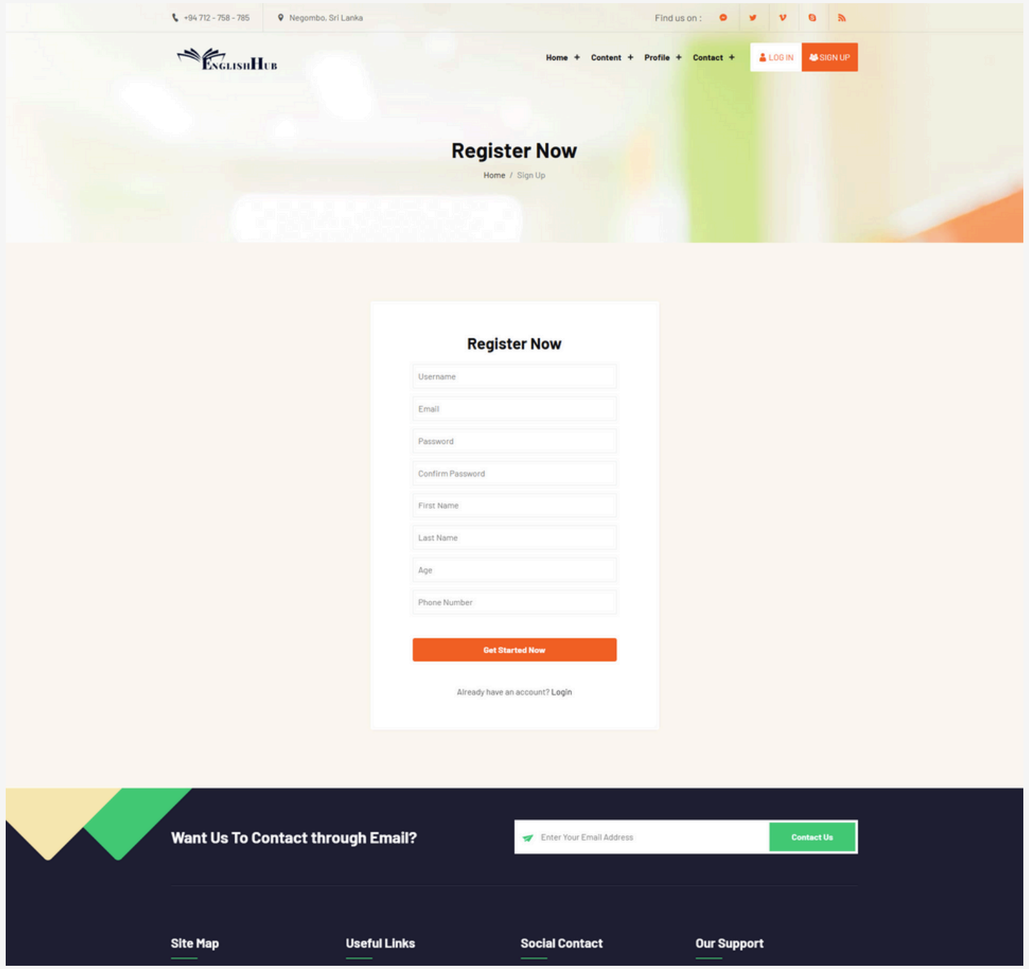
student level forcasting

Sri Lanka Institute of Information Technology

Web Application UI's

Proof of work

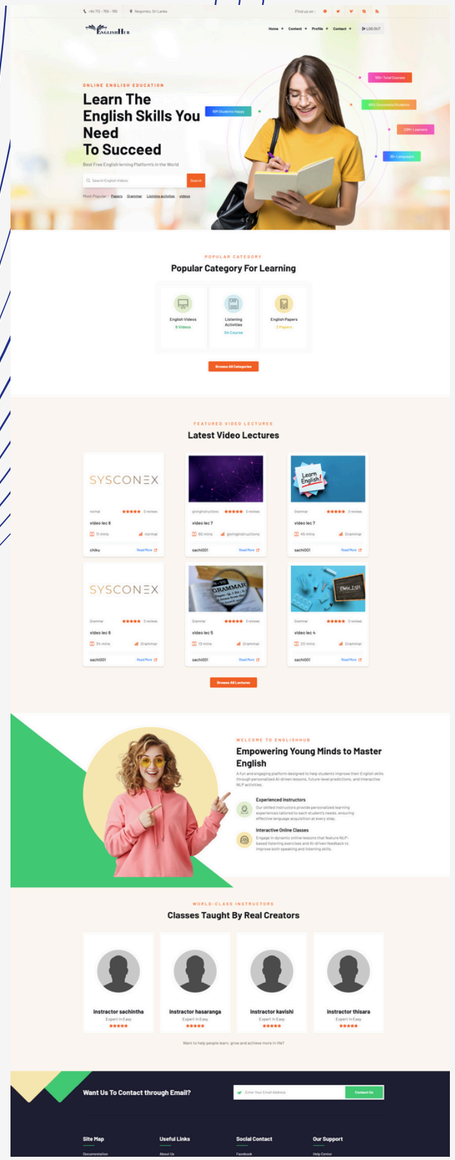


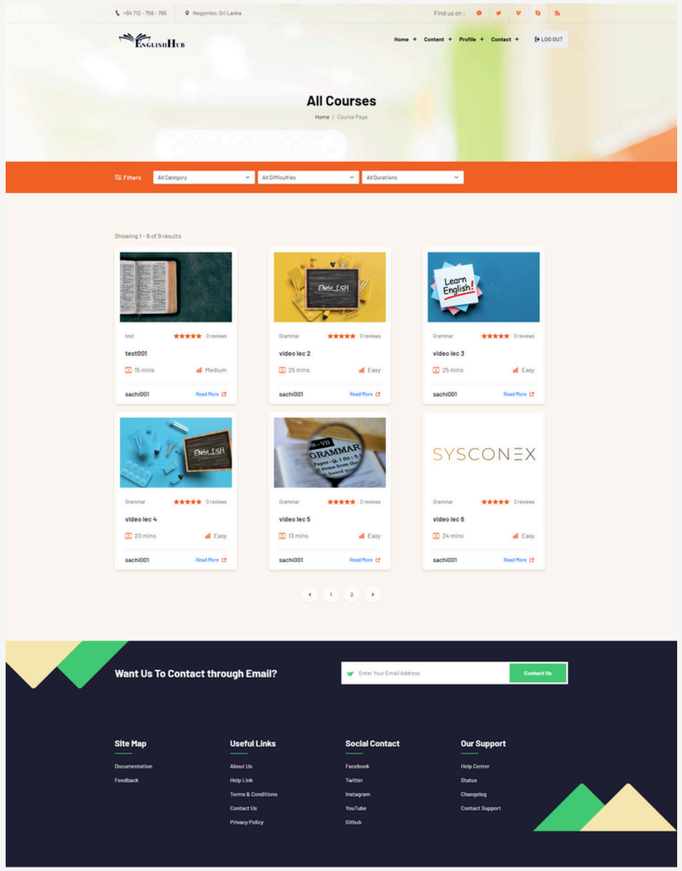


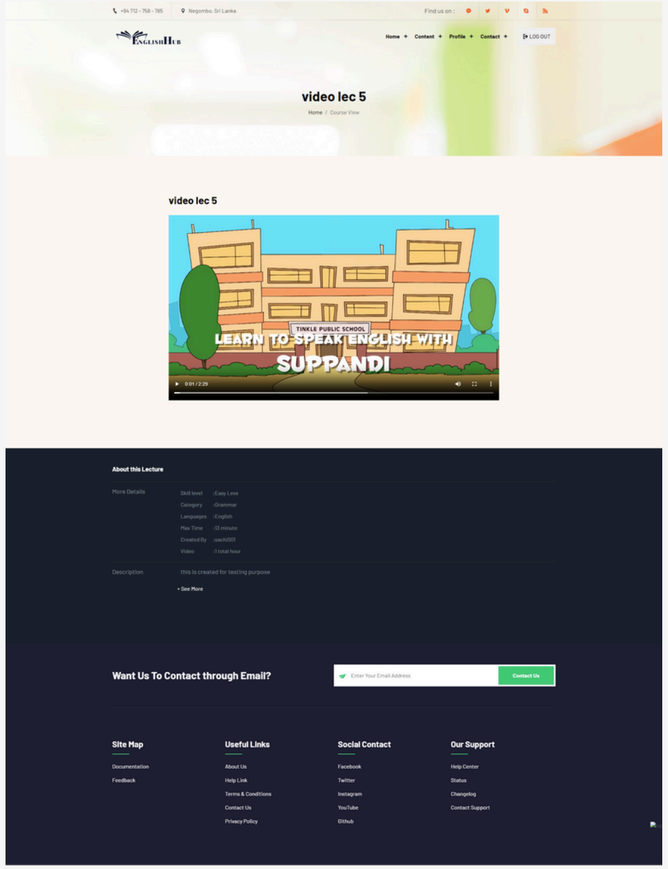
Sri Lanka Institute of Information Technology

