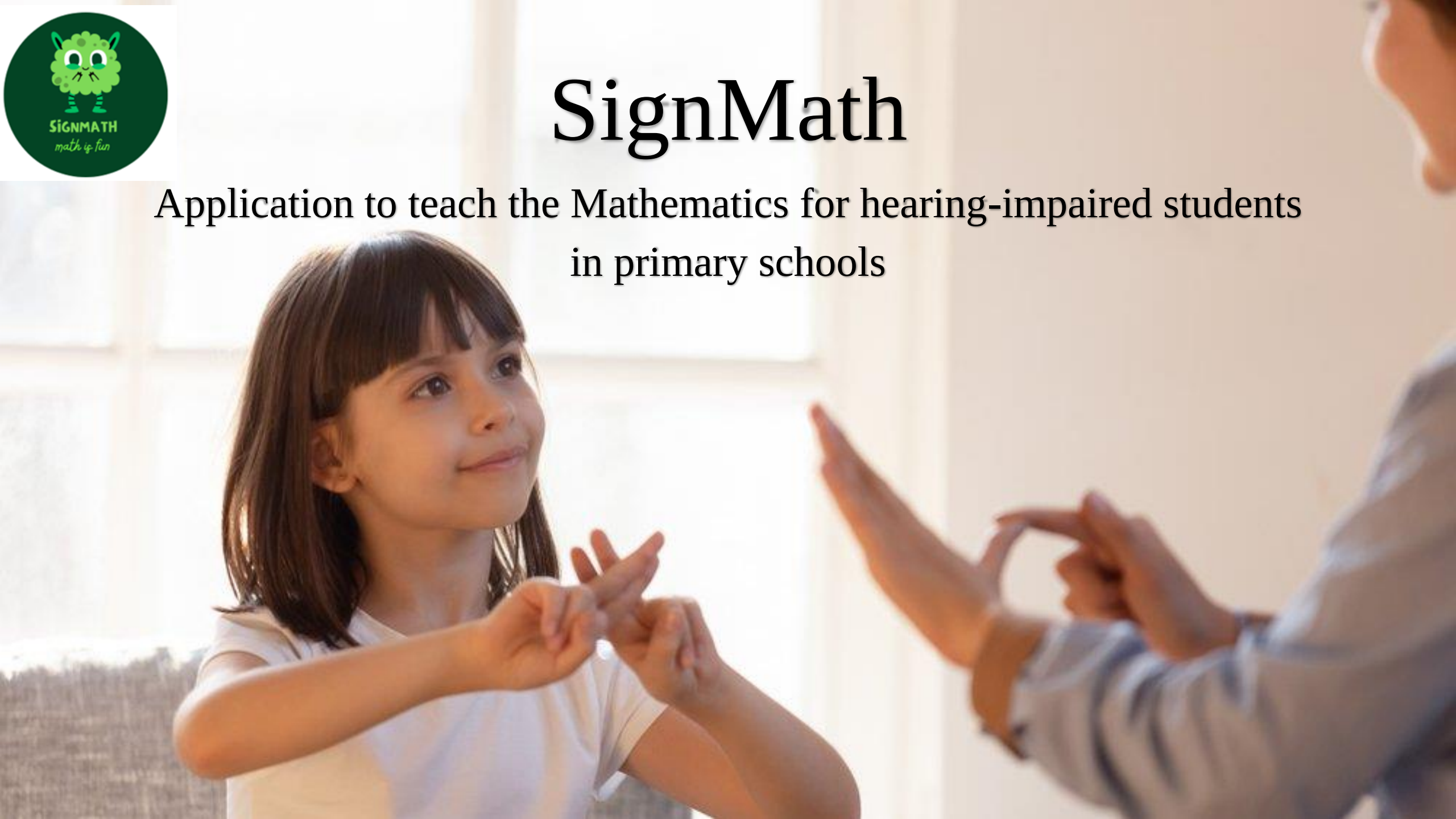


SignMath

Application to teach the Mathematics for hearing-impaired students in primary schools

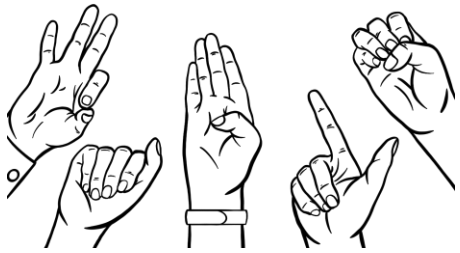
Team Members

- Supervisor:
- Co Supervisor:

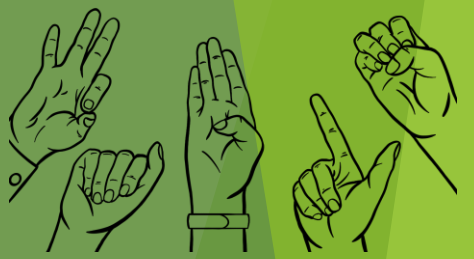
Student Name	Student Id
D.M.S.M.Dissanayaka	IT20145552
H.K.D.P.P.Weerarathne	IT19203072

Outline

- Introduction
- Background
- Research Problem
- High Overview Diagram
- Commercialization
- Budget
- Risk Mitigation
- Mobile App vs Web Application

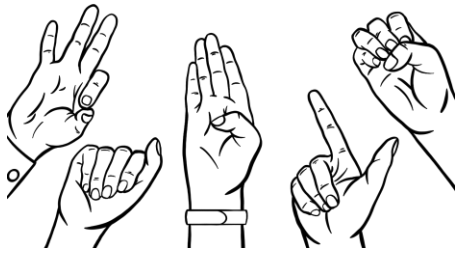


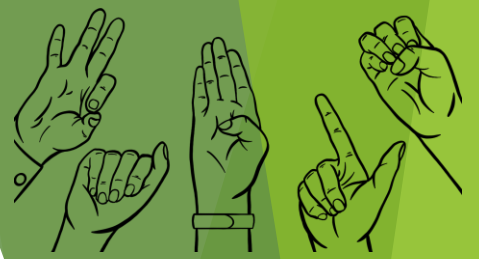
INTRODUCTION



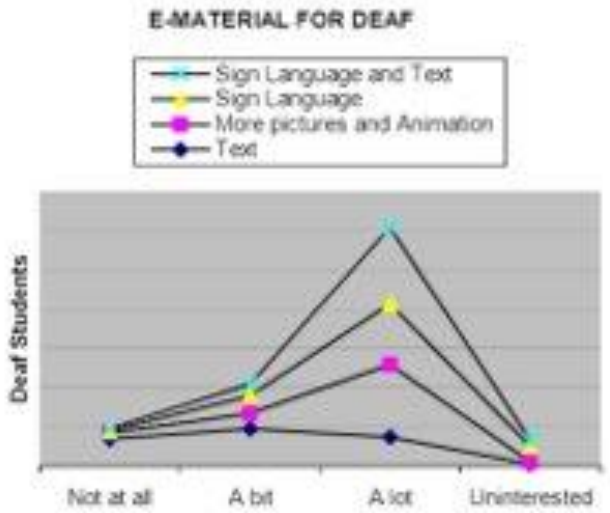
What is SignMath ?

- Mathematics education for deaf children in Sri Lanka faces significant challenges due to language barriers and limited literacy.
- The majority of deaf children rely on sign language for communication, making it difficult for them to connect written words and signs with Sinhala language.
- These challenges need to be addressed in primary education to provide equal opportunities for deaf children in mathematics learning.

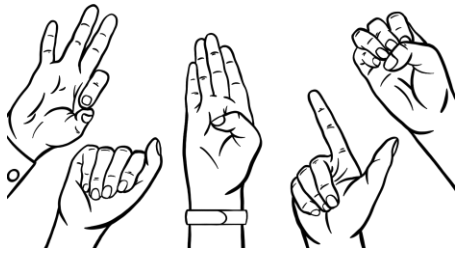




RESEARCH PROBLEM



- There were 1.2% deaf students (Age1-14), approximately 5,390 registered deaf students in Sri Lanka as of the end of 2019
- 1/3 of sign language students tend to drop out of school during secondary education because they cannot pass main subjects like mathematics .
- The lack of understanding of the basic of Mathematical concepts
- Inability to express their knowledge and Emotions in the natural languages, especially in Sinhala.
- Teachers may not have the necessary training or resources to support deaf children in their mathematical education.



RESEARCH OBJECTIVE

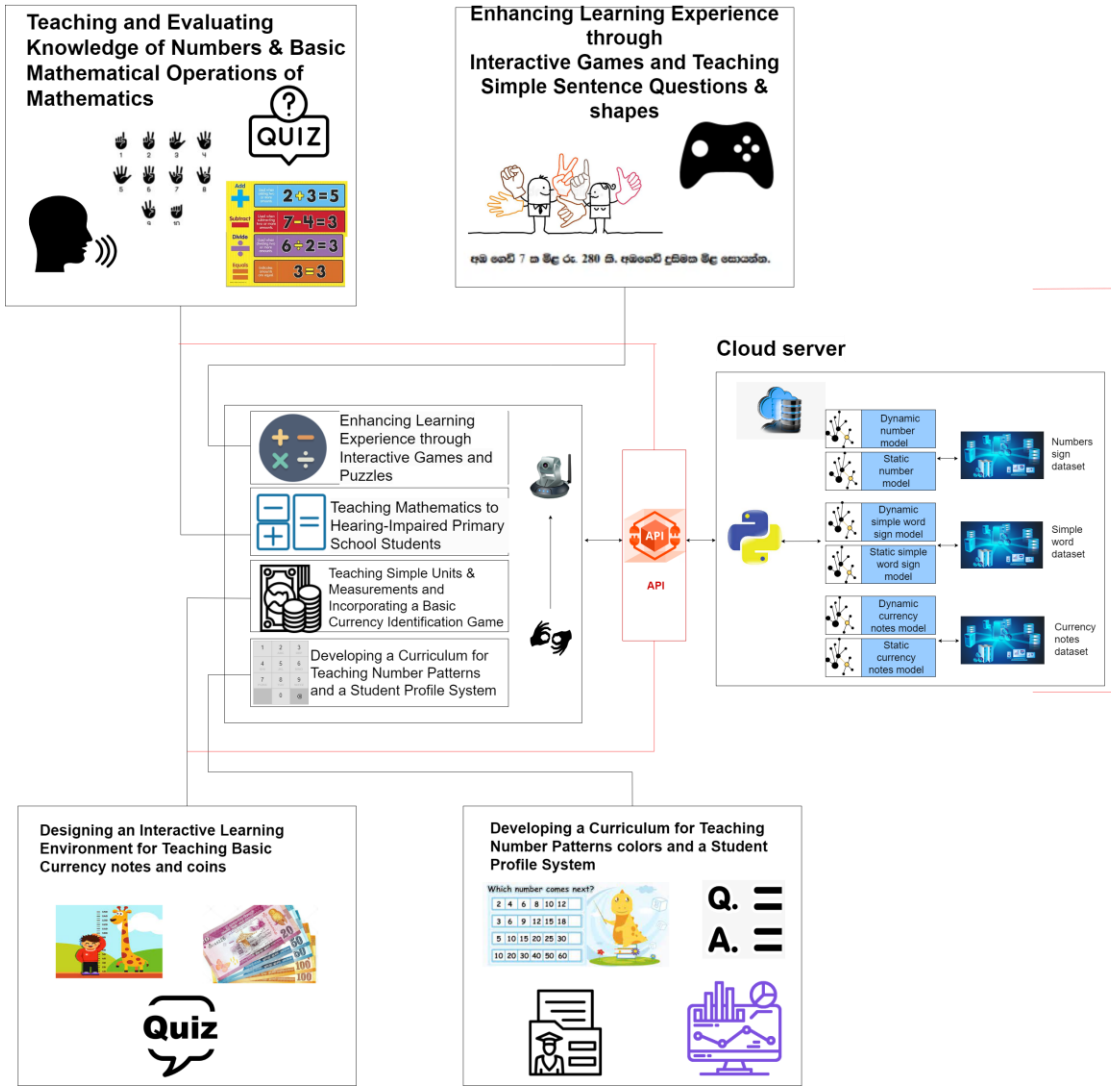
Main Objective

Create a **Web Application to teach Mathematical Concepts to hearing-impaired students in primary schools** who are doing their studies using sign language.

Components

- Teaching and Evaluating Numbers & Basic Mathematical Operations of Mathematics
- Design Environment to Teaching Simple Sentence Questions and Shapes
- Developing a Curriculum for Teaching Number Patterns, Colors and Evaluate Their Progress and Implementing a Student Profile System
- Designing an Interactive Learning Environment for Teaching Basic Currency Notes and Coins

High Overview Diagram

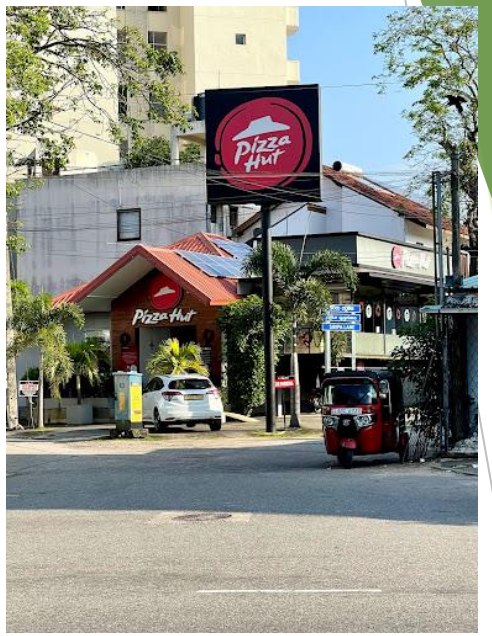


Data Collecting

- The School for the deaf (Rathmalana)
- Pizza Hut New Branch (Thimbirigasyaya)
- National Institute of Education (NIE - Maharagama)

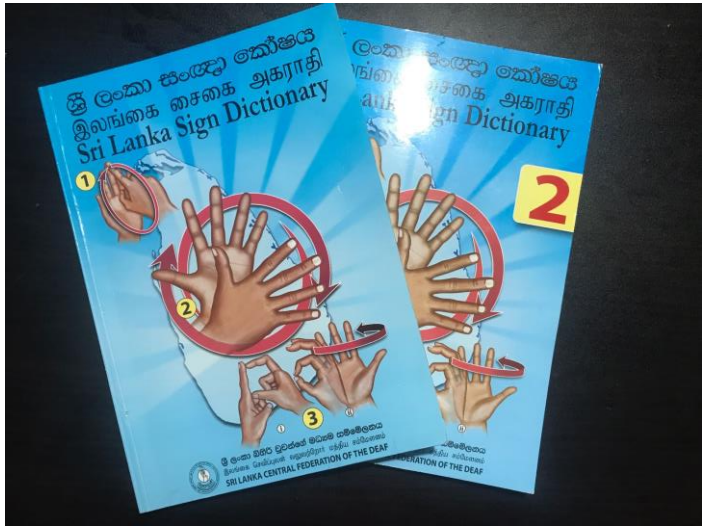
The School for the deaf (Ratmalana)

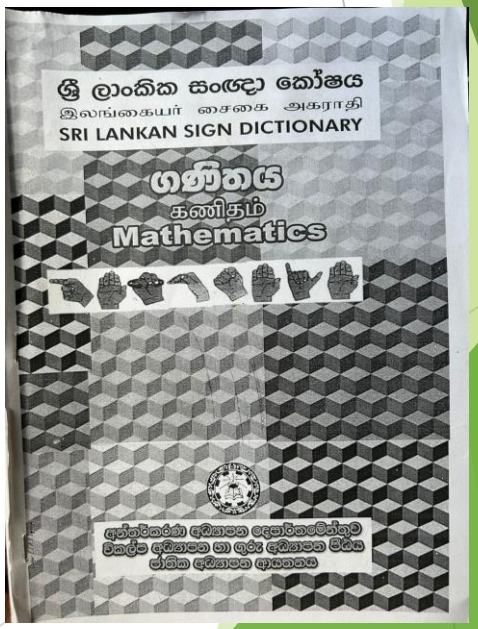
Pizza Hut New Branch (Thimbirigasyaya)

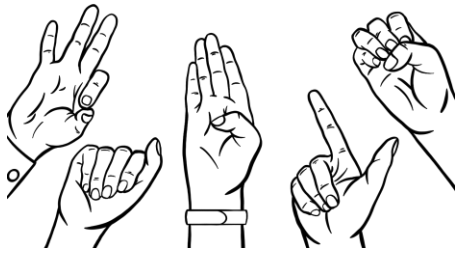


National Institute of Education (NIE – Maharagama)

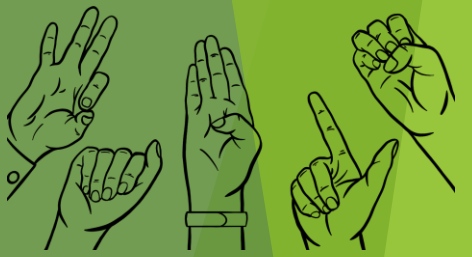
- Diploma in Sign Language -
National Institute of Education, Maharagama.



