Progress Review - 02

Sinhala Dialogue Management Tool to Screen Kids with Autism Spectrum Disorder

Project ID: 2021-006

Our Team

Supervisor: Prof. Koliya Pulasinghe

Co Supervisor: Ms. Vijani Piyawardana

Group Leader: Gunawardhana MDRT

Member 01: Herath HMDN

Member 02: Anjali RPDN

Member 03: Sampath GADM

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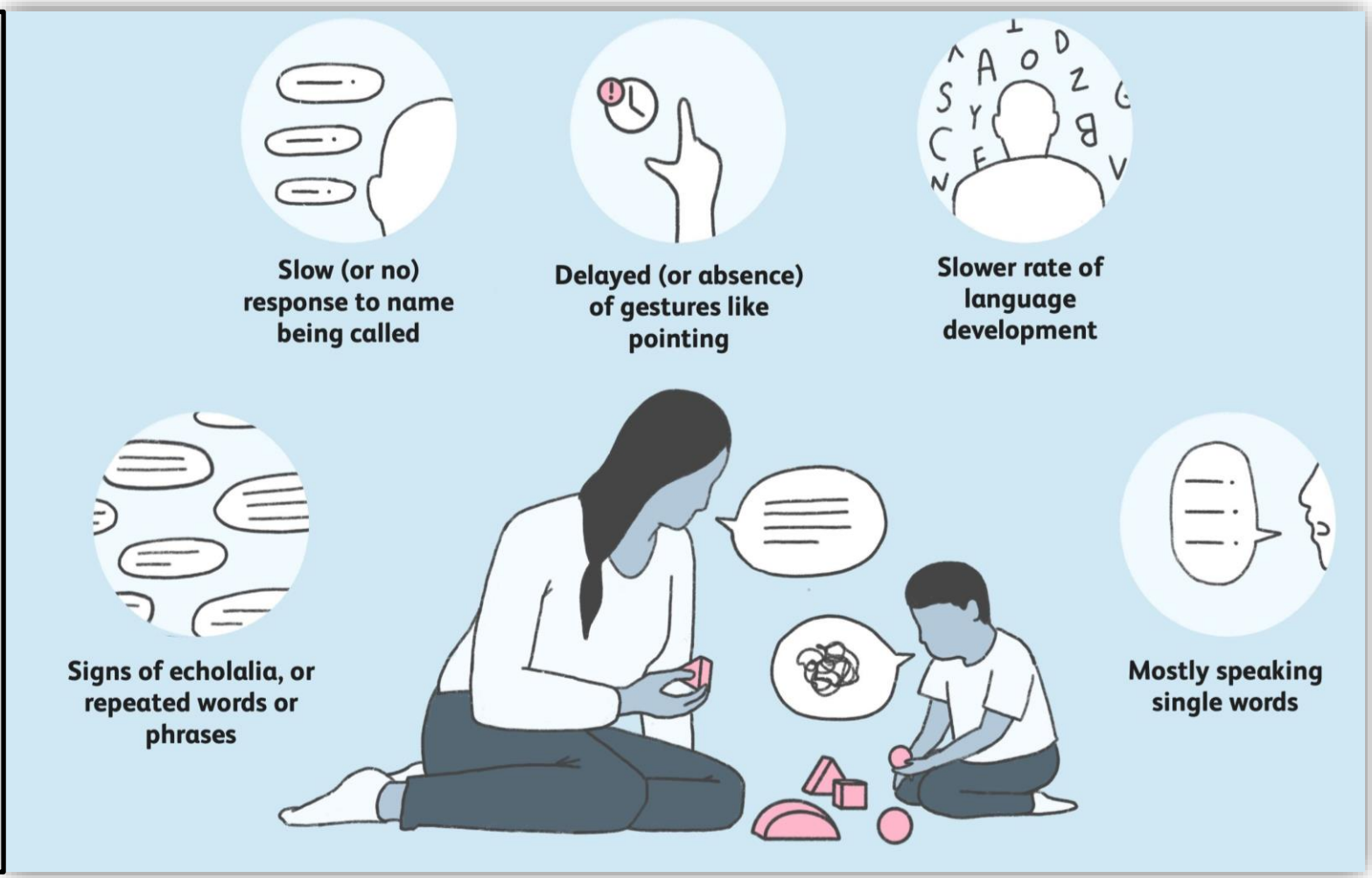
Introduction

- Autism spectrum disease (ASD) is a developmental incapacity th at can motive full-size social, verbal exchange and behavioral challenges.
- In the previous few years there hasn't been a desirable way of figuring out Autistic teens in Sri Lanka.
- Early identification and prognosis are vital to en hance the scientific results of the people with ASD. (6 months to four years of age- Early language improvement age)