Web Application UI’s

Proof of work



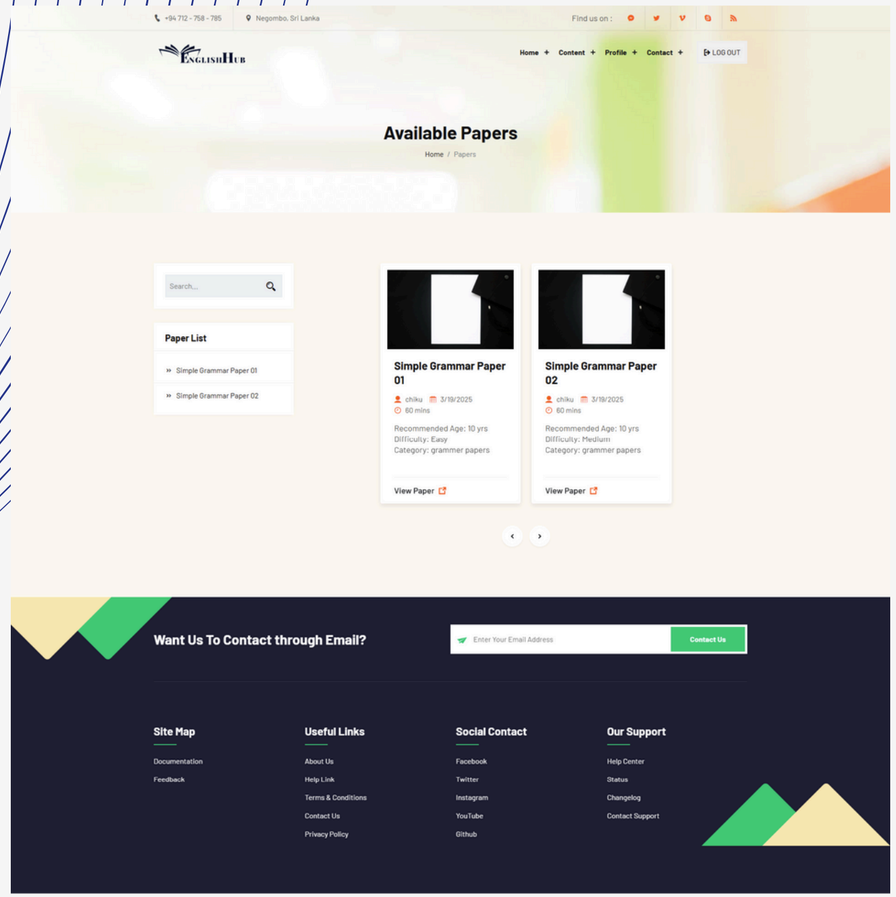


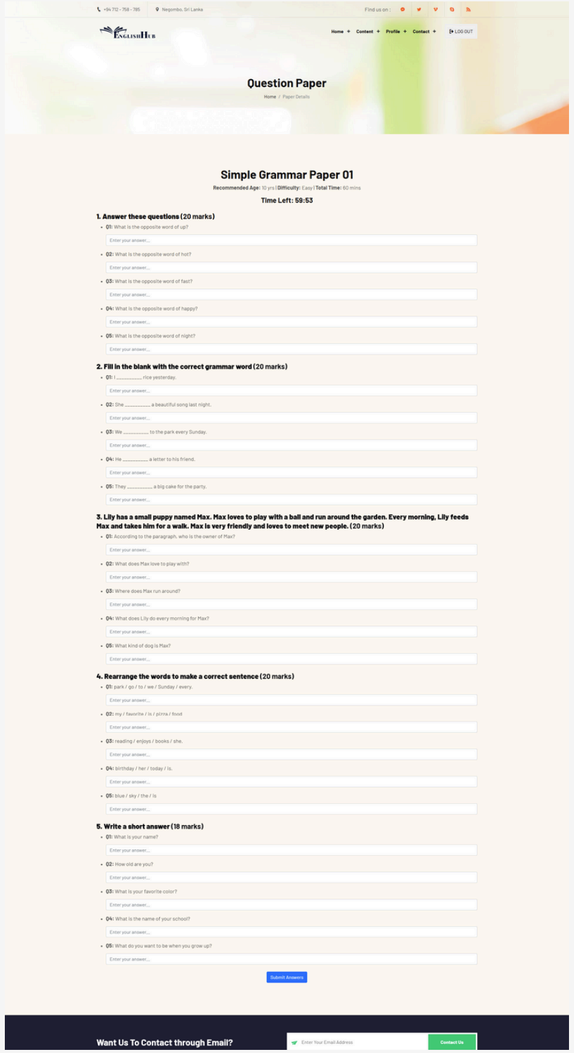


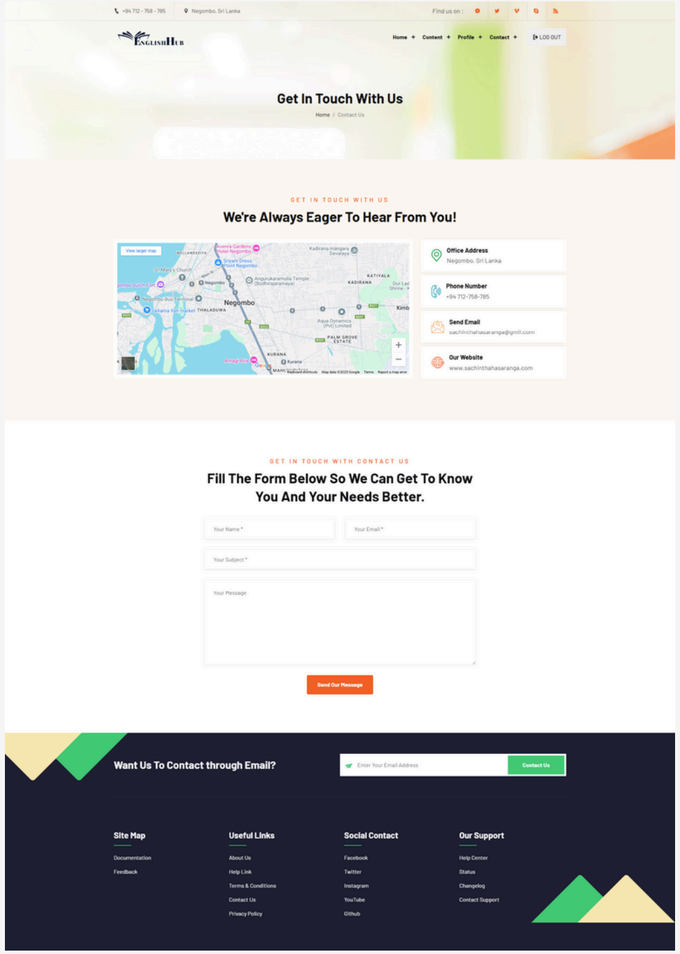
Sri Lanka Institute of Information Technology

