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SMART EDUCATIONAL TOOL FOR STUDENT WITH LEARNING DISABILITY

LEVERAGE ADVANCED TECHNOLOGIES TO ENHANCE EARLY DETECTION AND SUPPORT FOR LEARNING DISABILITIES

GROUP ID -24-25J-325

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OUR TEAM

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INTRODUCTION

- Learning disabilities affect an estimated 15% of primary school students, impacting their academic performance and overall development.
- Early detection and intervention can significantly improve outcomes for children with learning disabilities, enabling them to reach their full potential.
- Machine learning and AI technologies offer innovative solutions for identifying and supporting students with learning disabilities.
- Our research focuses on developing a smart educational tool that utilizes machine learning to detect and support four specific learning disabilities: Dysgraphia, Dyslexia, Dyscalculia, and ADHD, making primary education more inclusive and effective.

RESEARCH QUESTIONS

- How can Deep learning technology improve early detection of dysgraphia in primary school students?
- How effective is image processing in identifying dyslexia among students?
- What are the main challenges in deploying these technologies in educational settings?
- In what ways can parents utilize the tool's guidance to assist their children with learning disabilities at home?

OBJECTIVES

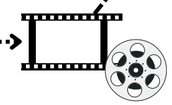
- Develop a machine learning system to accurately detect dysgraphia, dyslexia, dyscalculia, and ADHD in primary school students.
- Design algorithms to analyze handwriting and reading patterns for early identification of dysgraphia and dyslexia.
- Evaluate the impact of the smart educational tool on students' academic performance and engagement.
- Create personalized support plans and resources for students identified with learning disabilities.
- Develop a guidance system for parents to assist their children with learning disabilities at home.

User

Mobile Application

Image Input

Typed text input



Video Input

Database

Identify Dysgraphia

Collobarative platform

Tracing practise activity

Identify ADHD

Performance Tracking
& Feedback

Provide Specific learning
methods

Identify Dyslexia

Identify Dyscalculia

Provide activities

Performance Tracking
& Feedback

Real-Time Writing Assistance

Specific Learning Methods

BACKGROUND OF RESEARCH

- We aim to create a platform that helps educators and parents detect and support learning disabilities early. Collaborating with the Ayati Center in Ragama, we gather expert insights to develop an effective tool.

- Consulted Dr. Purasandu Daham De Silva (Lady Ridgeway Hospital for Children, Borella) & DR kamalani wanigasooriya to gain expertise on the identification tools and techniques used for early detection of learning disabilities. This consultation provided valuable input for designing an effective solution.

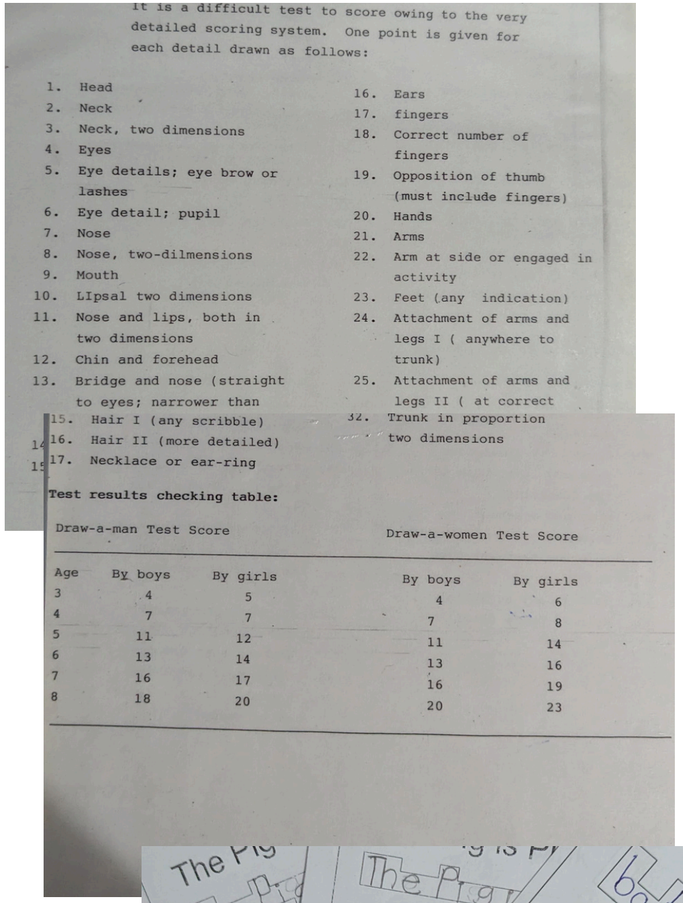
DATA COLLECTION

- In our application, we aim to identify disabilities such as Dysgraphia, Dyslexia, Dyscalculia, and ADHD. To achieve this, we need to collect specific data, including handwritten samples, video recordings of focus and attention behaviors, and time measurements for completing mathematical tasks.

- For this task, we visited a primary school and collected samples from the students. During this process, we observed that some students faced difficulties engaging with our activities.

ACTIVITY FOR LEARNING DISABILITIES

We incorporated Dr. Kamalani Wanigasooriya's identification techniques along with our own innovative activities to support students with Dysgraphia, Dyscalculia, Dyslexia, and ADHD. Our approach focuses on handwriting improvement, numerical skills, reading enhancement, and attention-building exercises to aid in early identification and support.



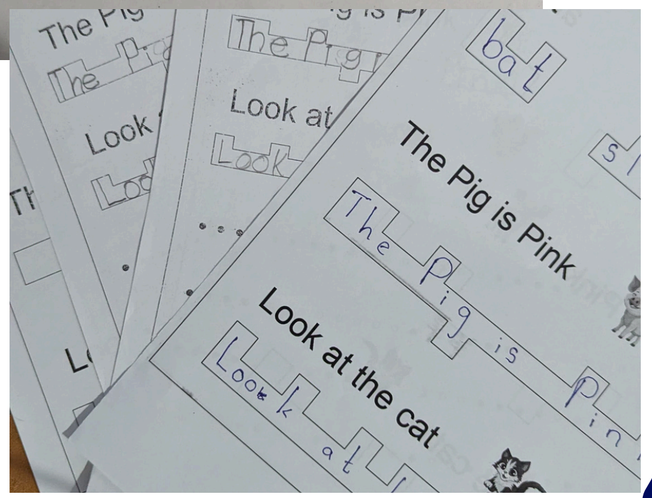
It is a difficult test to score owing to the very detailed scoring system. One point is given for each detail drawn as follows:

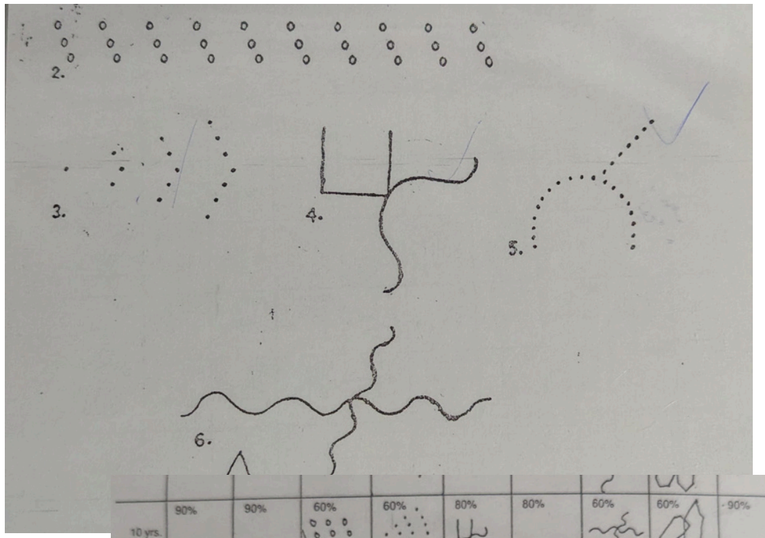
1. Head
2. Neck
3. Neck, two dimensions
4. Eyes
5. Eye details; eye brow or lashes
6. Eye detail; pupil
7. Nose
8. Nose, two-dilmensions
9. Mouth
10. LIpsal two dimensions
11. Nose and lips, both in two dimensions
12. Chin and forehead
13. Bridge and nose (straight to eyes; narrower than
16. Ears
17. fingers
18. Correct number of fingers
19. Opposition of thumb (must include fingers)
20. Hands
21. Arms
22. Arm at side or engaged in activity
23. Feet (any indication)
24. Attachment of arms and legs I (anywhere to trunk)
25. Attachment of arms and legs II (at correct
32. Trunk in proportion two dimensions

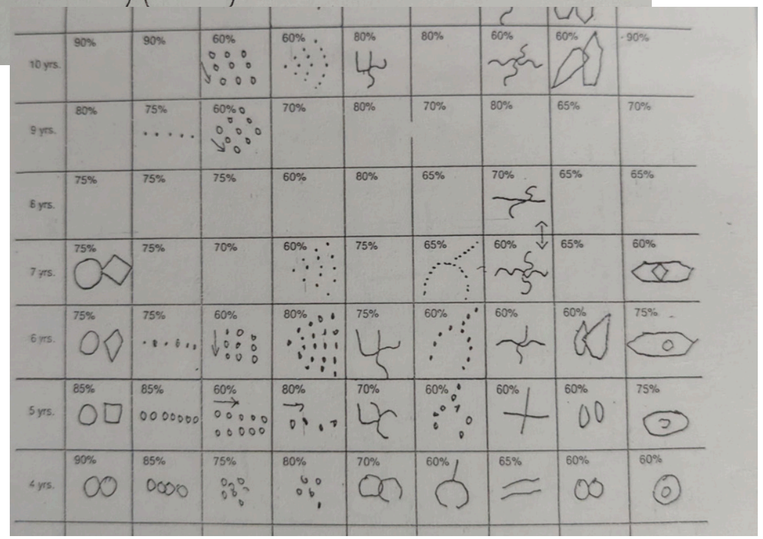
15. Hair I (any scribble)
16. Hair II (more detailed)
17. Necklace or ear-ring

Test results checking table:

Age	Draw-a-man Test Score		Draw-a-women Test Score	
	By boys	By girls	By boys	By girls
3	4	5	4	6
4	7	7	7	8
5	11	12	11	14
6	13	14	13	16
7	16	17	16	19
8	18	20	20	23







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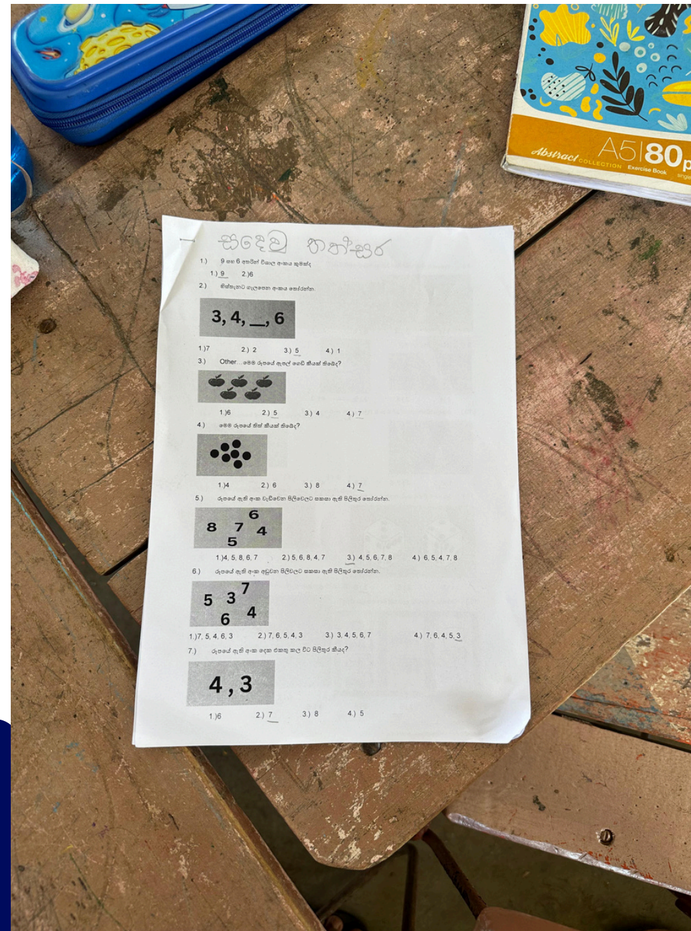
DATA COLLECTION