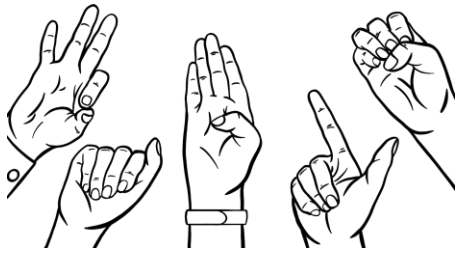




COMMERCIALIZATION

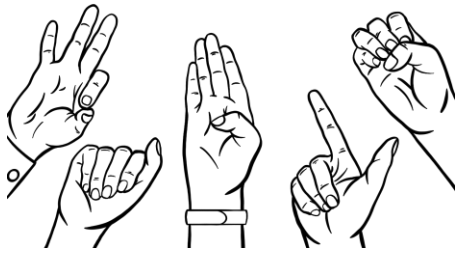


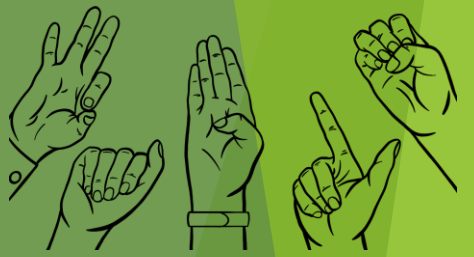
- For National Institute of Education – Rs. 2000 per month (Training Teachers)
- Registration Fee– Rs.1000
- Child schools Free Subscription (Only Registration Fee)– No Charge
- For Deaf Training Center – Rs. 3000 per month



Budget

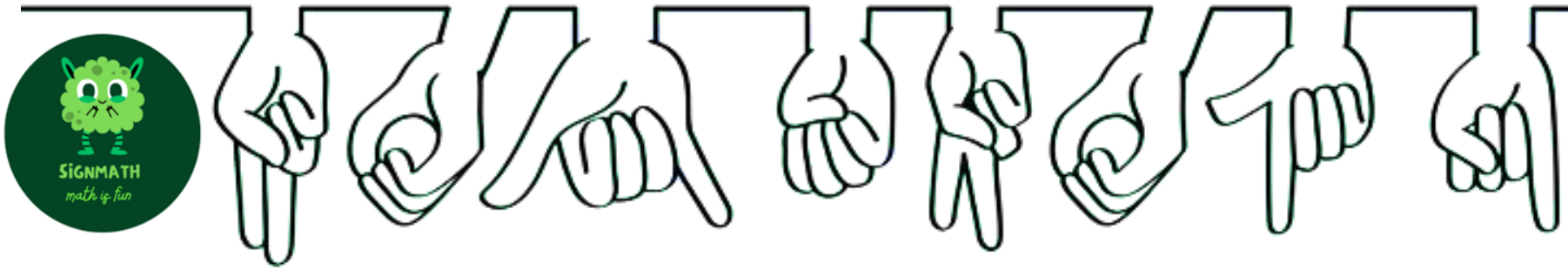
RESOURCES	PRICE
Domain & Server Cost	12,000
Traveling cost	4,000
Internet	3,000
Documentation & Printing Cost	3,000
Resources Books	1,200
Stationary	1,000
Total	**24,200**





RISK MITIGATION

Risk	Solution
No proper datasets available in websites(Sinhala)	Create dataset manually
Some sign models has less record of amounts	Remove those sign models
Algorithms sometimes failed to identify demonstration	Improve the size of dataset
Background issues	Keep the empty backgrounds



IT20145552| D.M.S.M.Dissanayaka

BSc(Hons)Information Technology Specializing in Information Technology

Designing a Novel Interactive Learning Environment for Enhancing Learning Experience through Shapes Comprehension

Introduction

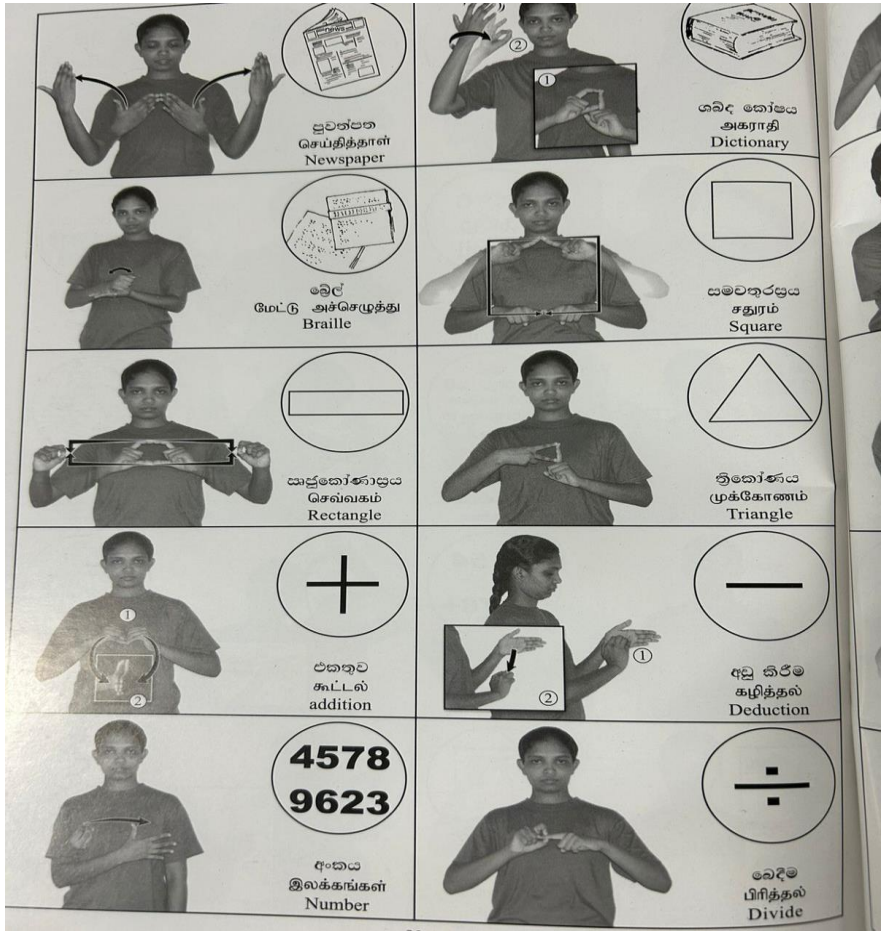
- Majority of Sri Lankan's mother language is **Sinhala** and most of Sri Lankan kids struggles with understanding of combination of signs.
- Teaching shapes to Deaf and Mute Students is challenging due to the lack of interaction and inclusive learning tools. This research focuses on designing a novel e-learning environment that combines

  Sign Language,

  Visual Aids to enhance shape comprehension.
- The aim is to create an attractive **Sinhala usage platform** that will help these students in more effective and independent learning shapes.

Background

- The two types of signs in teaching shapes for deaf and mute students are:
  - Static Signs
  - Dynamic Signs



Research Problem

- **Problem:**
  - How can an active learning environment be created through Sinhala Flatform (Sinhala Language) to improve shape comprehension for deaf and dumb students through sign language, visual aids and interactive features???
- **Answer:**
  - To address this problem, an innovative learning platform will be developed that integrates:
    1. Sign Language Integration
    2. Visual and Interactive Features
    3. Personalized Learning
    4. Continuous Practice Tools

Objectives

Main Objectives

Implement a system that Enhancing Learning Experience through Assessment and Design Environment to Teaching Simple Sentence mathematics And simple Shapes.

Create lesson plans and Teaching signs of simple Sentences math's.

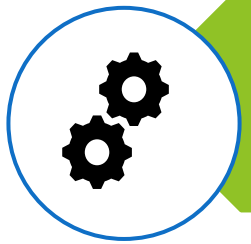
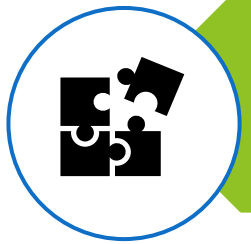


Image Pre-Processing and training the model, Creating a Dataset



Training the model and Generating quizzes

Checking students' physical demonstrations and answer evolution

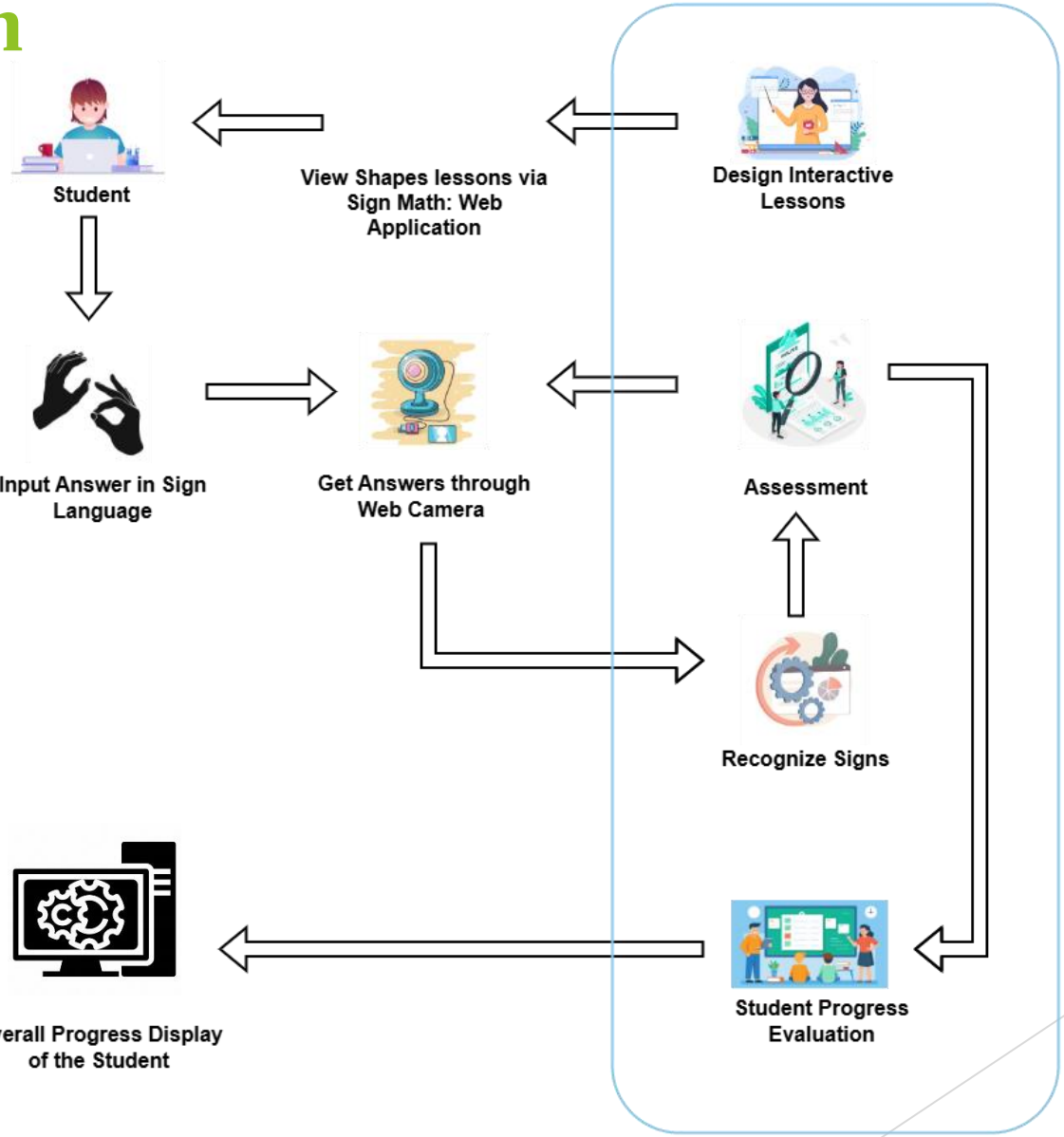
Research Gap

- In existing system,
  - No Sinhala sentences mathematics Teaching Facility only ASL
  - User cannot create sign photos (limited)
  - No Realtime Automated Quizzes and Assessment
  - Specially Not Designed for Children

Research Gap

System Features	Math Signs Game	ASL Kids	MathSigner	DragonBox	SignSchool	Proposed Solution
Interactive learning platform Sinhala as sentences	✗	✗	✗	✗	✗	✓
Sign language Integration	✗	✗	✗	✗	✗	✓
Include compress method	✗	✗	✗	✗	✓	✓
Real time image capturing and give feedback	✗	✗	✓	✓	✗	✓
Assessment and generate report	✗	✓	✗	✗	✗	✓

System Diagram



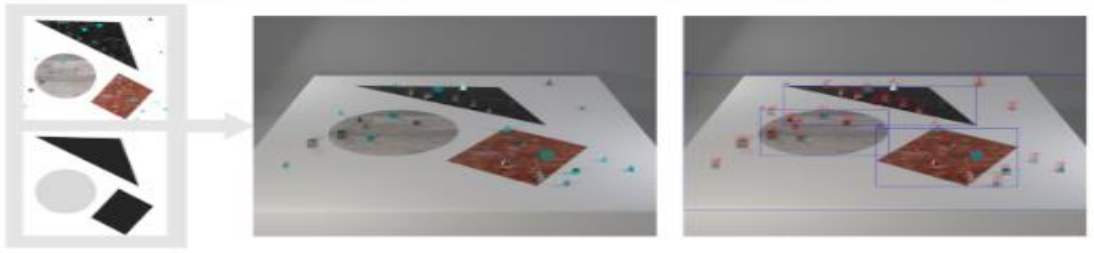
SUB-OBJECTIVIES COMPLETED

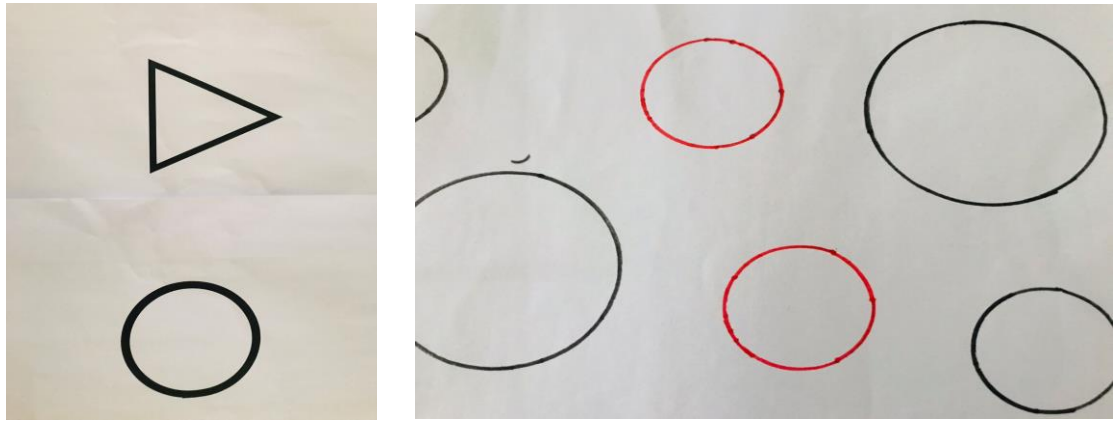
Image Pre-Processing and Training The Model