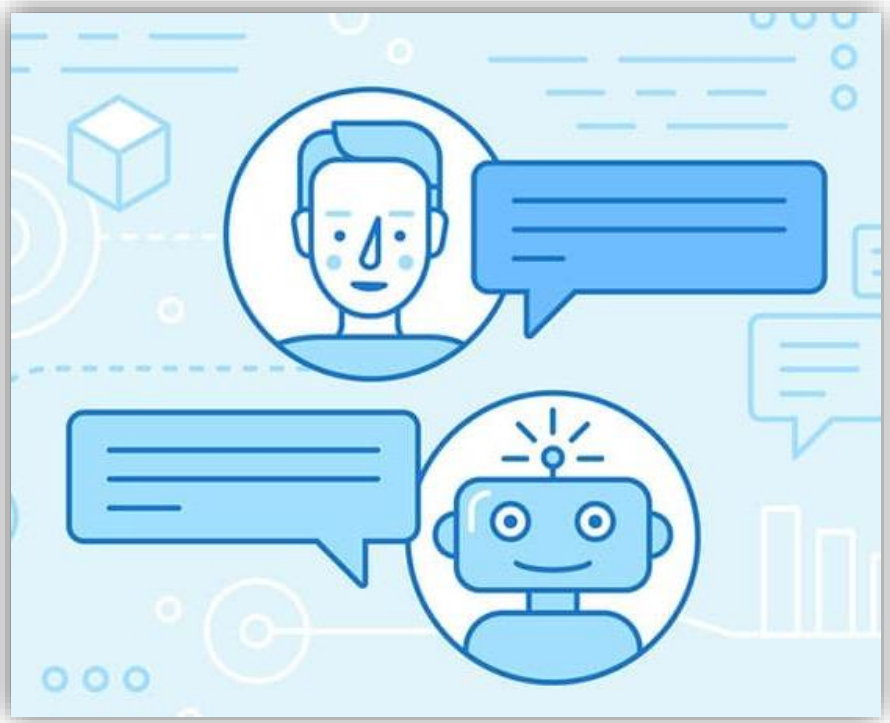


Research Question

In Sri Lanka

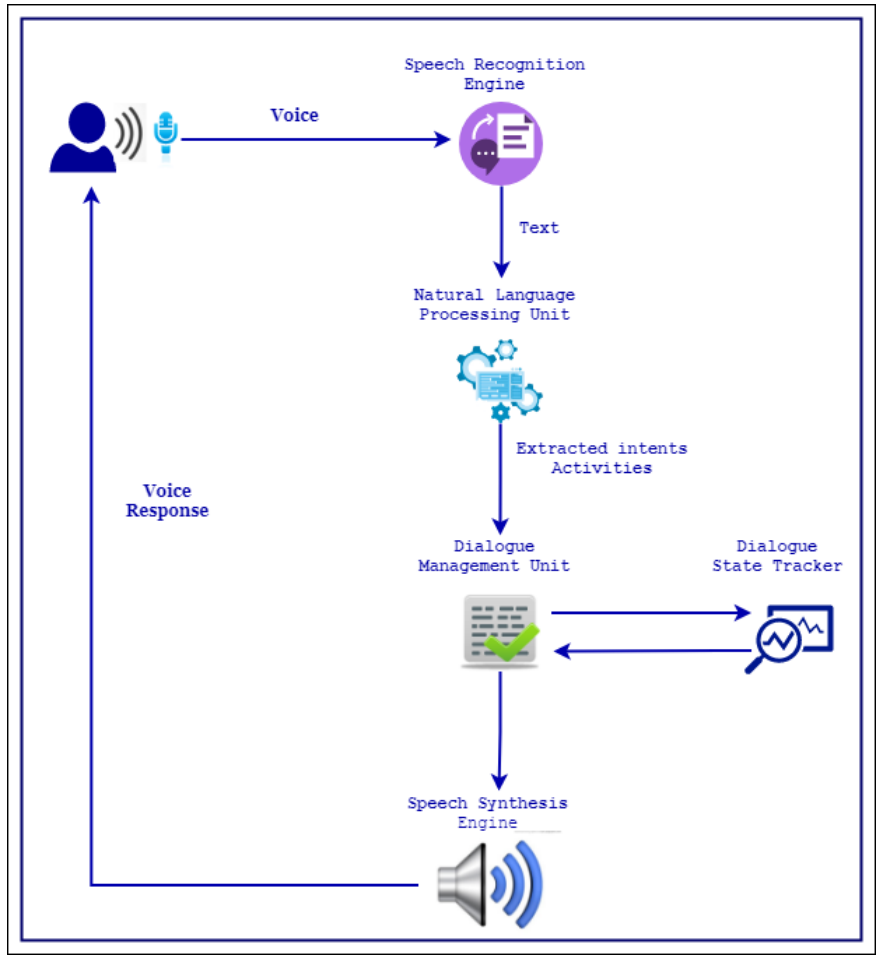
- Approximately 1 in ninety three (1.07%) of the teens has ASD.
- The standard cognizance and perception is lack related to autistic kids.
- In Sri Lanka, a obligatory culturally touchy and unique screening of toddlers and youngsters is restricted to the giant hospitals in Colombo and different city areas.
- Parents of autistic youth are frequently left on my own with their troubles and do no longer have get right of entry to sufficient help and information about their child's condition.
- Any intervention or therapy associated to autism is greater advantageous the until now it starts off evolved and the extra steady it is applied.[4]

Proposed Solution



ASD.AI is a computing device learning-based computerized autism screening device which offers a answer to decrease or cast off error-prone, inefficient human intervention in the field, unavailability of aid for the Sinhala language, unease integration with current applications, and incapacity to instruct the usage of preceding data.