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SACHINTHA HESHAN

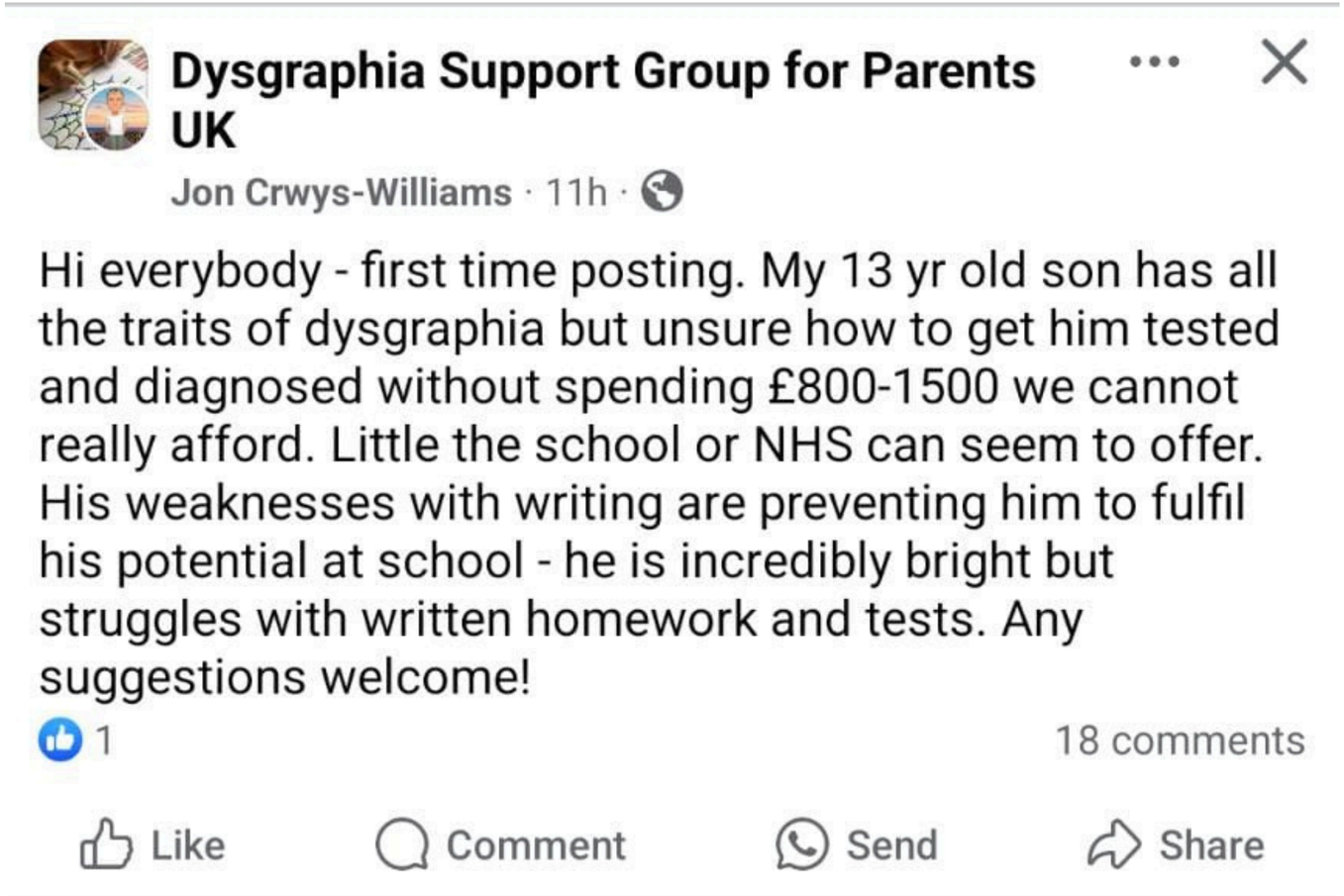
IT21183768

Dysgraphia Identification, Intervention and Skill Enhancement

IT21183768 | W.A.S Heshan | 24-25J-325

BACKGROUND & RESEARCH PROBLEM

- Traditional methods for identifying dysgraphia rely heavily on teacher observation and standardized tests, which can be subjective and time-consuming.
- Limited Accessibility: Access to expert evaluation is often limited, especially in under-resourced areas, causing many students to go undiagnosed and unsupported.
- Real-Time Monitoring and Feedback: The app allows for continuous monitoring of handwriting, offering real-time feedback to both students and educators, enhancing early detection and intervention.
- Many platforms focus on recognising handwritten text but neglect improving writing skills. This platform integrates interactive tracing exercises to help children with dysgraphia practice proper letter formation



The Need for Learning Disability Support: A Parent's Perspective

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RESEARCH GAP

Application References	Detection System	Intractive Tracing	Realtime Feedback	Collabarative Community
Research A	✓	✗	✓	✗
Research B	✓	✗	✓	✗
Research C	✗	✓	✓	✗
Proposed System	✓	✓	✓	✓

Research A

Identifying Developmental Dysgraphia Characteristics Utilizing Handwriting Classification Methods **[1]**

Research B

Addressing Dysgraphia with a mobile, web-based software with interactive feedback **[2]**

Research C

Serious games for a technology-enhanced early screening of handwriting difficulties **[3]**

IT21183768 | W.A.S Heshan | 24-25J-325

OBJECTIVES

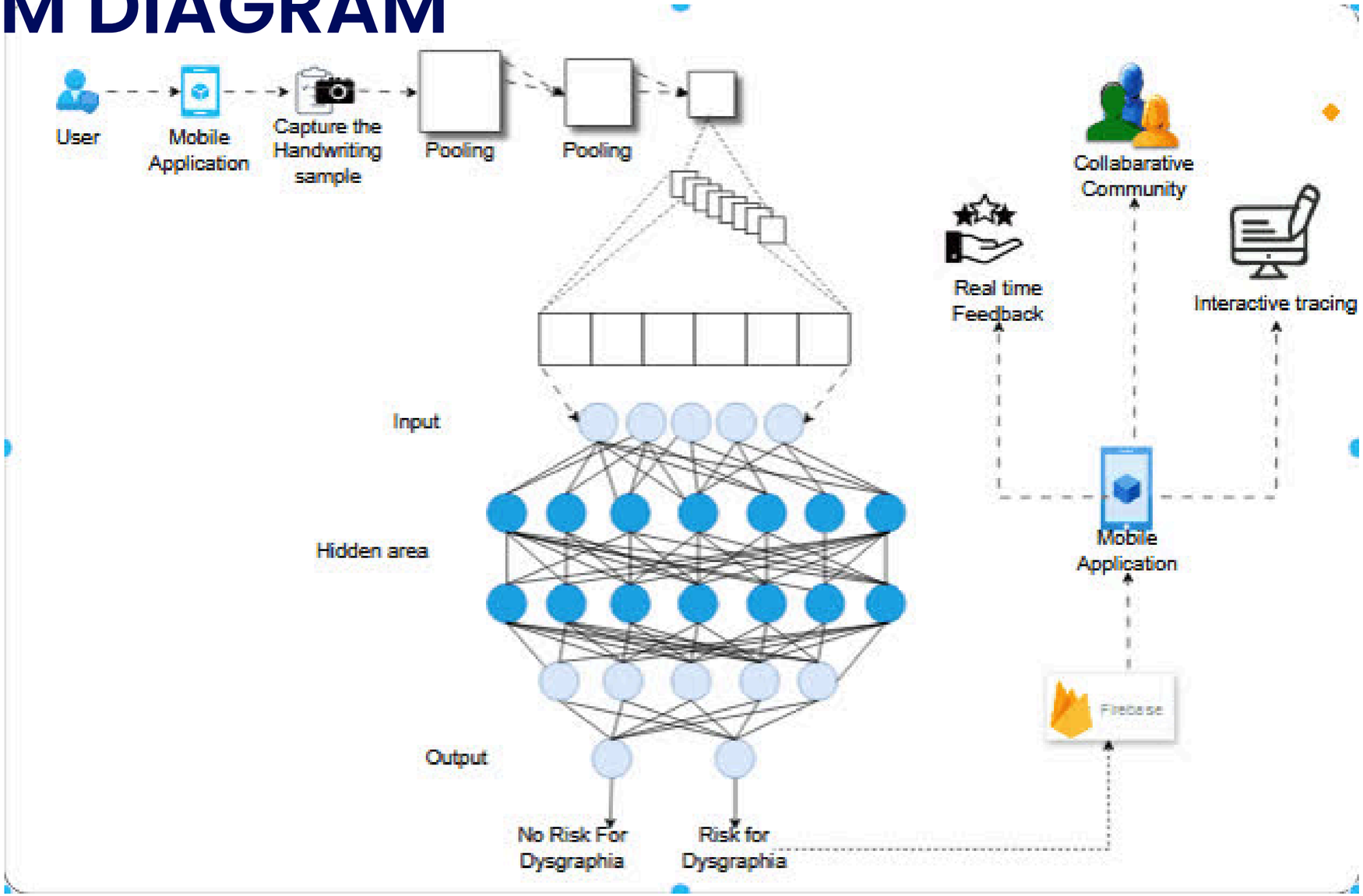
MAIN OBJECTIVE

- Develop a Machine Learning-based Mobile Application for Real-Time Dysgraphia Risk Identification, Personalized Learning Plan Creation.

SUB OBJECTIVES

- Collect and Label Handwriting Samples to Train the Dysgraphia Detection Model.
- Implement Real-Time Monitoring and Feedback Features for Continuous Student Support.
- Design and Implement Interactive Tracing Activities.
- Create a Collaborative Community Platform for Support and Knowledge Sharing.

SYSTEM DIAGRAM



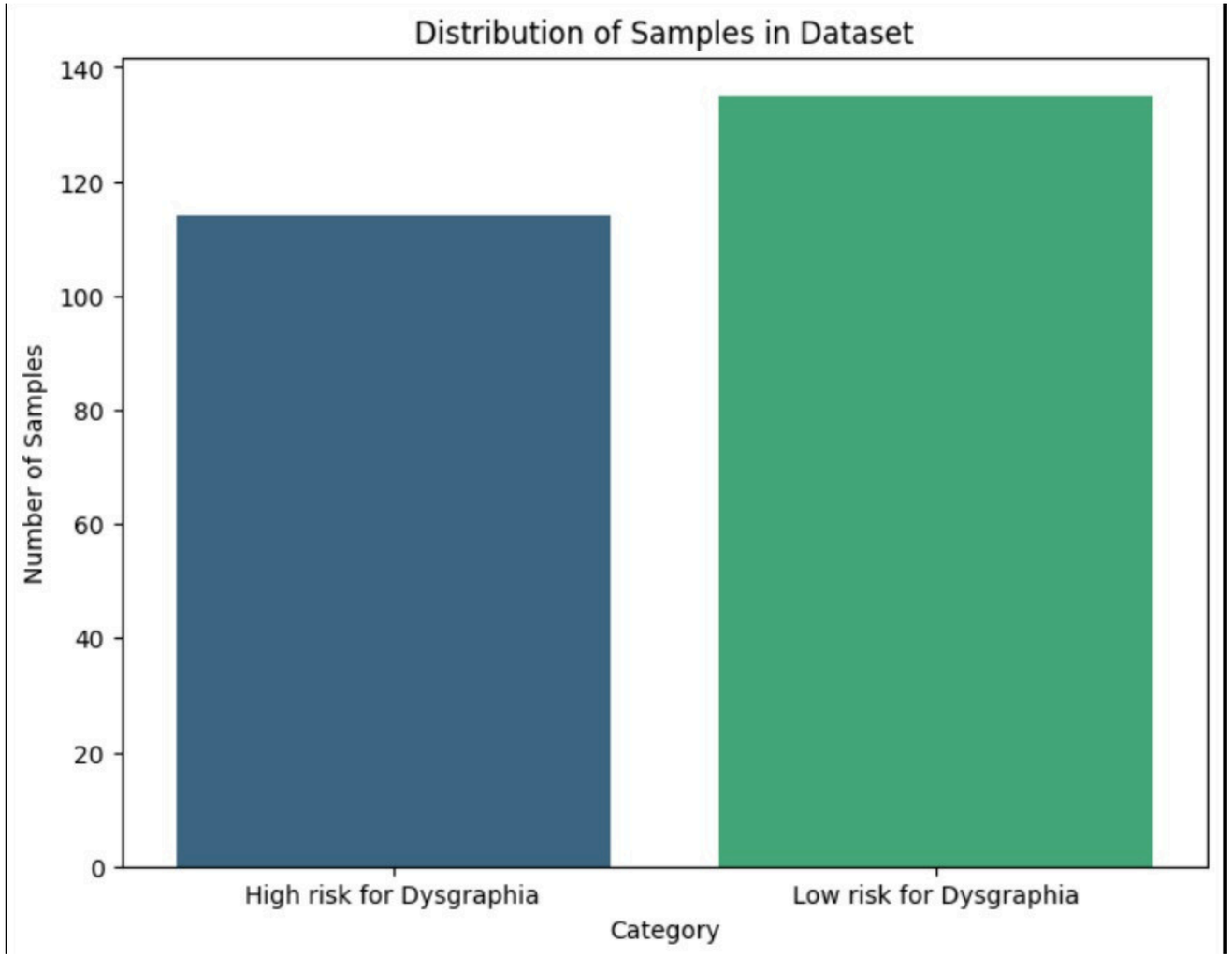
ACHIEVEMENTS

- Preparing the necessary environment in the machine
- Collecting the necessary dataset
- Completed the Model With Testing and 98% Accuracy for Identifying have a Risk for Dysgraphia or Not By using Dataset
- Developed the real time progress monitoring and mitigation activity