IT20145552 | D.M.S.M.Dissanayaka | 24-25J-338

Dataset

- Created a dataset with,
  - Different backgrounds
  - Slight variations in the shapes
  - Close to 100 hundred images for one shape





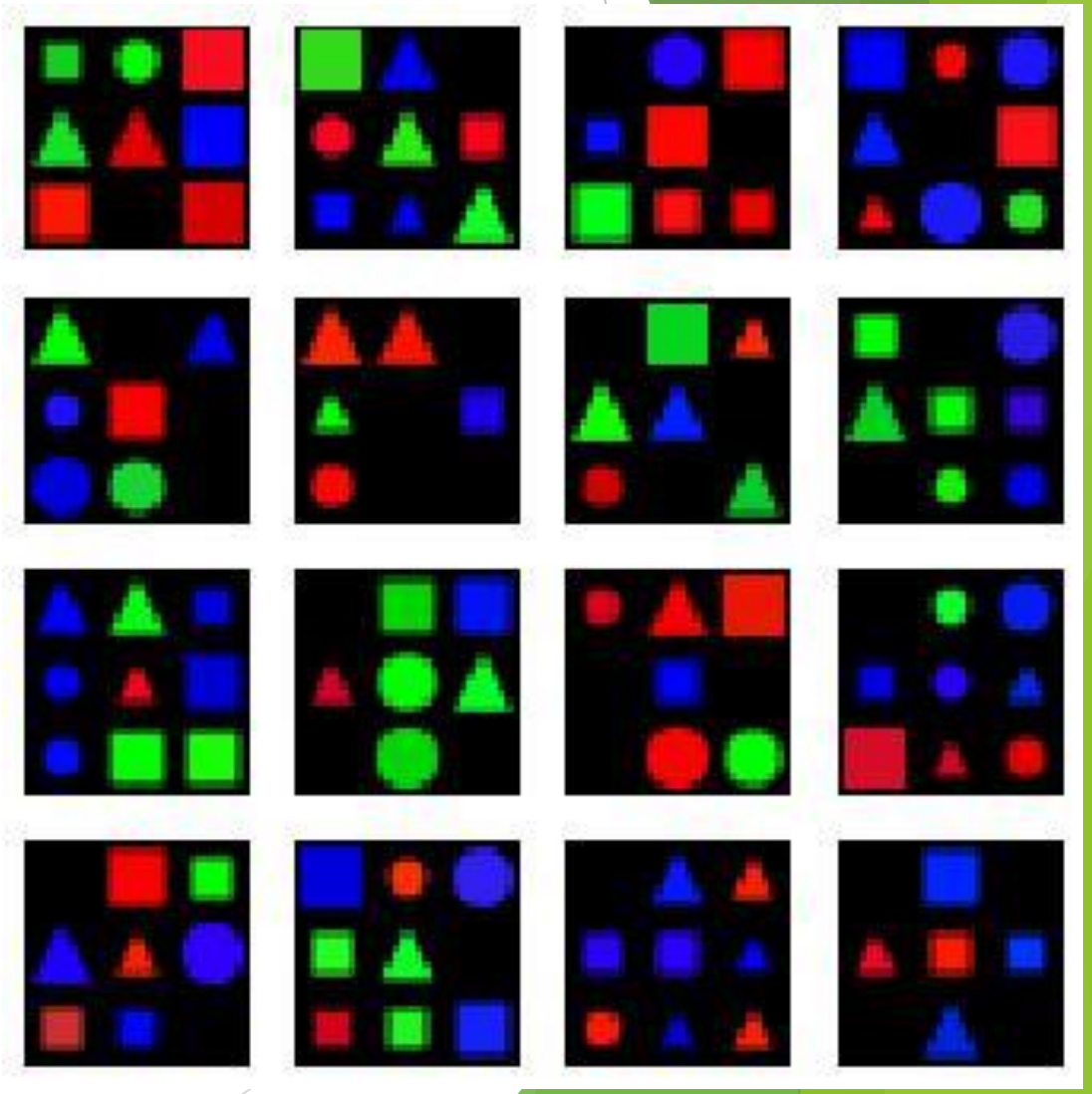


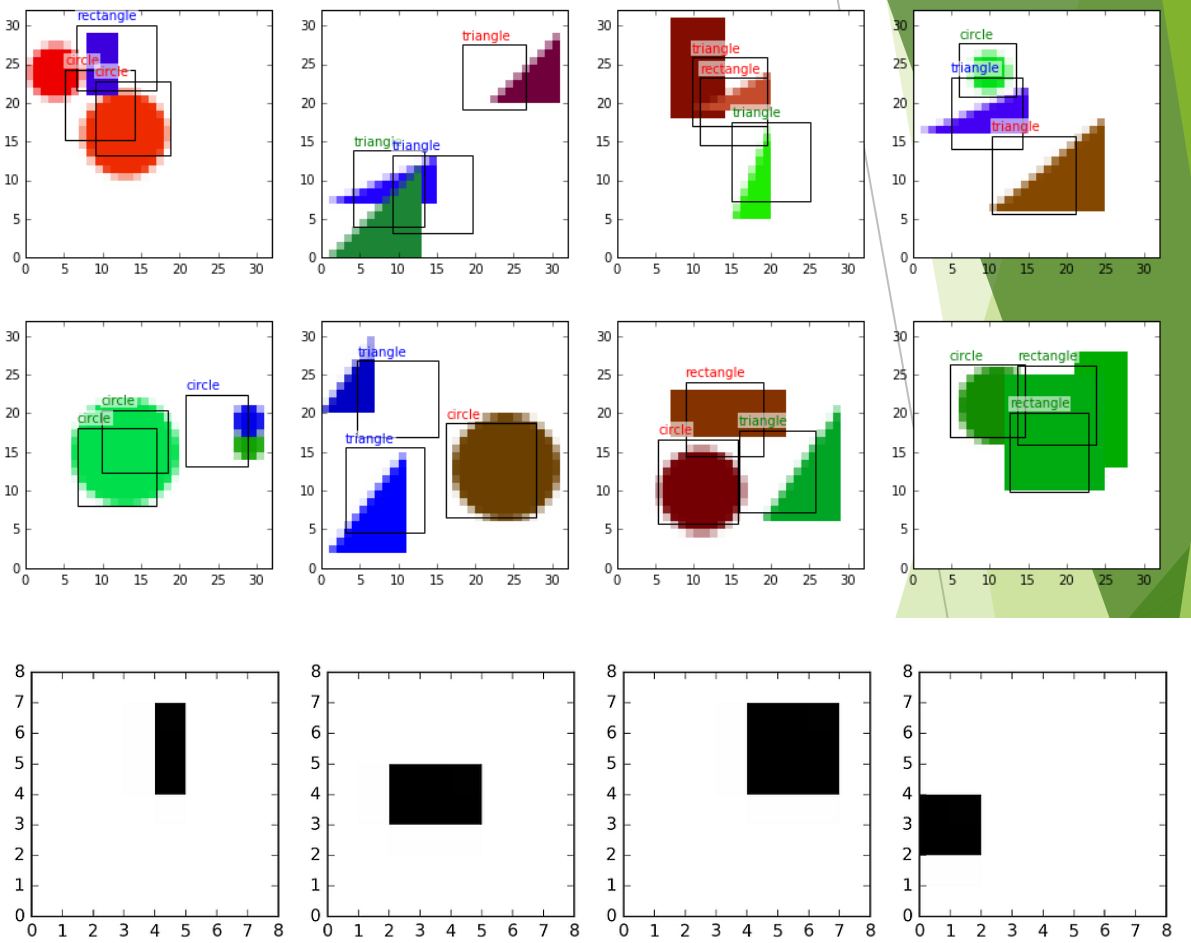
Image Pre-Processing

without pre-processing

High fluctuation precision-recall graphs
Less Map value
Hight train and validation loss
Without Gray scale

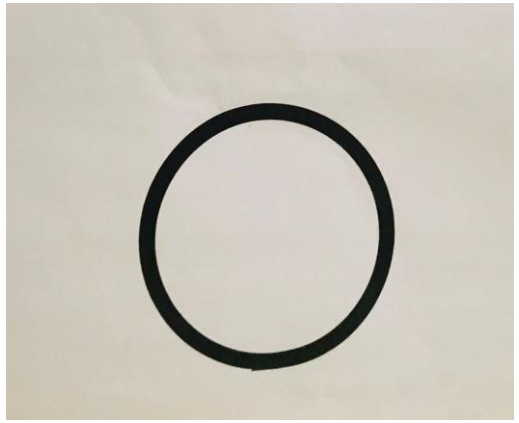
with pre-processing

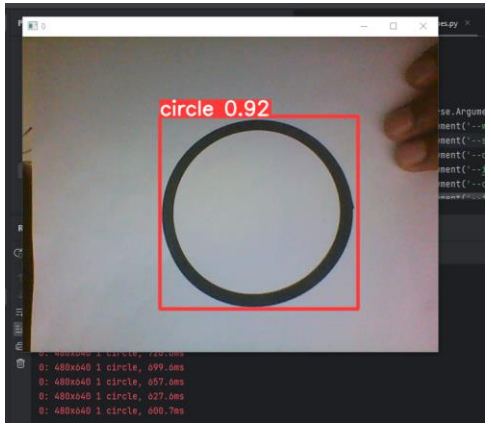
Less fluctuation precision-recall graphs
High Map value
Less train and validation loss
With Gray scale

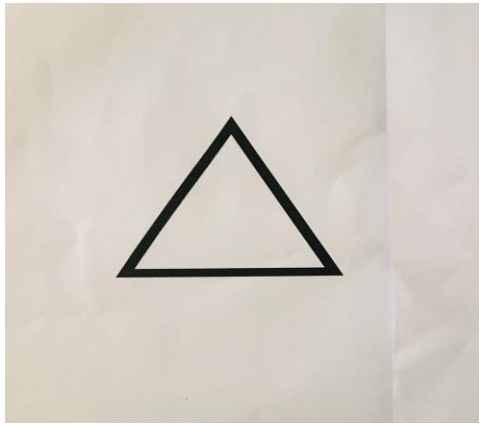


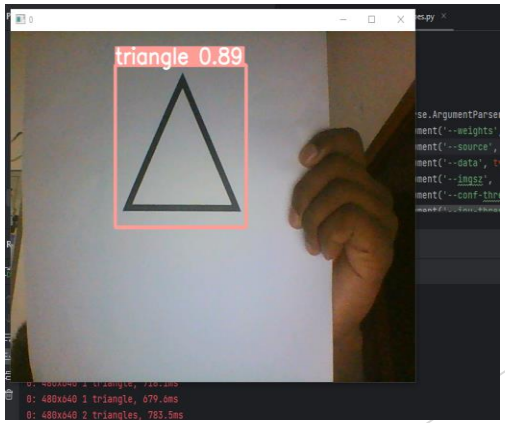
IT20145552 | D.M.S.M.Dissanayaka | 24-25J-338

Image Pre-Processing



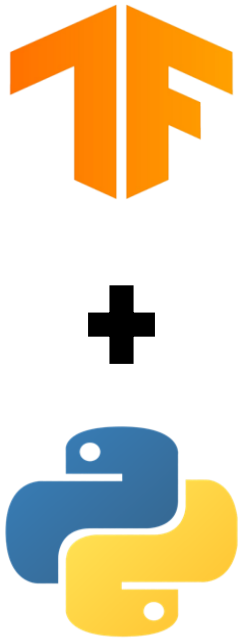






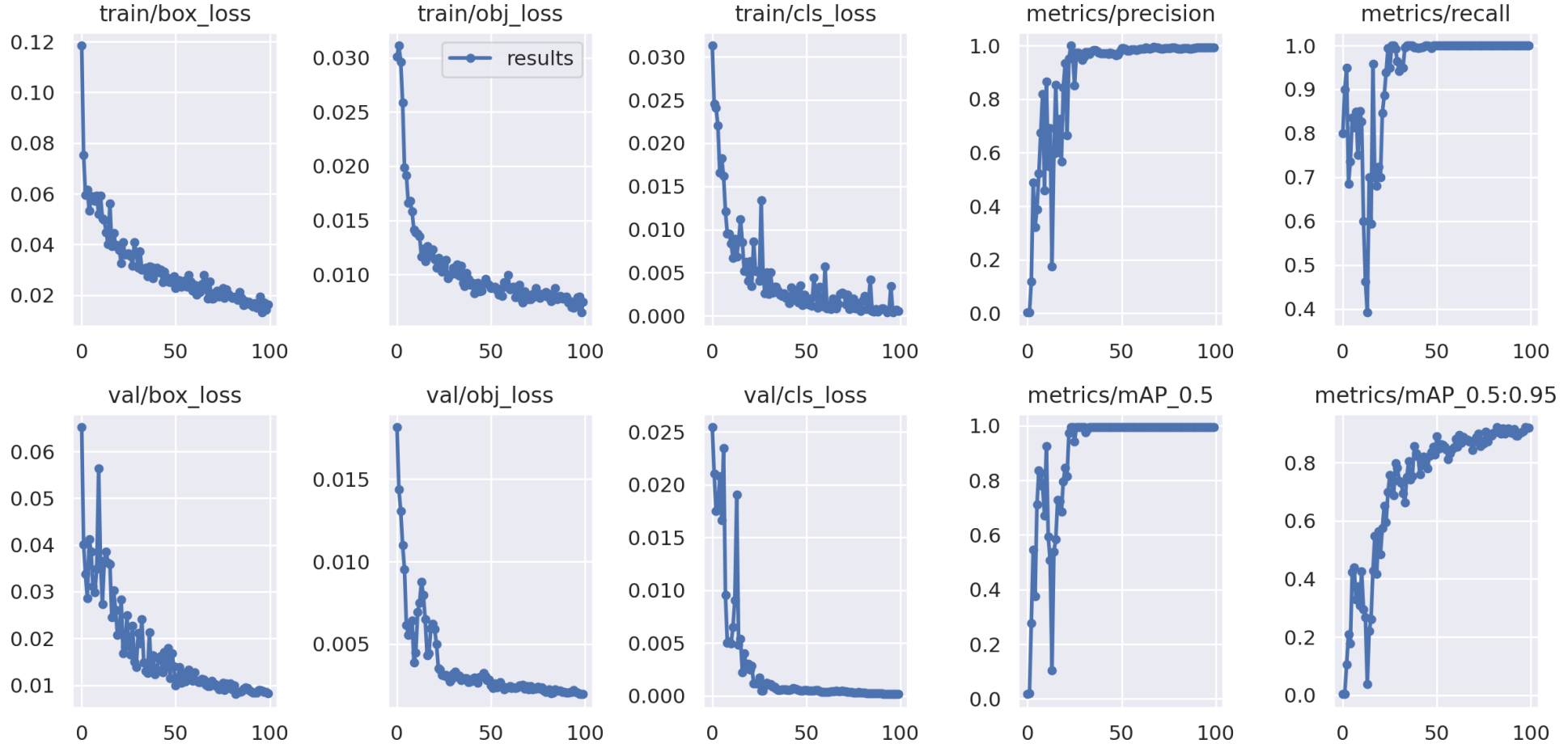
Training the Model

- Model trained using Google Colab online tool

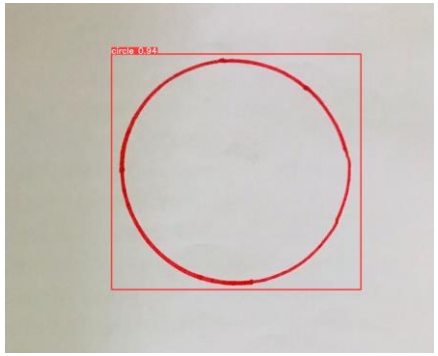


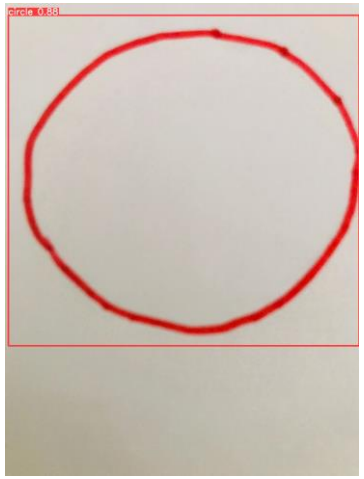
```
100 epochs completed in 0.096 hours.
Optimizer stripped from runs/train/exp/weights/last.pt, 14.4MB
Optimizer stripped from runs/train/exp/weights/best.pt, 14.4MB

Validating runs/train/exp/weights/best.pt...
Fusing layers...
Model summary: 157 layers, 7015519 parameters, 0 gradients, 15.8 GFLOPs
                 Class     Images  Instances          P          R      mAP50   mAP50-95: 100% 1/1
                   all         20         20      0.988          1      0.995      0.922
                circle         20         10      0.981          1      0.995       0.96
              triangle         20         10      0.995          1      0.995      0.885
Results saved to runs/train/exp
```