Web Application UI's

Proof of work



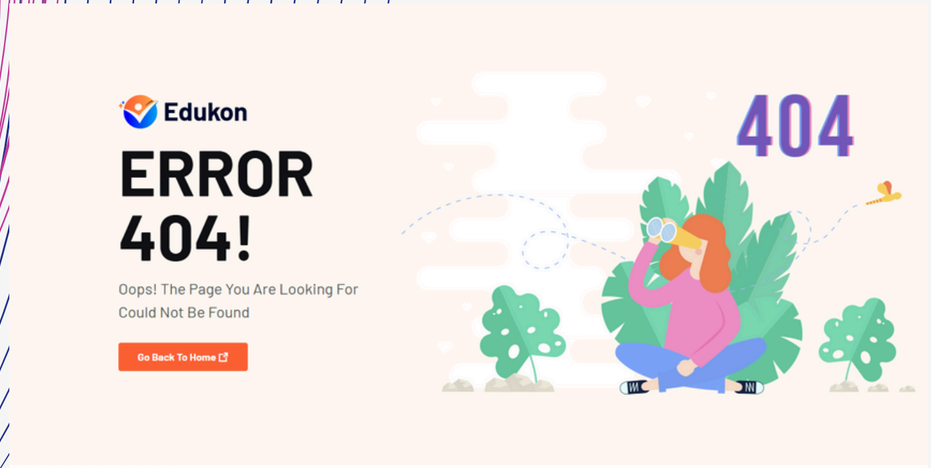


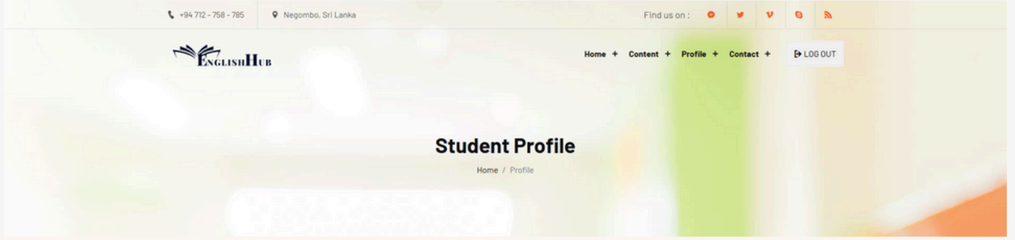


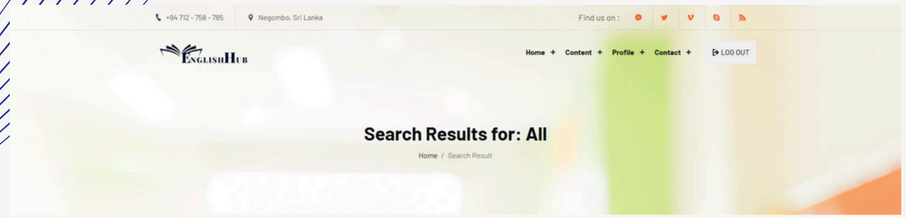
Sri Lanka Institute of Information Technology