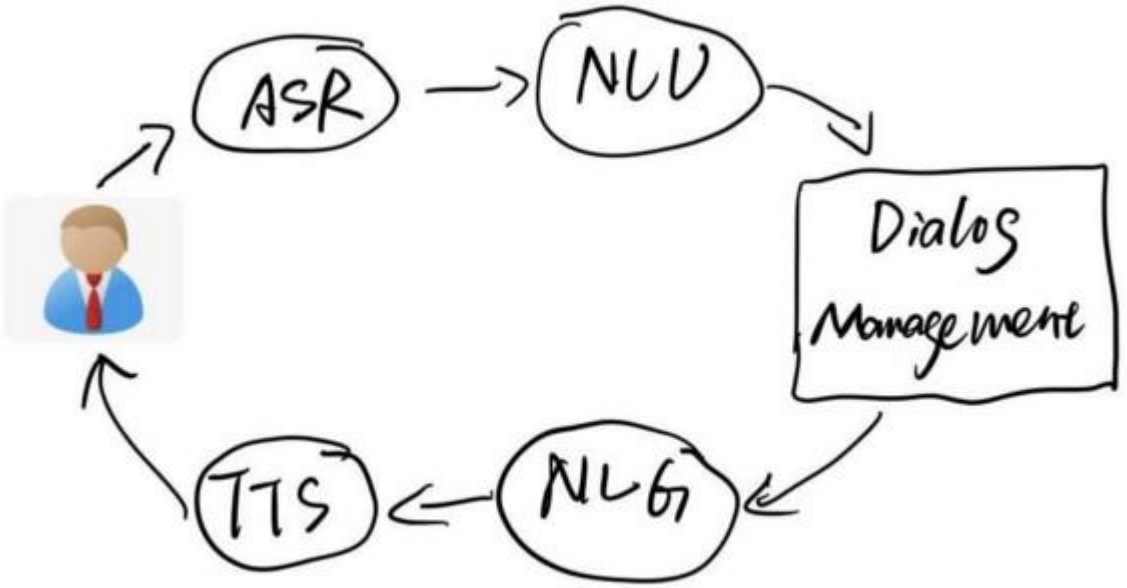
System Diagram of Proposed Solution



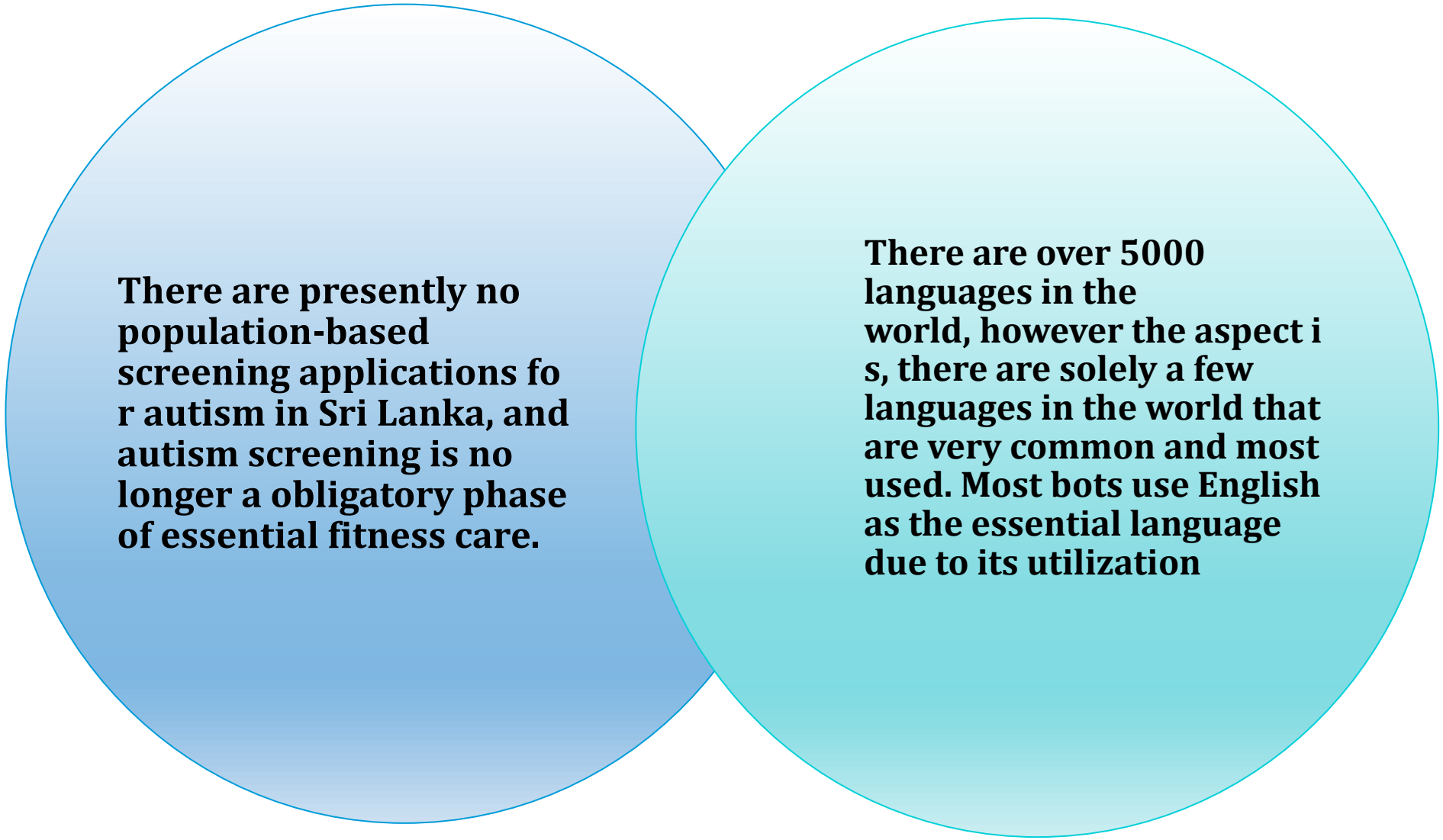
Work Breakdown Structure

DIALOGUE MANAGEMENT COMPONENT

Gunawardhana MDRT
IT16090804



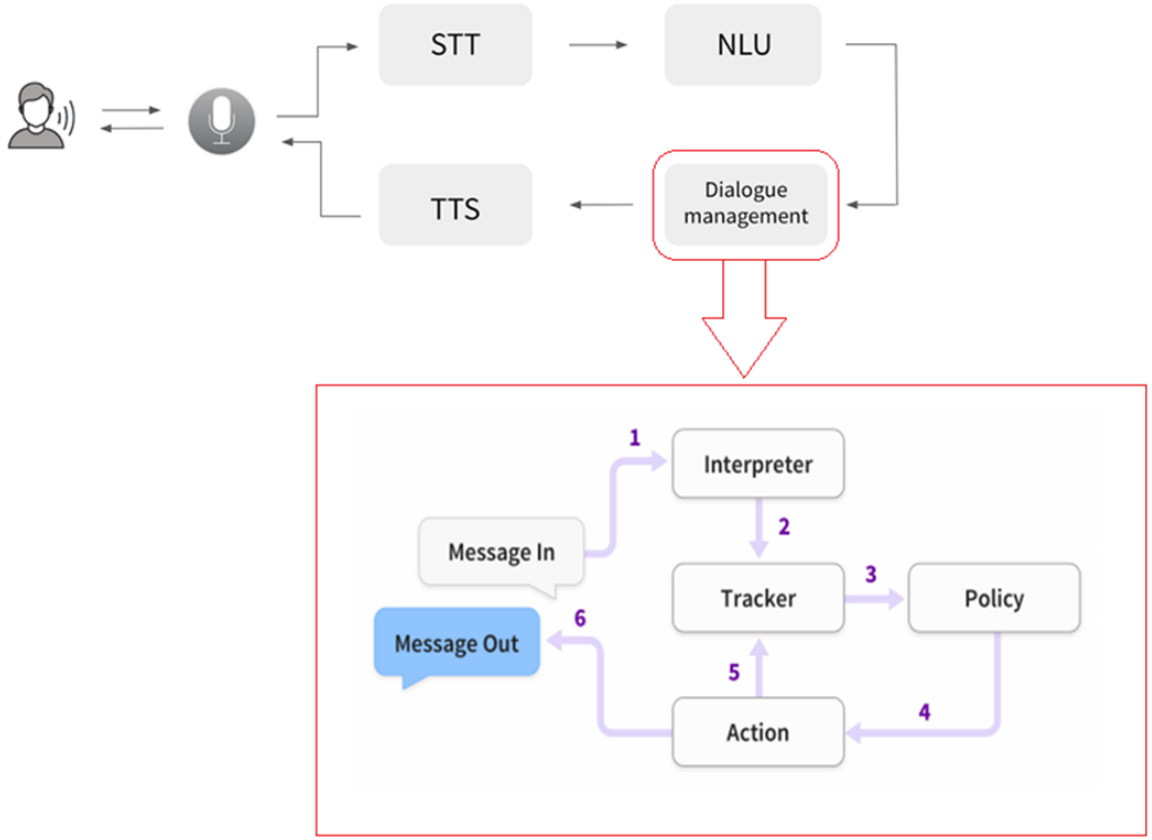
Research Question



Objectives

- **To control ongoing di alog dialogues with the useful resource of a computer gaining knowledge of algorithm**
- **To educate based totally on preceding dialog statistics**
- **To function moves via interacting with an exterior device by using API, question et c..**
- To add **exterior machine interplay** to the **dialog**