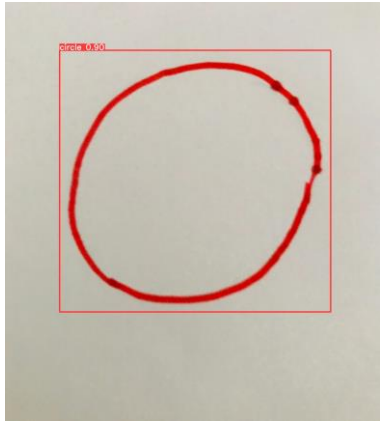
Training the Model

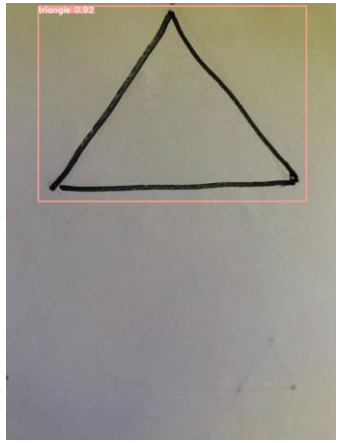


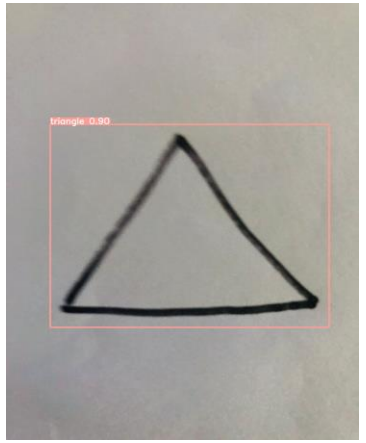
Accuracy Check





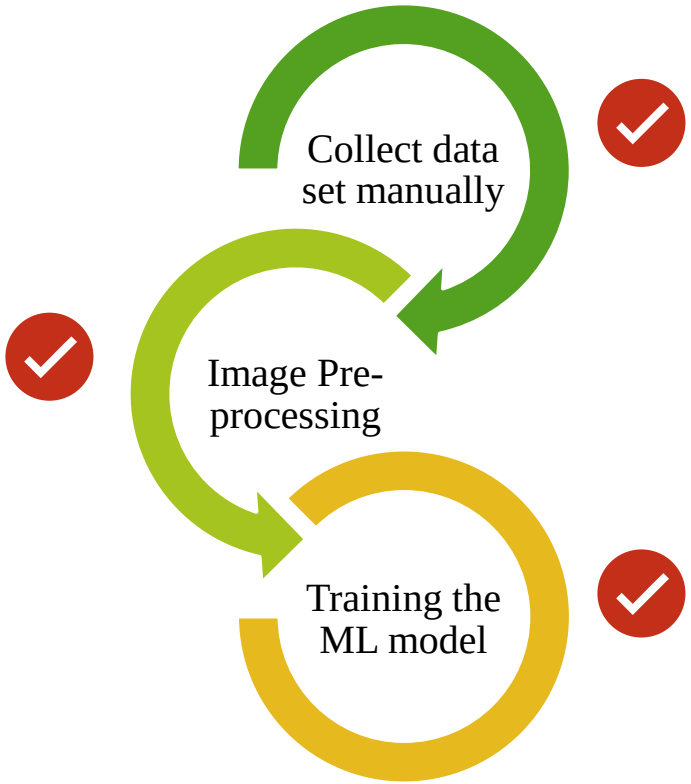




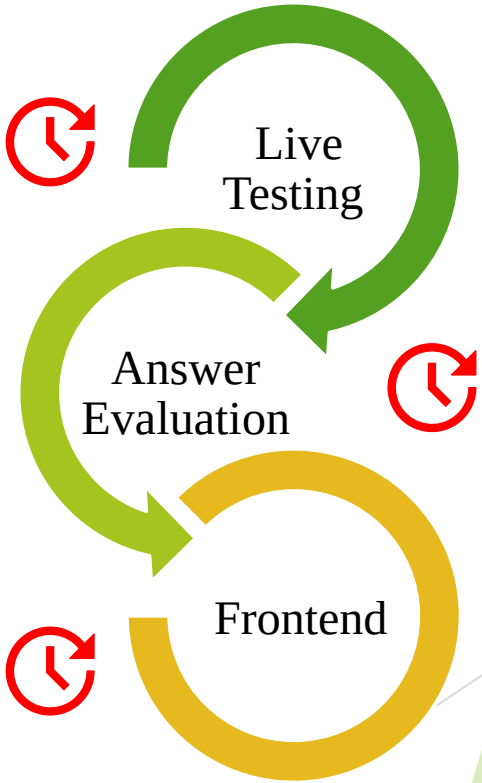


Completion and Future Works

Completed Implementations

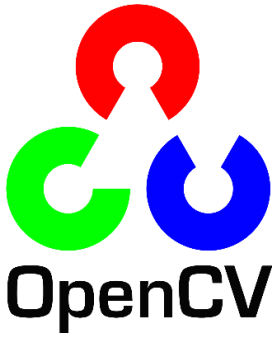


Future Implementations



Used Technologies

- Keras (implement neural networks)
- React (Frontend)
- Firebase (Database)
- Google Colab (Training the model)
- Python(model)
- REST API
- Python flask (creating rest API)
- Open CV(image processing)
- Tensor Flow



Requirements

FUNCTIONAL REQUIREMENTS

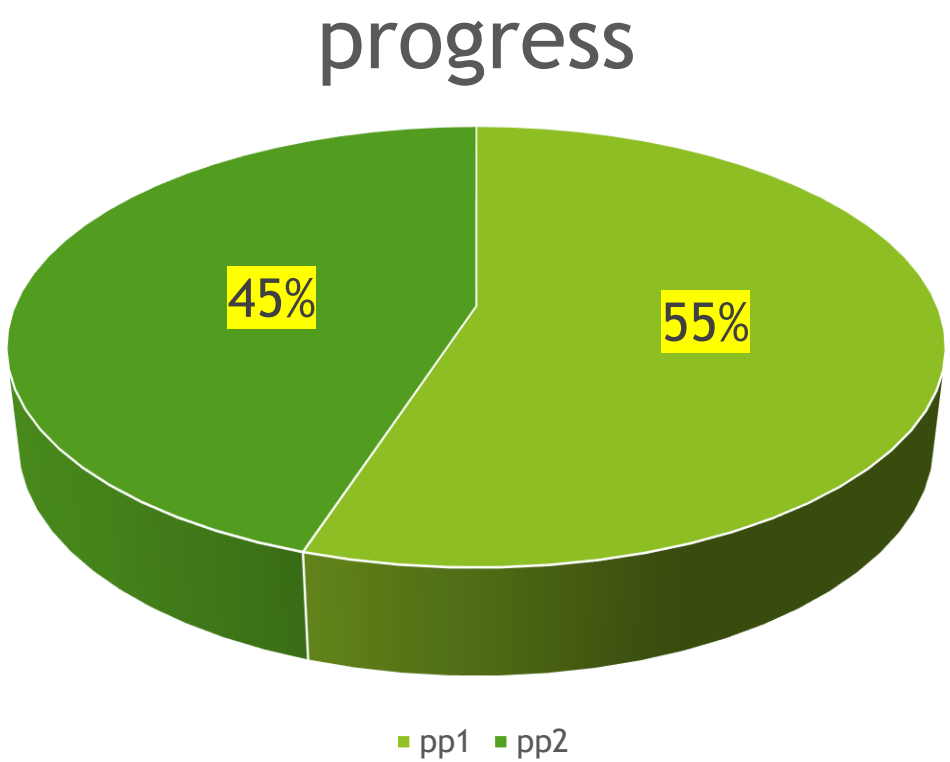
- ✓ Sign Language Integration
- ✓ Word Identifying Quizzes
- ✓ Answer Evaluation & score

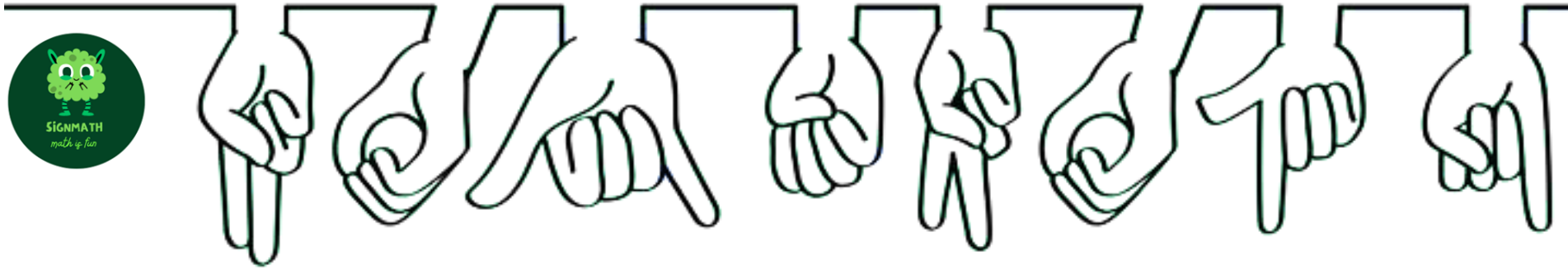
NON-FUNCTIONAL REQUIREMENTS

- ✓ Usability
- ✓ Reliability
- ✓ Portability
- ✓ Speed

USER REQUIREMENTS

- ✓ Laptop
- ✓ Internet Connection
- ✓ Front Camera


progress
45%
55%
pp1
pp2



IT19203072 | H.K.D.P.P.Weerarathne

BSc(Hons)Information Technology Specializing in Information Technology

Designing a Novel Interactive Learning Environment for Teaching and Evaluating Numbers & Basic Mathematical Operations of Mathematic

Introduction

Design an interactive learning environment for teaching Sinhala Alphabet and vowel signs

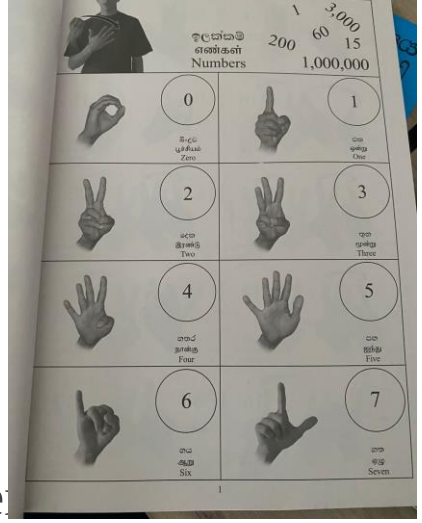
- Background
- Research Problem
- Main Objectives and Sub Objectives

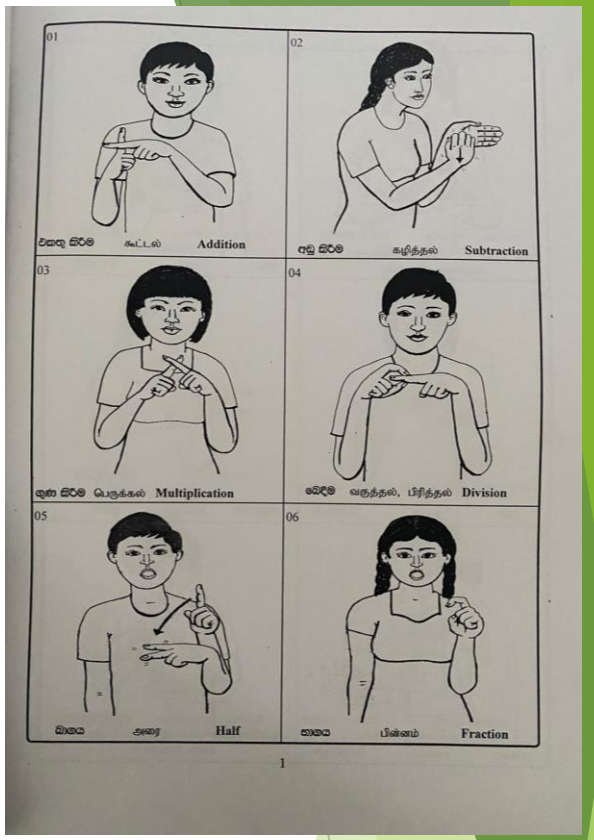
Background

Why Mathematical Basic Concepts Important to Deaf Children?

What type of Quizzes Can We Provide Through the Web App ?

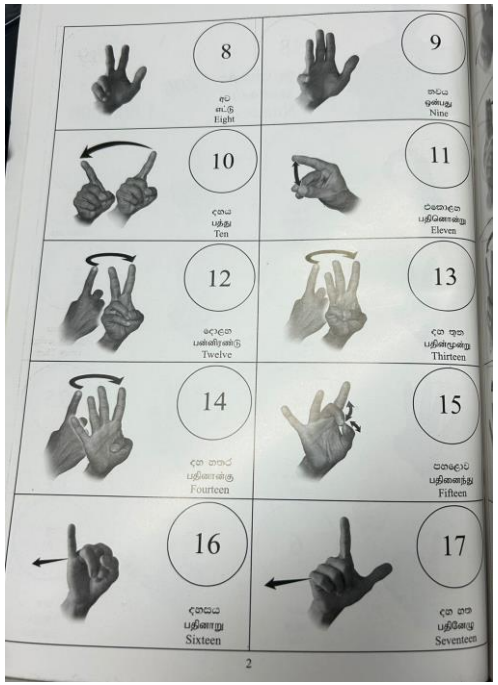
Background



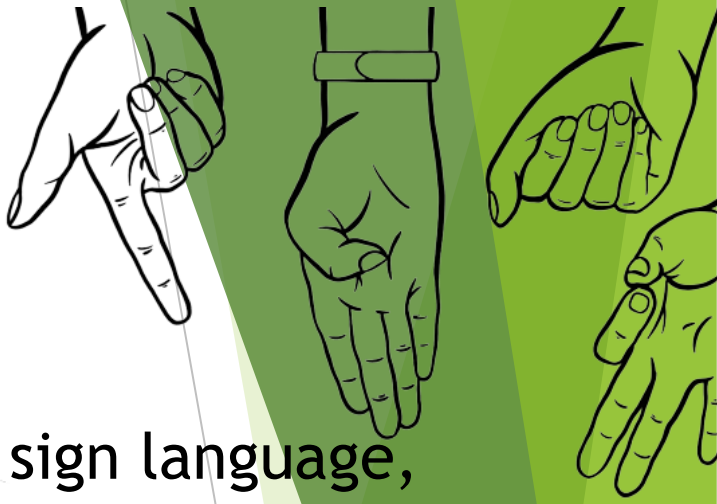


There are 2 types of sigs in the in Numbe

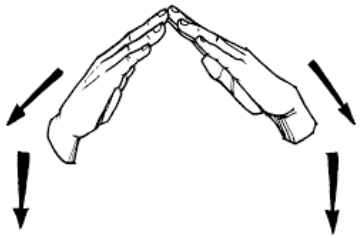
- Static Signs
- Dynamic sign



Research problem



- How can an interactive learning environment incorporating sign language, visual aids, and machine learning technologies be designed?
- Can this novel approach improve the numeracy skills of deaf and mute children?
- Most of the time they use common (universal) signs in sign language to communicate. Therefore, they don't get an opportunity to revise their knowledge outside of the classroom.