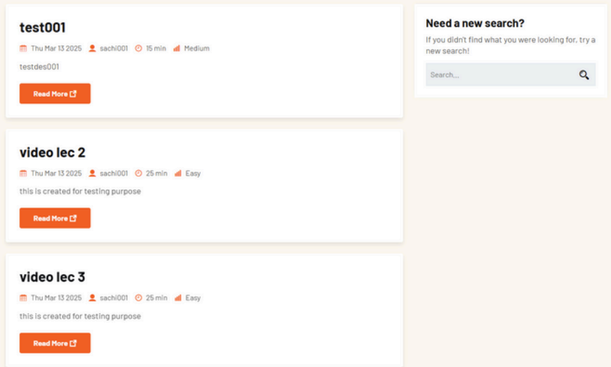
Web Application UI’s

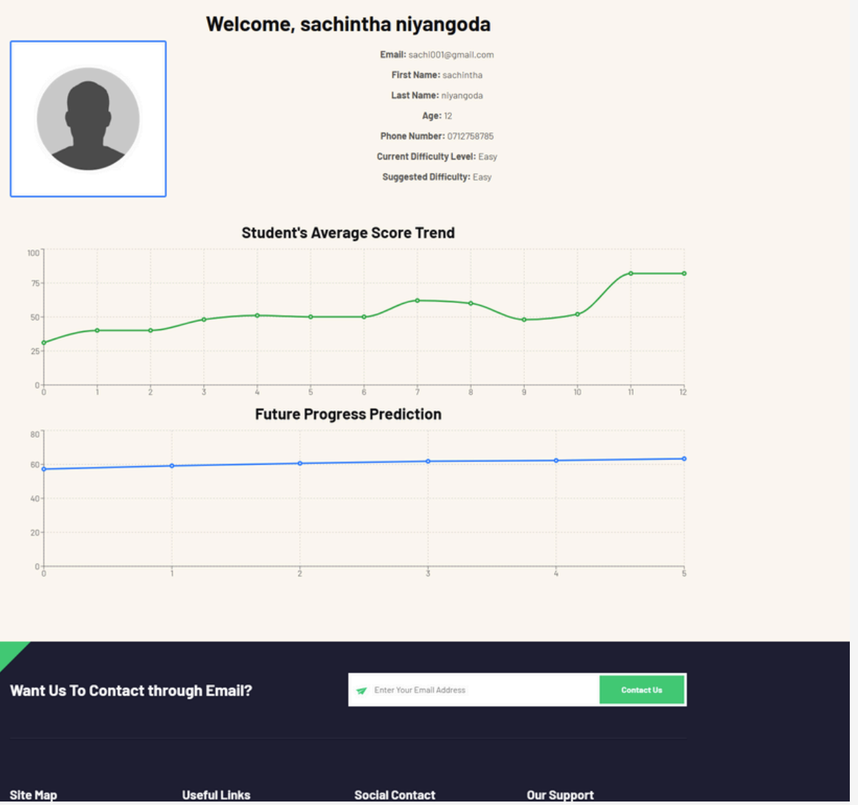
Proof of work





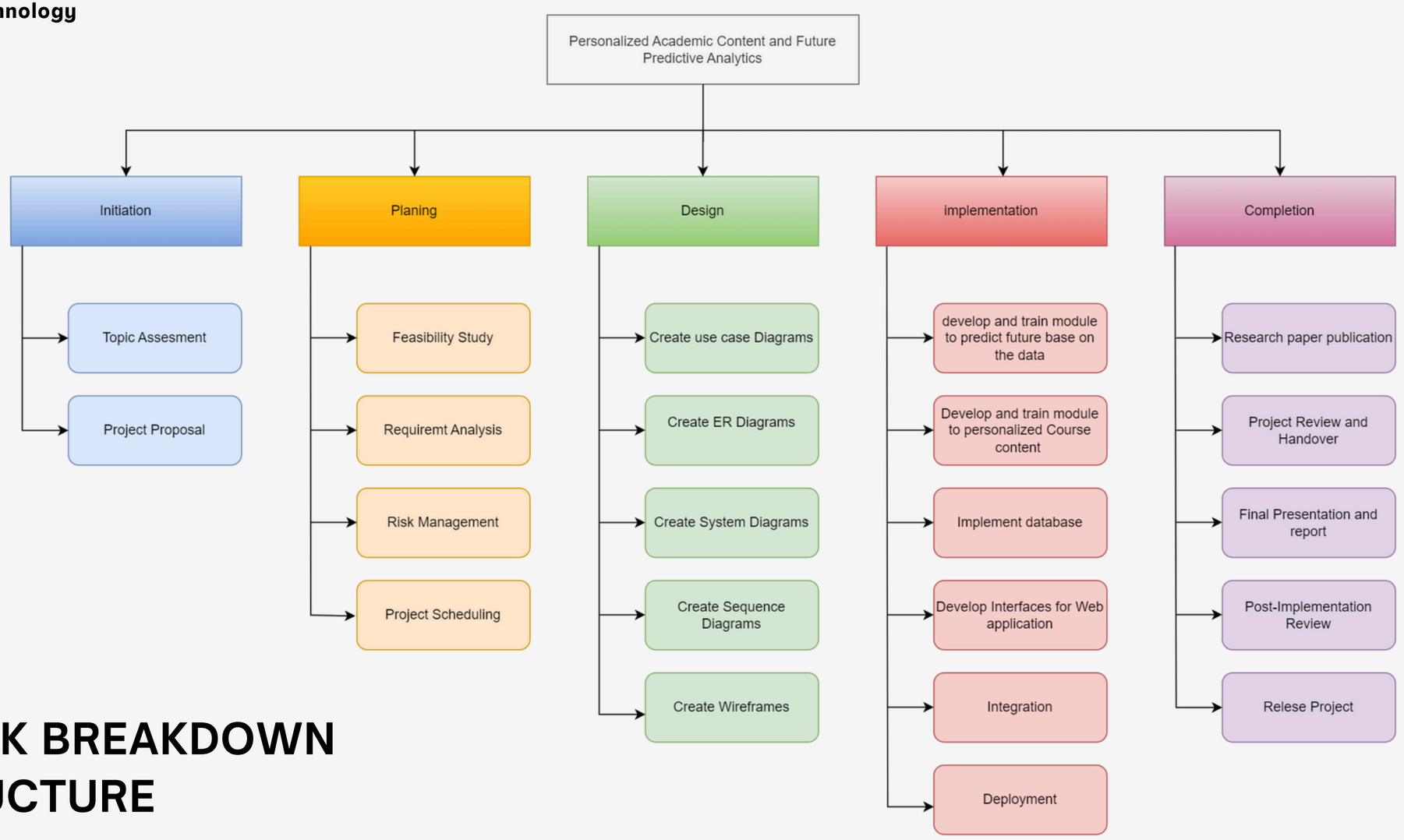






COMPLETED COMPONENTS 100%

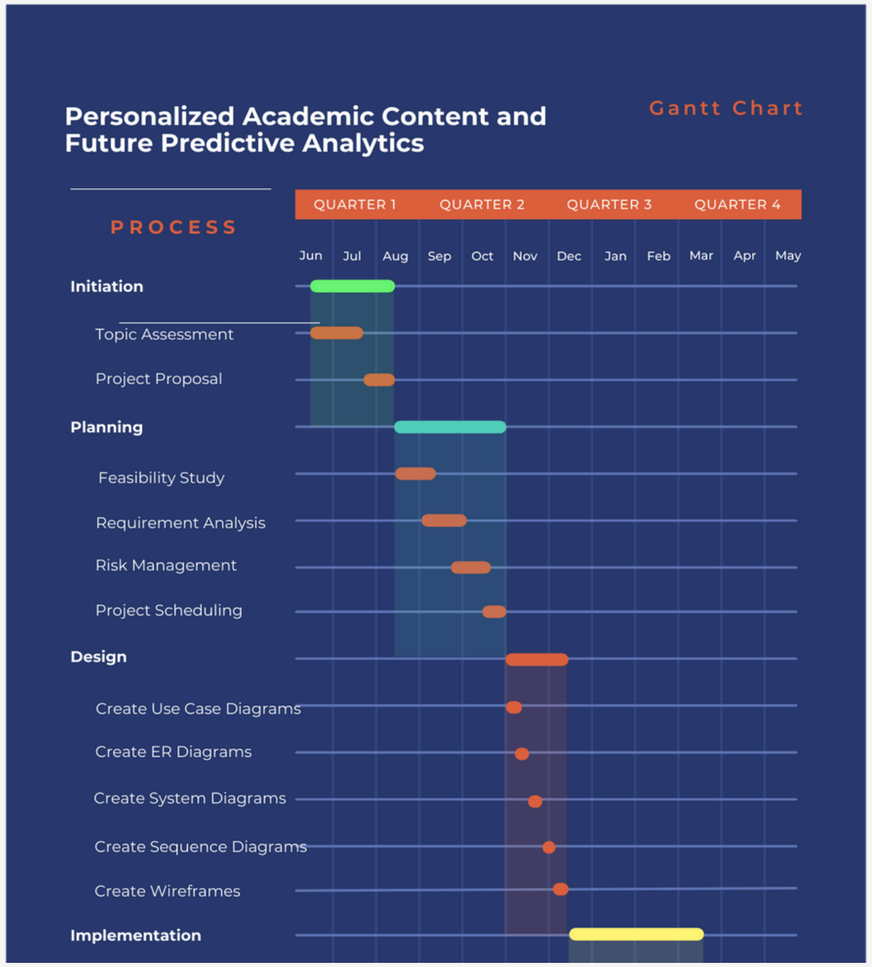
- Data Collection - 100%
- NLP Model for get answer correction for paper
- student level prediction model
- student future level forecast
- UI implementation - User and Admin
- Backend Implementation
- Integrate with other members parts
- Attach Thisra’s NLP model for papers

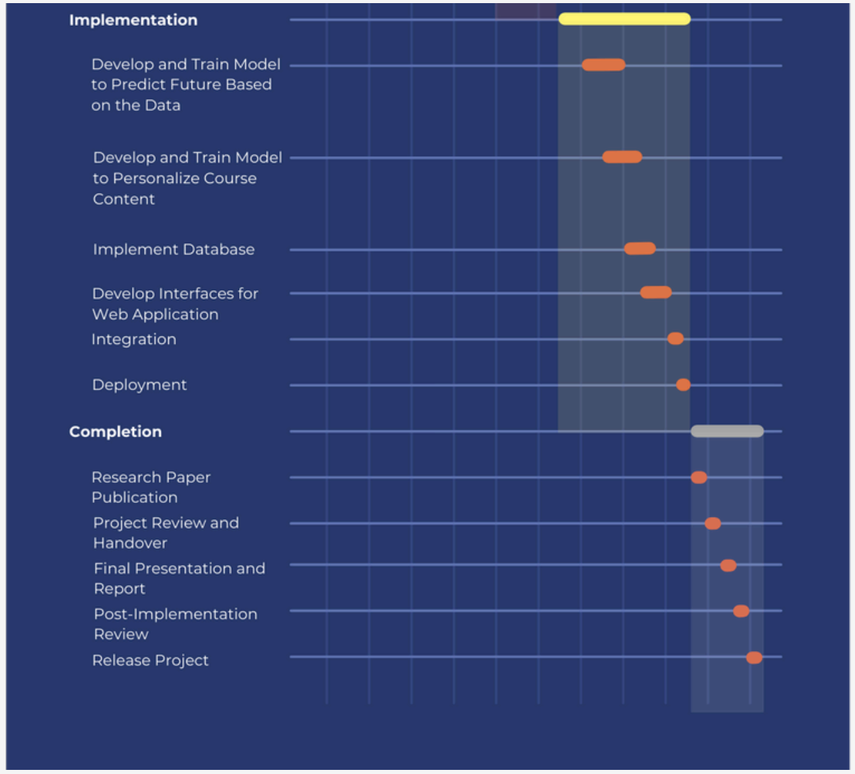


WORK BREAKDOWN STRUCTURE

Sri Lanka Institute of Information Technology

GANNT CHART





IIT21194962 Niyangoda S A N S H 24-25J-103

Sri Lanka Institute of Information Technology

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

Sri Lanka Institute of
Information Technology

AI - LISTENING ACTIVITIES

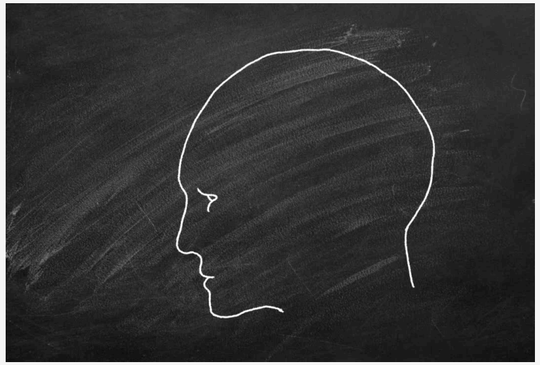
IT21196560 Dewinda A G T 24-25J-103

Sri Lanka Institute of Information Technology

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

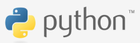
Sri Lanka Institute of Information Technology

