

# Eusarthria

EU being the Latin prefix that is the opposite of DYS. Hence, enabling speech instead of limiting it



## AI-POWERED DYSARTHRIA SPEECH REFINEMENT

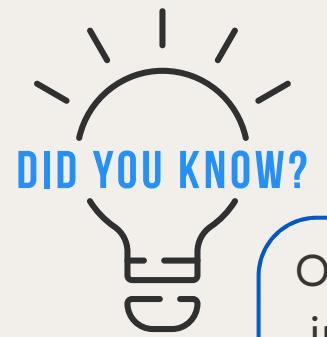
TEAM: 5 NEURAL NETWORKS

# Addressing the Challenge of Dysarthria

Meet Alex, a dysarthria patient who has trouble communicating clearly, making daily tasks such as ordering food, chatting with family, and expressing ideas a constant challenge



- Social Isolation
- Loss of Independence
- Abnormal lifestyle



Over 6 million people worldwide live with Dysarthria, many of whom experience speech impairments like Alex's. 10 million people globally are affected by Parkinson's disease, with 70-90 % experiencing speech difficulties.

# From Reactive Treatment to Proactive Solutions



- **Speech Therapy** is slow, costly, and not always effective.
- Current solutions either depend on clear articulation, expensive hardware, or lengthy training—none of which truly empower people with severe speech impairments.

**How can we make communication for dysarthria patients easier and more accessible?**

# Our Solution

## An AI-Based Speech Refinement System

- **Speech Classification** 🎤 – The user's speech is analyzed and categorized as "Clear" or "Slurred."
- **Text Conversion** 📄 – If identified as slurred, the speech is transcribed into text using advanced AI models.
- **AI-Powered Refinement** 🤖 – The text is processed through our AI model to enhance clarity and accuracy.
- **Natural Voice Reconstruction** 🔊 – The refined text is converted back into speech using an AI-generated, natural-sounding voice.



# Stephen Hawking's Communication System vs. Eusarthria



**Hardware-based** communication system with a speech synthesizer

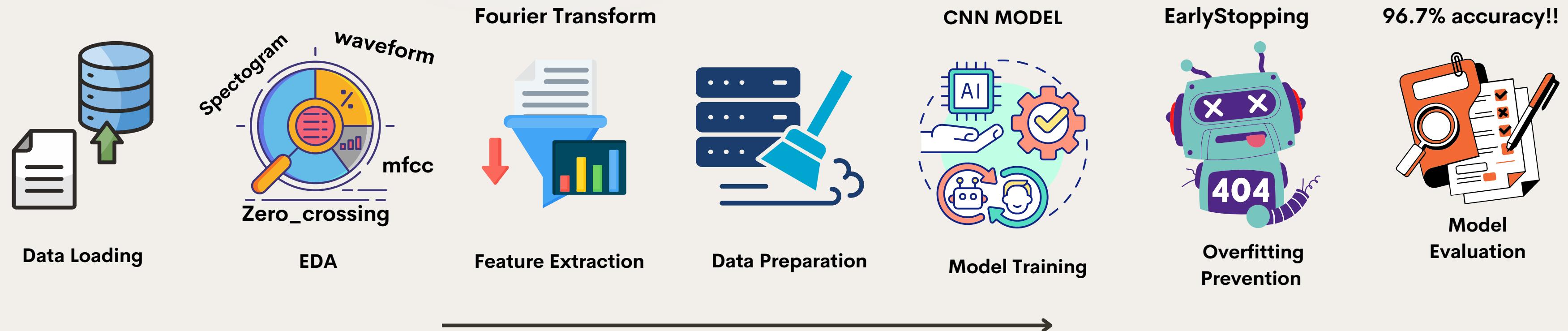
- Slow – need to manually select words/phrases
- Expensive & Bulky
- Primarily for ALS patients, and those unable to speak entirely

Speech refinement using LLMs, purely **software-based**

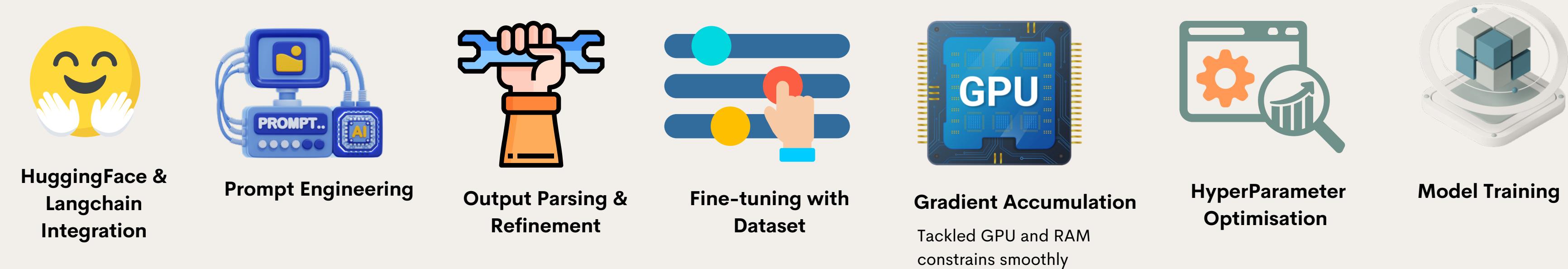
- Users speak naturally, and AI refines output in real-time
- Portable & easily accessible
- Easily scalable