Research Gap

System Features	Math Signs Game	ASL Kids	MathSigner	DragonBox	SignSchool	Proposed Solution
Teaching Numbers in Sri Lankan Sign Language (SLSL)	✗	✗	✗	✗	✗	✓
Teaching Mathematics Basic Operations in Sri Lankan Sign Language (SLSL)	✗	✗	✗	✗	✗	✓
Generate Quizes	✓	✗	✗	✓	✗	✓
Student Evaluation Profile	✓	✗	✗	✗	✓	✓
Use of Machine Learning	✗	✗	✗	✗	✗	✓

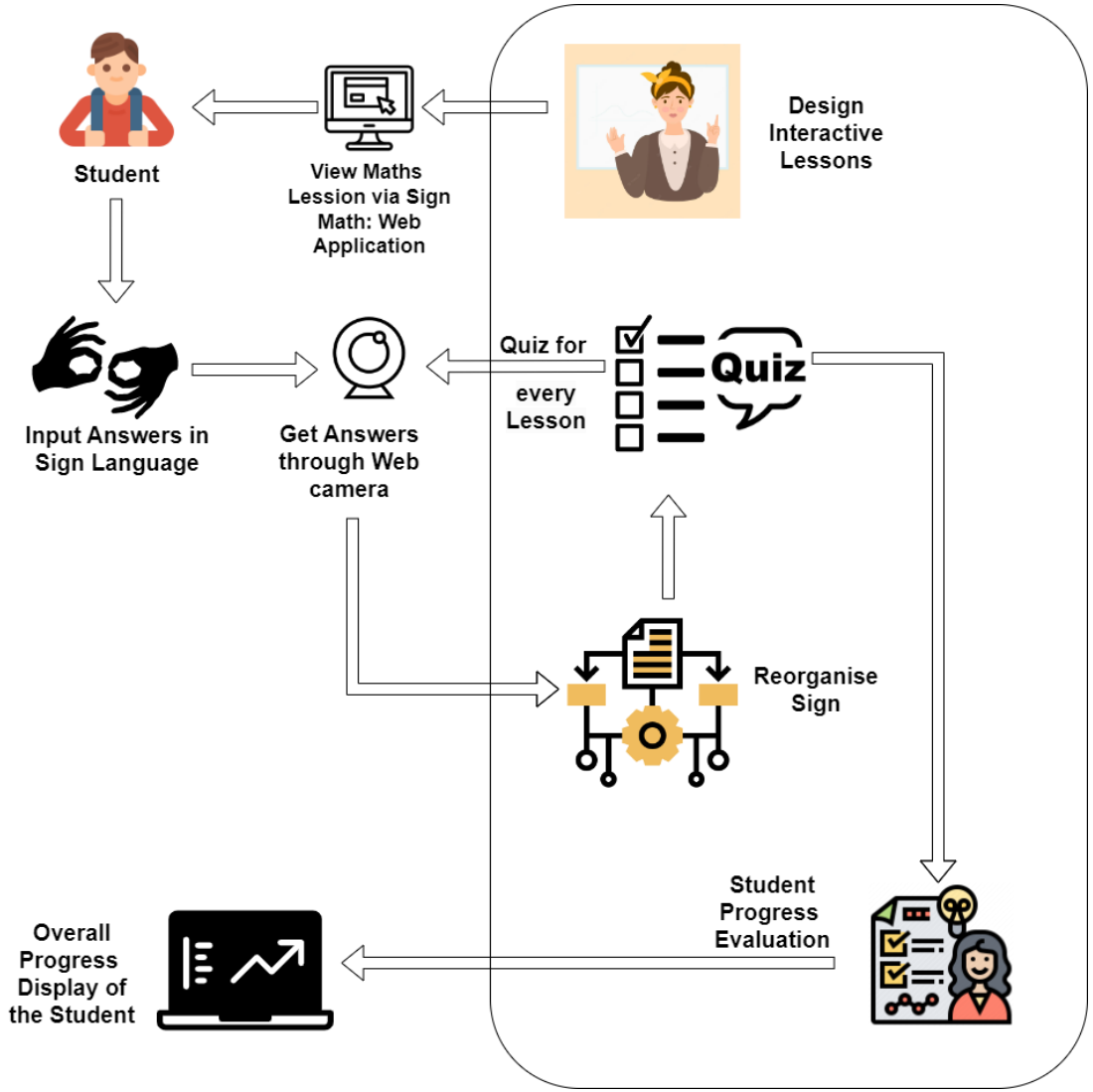
Specific Objectives & Sub Objectives

Main objective- Implement a system that teach and evaluate the understanding of numbers and basic mathematic operations to deaf and mute children

Sub Objectives

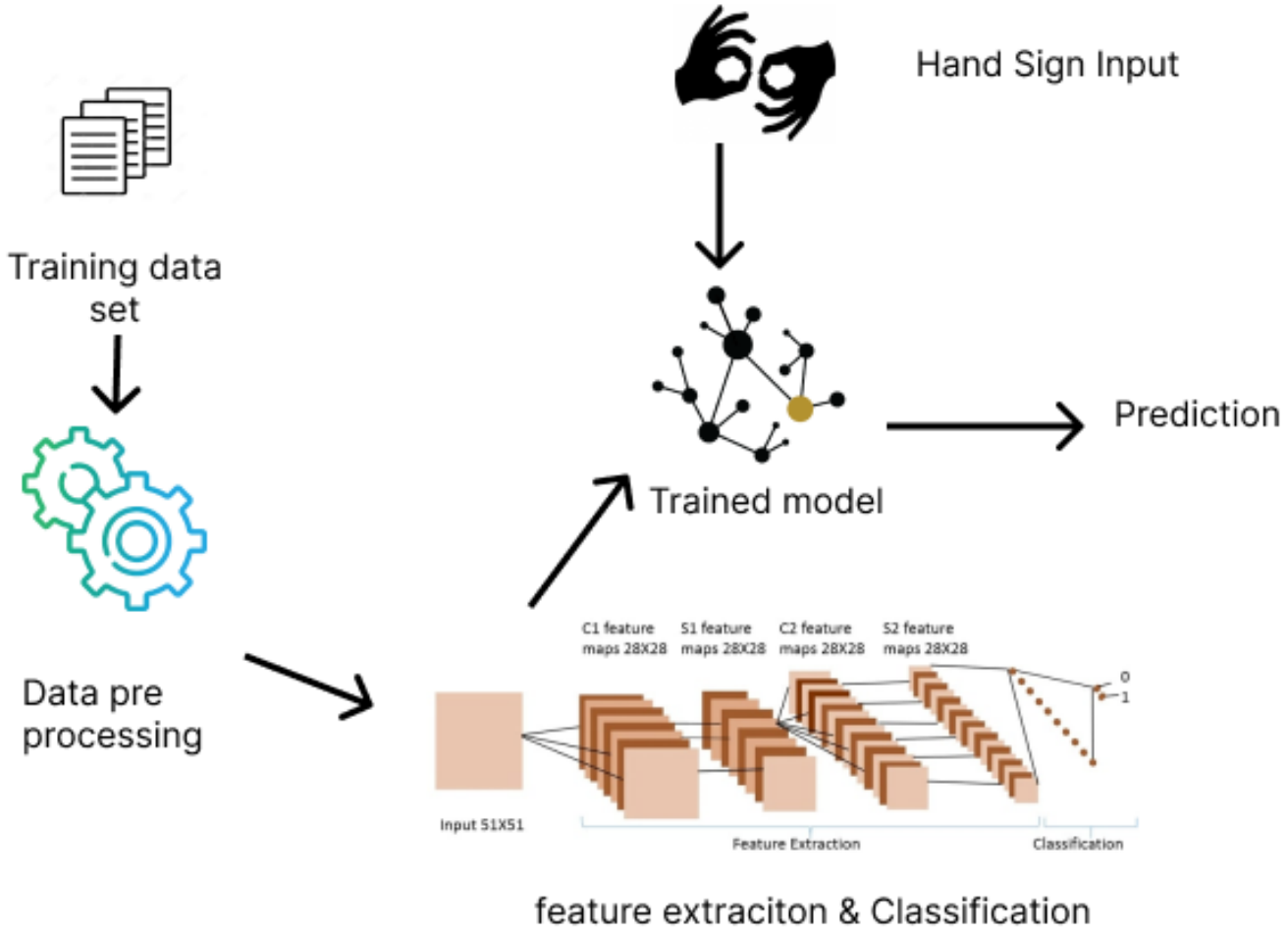
- Creating interactive lessons to teach Numbers and Operations (images, animations, videos).
- Grading Student's knowledge using quizzes.
- Evaluating students' overall progress.
- Identify finger spelling through the camera
  - Creating a Dataset
  - Building a separate model to Identify signed numbers
  - Image pre-processing
  - Training the model
  - Hands segmentation and tracking
  - Feature extraction and classification

System Overview Diagram



IT19203072 | H.K.D.P.P Weerarathne | 24-25J-338

How finger Spelling is identified



feature extraciton & Classification

IT19203072 | H.K.D.P.P Weerarathne | 24-25J-338

Methodology

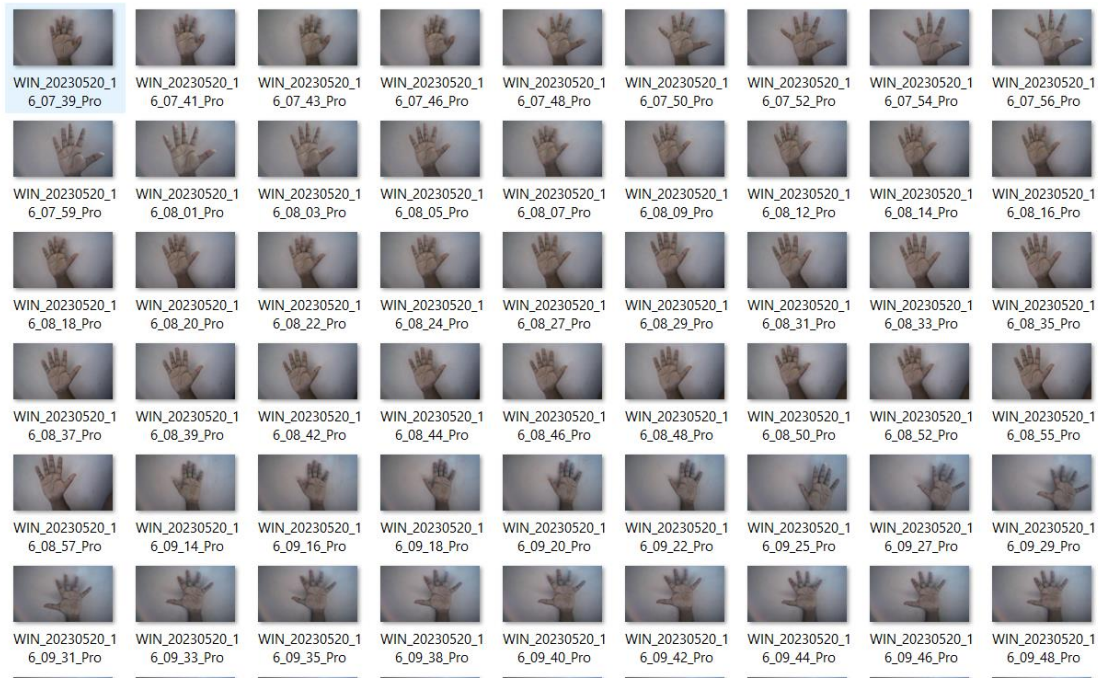
Individual lesson & quiz for each Number & Operation

Lesson interface(related sign+ Sinhala word +lip movement video)

Quiz interface

Dataset

Created a Dataset with,



- Different backgrounds
- Hand signs from two persons
- Slight variations in the hand
- Close to 400 hundred images for one sign

Training the model

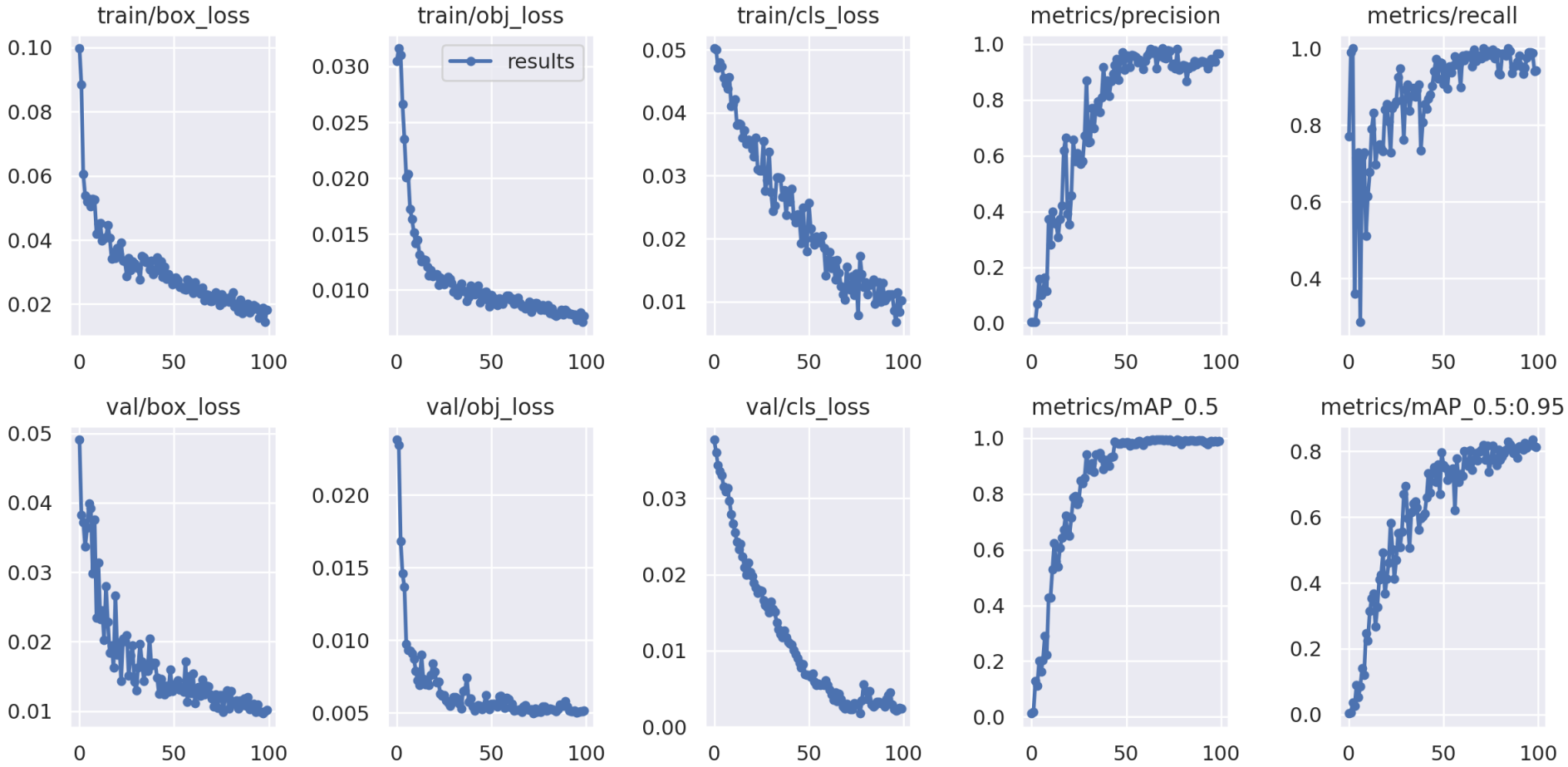
```
Validating runs/train/exp/weights/best.pt...
Fusing layers...
Model summary: 157 layers, 7026307 parameters, 0 gradients, 15.8 GFLOPs
                 Class     Images  Instances          P          R      mAP50   mAP50-95: 100% 3/3 [00:01<
                   all         66         66      0.912      0.963      0.995       0.86
                     0         66         11       0.98          1      0.995      0.911
                     1         66         11          1      0.967      0.995      0.847
                     2         66         11      0.741          1      0.995      0.869
                     3         66         11      0.754          1      0.995      0.851
                     4         66         11          1      0.862      0.995      0.834
                     5         66         11          1      0.952      0.995      0.849
Results saved to runs/train/exp
```

