

# AI POWERED LANGUAGE LEARNING PLATFORM

TEAM MEMBERS:

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# PROBLEM STATEMENT

- Many English learning platforms lack interactivity and regional support.
- Tamil-speaking learners face challenges in pronunciation, writing, and comprehension.
- No unified tool provides real-time feedback across all language skills.
- Goal: Build an AI-powered platform that solves these limitations.

# SOCIAL RELEVANCE

- High demand for digital learning tools in rural and semi-urban Tamil regions
- Supports the Digital India initiative and NEP 2020 goals
- Promotes inclusive education by:
  - i.Reducing language learning barriers
  - ii.Encouraging self-paced learning
- Can be adapted for other regional languages too

# OBJECTIVES

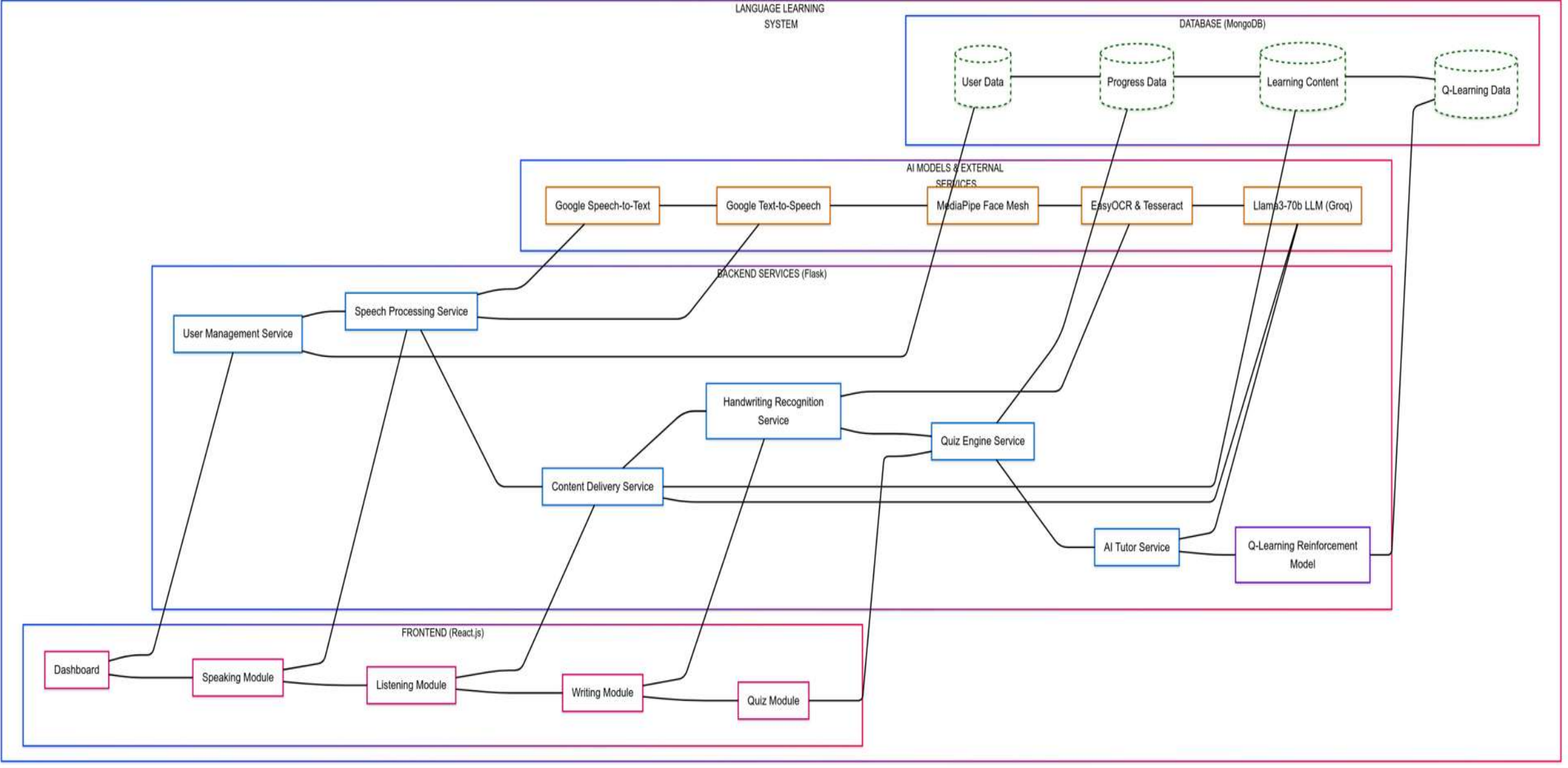
- Develop an adaptive language learning platform for non-English speakers.
- Implement Q-learning for personalized difficulty progression.
- Integrate speech recognition for pronunciation assessment.
- Provide real-time translation with cultural context.
- Enable interactive storytelling with comprehension feedback.