WHAT'S TO BE DONE

- Completing Community platform
- Completing the mobile App

COMPLETION OF THE PROJECT



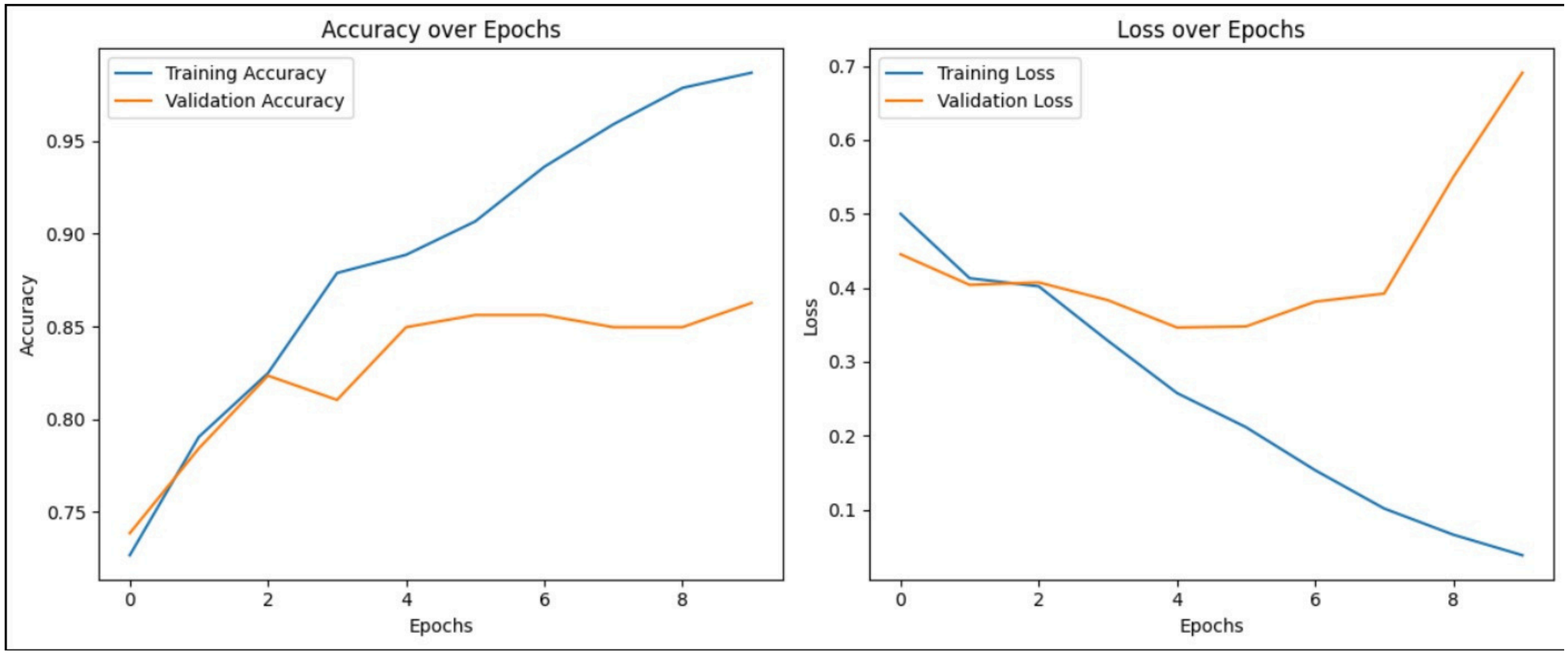
COMPLETION OF THE PROJECT

```
epochs = 10
history = model.fit(
    X_train, y_train,
    epochs=epochs,
    validation_data=(X_val, y_val),
    batch_size=32
)
```

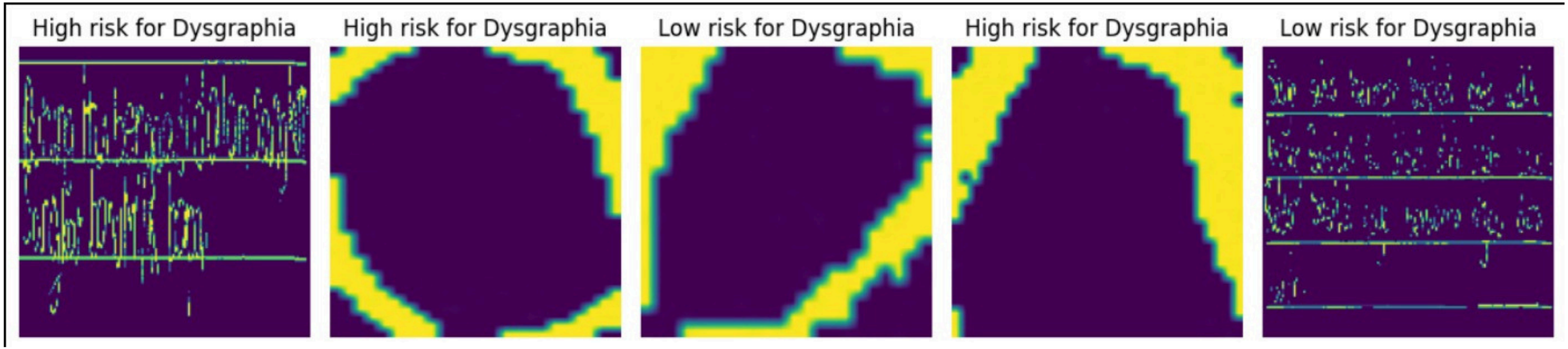
✓ 1m 28.7s

```
Epoch 1/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 12s 489ms/step - accuracy: 0.7193 - loss: 0.5642 - val_accuracy: 0.7386 - val_loss: 0.4397
Epoch 2/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 11s 523ms/step - accuracy: 0.7700 - loss: 0.4473 - val_accuracy: 0.8366 - val_loss: 0.3672
Epoch 3/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 9s 419ms/step - accuracy: 0.8854 - loss: 0.3179 - val_accuracy: 0.8497 - val_loss: 0.3564
Epoch 4/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 8s 401ms/step - accuracy: 0.9001 - loss: 0.2562 - val_accuracy: 0.8693 - val_loss: 0.3236
Epoch 5/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 8s 414ms/step - accuracy: 0.9286 - loss: 0.1936 - val_accuracy: 0.8627 - val_loss: 0.3216
Epoch 6/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 8s 402ms/step - accuracy: 0.9290 - loss: 0.1606 - val_accuracy: 0.8693 - val_loss: 0.3715
Epoch 7/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 8s 414ms/step - accuracy: 0.9593 - loss: 0.0898 - val_accuracy: 0.8431 - val_loss: 0.3902
Epoch 8/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 8s 403ms/step - accuracy: 0.9704 - loss: 0.0852 - val_accuracy: 0.8366 - val_loss: 0.3967
Epoch 9/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 8s 404ms/step - accuracy: 0.9821 - loss: 0.0567 - val_accuracy: 0.8497 - val_loss: 0.4700
Epoch 10/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 8s 402ms/step - accuracy: 0.9945 - loss: 0.0280 - val_accuracy: 0.8693 - val_loss: 0.4915
```

COMPLETION OF THE PROJECT



COMPLETION OF THE PROJECT



REFERENCES

1) S. Rosenblum and G. Dror, "Identifying Developmental Dysgraphia Characteristics Utilizing Handwriting Classification Methods," in IEEE Transactions on Human-Machine Systems, vol. 47, no. 2, pp. 293-298, April 2017, doi: 10.1109/THMS.2016.2628799.

2) D. Giordano and F. Maiorana, "Addressing dysgraphia with a mobile, web-based software with interactive feedback," IEEE-EMBS International Conference on Biomedical and Health Informatics (BHI), Valencia, Spain, 2014, pp. 264-268, doi: 10.1109/BHI.2014.6864354.

3) L. G. Dui et al., "Serious games for a technology-enhanced early screening of handwriting difficulties," 2023 IEEE EMBS International Conference on Biomedical and Health Informatics (BHI), Pittsburgh, PA, USA, 2023, pp. 1-4, doi: 10.1109/BHI58575.2023.10313501.

4) K. Charoy-boon, N. Kruesang, A. Anuntachai and N. Raksadawan, "Writing Test with Image Processing Technique," 2023 23rd International Conference on Control, Automation and Systems (ICCAS), Yeosu, Korea, Republic of, 2023, pp. 1711-1716, doi: 10.23919/ICCAS59377.2023.10316932.

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SHEHAN MALINGA

Identifying and Reducing the Impact of ADHD

IT21186424 | N.G.S.S.M Bandara | 24-25J-325

BACKGROUND & RESEARCH PROBLEM

ADHD affects 5-10% of children globally, leading to significant academic and social challenges that traditional teaching methods often fail to address.

Current educational technologies lack the ability to provide adaptive, personalized support tailored to the unique needs of students with ADHD.

To bridge this gap, Research focuses on developing a mobile application that machine learning, and NLP to accurately classify ADHD subtypes, generate personalized learning plans, and monitor behaviors in real-time.

This tool will be customizable by educators and parents, ensuring continuous adaptation and effective support to improve academic outcomes and behavioral management for students with ADHD.

RESEARCH GAP

Application References	Identification System	Personalized learning Activities	Realtime Feedback	Progress Monitoring
Research A	✓	✗	✗	✓
Research B	✓	✗	✓	✗
Research C	✓	✗	✓	✓
Proposed System	✓	✓	✓	✓

Research A

dentification ADHD and make the system for progress monitoring **[2]**

Research B

Addressing ADHD with a mobile, web-based software with interactive feedback **[2]**

Research C

Identification ADHD with Real time feedback and progress monitoring **[2]**

OBJECTIVES

MAIN OBJECTIVE

- Develop a mobile application that utilizes machine learning to accurately identify ADHD subtypes, provide personalized learning strategies, and monitor student behaviors in real-time. The application aims to improve the academic performance and behavioral management of students with ADHD by offering customizable tools that can be tailored by teachers and parents to meet each student's unique needs.

SUB OBJECTIVES

- Subtype Identification: Develop machine learning algorithms to classify ADHD subtypes based on behavioral and academic data.
- Personalized Learning plan: Create algorithms that generate individualized learning plans to improve academic performance.
- Behavioral Monitoring: Implement real-time AI tools to track and respond to student behavior and engagement.
- Develop AI-driven tutors that can be tailored by teachers and parents to meet the specific needs and preferences of individual students with ADHD, ensuring personalized and effective educational support.