# Technical Overview

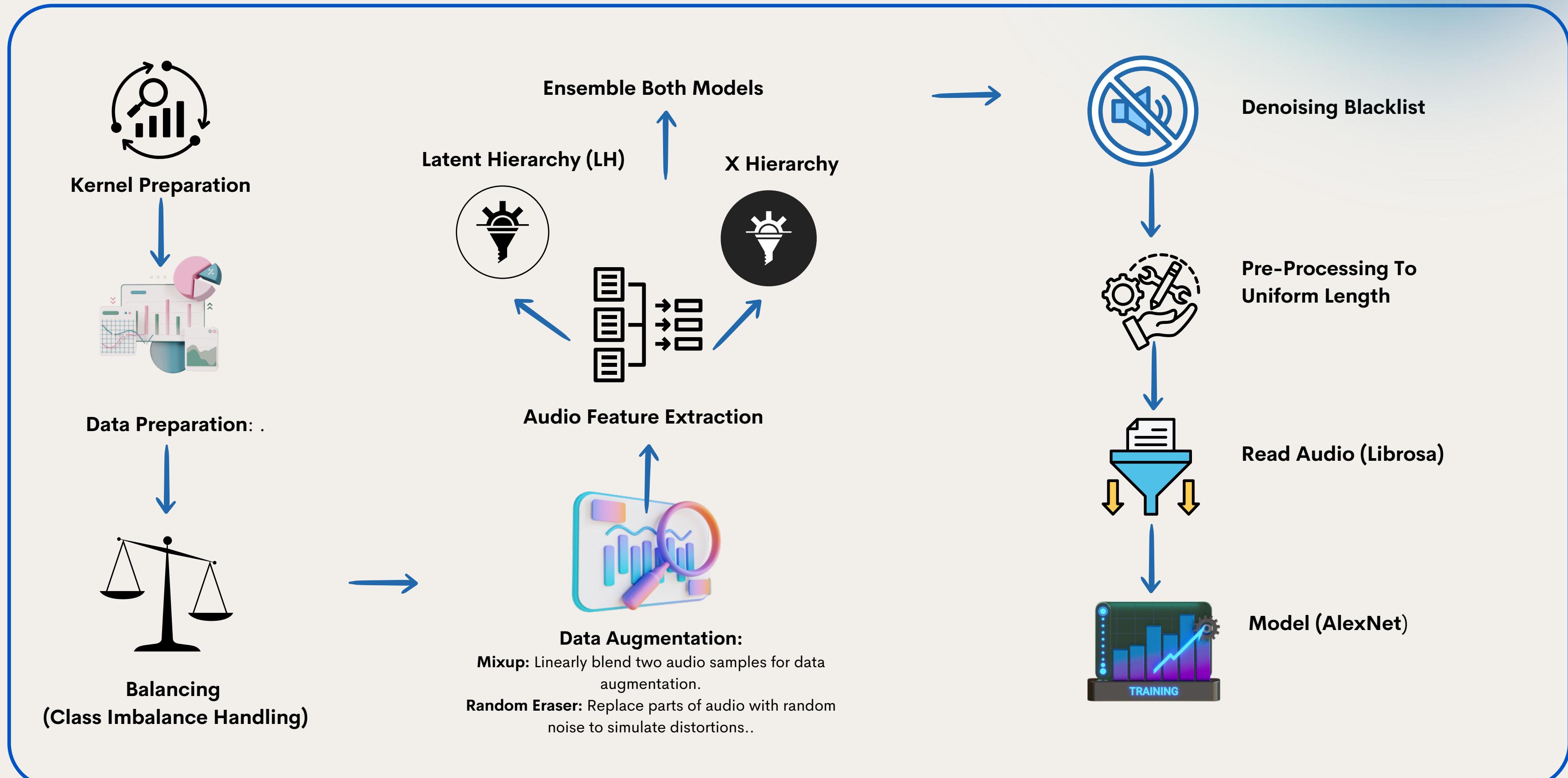
## Dysarthria Classifier



## LLM Refiner (Mistral-7B)



# Audio-To-Text Model



# Empowering Communication

## Instant Accessibility

Hands-free interaction with technology.

## Empathy at the Core

Enhances emotional awareness and Confidence Booster!

## Real-Time Impact

Real-time transcription and sentiment analysis.

## Next-Gen AI

Combining Latent Ensembling, AlexNet, LLMs, and CNNs to set new standards in speech recognition.

## Gradient Accumulation used for GPU - RAM efficiency



# Future Expansion & Potential



## Seamless Wearable Integration

- Future versions will integrate our AI into smartwatches and wearables
- Providing real-time speech enhancement on the go—instant communication, no bulky devices needed!!



## Beyond Dysarthria

- Scalable to support stroke survivors, Parkinson's patients, and neurodegenerative disorders.
- Adaptive AI capable of learning individual speech patterns for personalized enhancement.



## Gamification for Empowerment

- Interactive feedback to track speech clarity progress.
- Highlighting problematic words with pronunciation suggestions.
- Motivating users with achievement milestones for continuous improvement.

# THANK YOU!!