METHODOLOGY

SYSTEM, PERSONAL, AND SOFTWARE REQUIREMENT SPECIFICATION

Software Requirement

- Tensorflow
- Python
- MERN
- NLTK



Personal Requirement

- School teacher
- School children

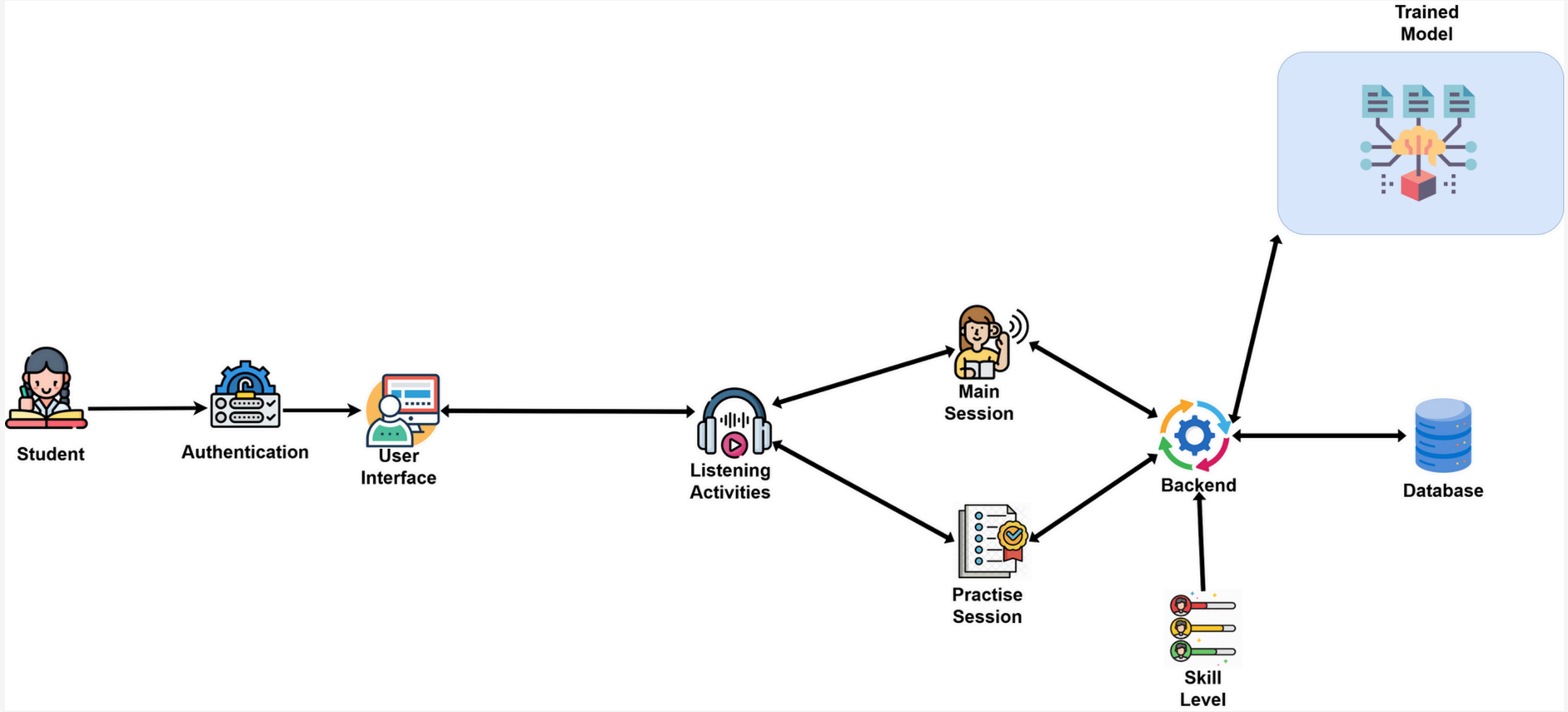
Functional Requirement

- 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



Sri Lanka Institute of Information Technology

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

REGENT LANGUAGE INTERNATIONAL

Sri Lanka Institute of
Information Technology

Prevoiuse Results

```
Test Predictions: [0.95188403 0.82827616]
Test Loss (MSE): 0.055228594103560 91
Test MAE: 0.190080094337463 37
Test MSE: 0.055228594103560 91
Test R²: 0.999999999999998
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>
```