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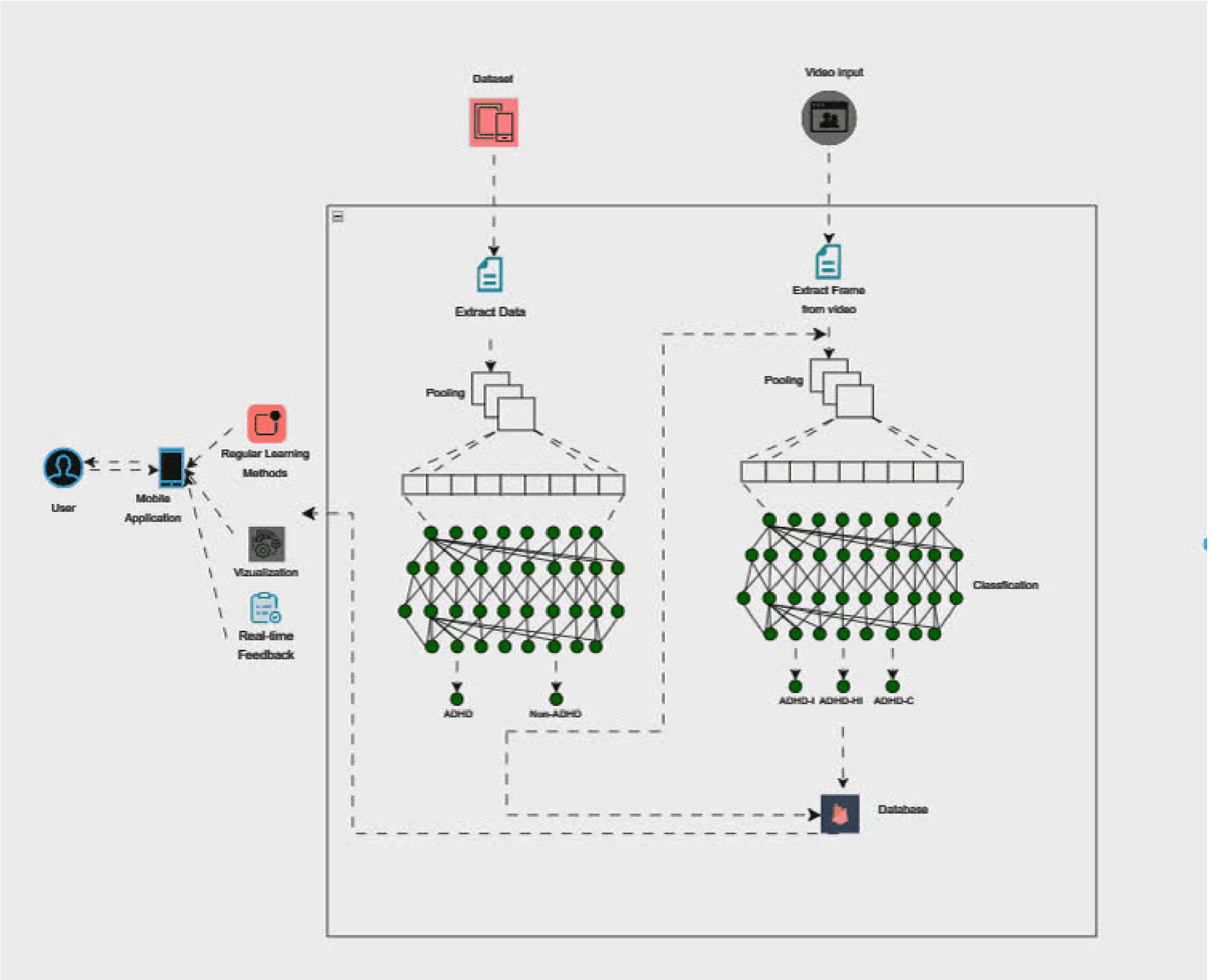
METHODOLOGY

System Diagram



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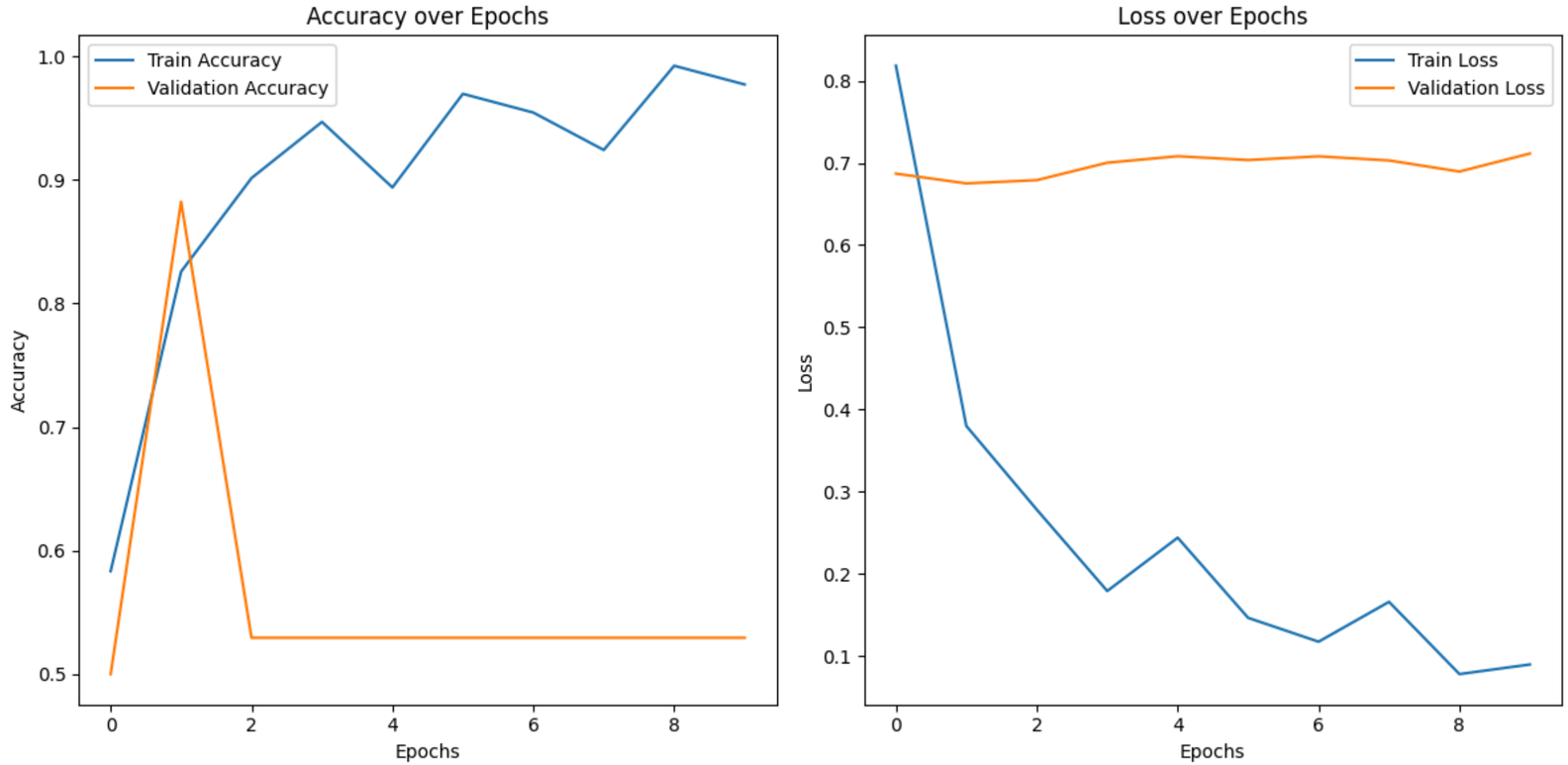

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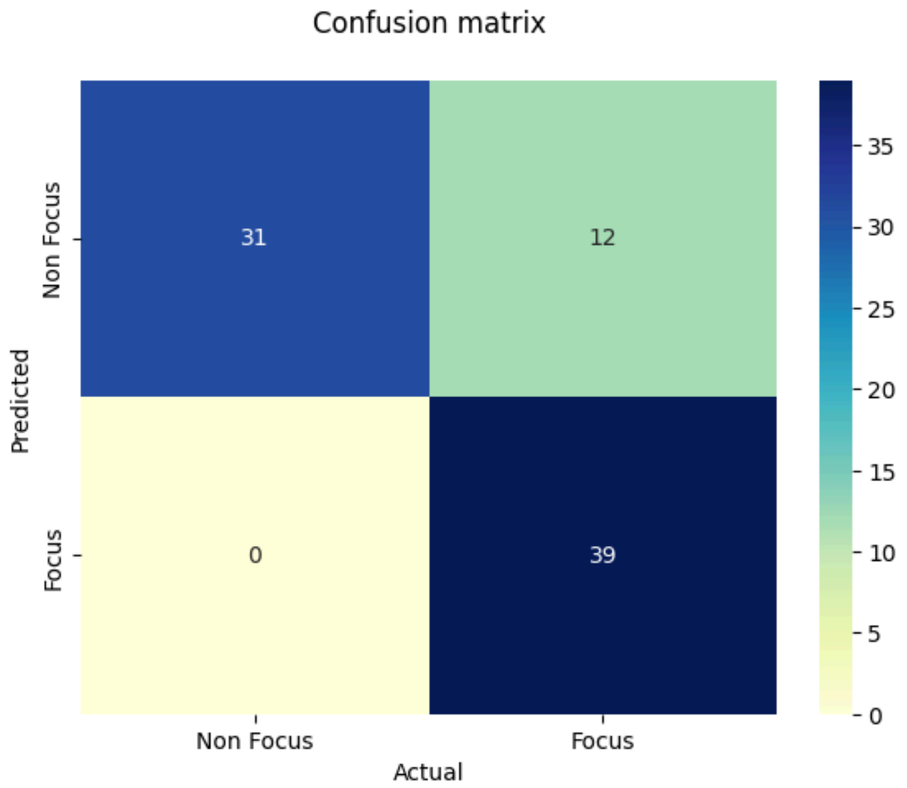

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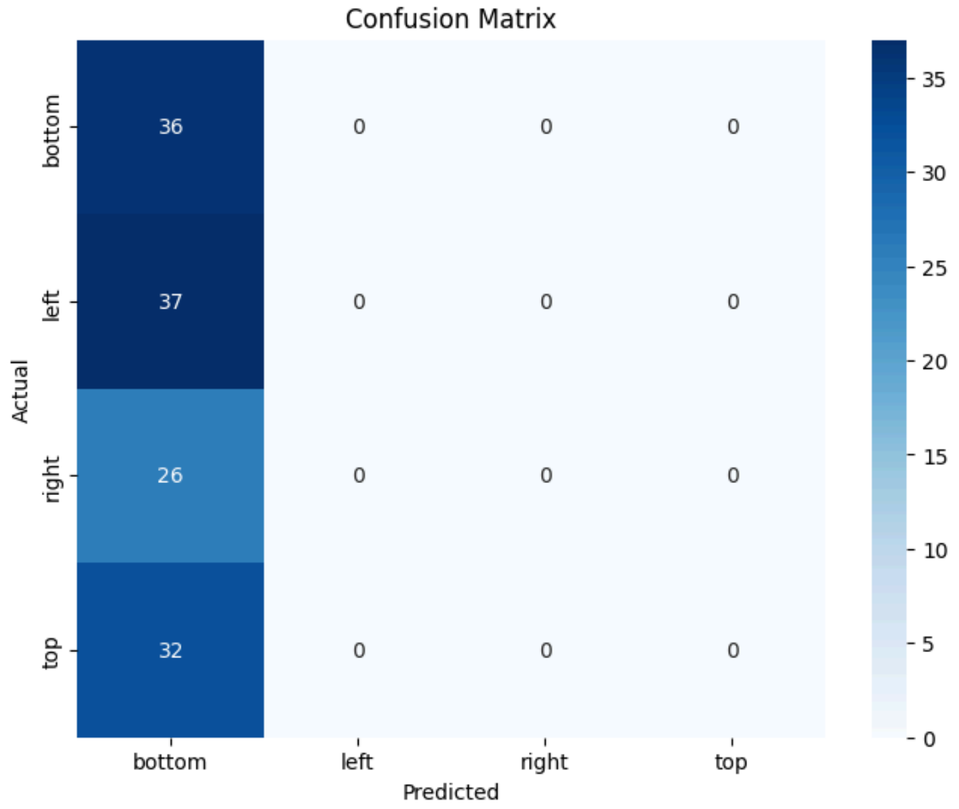

ACHIEVEMENTS

- prepared the PC environment for the project
- Collected datasets(photo & Text) to train and validate the task
- Prepared the models for each task using datasets

WHAT'S TO BE DONE

- intigrate the realtime camara feature to capture image to model
- Completing the mobile App

REFERENCES

1) N. Vanjari and P. Shete, "CNN-based Cognitive Impairment Prediction using Handwriting Recognition and Analysis," 2023 International Conference on Innovation and Intelligence for Informatics, Computing, and Technologies (3ICT), Sakheer, Bahrain, 2023, pp. 408-412, doi: 10.1109/3ICT60104.2023.10391633.

2) S. Rosenblum and G. Dror, "Identifying Developmental Dysgraphia Characteristics Utilizing Handwriting Classification Methods," in IEEE Transactions on Human-Machine Systems, vol. 47, no. 2, pp. 293-298, April 2017, doi: 10.1109/THMS.2016.2628799.

3) K. Charoy-boon, N. Kruesang, A. Anuntachai and N. Raksadawan, "Writing Test with Image Processing Technique," 2023 23rd International Conference on Control, Automation and Systems (ICCAS), Yeosu, Korea, Republic of, 2023, pp. 1711-1716, doi: 10.23919/ICCAS59377.2023.10316932.

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SHANUKA LAKSHAN

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Identifying and Reducing the Impact of Dyscalculia

IT21183454 | P.A.D.S.L Jayathilaka | 24-25J-325

BACKGROUND & RESEARCH PROBLEM

Dyscalculia affects approximately 3-6% of children globally, causing significant difficulties in understanding and processing mathematical concepts, which traditional educational methods often struggle to address effectively.