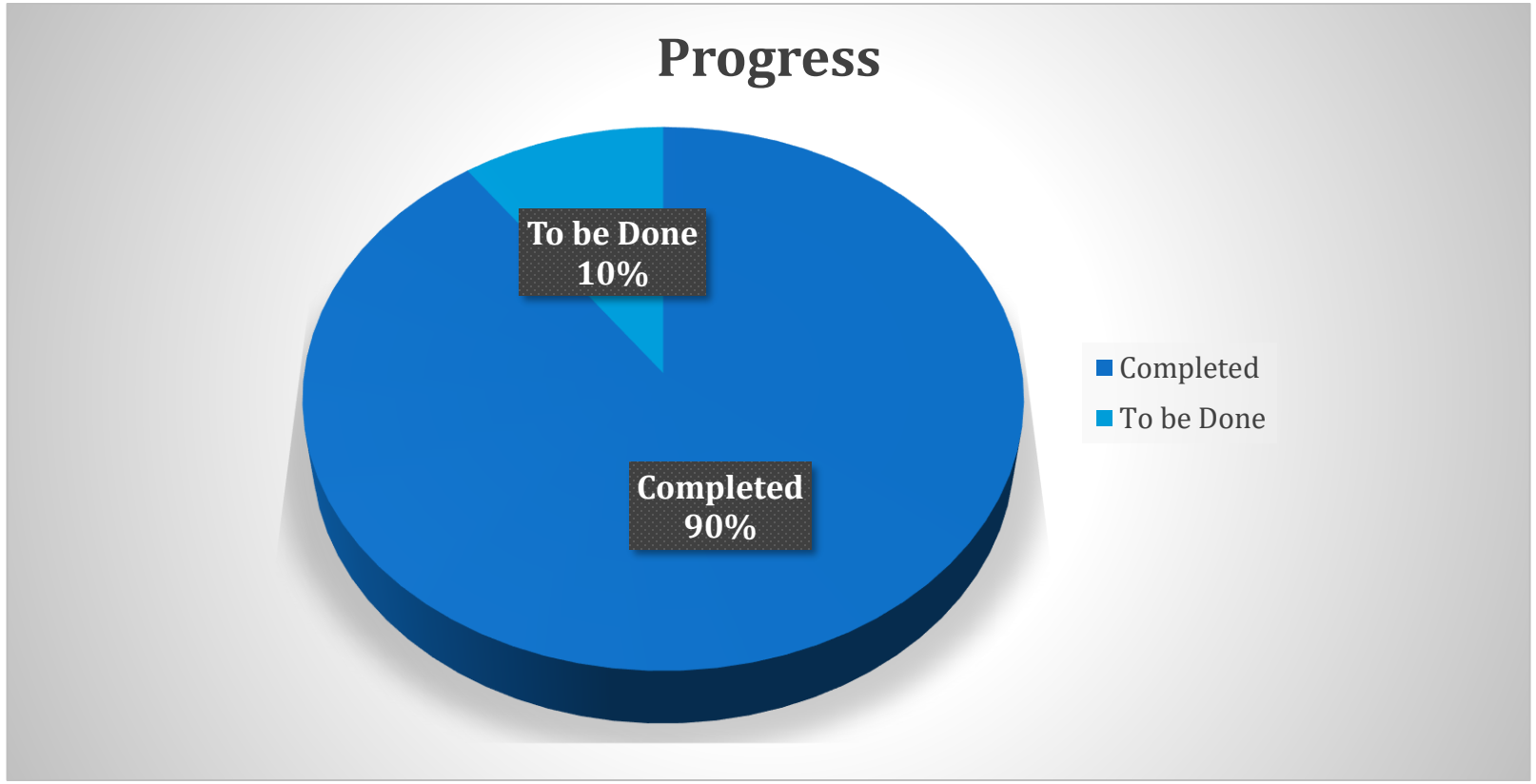
System Diagram



Methodology

- Rasa Core predicts which motion to take from a predefined list. A motion can be an easy utterance, i.e., sending a message to the user, or it can be an arbitrary characteristic to execute.
- When a motion is executed, it is handed a tracker instance, and so can make use of any relevant statistics gathered over the records of the dialogue: slots, preceding utterances, and the consequences of preceding actions.
- Actions can't at once mutate the tracker, however when achieved may also return a listing of events.
- The tracker consumes these activities to replace its state. There are a wide variety of special tournament types, such as Slot Set, AllSlotsReset, Restarted, etc.