Sri Lanka Institute of Information Technology

Prevoiuse Results

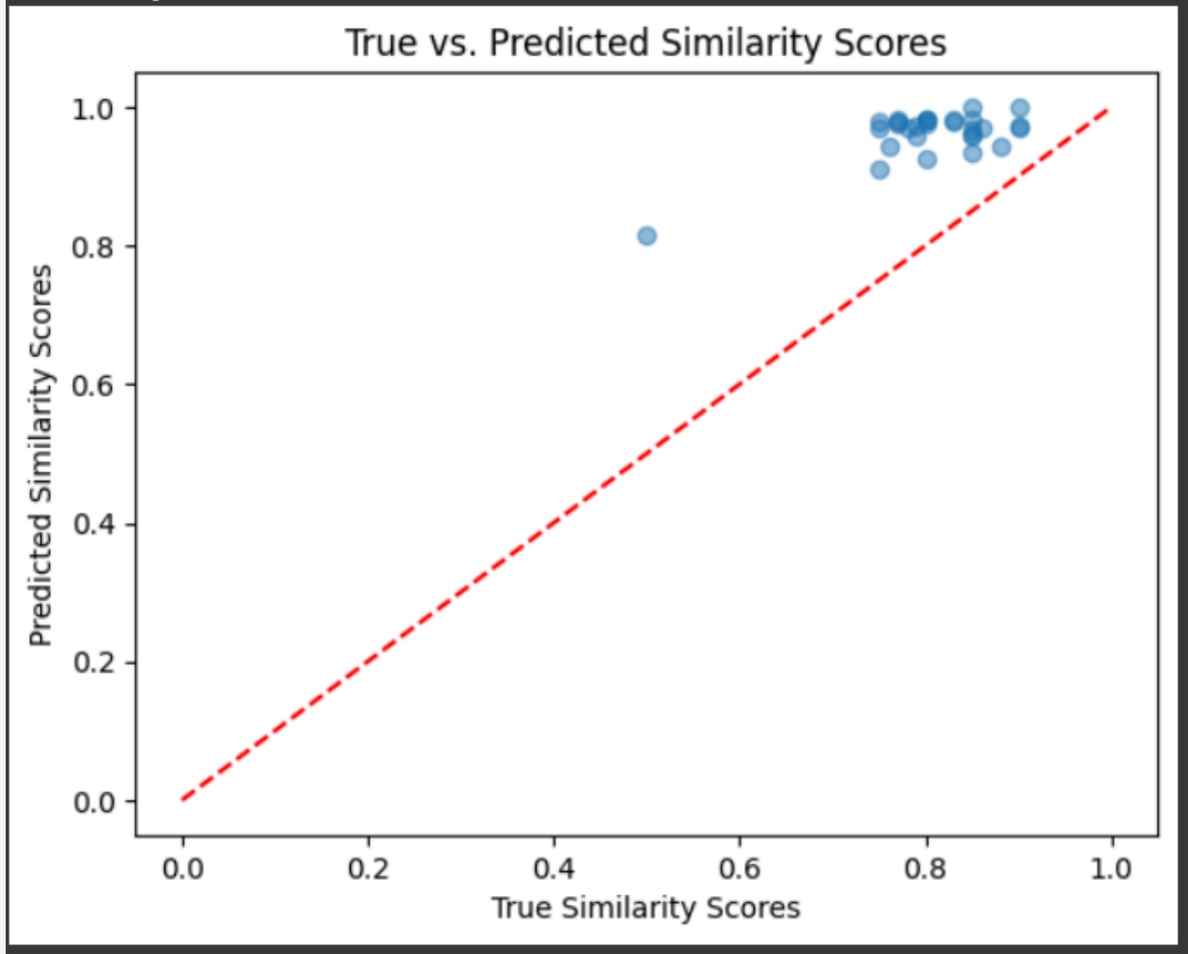
```
Test Predictions: [0.95188403 0.82827616]
Test Ground Truth: [0.9 0.5]
Test Loss (MSE): 0.0552285941035609 1
Test MAE: 0.19008009433746337
Test MSE: 0.0552285941035609 1
Test R²: 0.9999999999999998
Test Accuracy (within ±0.1): 50.00%
PS C:\SLIIT\4th Year\Research\similarity_model>
```

```
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
```

Sri Lanka Institute of Information Technology

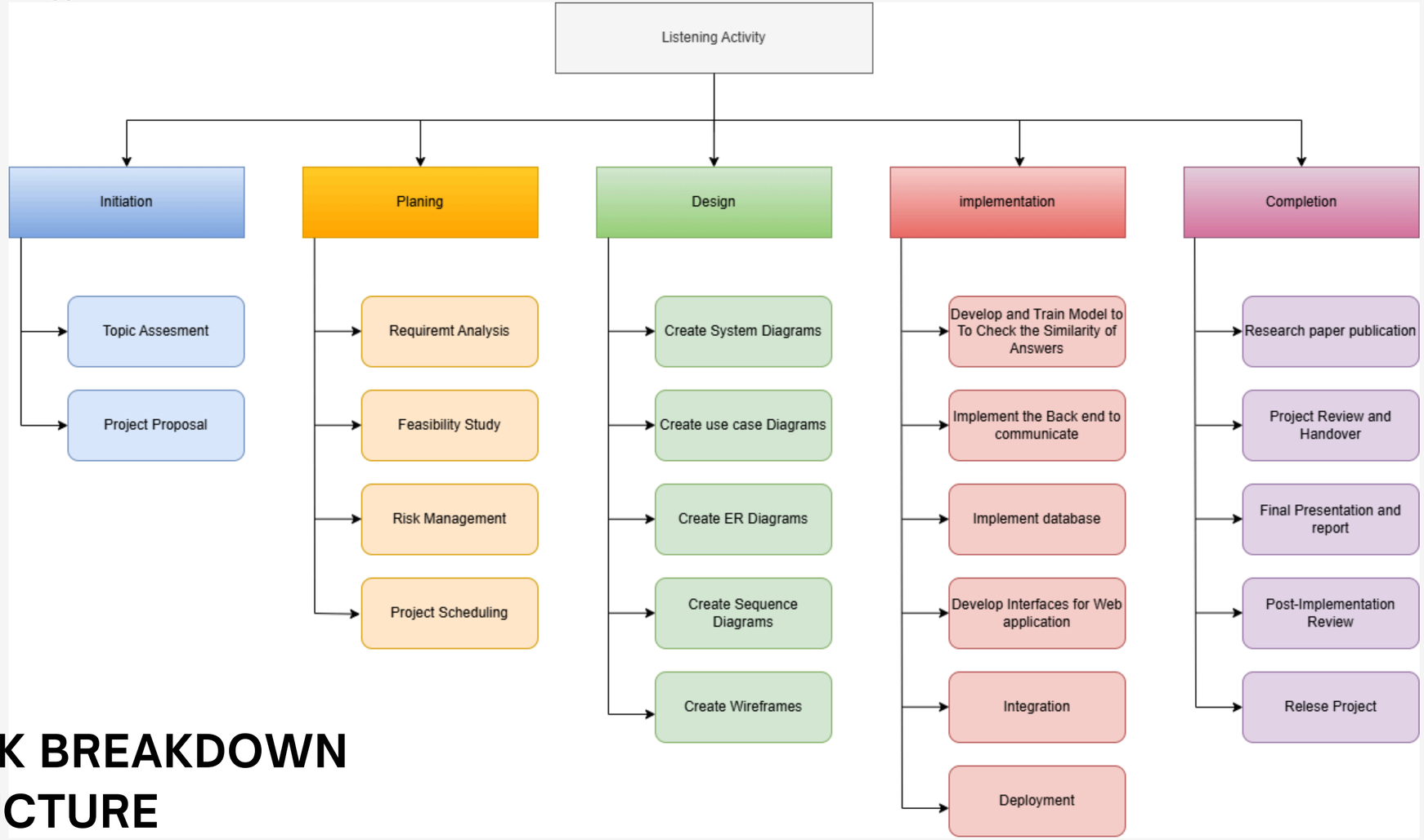
New Results

```
Mean Squared Error: 0.0276
Pearson Correlation: 0.6976
Similarity between 'hello' and 'helo': 0.9449
```