Delayed Diagnosis: Traditional methods for identifying dyscalculia often result in late diagnosis, delaying necessary interventions.

Inadequate Progress Tracking: There is a lack of tools to continuously monitor a child's progress, making it difficult to adjust interventions as needed.

Prolonged Learning Difficulties: These challenges contribute to extended periods of struggle for children, impacting their overall learning and self-esteem.

Critical Need: A mobile-based solution is needed to diagnose dyscalculia efficiently, provide personalized activities, and monitor progress in real-time, ensuring timely and effective interventions.

RESEARCH GAP

Application References	Identification System	Performance based Activities	Dyscalculia mitigation activitis	Progress Monitoring
Research A	✗	✗	✓	✓
Research B	✓	✗	✗	✗
Research C	✓	✗	✗	✓
Research D	✗	✗	✓	✓
Proposed System	✓	✓	✓	✓

Research A

Ganitha Piyasa: Effective Lesson Delivery Method for Graphical Dyscalculia Students

Research B

Detection of Dyscalculia Using Machine Learning

Research C

Unraveling Dyscalculia: Identifying Mathematical Learning Difficulties in Early Education

OBJECTIVES

MAIN OBJECTIVE

To develop a mobile application that identifies dyscalculia in students, provides targeted activities to improve their mathematical skills, and tracks their progress, utilizing machine learning to enhance the accuracy of identification and effectiveness of interventions.

SUB OBJECTIVES

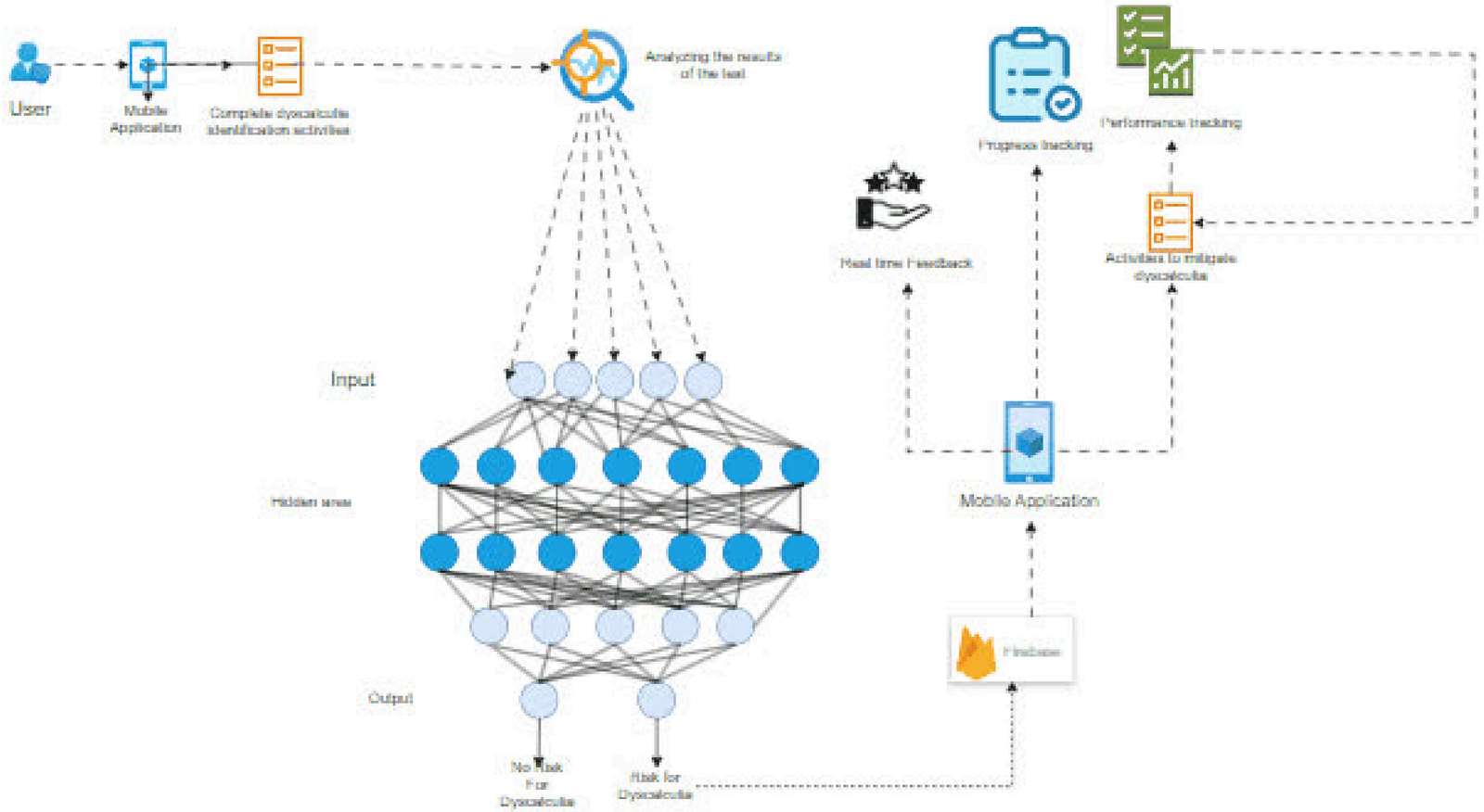
- Identification of Dyscalculia: - Develop cognitive and arithmetic tests within the app to identify students at risk of dyscalculia.
- Machine Learning Integration:- Implement machine learning models to analyze test results and classify students based on dyscalculia risk.
- Personalized learning activities: The nature of the activities should be changed according to the change in the ability of each child.
- Progress Monitoring:- Design a system within the app for students, parents, and educators to monitor progress over time.

PROGRESS UP TO PP2

- Data collection, data preprocessing, training, and testing of the model.
- Create identification activities.
- Create mitigation activities.

METHODOLOGY

System Diagram



COMPLETION OF THE PROJECT

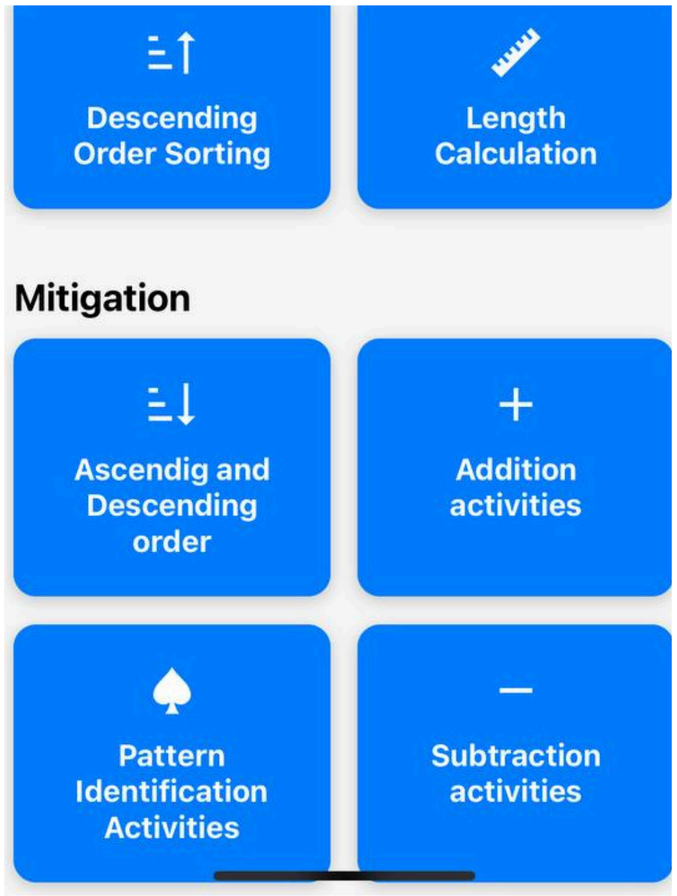
```
        print(f"{name} Accuracy: {accuracy:.4f}")

        # Store accuracy for plotting
        model_accuracies[name] = accuracy

        # Save the best model
        if accuracy > best_accuracy:
            best_accuracy = accuracy
            best_model = model
            best_model_name = name
```

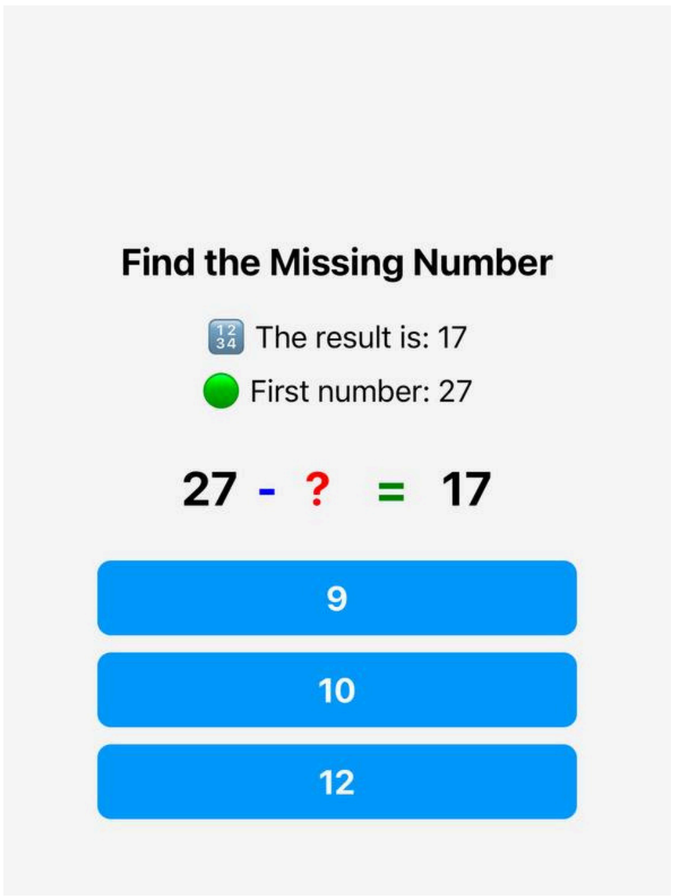
```
Logistic Regression Accuracy: 0.9375
Random Forest Accuracy: 0.9167
Support Vector Classifier Accuracy: 0.9375
```

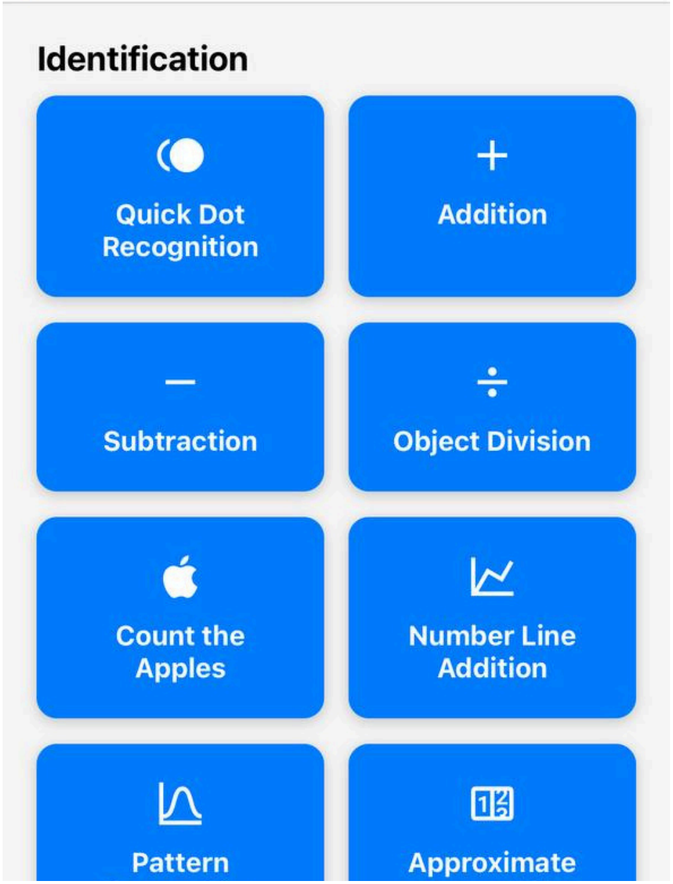
```
    # Save the best model using pickle
    if best_model:
        with open('best_model.pkl', 'wb') as f:
            pickle.dump(best_model, f)
        print(f"Best model '{best_model_name}' saved with accuracy {best_accuracy:.4f}")
```

```
Best model 'Logistic Regression' saved with accuracy 0.9375
```