✓ 12m 26s completed at 11:52 PM

```
100 epochs completed in 0.132 hours.
Optimizer stripped from runs/train/exp/weights/last.pt, 14.4MB
Optimizer stripped from runs/train/exp/weights/best.pt, 14.4MB

Validating runs/train/exp/weights/best.pt...
Fusing layers...
Model summary: 157 layers, 7026307 parameters, 0 gradients, 15.8 GFLOPs
                 Class     Images  Instances          P          R      mAP50   mAP50-95: 100%
                   all         96         96      0.937      0.987      0.989      0.835
                     0         96         16      0.993      0.938      0.971      0.701
                     1         96         16      0.943          1      0.995      0.816
                     2         96         16      0.953          1      0.995       0.89
                     3         96         16      0.974          1      0.995      0.844
                     4         96         16      0.759          1      0.984      0.846
                     5         96         16          1      0.984      0.995      0.915
Results saved to runs/train/exp
```

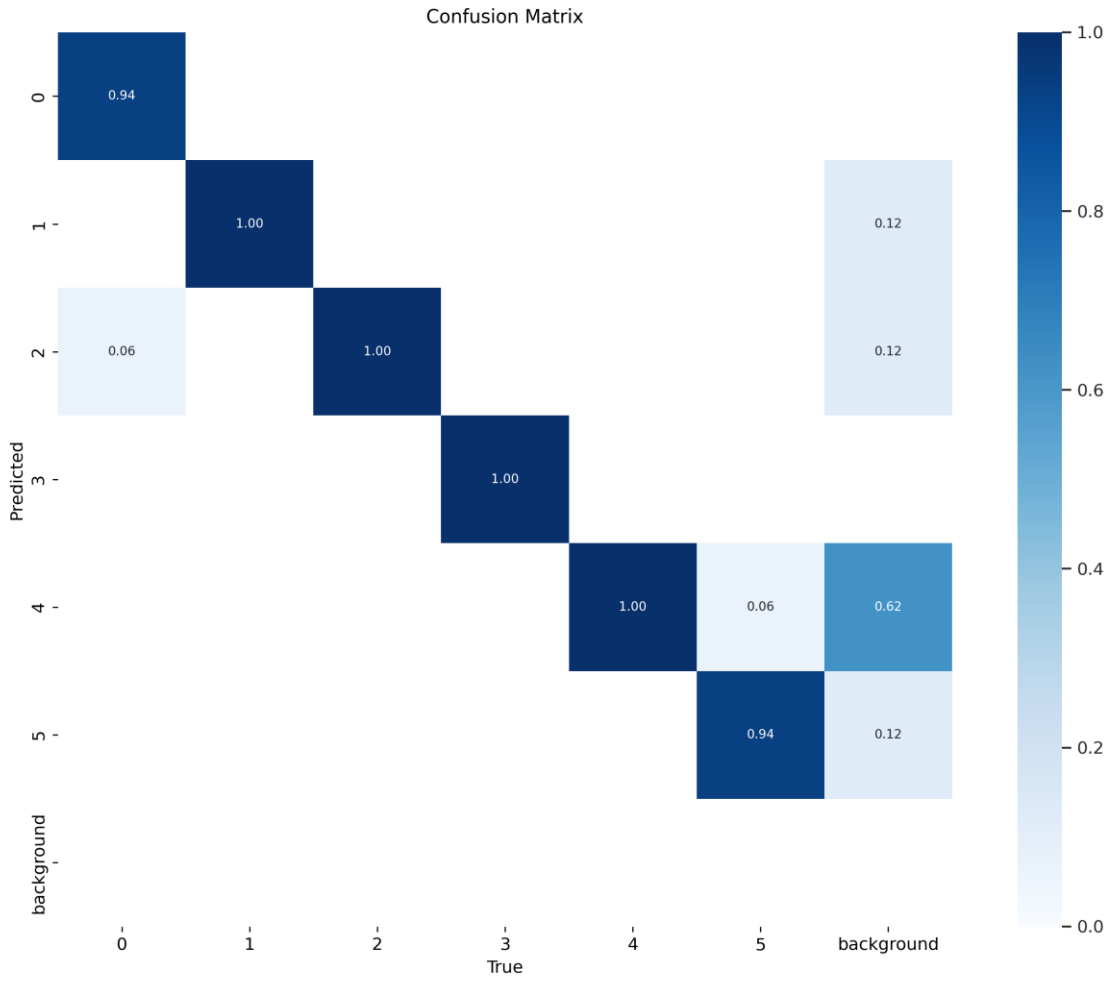
- Model trained using Google Colab online tool
- Separate dataset is used to validate the model

Accuracy Report



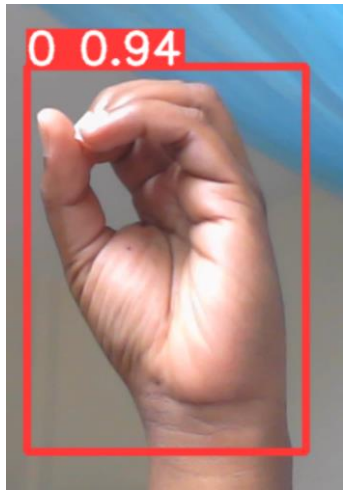
IT19203072 | H.K.D.P.P Weerarathne | 24-25J-338

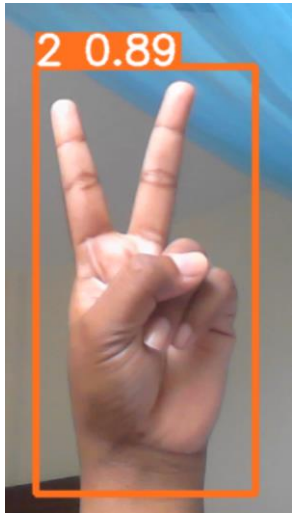
Accuracy Reports

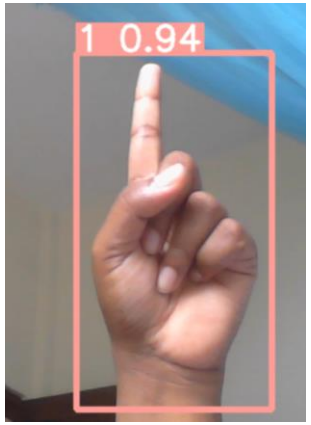


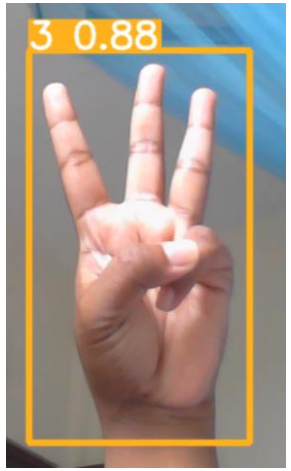
IT19203072 | H.K.D.P.P Weerarathne | 24-25J-338

Accuracy Check









Detecting Hand sign using camera(partial)

detect_numbers.py

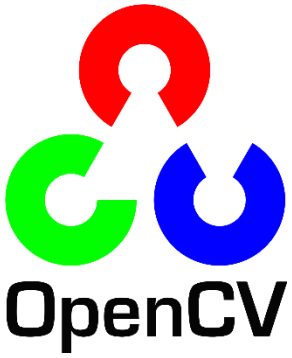
```
        strip_optimizer(weights[0])  # update model (to fix SourceChangeWarning)

    print('Done')


def parse_opt():
    parser = argparse.ArgumentParser()
    parser.add_argument('--weights', nargs='+', type=str, default=ROOT / 'models/best_numbers.pt', help='model path or triton URL')
    parser.add_argument('--source', type=str, default=ROOT / '0', help='file/dir/URL/glob/screen/0(webcam)') #0 webcam #data/images/numbers
    parser.add_argument('--data', type=str, default=ROOT / 'data/coco128.yaml', help='(optional) dataset.yaml path')
    parser.add_argument('--imgsz', '--img', '--img-size', nargs='+', type=int, default=[640], help='inference size h,w')
    parser.add_argument('--conf-thres', type=float, default=0.25, help='confidence threshold')
    parser.add_argument('--iou-thres', type=float, default=0.45, help='NMS IoU threshold')
    parser.add_argument('--max-det', type=int, default=1000, help='maximum detections per image')
    parser.add_argument('--device', default='', help='cuda device, i.e. 0 or 0,1,2,3 or cpu')
    parser.add_argument('--view-img', action='store_true', help='show results')
    parser.add_argument('--save-txt', action='store_true', help='save results to *.txt')
    parser.add_argument('--save-conf', action='store_true', help='save confidences in --save-txt labels')
    parser.add_argument('--save-crop', action='store_true', help='save cropped prediction boxes')
    parser.add_argument('--nosave', action='store_true', help='do not save images/videos')
    parser.add_argument('--classes', nargs='+', type=int, help='filter by class: --classes 0, or --classes 0 2 3')
    parser.add_argument('--agnostic-nms', action='store_true', help='class-agnostic NMS')
    parser.add_argument('--augment', action='store_true', help='augmented inference')
    parser.add_argument('--visualize', action='store_true', help='visualize features')
    parser.add_argument('--update', action='store_true', help='update all models')
    parser.add_argument('--project', default=ROOT / 'runs/detect', help='save results to project/name')
    parser.add_argument('--name', default='exp', help='save results to project/name')
```

run()

- Presence of the hand in the camera input is identified
- Image of the hand is used as an input for predicting the hand sign.
- Return the output to the web application
- Ex:

Technologies used

- Keras (implement neural networks)
- React (Frontend)
- Firebase (Database)
- Google Colab (Training the model)
- Python(model)
- REST API
- Python flask (creating rest API)
- Open CV(image processing)
- Tensor Flow



Requirements

- Functional Requirements

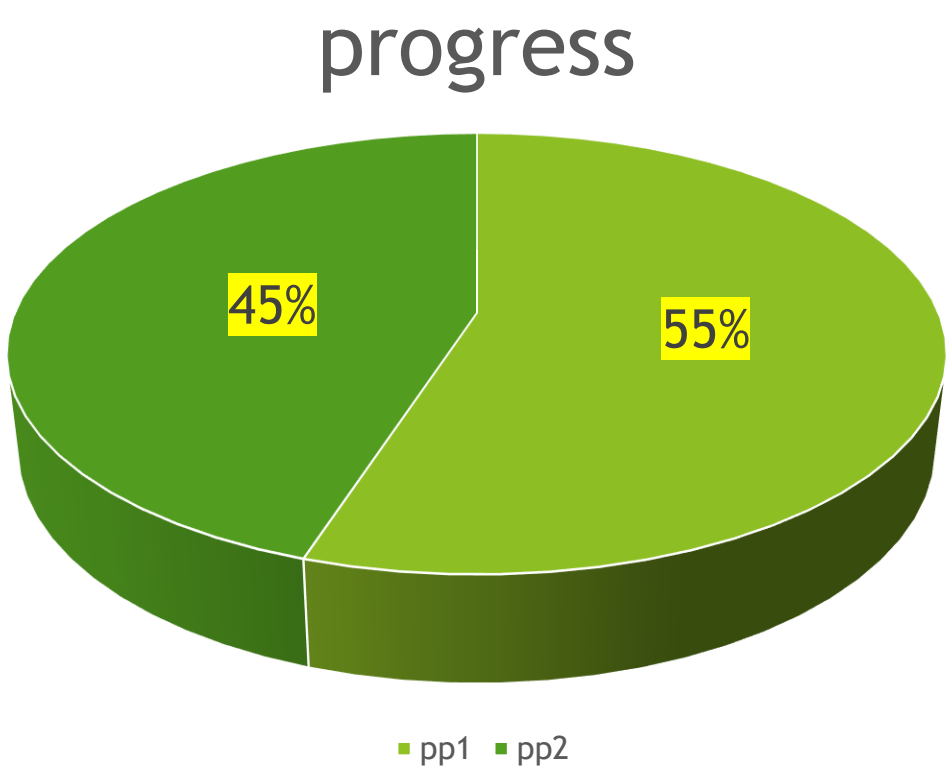
- User should be able to view individual lessons.
- Users should be able to measure their knowledge after the lesson by attempting the quizzes in a lesson
- Sign input should be identified using the image acquired through the camera.
- Quizzes should be graded.
- Individual students' progress should be evaluated by quiz marks and displayed.

Progress

- A New dataset is created for Numbers in Sinhala sign language.
- Build the model to identify signs.
- Adjusting and training the model to achieve high accuracy
- Validating the model using the test dataset
- Sign Detection using camera input

Future Implementation

- complete sign detection using camera input
- Designing interactive lessons to teach more numbers (front-end)
- Evaluating student’s progress
  - Grading quizzes
  - Calculate overall student’s progress



IT19203072 | H.K.D.P.P Weerarathne | 24-25J-338

BSc (Hons) in Information Technology Specializing in Computer System and Network Engineering

Designing an Interactive Learning Environment for Teaching Basic Currency Identification

Outline

- Introduction
- Background
- Research Problem
- Objectives
- Research Gap
- System Diagram
- Methodology

BACKGROUND

Why we need to teach currency notes and coins ?

- Use of currency notes and coins is essential nowadays.
- Majority of children struggled with understanding the combinations of signs
- Teachers also struggled to teach them in school
- That it is good to give them an understanding of currencies at an early age.

WHY
Currency notes
and coins?

RESEARCH PROBLEM

How to reduce the difficulties Of teachers while teaching ?

- Teach combined signs with user-friendly interface

- Create Sign Videos with Sentences

Teachers can demonstrate create their difficult part with sign videos-so they don't need to teach again and again

- Currency identifying Quizzes for related sign videos

- Currency identifying quizzes using Sinhala medium

OBJECTIVES

Main Objective

- Designing an Interactive Learning Environment for Teaching Basic Currency Identification.

Sub-Objective

- Teaching Sri Lanka Basic Currency notes and coins.
- Generate Quizzes, Showing Answers to the camera.
- Answer Evaluation & Correction.

Why sign language videos better than Images?

- The video makes learning convenient
- Videos have the power to express strong emotions that encourage viewers.
- Images can not contain movements, but videos can.
- Brain can also process visuals much quicker than it can text.
- Children likes to watch videos than Reading
- Enjoyable & memorable

According to studies, the average viewer remembers 95% of a message when it is watched.

How to increase the student's memorization of the Sign language Easily?