COMPLETED COMPONENTS 100%

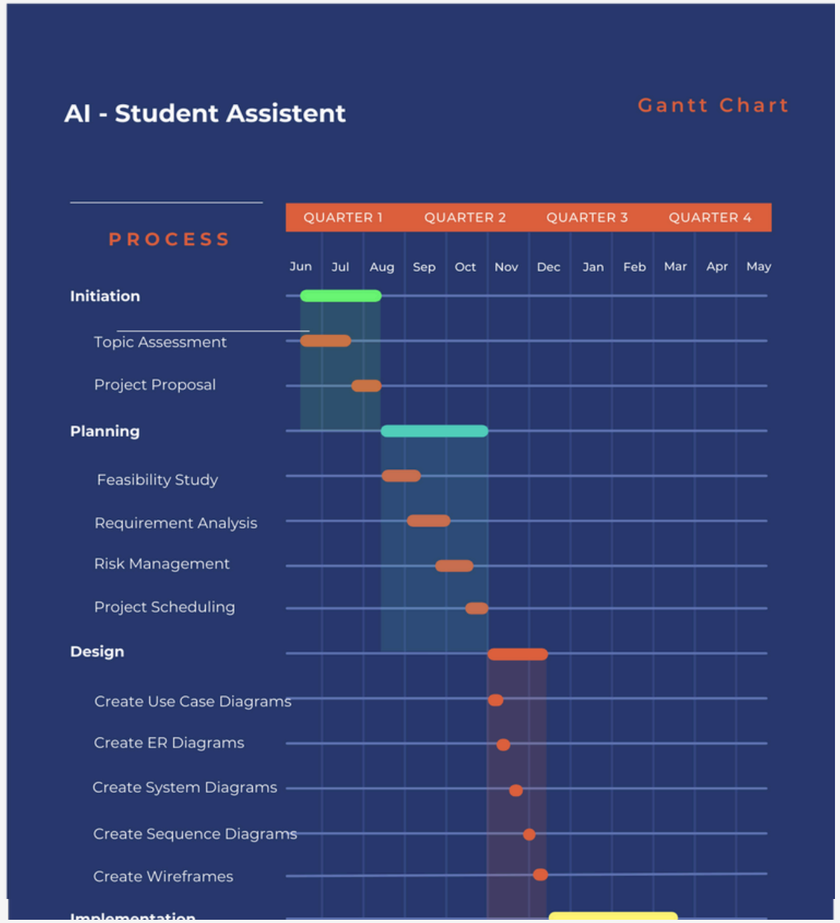
- Data Collection - 100%
- Improved the Accuracy of the model
- UI implementation - 100%
- Backend Implementation
- Data Collection -100%
- Integrate with other members parts

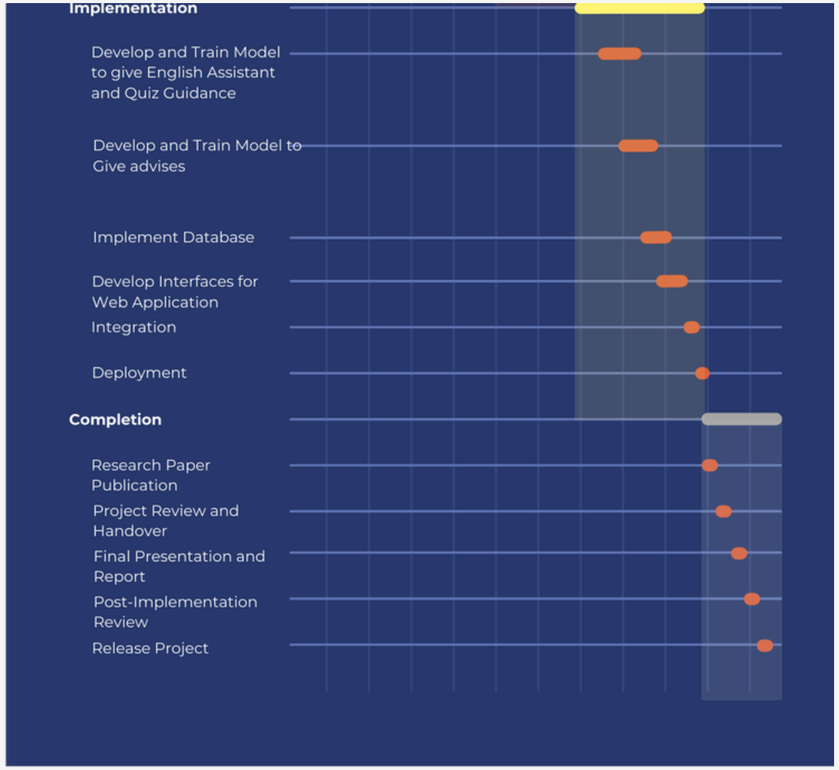


WORK BREAKDOWN STRUCTURE

Sri Lanka Institute of Information Technology

GANNT CHART





IT21196560 Dewinda A G T 24-25J-103

Sri Lanka Institute of Information Technology

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.

Sri Lanka Institute of Information Technology

RESEARCH PUBLISHED

2025 7th IEEE Symposium on Computers & Informatics

OpenConf Peer Review and Submission Management System

OpenConf Home | Privacy Policy | Email Chair

Check Status

Submission ID: 93

Title: AI-Driven Approaches to Language Skill Development in Pre-Adolescent Learners

Status: Pending

Sri Lanka Institute of
Information Technology

THANK YOU