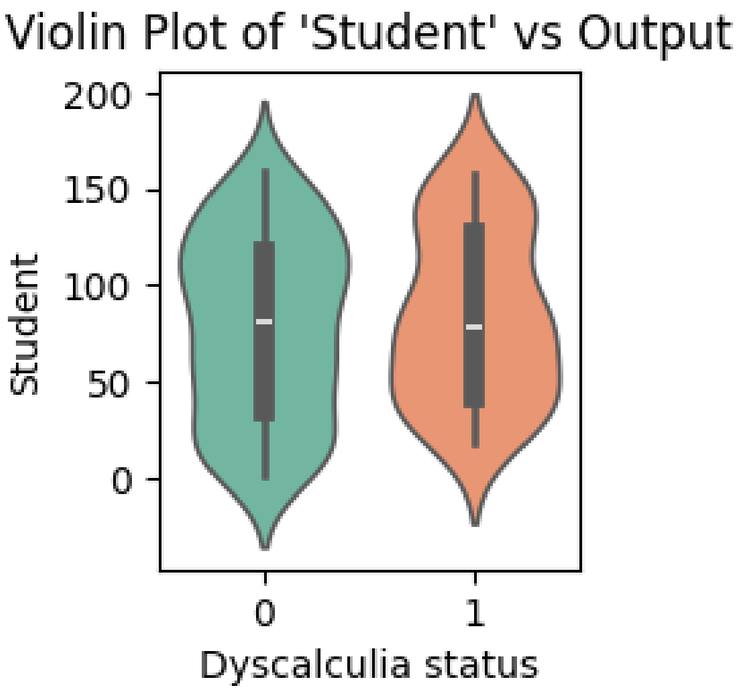
COMPLETION OF THE PROJECT

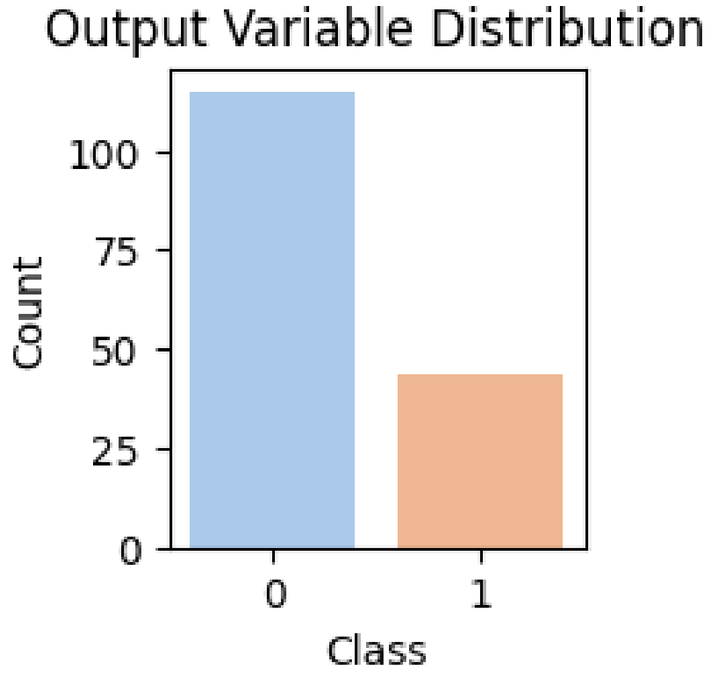






COMPLETION OF THE PROJECT





ACHIEVEMENTS

- Collect the nessasary dataset.
- Prepared the model to identify the Risk level of dyscalculia with high accuracy.
- Create the mobile app

WHAT'S TO BE DONE

- assigns activities based on performance.

- Completing the mobile app.
- Host the app

REFERENCES

1) U. A.N., J. J.A.D.I.S, F. R.R.M., T. G.W.D.N.R., S. Rajapaksha and T. Thilakarathna, "Ganitha Piyasa: Effective Lesson Delivery Method for Graphical Dyscalculia Students," 2023 5th International Conference on Advancements in Computing (ICAC), Colombo, Sri Lanka, 2023, pp. 263-267, doi: 10.1109/ICAC60630.2023.10417645.

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4) B. M et al., "Web based Assessment and Training Model for Dyslexia Dyscalculia Dysgraphia Dyspraxia ADHD & Autism," 2022 4th International Conference on Inventive Research in Computing Applications (ICIRCA), Coimbatore, India, 2022, pp. 1753-1757, doi: 10.1109/ICIRCA54612.2022.9985715.

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Dyslexia Identification and Mitigating the Disability

BACKGROUND & RESEARCH PROBLEM

•Dyslexia is a common learning disability that affects a person's ability to read, write, and spell. Dyslexia affects approximately 5% to 15% of the population It is characterized by difficulties in accurate and/or fluent word recognition, poor spelling, and writing abilities.

•Existing dyslexia assessments are manual and subjective, lacking standardized, automated tools that can efficiently identify dyslexia-related issues in both reading and writing.

•Developing an accurate system that can process and analyze the unique characteristics of dyslexic handwriting, such as inconsistent letter shapes, spacing, and alignment using OCR(Optical Character Recognition) , NLP(Natural language processing) and CNN (Convolutional Neural Networks)

RESEARCH GAP

Application References	Handwriting Analysis	Gamification Learning	Realtime Assistance	Multimodal Integration
Research A	✓	✗	✓	✓
Research B	✗	✓	✗	✓
Research C	✗	✗	✓	✗
Proposed System	✓	✓	✓	✓

Research A

The Hope: An Interactive Mobile Solution to Overcome the Writing, Reading and Speaking Weaknesses of Dyslexia. **[1]**

Research B

Arunalu: Learning Ecosystem to Overcome Sinhala Reading Weakness due to Dyslexia. **[2]**

Research C

Enhancing Dyslexia Awareness: A ML Model for Early Identification and Support. **[3]**

OBJECTIVES

MAIN OBJECTIVE

The primary objective of this research project is to develop an automated system using OCR, convolutional neural network (CNN) and Deep learning techniques to identify writing problems indicative of dyslexia.

SUB OBJECTIVES

- **Data Collection**
  Gather a diverse set of handwritten samples from individuals with and without dyslexia.

- **DL Models**
  Train models to classify handwriting based on these features.

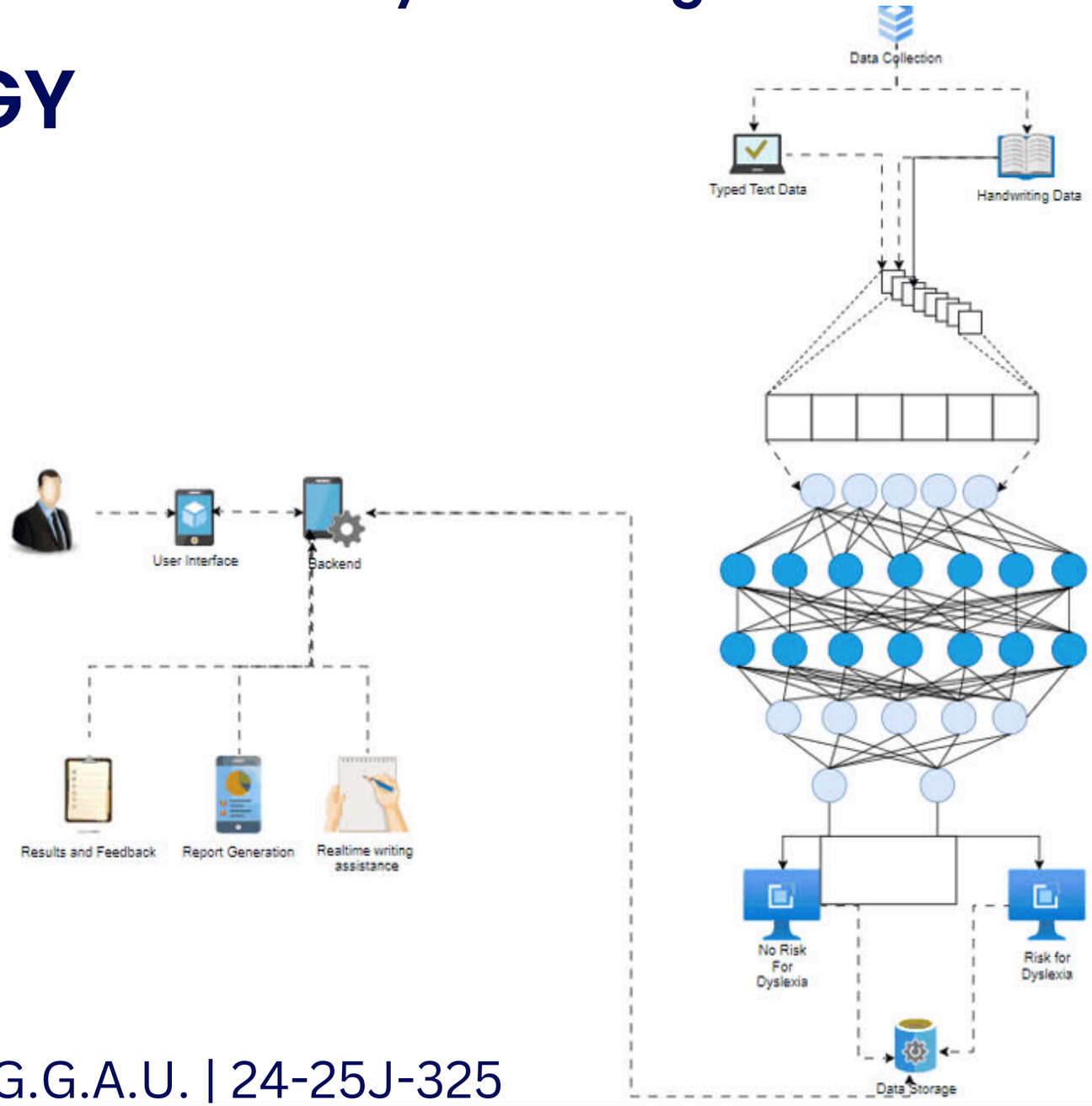
- **OCR Processing:**
  The system accurately converts handwritten text into digital text.

- **NLP Analysis:**
  Use NLP techniques to preprocess and analyze typed text .

- **Real-Time Assistance and Feedback:** provide real-time feedback and detailed analysis reports to users.

METHODOLOGY

System Diagram



ACHIEVEMENTS

- Collecting the necessary dataset
- Completed the Model With Testing and 80% Accuracy for Identifying words are reversed or normal By using Dataset
- Integrated the frontend with mitigation activities

WHAT'S TO BE DONE

- Finishing the DL model of identify the disability by increasing the accuracy and performance.

- Finalize the mobile App

Technical Details

Data Overview

- Dataset Name : NIST Special Database
- From : Seberang Jaya primary school, Penang, Malaysia.
- Size : 78275 for normal class while for reversal is 52196 and for corrected is 8029
- Preprocessing Steps : Resize the images to 128 X 128 pixels

Completion of the Project

model_train.ipynb × StreamApp.py 5

model_train.ipynb > # Evaluate the model on test data

Generate + Code + Markdown | Run All Restart Clear All Outputs | Variables Outline ··· Python 3.11.9

```
model.save('dyslexia_model.h5')
```

[252] ✓ 0.0s Python

```
WARNING:absl:You are saving your model as an HDF5 file via `model.save()` or `keras.saving.save_model(model)`. This file format is considered legacy. We
```

```
# Evaluate the model on test data
test_loss, test_accuracy = model.evaluate(test_dataset)
print(f"Test Accuracy: {test_accuracy * 100:.2f}%")
```

[253] ✓ 3.1s Python

```
35/35 ━━━━━━━━━━━━━━━━━━━━ 3s 88ms/step - accuracy: 0.8735 - loss: 1.9101
Test Accuracy: 77.52%
```

```
import matplotlib.pyplot as plt
import numpy as np
from sklearn.metrics import confusion_matrix, ConfusionMatrixDisplay

# Plot training and validation accuracy
plt.plot(history.history['accuracy'], label='Train Accuracy')
plt.plot(history.history['val_accuracy'], label='Validation Accuracy')
plt.xlabel('Epochs')
plt.ylabel('Accuracy')
plt.title('Training and Validation Accuracy')
plt.legend()
plt.show()
```