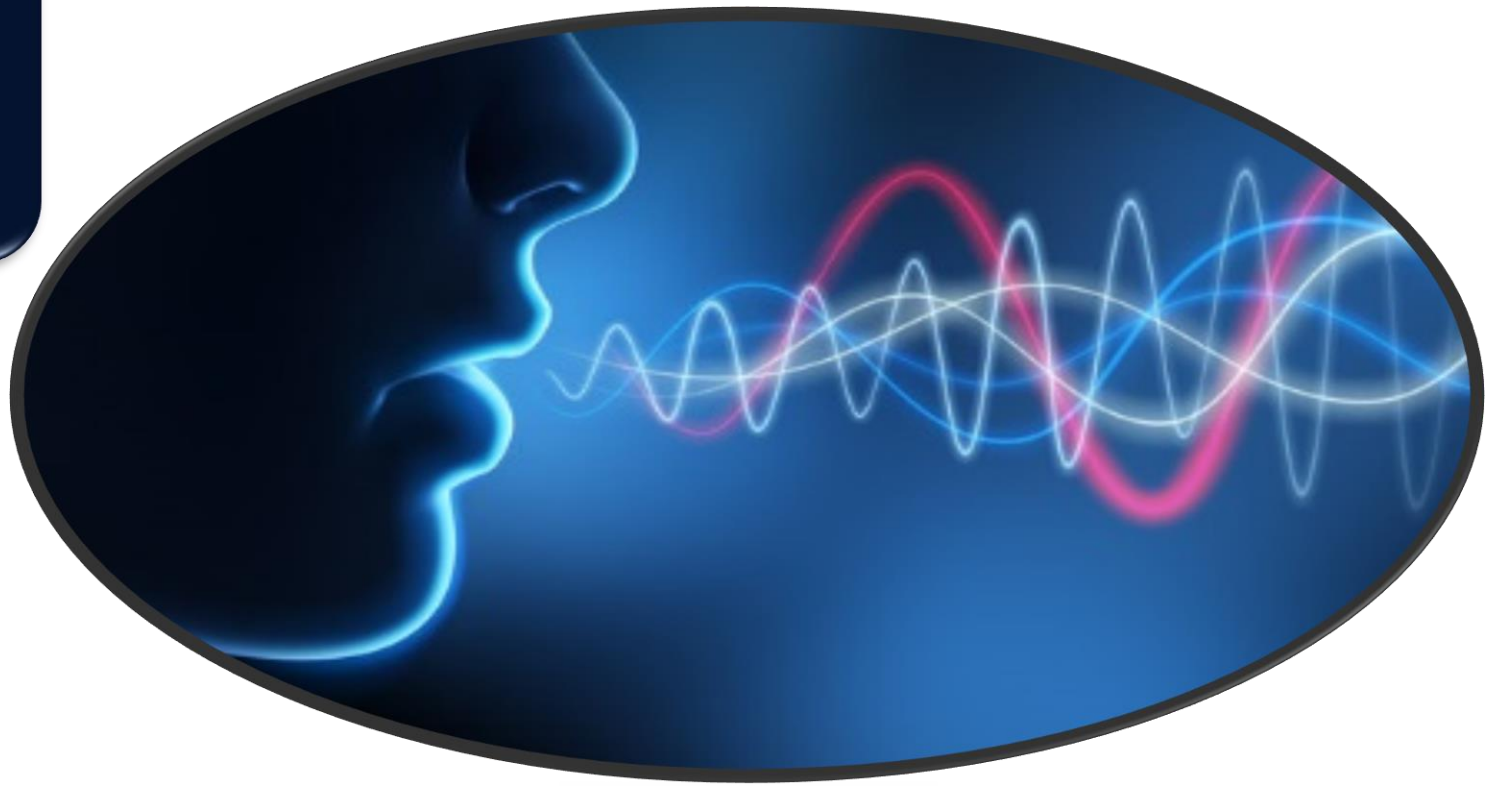
Progress at the Moment



Progress Status

Completed	Further Improvements
• Implementation of a dialogue management system to effectively manage the conversations between kids and the system for a specific domain of concern (e.g., Kid's preferences) in English language. • Improving the system for it to suit the domain of screening kids with autism disorder and the Sinhala language.	• Improve the UI as user friendly. • Data analysis.

SINHALA SPEECH RECOGNITION COMPONENT

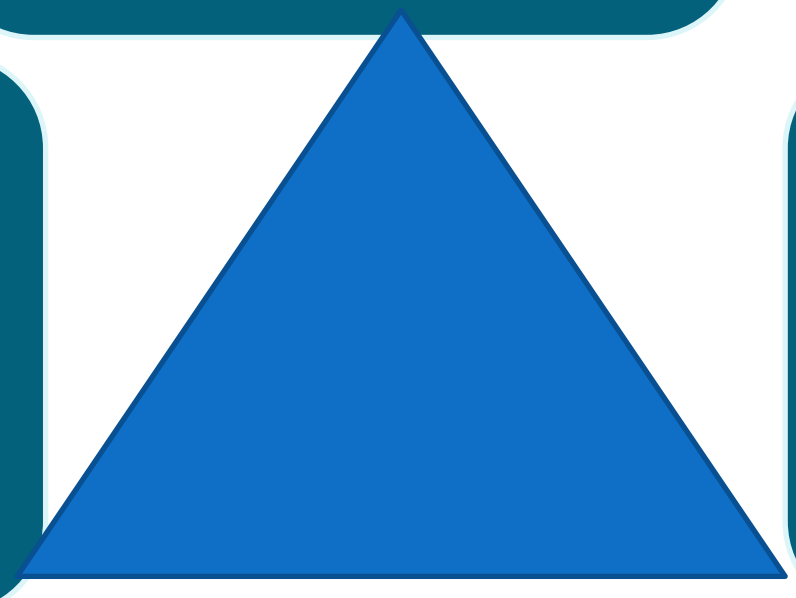


Anjali RPDN
IT17109536

Research Question

Although many of these structures help languages help languages round the world, we have but to discover a single platform that helps Sinhala.

Basic vocabulary for speech recognition: The incapability of the machine to understand a ma ssive variety of words.



Lack of readability of speech fashion and lack of ability to understand phrases d ue to heritage noise.