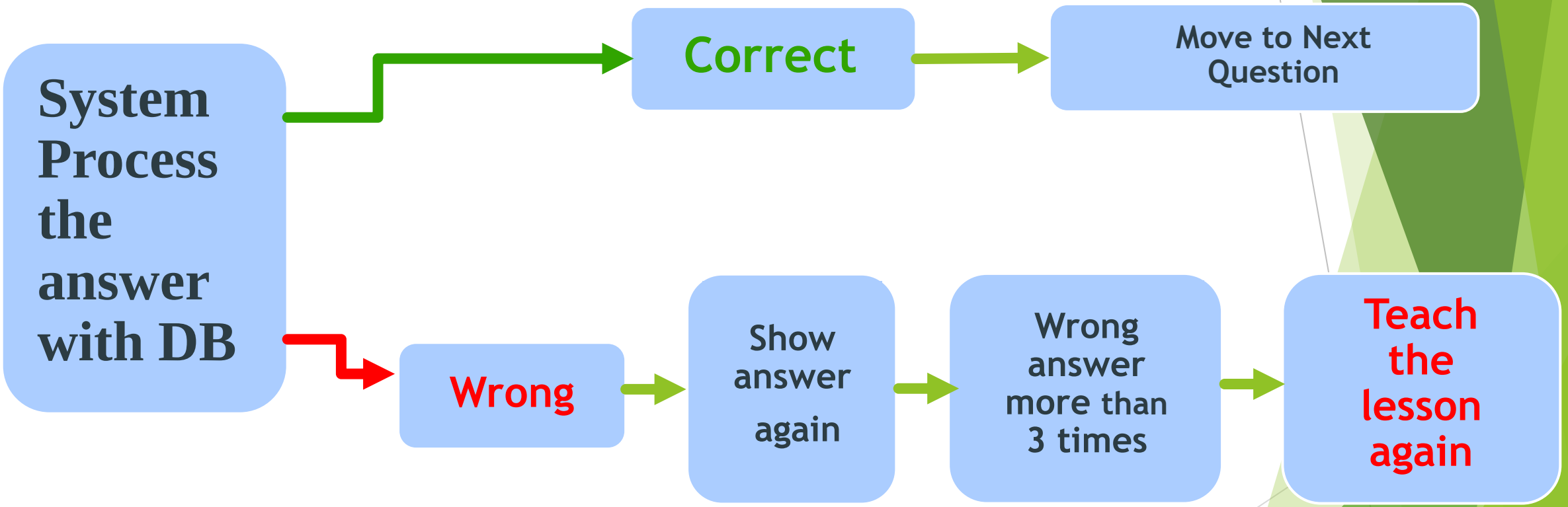
- Provide multiple choice questions to identify the correct sentence for the related video

රුපියල් 100 යි

රුපියල් 1000 යි

රුපියල් 500යි

How to provide Answer Evaluation for the students ?



RESEARCH GAP

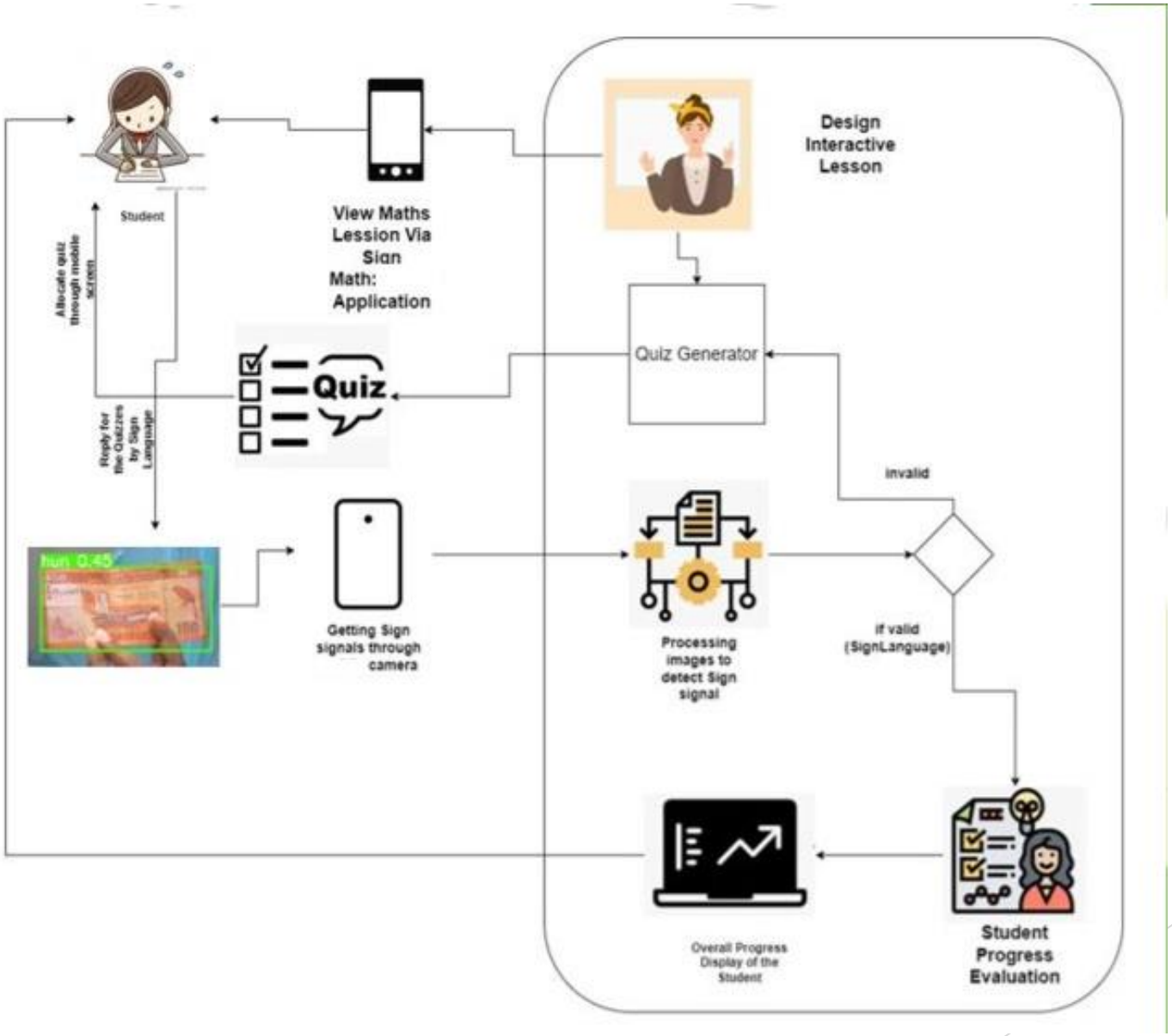
In Existing systems,

- Use Sri lanka Sign Language (SLSL) to teach maths.
- User can not create Sign videos (Data limited)
- Existence of descriptions, and quizzes in Sinhala medium.
- Designed for children
- Answer Evaluation & Correction

RESEARCH GAP

System Features	Mathway	Mathsigner	DeafSign	Teach currency note for disable students	DragonBox Numbers	Proposed Solution
Teaching currency notes in Sinhala	✗	✗	✗	✗	✗	✓
Quizzes	✗	✓	✓	✗	✗	✓
Report generation	✗	✓	✗	✗	✗	✓

System Overview Diagram

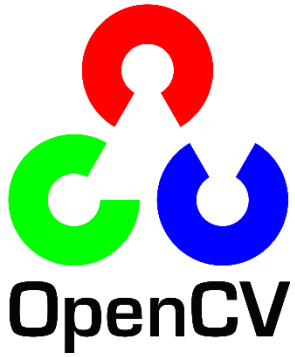


Methodology

- TECHNOLOGIES
- REQUIREMENTS
- PROGRESS
- FUTURE IMPLEMENTATION

Technologies used

- Keras (implement neural networks)
- React
- Firebase
- Google Colab (Training the model)
- Python(model)
- REST API
- Python flask (creating rest API)
- Open CV(image processing)
- Tensor Flow



REQUIREMENTS

FUNCTIONAL REQUIREMENTS

- ✓ Currency notes and coins Teaching Lessons
- ✓ Sentence Identifying Quizzes
- ✓ Show the correct answers
- ✓ Answer Evaluation & score

NON-FUNCTIONAL REQUIREMENTS

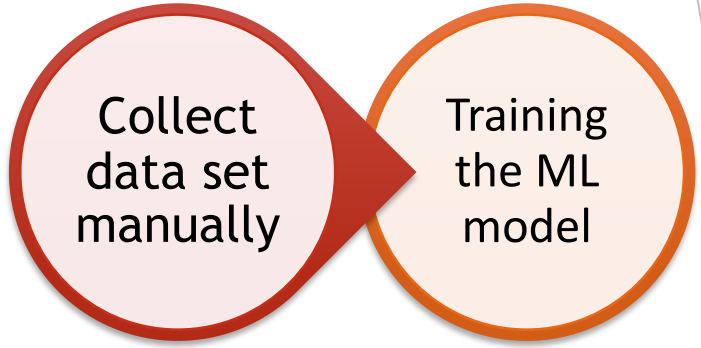
- ✓ Usability
- ✓ Reliability
- ✓ Portability
- ✓ Speed