[254] ✓ 0.1s Python

Completion of the Project

model_train.ipynb | StreamApp.py 5

model_train.ipynb > import numpy as np

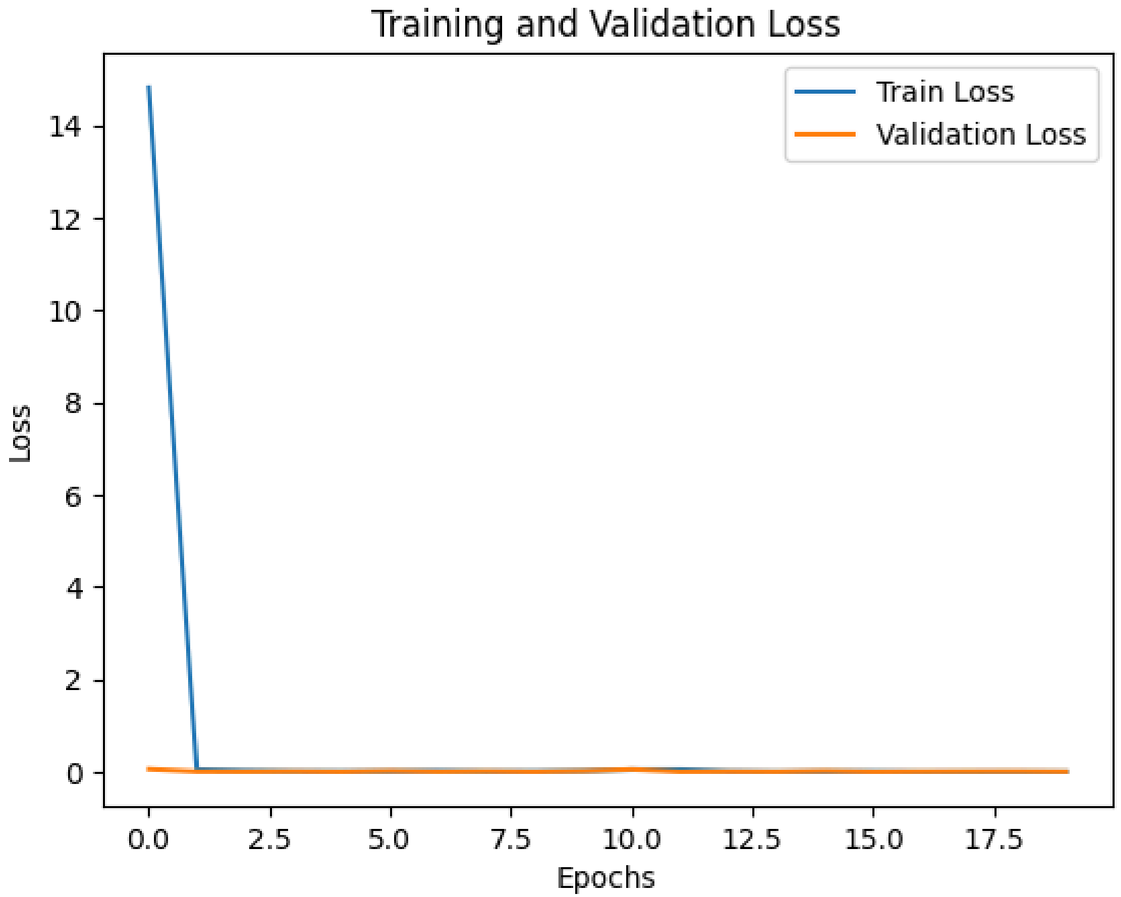
+ Code + Markdown | Run All | Restart | Clear All Outputs | Variables | Outline ... | Python 3.11.9

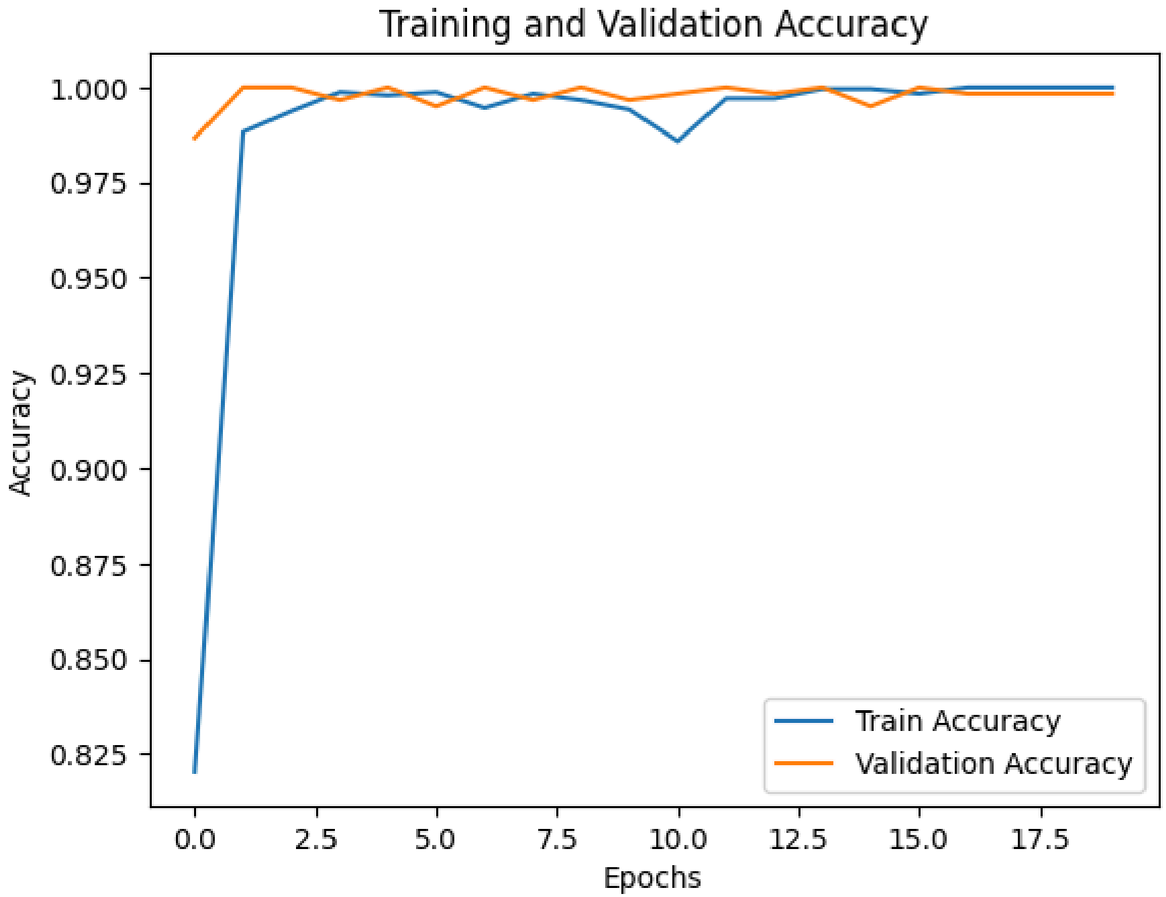
```
# Train the model
EPOCHS = 10

history = model.fit(
    train_dataset,
    validation_data=val_dataset,
    epochs=EPOCHS
)
```

[13] ✓ 1m 33.2s Python

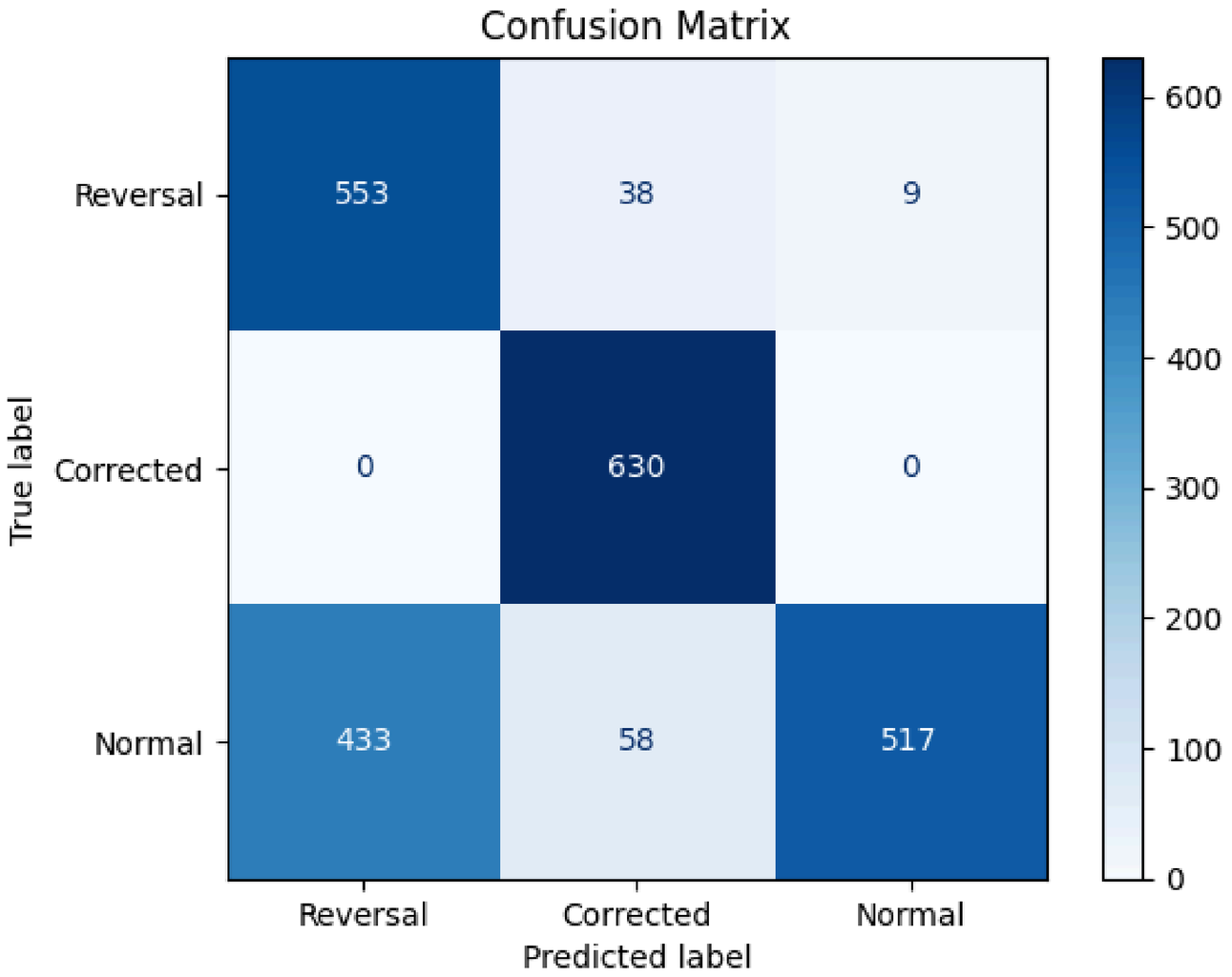
```
Epoch 1/10
25/25 ━━━━━━━━━━━━━━━━━━━━ 10s 334ms/step - accuracy: 0.6436 - loss: 43.8115 - val_accuracy: 0.9849 - val_loss: 0.0408
Epoch 2/10
25/25 ━━━━━━━━━━━━━━━━━━━━ 10s 407ms/step - accuracy: 0.9763 - loss: 0.0755 - val_accuracy: 0.9899 - val_loss: 0.0213
Epoch 3/10
25/25 ━━━━━━━━━━━━━━━━━━━━ 9s 342ms/step - accuracy: 0.9912 - loss: 0.0235 - val_accuracy: 0.9975 - val_loss: 0.0067
Epoch 4/10
25/25 ━━━━━━━━━━━━━━━━━━━━ 9s 338ms/step - accuracy: 0.9965 - loss: 0.0139 - val_accuracy: 1.0000 - val_loss: 0.0030
Epoch 5/10
25/25 ━━━━━━━━━━━━━━━━━━━━ 9s 347ms/step - accuracy: 0.9978 - loss: 0.0076 - val_accuracy: 0.9975 - val_loss: 0.0035
Epoch 6/10
25/25 ━━━━━━━━━━━━━━━━━━━━ 9s 362ms/step - accuracy: 0.9935 - loss: 0.0193 - val_accuracy: 0.9975 - val_loss: 0.0044
Epoch 7/10
25/25 ━━━━━━━━━━━━━━━━━━━━ 9s 352ms/step - accuracy: 0.9989 - loss: 0.0041 - val_accuracy: 0.9975 - val_loss: 0.0042
Epoch 8/10
25/25 ━━━━━━━━━━━━━━━━━━━━ 11s 422ms/step - accuracy: 0.9992 - loss: 0.0019 - val_accuracy: 1.0000 - val_loss: 0.0020
Epoch 9/10
25/25 ━━━━━━━━━━━━━━━━━━━━ 10s 404ms/step - accuracy: 1.0000 - loss: 3.2491e-04 - val_accuracy: 1.0000 - val_loss: 7.4516e-04
Epoch 10/10
25/25 ━━━━━━━━━━━━━━━━━━━━ 9s 354ms/step - accuracy: 1.0000 - loss: 2.8203e-04 - val_accuracy: 1.0000 - val_loss: 0.0011
```