Objectives

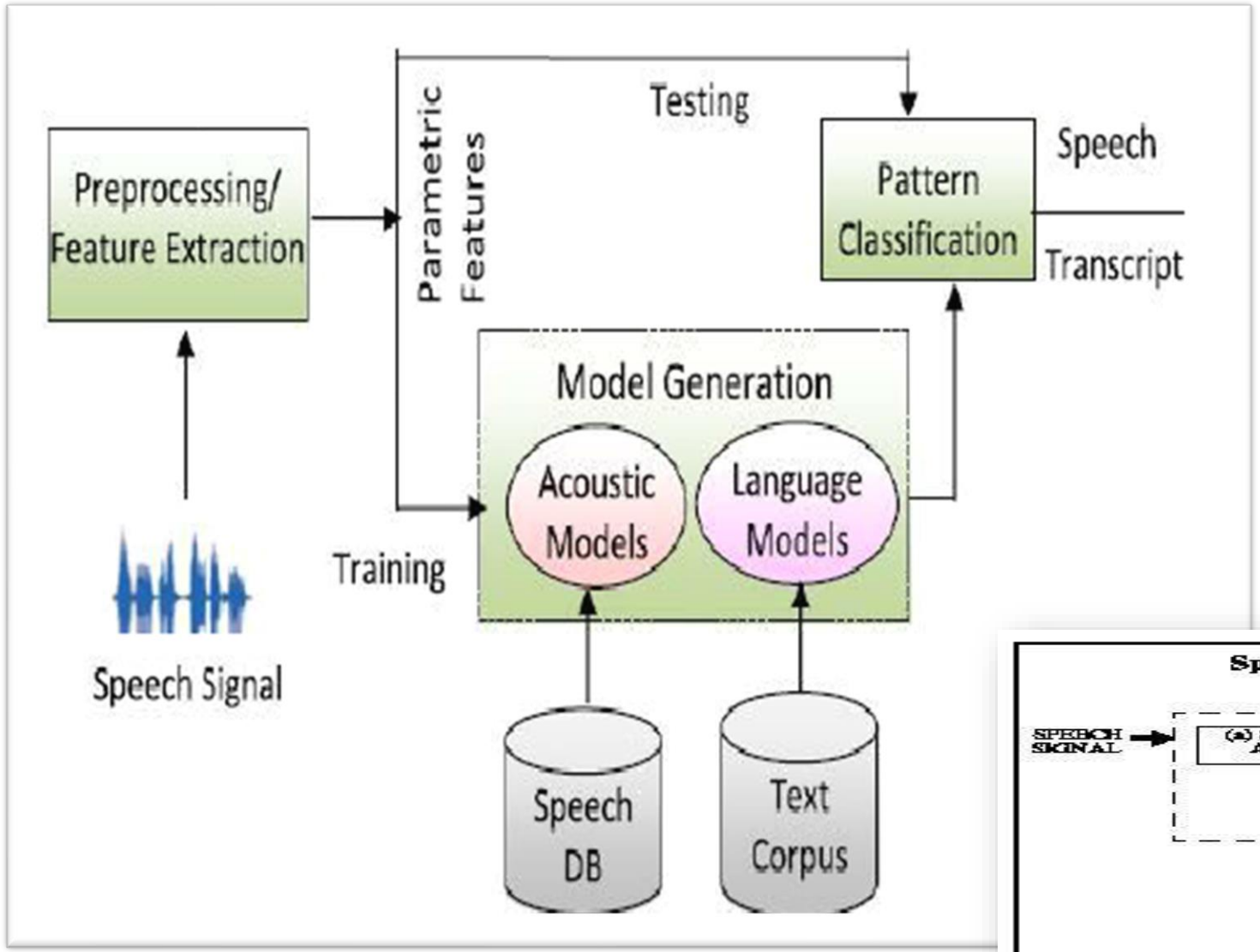
- To support both English and Sinhala languages.

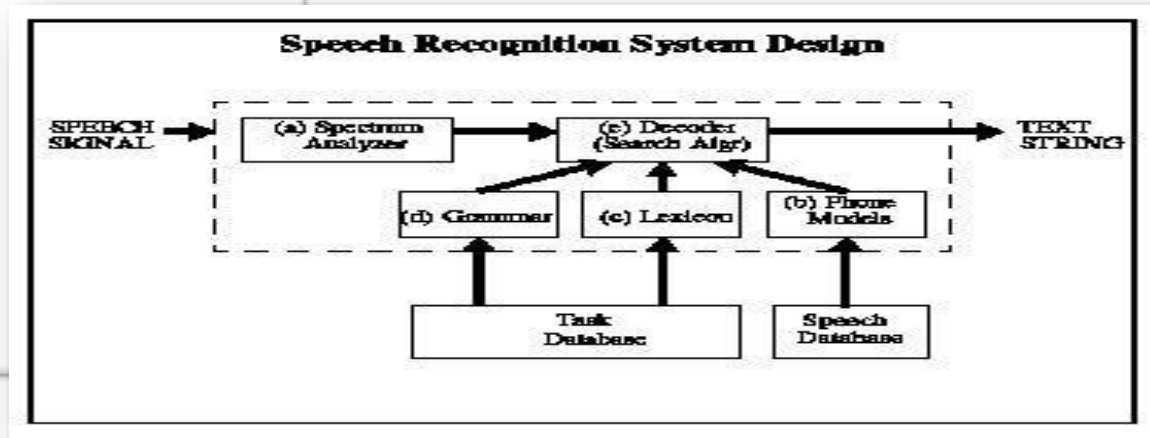
- **To locate a way to distinguish between unique sound waves from the host in accordance to the heritage noise.**

- **To if the equal phrase can be mentioned differently, the spelling and phonology of the identical phrase will alternate and the software program will discover a way to understand it correct.**

- **To locate a way to distinguish between unique sound waves from the host in accordance to the heritage noise.**