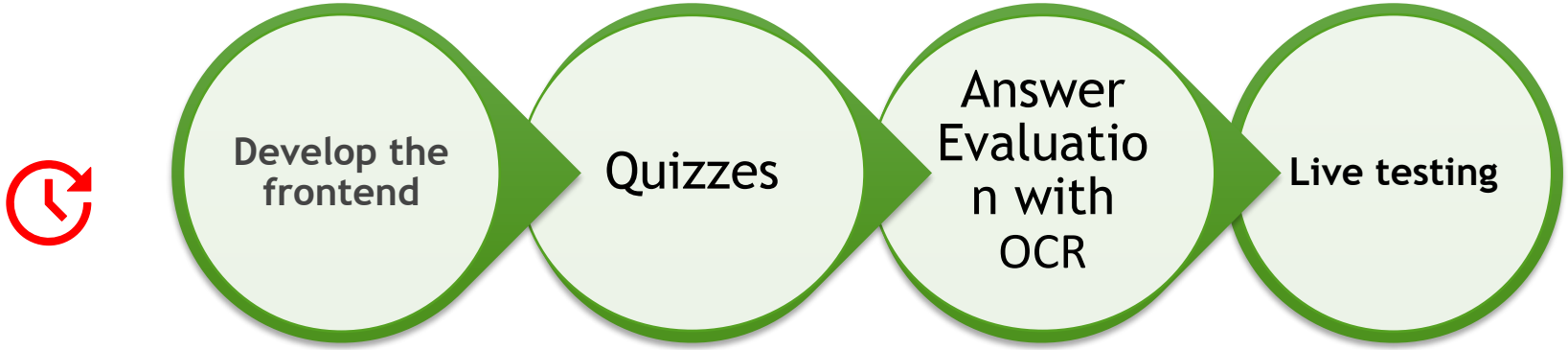
USER REQUIREMENTS

- ✓ Laptop
- ✓ Internet Connection
- ✓ Front Camera

COMPLETION AND FUTURE WORKS

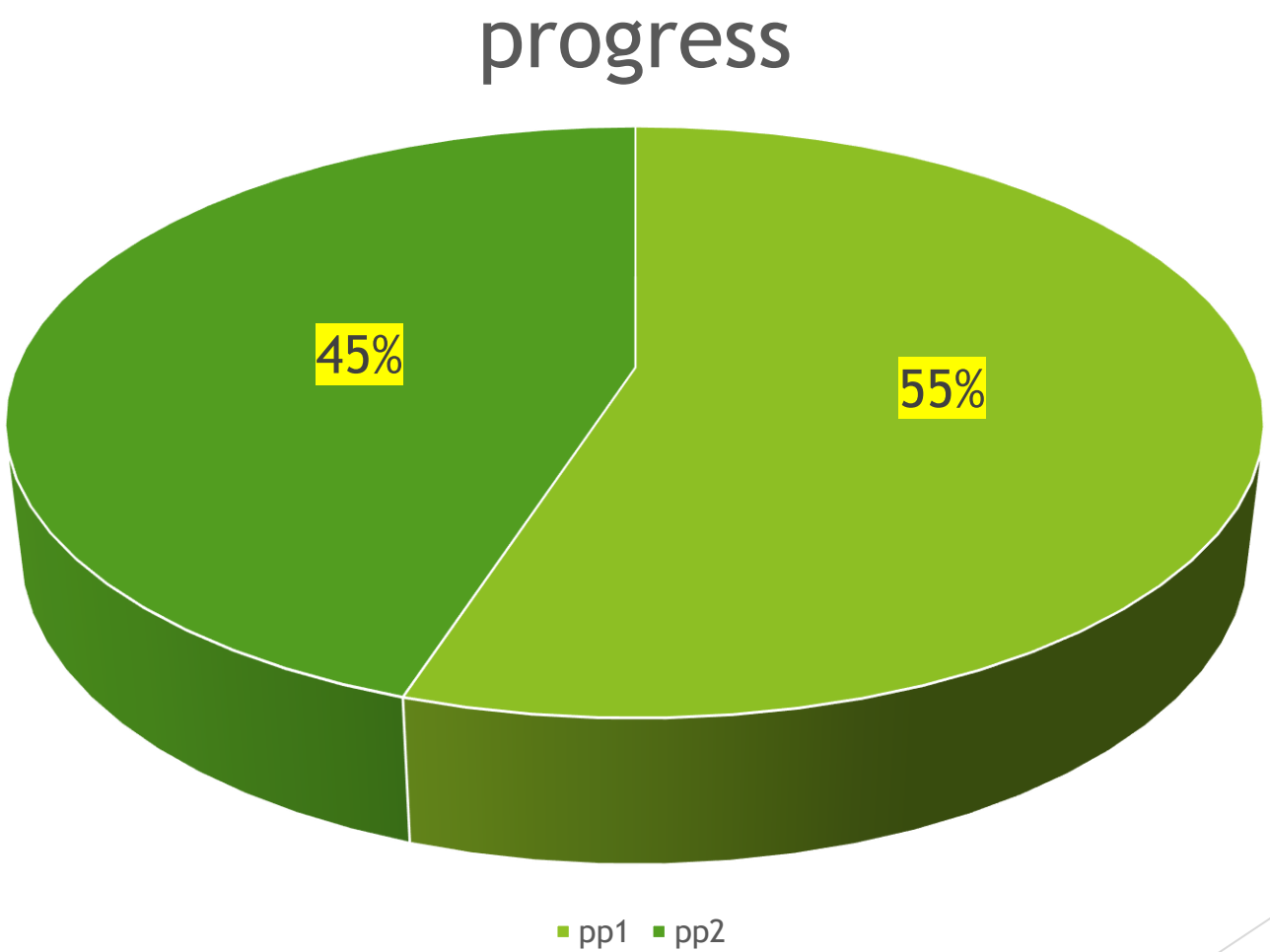
Completed Implementations





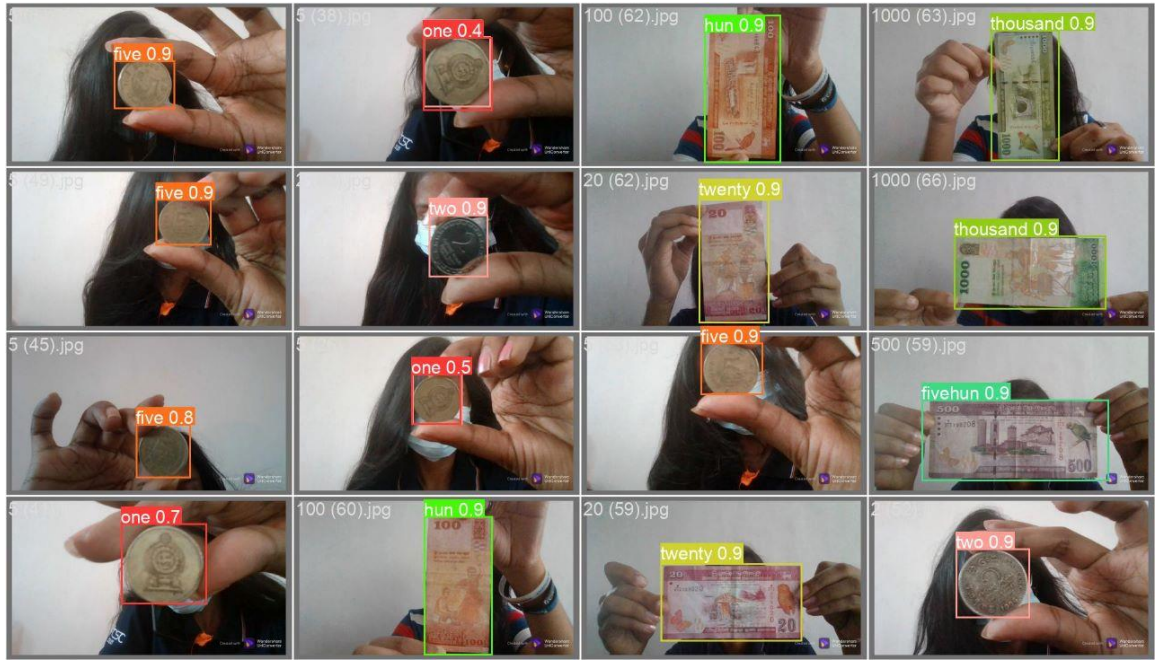
Future Implementations

Progress



Dataset

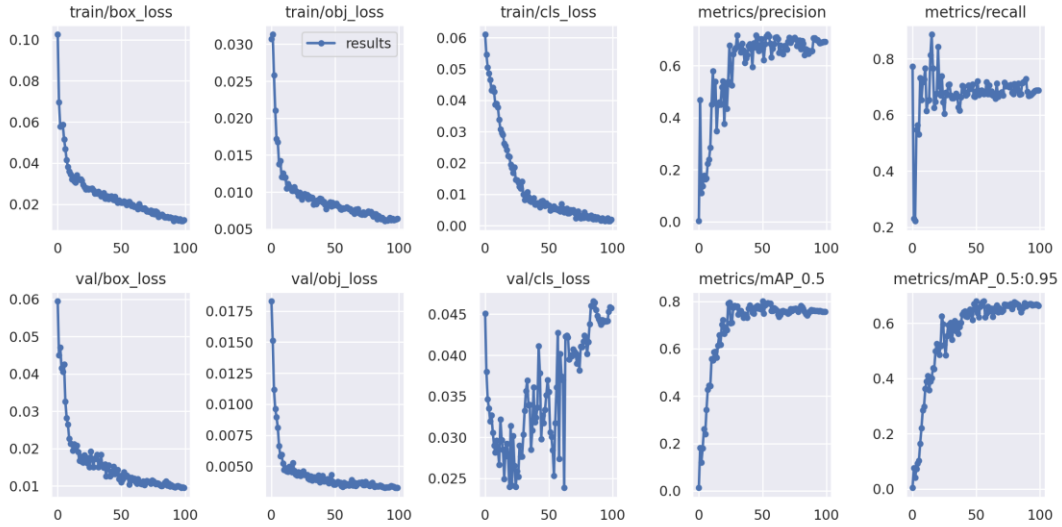
Created a Dataset with,



- Different backgrounds , currency notes and coin
- Use several coins and notes of the same type
- Took photos of coins and currency notes in various poses
- Use 200 images for one class

Training the model and Accuracy report

```
100 epochs completed in 0.182 hours.
Optimizer stripped from runs/train/exp/weights/last.pt, 14.4MB
Optimizer stripped from runs/train/exp/weights/best.pt, 14.4MB

Validating runs/train/exp/weights/best.pt...
Fusing layers...
Model summary: 157 layers, 7031701 parameters, 0 gradients, 15.8 GFLOPs
                 Class     Images  Instances          P          R      mAP50   mAP50-95: 100% 4/4
                   all        101        102      0.667      0.685      0.801      0.681
                   one        101         15      0.815      0.884      0.942      0.698
                   two        101         13      0.754      0.923      0.952      0.863
                  five        101         12      0.879      0.608      0.834      0.621
                   ten        101          8      0.858          1      0.995      0.886
                 twenty        101         14      0.982          1      0.995      0.871
                   hun        101         14      0.982          1      0.995      0.907
                fivehun        101         12          0          0      0.238      0.193
              thousand        101         14     0.0666     0.0619      0.458      0.408
Results saved to runs/train/exp
```



- **Model trained using Google Colab online tool**

Accuracy: 0.9624

Loss: 0.113

Validation accuracy:0.6533

Validation loss:337.2601

Sign detection using camera input

README.md | detect_coin_notes.py

```python
def run(
        weights='best.pt',  # model path or triton URL
        source='data/images',  # file/dir/URL/glob/screen/0(webcam)
        data=ROOT / 'data/coco128.yaml',  # dataset.yaml path
        imgsz=(640, 640),  # inference size (height, width)
        conf_thres=0.25,  # confidence threshold
        iou_thres=0.45,  # NMS IOU threshold
        max_det=1000,  # maximum detections per image
        device='',  # cuda device, i.e. 0 or 0,1,2,3 or cpu
        view_img=False,  # show results
        save_txt=False,  # save results to *.txt
        save_conf=False,  # save confidences in --save-txt labels
        save_crop=False,  # save cropped prediction boxes
        nosave=False,  # do not save images/videos
        classes=None,  # filter by class: --class 0, or --class 0 2 3
        agnostic_nms=False,  # class-agnostic NMS
        augment=False,  # augmented inference
        visualize=False,  # visualize features
        update=False,  # update all models
        project=ROOT / 'runs/detect',  # save results to project/name
        name='exp',  # save results to project/name
        exist_ok=False,  # existing project/name ok, do not increment
        line_thickness=3,  # bounding box thickness (pixels)
        hide_labels=False,  # hide labels
        hide_conf=False,  # hide confidences
        half=False,  # use FP16 half-precision inference
```

- Currency notes and coins Detector class is implemented to identify the sign input through the camera

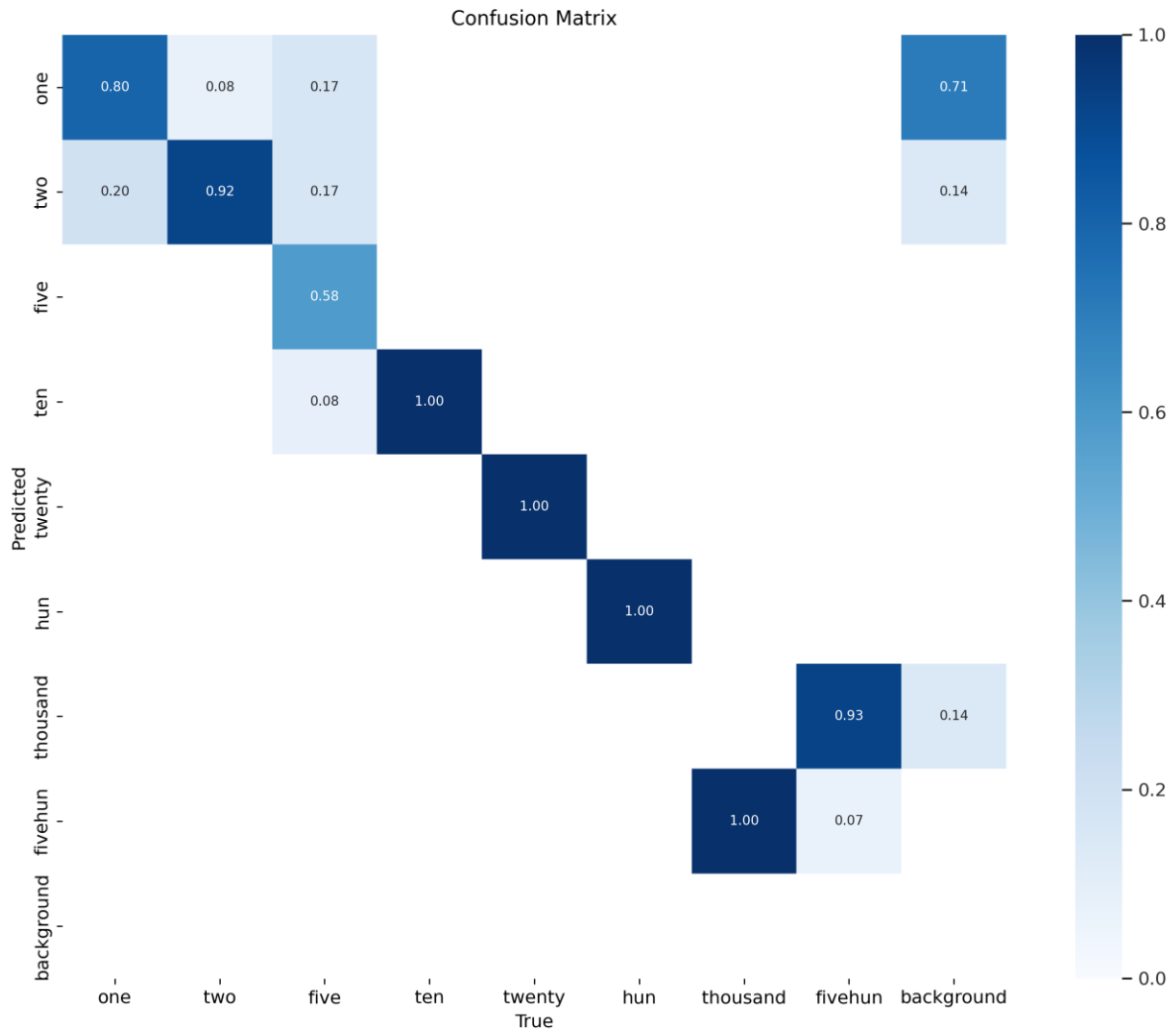
Ex.

Detecting sign using camera

```python
def parse_opt():
    parser = argparse.ArgumentParser()
    parser.add_argument('--weights', nargs='+', type=str, default=ROOT / 'models/best_coin.pt', help='model path or
    parser.add_argument('--source', type=str, default=ROOT / '0', help='file/dir/URL/glob/screen/0(webcam)') #data/i
    parser.add_argument('--data', type=str, default=ROOT / 'data/coco128.yaml', help='(optional) dataset.yaml path')
    parser.add_argument('--imgsz', '--img', '--img-size', nargs='+', type=int, default=[640], help='inference size h
    parser.add_argument('--conf-thres', type=float, default=0.25, help='confidence threshold')
    parser.add_argument('--iou-thres', type=float, default=0.45, help='NMS IoU threshold')
    parser.add_argument('--max-det', type=int, default=1000, help='maximum detections per image')
    parser.add_argument('--device', default='', help='cuda device, i.e. 0 or 0,1,2,3 or cpu')
    parser.add_argument('--view-img', action='store_true', help='show results')
    parser.add_argument('--save-txt', action='store_true', help='save results to *.txt')
    parser.add_argument('--save-conf', action='store_true', help='save confidences in --save-txt labels')
    parser.add_argument('--save-crop', action='store_true', help='save cropped prediction boxes')
    parser.add_argument('--nosave', action='store_true', help='do not save images/videos')
    parser.add_argument('--classes', nargs='+', type=int, help='filter by class: --classes 0, or --classes 0 2 3')
    parser.add_argument('--agnostic-nms', action='store_true', help='class-agnostic NMS')
    parser.add_argument('--augment', action='store_true', help='augmented inference')
    parser.add_argument('--visualize', action='store_true', help='visualize features')
    parser.add_argument('--update', action='store_true', help='update all models')
    parser.add_argument('--project', default=ROOT / 'runs/detect', help='save results to project/name')
    parser.add_argument('--name', default='exp', help='save results to project/name')
    parser.add_argument('--exist-ok', action='store_true', help='existing project/name ok, do not increment')
    parser.add_argument('--line-thickness', default=3, type=int, help='bounding box thickness (pixels)')
```

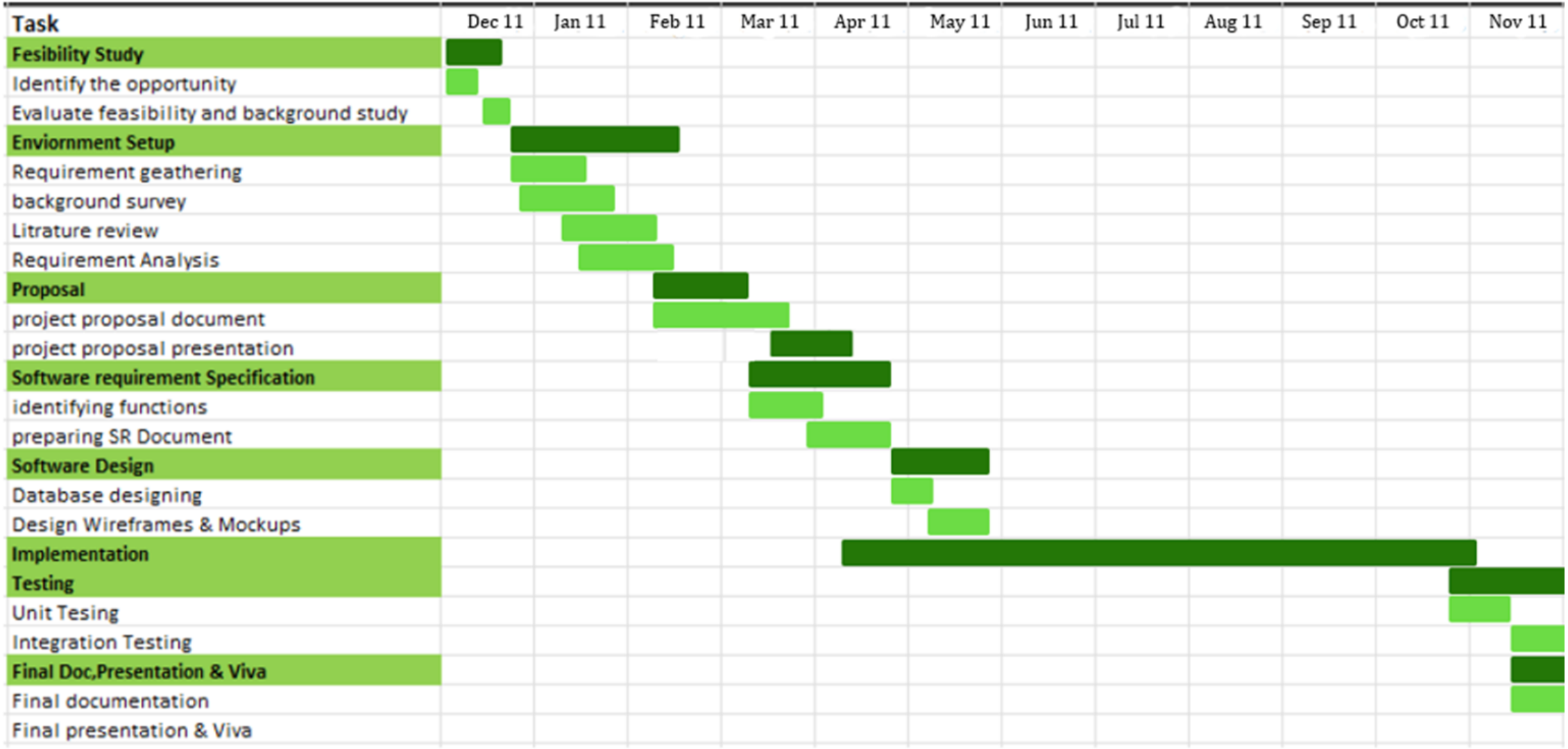
- Presence of the currency notes in the camera input is identified
- Image of the currency notes is used as an input for predicting the sign.
- Return the output to the web application

Accurecy check



Setup the webcam & Set up variables to keep track of the current sign and number of videos taken


SMS
SMS


Task
Dec 11
Jan 11
Feb 11
Mar 11
Apr 11
May 11
Jun 11
Jul 11
Aug 11
Sep 11
Oct 11
Nov 11
Fesibility Study
Identify the opportunity
Evaluate feasibility and background study
Enviornment Setup
Requirement geathering
background survey
Litrature review
Requirement Analysis
Proposal
project proposal document
project proposal presentation
Software requirement Specification
identifying functions
preparing SR Document
Software Design
Database designing
Design Wireframes & Mockups
Implementation
Testing
Unit Tesing
Integration Testing
Final Doc,Presentation & Viva
Final documentation
Final presentation & Viva

THANK YOU