Visual Demostrations

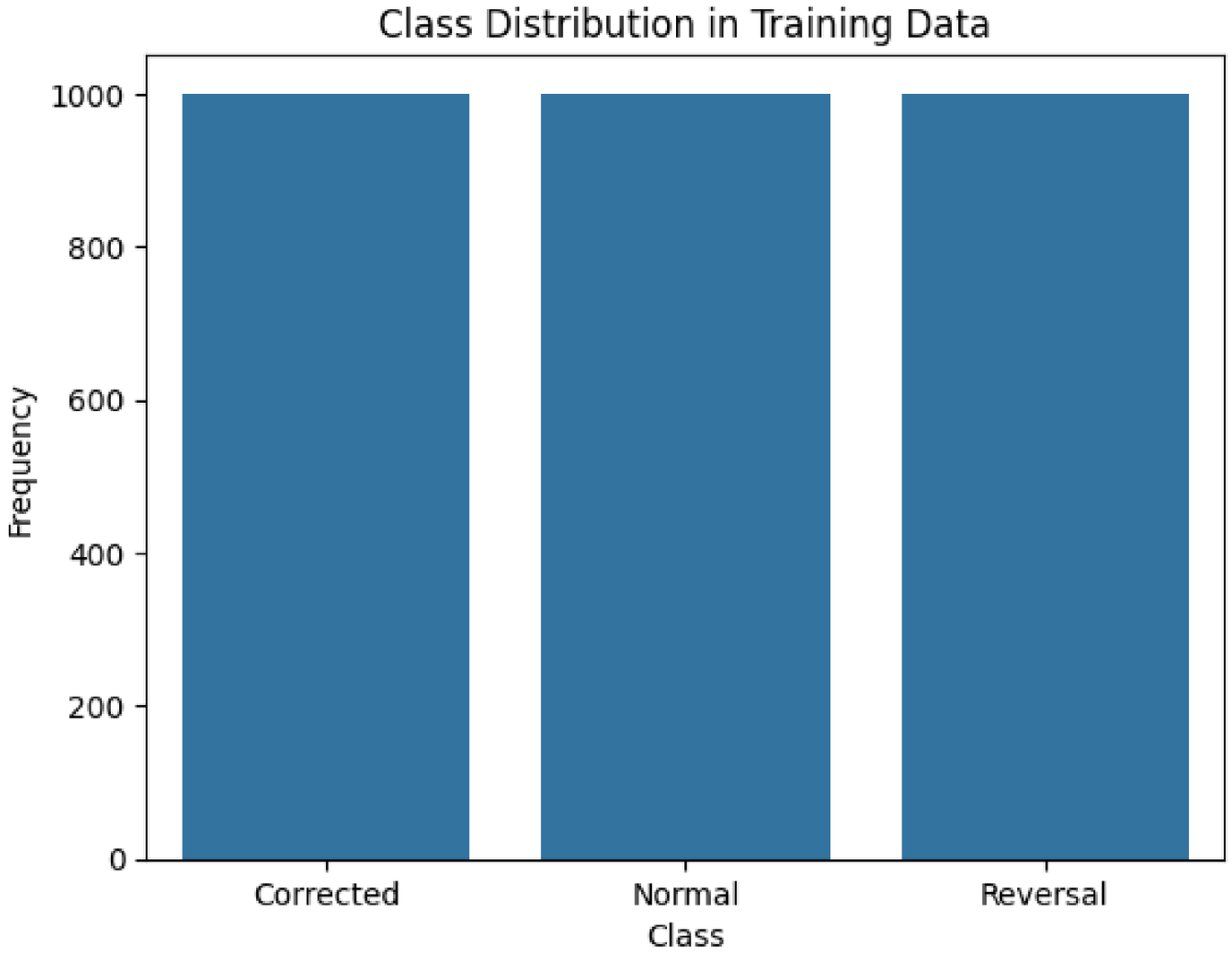




Visual Demostrations



Visual Demostrations



Challenges Encountered

- Data quality issues
- Data availability issues
- Performance issues
- False positive detection

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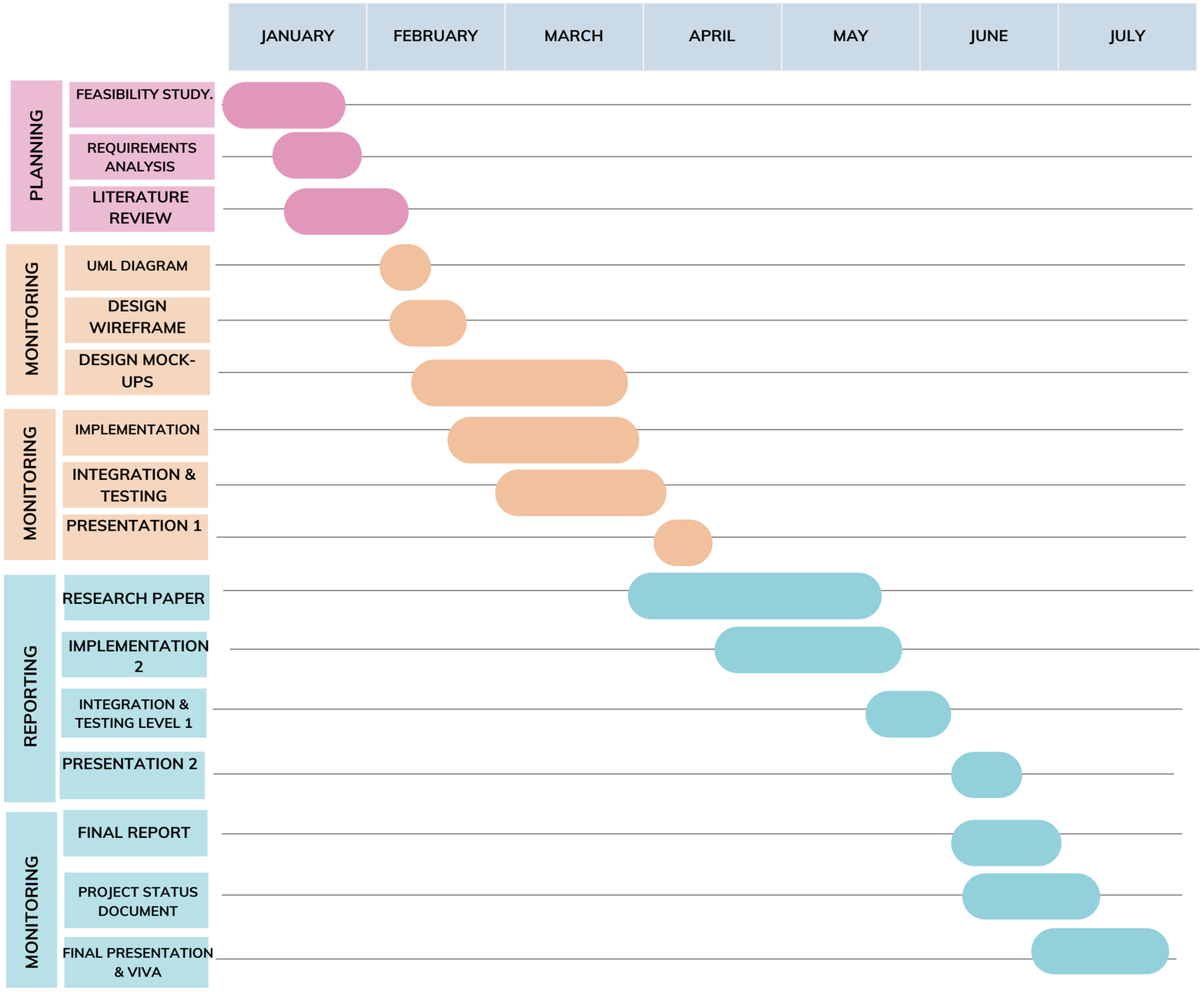

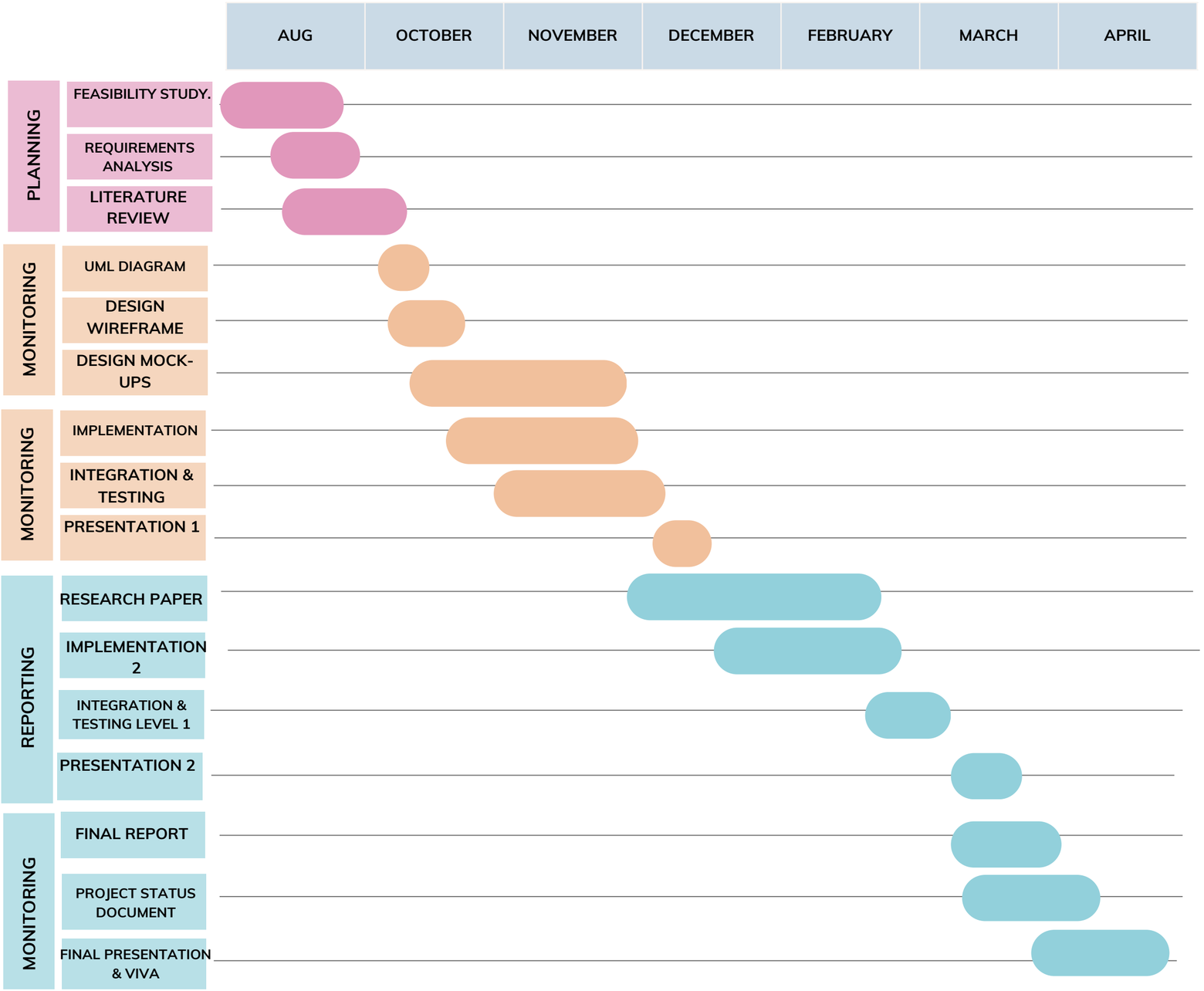
AUG
OCTOBER
NOVEMBER
DECEMBER
FEBRUARY
MARCH
APRIL
PLANNING
FEASIBILITY STUDY.
REQUIREMENTS ANALYSIS
LITERATURE REVIEW
MONITORING
UML DIAGRAM
DESIGN WIREFRAME
DESIGN MOCK-UPS
MONITORING
IMPLEMENTATION
INTEGRATION & TESTING
PRESENTATION 1
REPORTING
RESEARCH PAPER
IMPLEMENTATION 2
INTEGRATION & TESTING LEVEL 1
PRESENTATION 2
MONITORING
FINAL REPORT
PROJECT STATUS DOCUMENT
FINAL PRESENTATION & VIVA

COMMERCIALIZATION

Target Audience

- PRIMARY SCHOOL STUDENTS
- PARENTS AND GUARDIANS
- PRIMARY SCHOOL TEACHERS
- EDUCATORS

BUDGET

REQUIREMENT	COST(LKR)
COST OF DEPLOYMENT	4000/-
TESTING AND QA	1 500/-
TRAVELLING COST	3 000/-
COMMERCIALIZATION	7 500/-
OTHER	4 000/-(ANNUAL)
TOTAL COST	16 000/-

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THANK YOU

FOR YOUR ATTENTION

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