# LITERATURE SURVEY AND BACKGROUND

- Existing platforms lack personalization & real-time feedback.
- Research shows native language support improves retention.
- AI-driven adaptive systems show 30% better learning outcomes.
- Modern speech recognition enhances non-native speaker assessment.
- LLMs enable contextual content generation for language learning.

# ARCHITECTURE / WORKFLOW



# TOOLS AND TECHNOLOGIES USED

- Backend: Flask
- Frontend: React
- AI/NLP: Sentence-BERT, spaCy
- OCR: EasyOCR, Tesseract, OpenCV
- Speech:
  - i.TTS: gTTS
  - ii.STT: Google SpeechRecognition API
- Database: MongoDB
- ML model: Q-learning(Reinforcement Learning)
- Other Libraries: Pygame, Deep Translator, MediaPipe, dotenv



# IMPLEMENTATION (Screen Shot)

## Dashboard

மீண்டும் வரவேற்கிறோம், Deiva Raja

சுயவிவரம்

[→ வெளியேறு

### கற்றல் பிரிவுகள்

அனைத்தையும் காண்க >



#### வாசித்தல்

ஈடுபாடான  
உள்ளடக்கத்துடன்  
புரிதலை  
மேம்படுத்தவும்

கற்கத் தொடங்கு



#### எழுதுதல்

கட்டமைக்கப்பட்ட  
பயிற்சிகளுடன்  
பயிற்சி செய்யுங்கள்

கற்கத் தொடங்கு



#### கேட்டல்

இயல்பான ஒலியுடன்  
திறன்களை  
வளர்க்கவும்

கற்கத் தொடங்கு



#### தேர்வு

பேசுதல் மற்றும்  
எழுதுதல் பயிற்சி

தேர்வு எடுக்கத்  
தொடங்கு



# Reading Page

## English Learning Platform

Vocabulary Builder Reading Comprehension Accent Training

book



புத்தகம்

[puthagam]

▶ New Pronunciation

Example Sentences:

I need a book to read.

எனக்கு புத்தகம் வேண்டுமே.

▶

She has many books in her bag.

அவளுக்கு பைக்கில் மிகவும் புத்தகங்கள் உள்ளன.

▶

book bag baggy books make

Practice Pronunciation

▶ Record Pronunciation

Teaching Tip

Tamil speakers may find it helpful to focus on the pronunciation of English words, as the sounds and intonation patterns may differ from those in Tamil. Additionally, Tamil speakers may want to pay attention to the word order in English sentences, as it can be different from the subject-object-verb word order commonly used in Tamil.

## English Learning Platform

Vocabulary Builder Reading Comprehension Accent Training

### Reading Practice

The city of Chennai is one of the most populous cities in India. It is located on the Coromandel Coast of the Bay of Bengal and is the capital of Tamil Nadu state. Chennai is known for its rich cultural heritage and is home to many historic landmarks such as the Fort St. George and the Kapaleeswarar Temple.

▶ Show Tamil Translation

Read Aloud Practice

▶ Record Reading

### Comprehension Check

What is Chennai known for?

Select answer

Which state is Chennai the capital of?

Select answer

What is the location of Chennai?

Select answer

Submit Answers

## English Learning Platform

Vocabulary Builder Reading Comprehension Accent Training

### Accent Mirror

Practice English sounds with real-time feedback

Select sound to practice:

THN /W /NW /FT /RU /LI /PT /BI

Camera is currently off

Start Camera

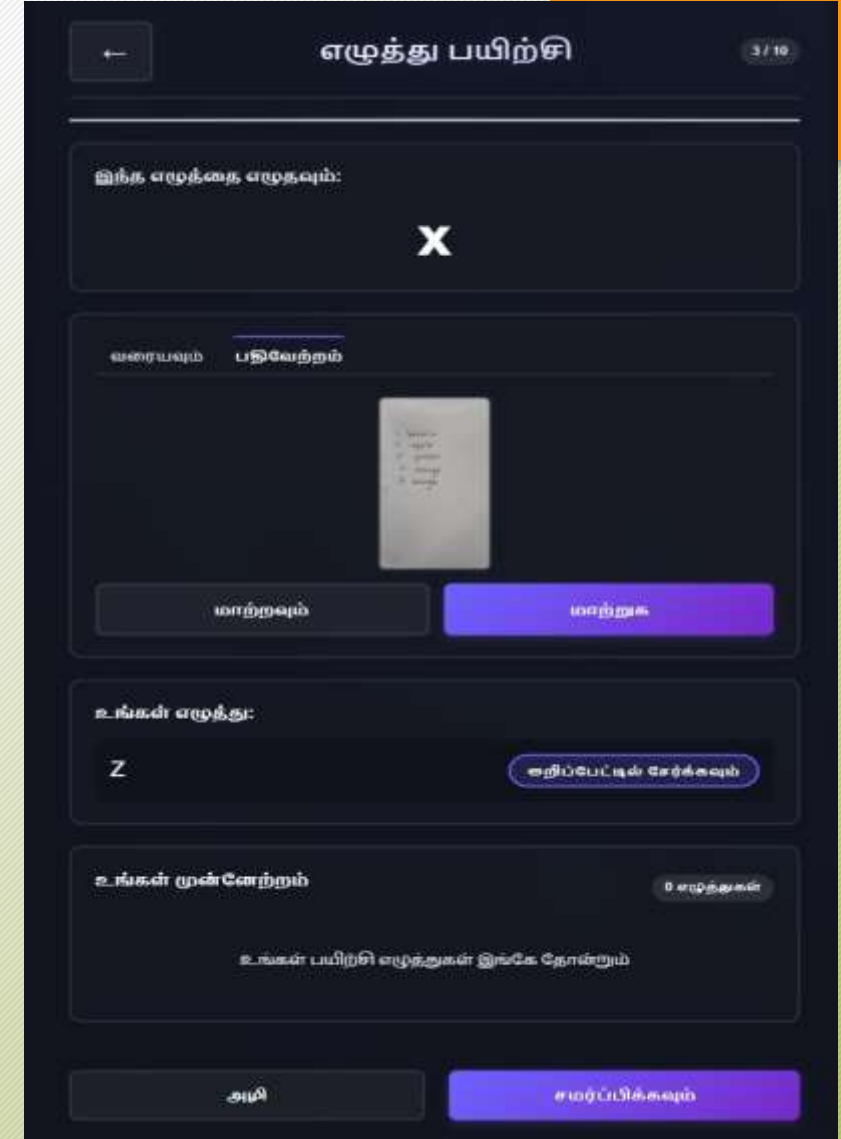
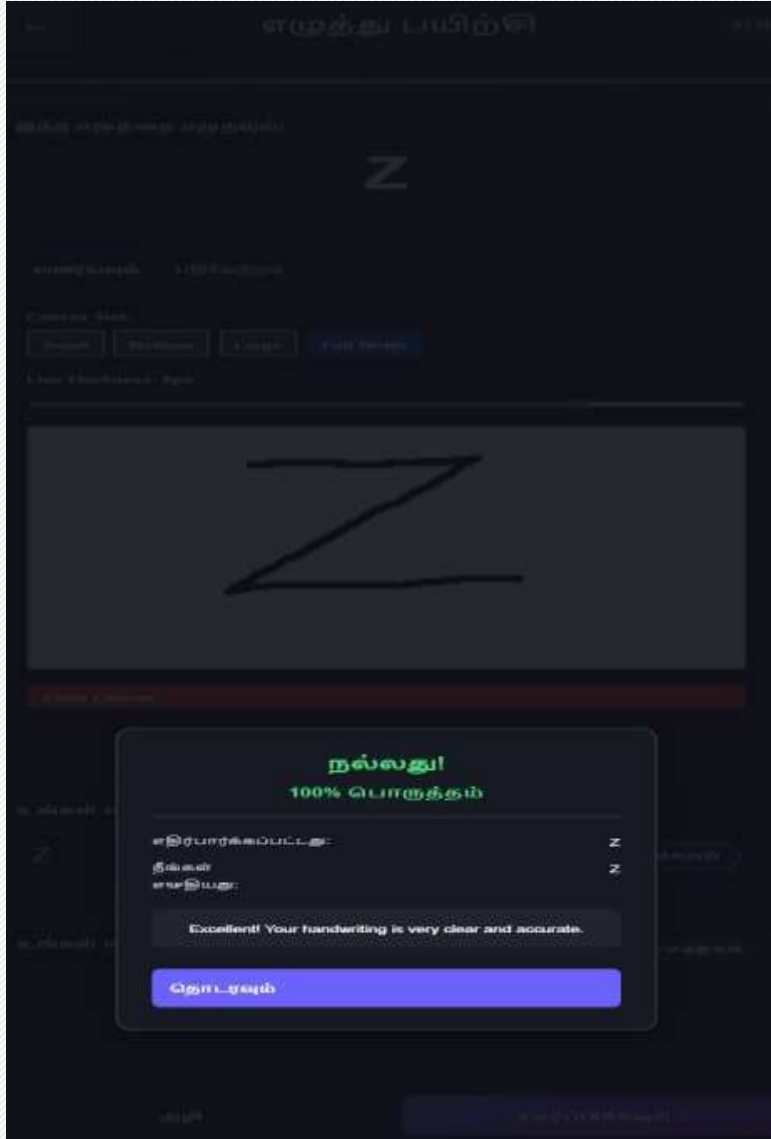
Record Your Pronunciation:

▶ Record Sound

Tamil Pronunciation Guide

தமிழில் 'த' பேரில் அமைந்த ஒலி பற்களில் தொடரும் (Like 'த' but with tongue touching upper teeth)

## Writing page



# Listening Page

## English Listening Practice

### Festival Story

Speed: Slow Translation: Tamil Difficulty: Advanced

Pause

Repeat Section

Hide Transcript

The festival ended with a community feast featuring special moon cakes and sweet rice balls, celebrating togetherness and continuity.

(Tamil) திருவிழா ஒரு சமூக விருந்துடன் நிறைவு மூன்று பேர்களுள் மற்றும் இனிப்பு அரிசி பந்தங்களைக் கொண்டது. ஒற்றுமை மற்றும் தொடர்ச்சியைக் கொண்டாடியது.

#### Interactive Transcript

The **annual** Lantern Festival was the highlight of the year in Lin 's village . For weeks , everyone prepared colorful paper lanterns in various shapes and sizes . On the night of the full moon , the entire village gathered in the central square . Lin brought her butterfly - shaped lantern that she had worked on for days . As darkness fell , hundreds of lanterns were lit **simultaneously** , creating a magical atmosphere . The elders told traditional stories about the origins of the festival . Lin 's grandmother explained how the lanterns **symbolized** hope and guidance , helping **ancestral** spirits find their way back to heaven . After the ceremony , everyone released their lanterns into the night sky . Lin watched as her butterfly lantern joined the others , floating upward like a **constellation** of stars . The festival ended with a community feast featuring special moon cakes and sweet rice balls , celebrating togetherness and continuity .

#### Cultural Notes

**Lantern Festival:** The Lantern Festival is celebrated in many Asian countries to mark the end of lunar new year celebrations.

**moon cakes:** Traditional pastries often filled with lotus seed paste, symbolizing completeness and reunion.

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**moon cakes:** Traditional pastries often filled with lotus seed paste, symbolizing completeness and reunion.

#### Practice Pronunciation

Start Recording

#### Ask a Question

Ask about the story...

Ask

Story Completed!

Take Quiz

## Quiz page

### English Learning App

• Level: 1 • Streak: 0 • Question: 1/10

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#### Word Speaking Practice (Level 1)

Say this word in English:

என்ன சொல் பொருத்தமான நிலையில் உள்ளது

(இது நிலையில் உள்ள ஒரு நிலையைக் குறிக்கும்)

For best results, use headphones or earbuds with a microphone.

Start Recording

Hear Example

Audio loaded, playing now...

Submit

Next Question

## Your Results

Correct Answers: 0/10

Current Level: 1/5

Exercise Types:

Word Speaking: 4/3

Sentence Speaking: 0/2

Listening: 3

Writing: 4

Start New Session



# RESULTS AND OUTCOMES

- OCR-based writing feedback from real time handwritten images.
- Real-time pronunciation feedback (score + mistake highlight)
- Adaptive quizzes based on Q-learning and user history
- Interactive storytelling with cultural & vocabulary explanations.
- LLM-generated content (Llama3-70b) at appropriate difficulty levels.

# CHALLENGES FACED

- Accent variations affected speech recognition accuracy.
- LLM prompting required tuning for consistent difficulty.
- Audio processing latency impacted real-time feedback.
- Q-learning parameters needed iterative optimization.
- Cross-origin issues with frontend integration

# CONCLUSION AND FUTURE WORK

✓ Successfully built an adaptive learning system with speech & AI integration.

→ SOON Future Enhancements:

- Offline functionality
- Expanded cultural context database
- Mobile app development
- More language support (beyond Tamil)
- Improved pronunciation visualization tools



# REFERENCES

- The Effectiveness of Immersive Language Learning: [Link](#)
- Q learning IEEE Research paper: [Link](#)
- OCR: [Link](#)
- Sentence-BERT: <https://www.sbert.net/>
- spaCy: <https://spacy.io>
- Groq (LLaMA-3 API): <https://groq.com>