System Diagram

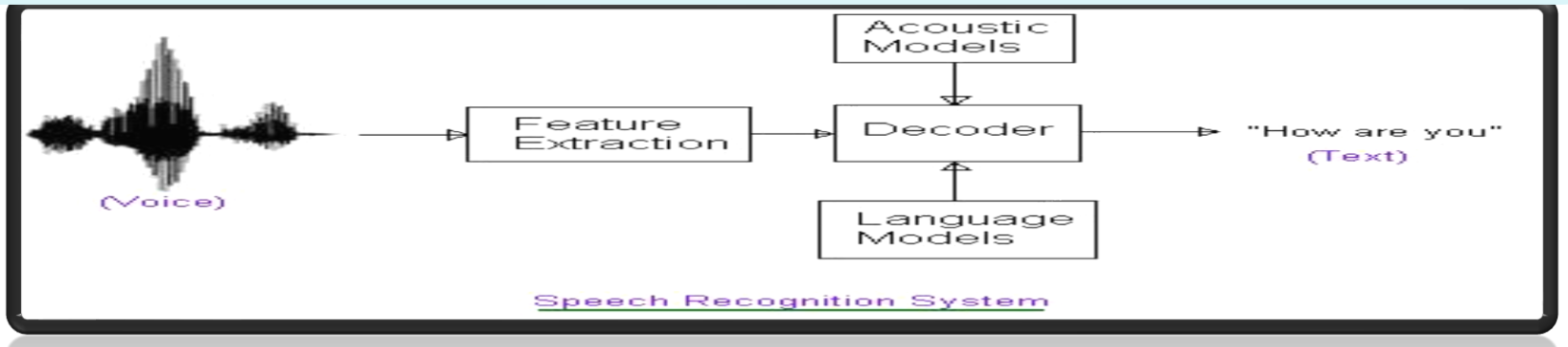




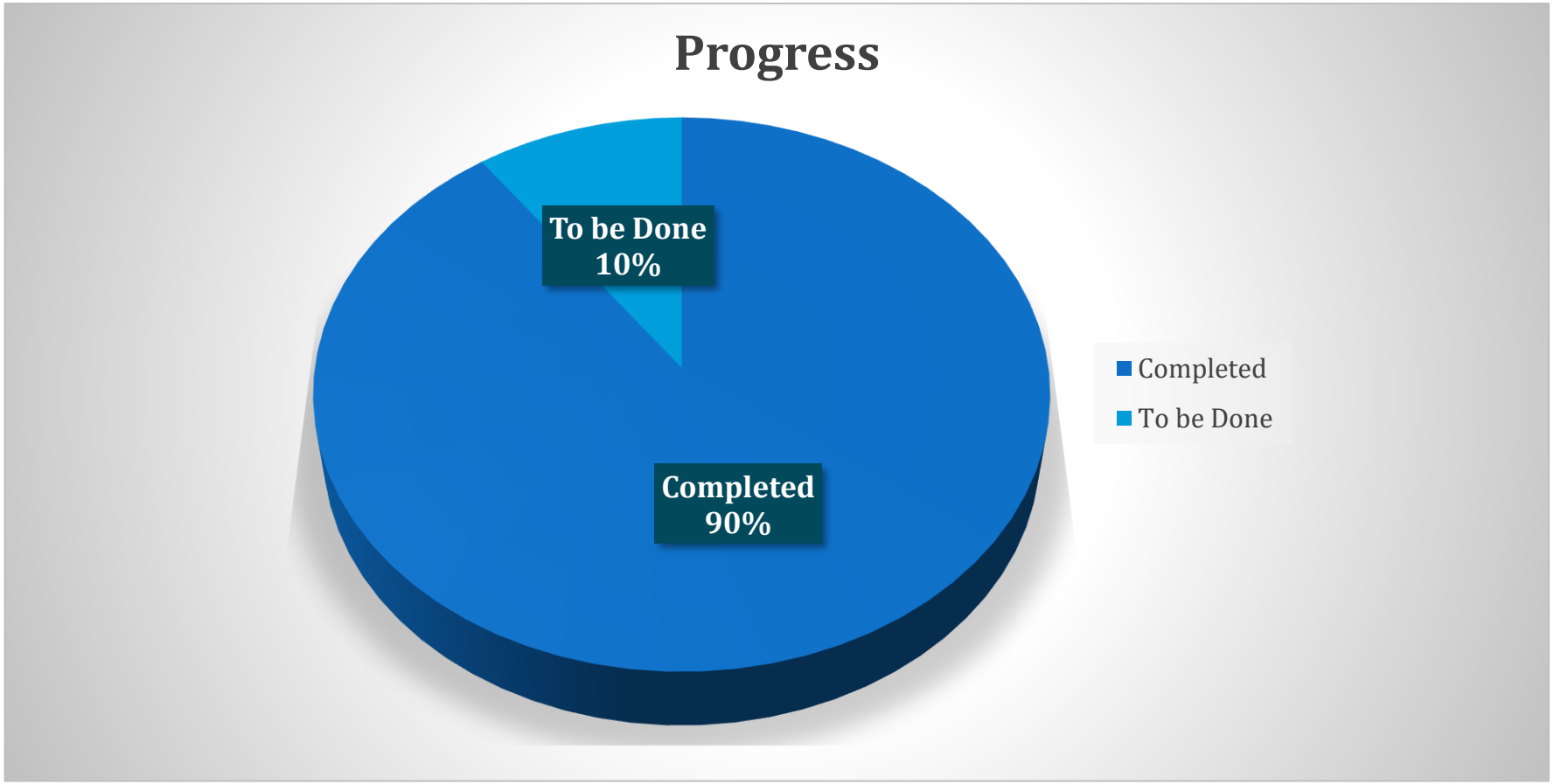
Methodology

- This can be considered as an inverse operation for speech synthesis system. The kids' voices will be enter into the system..
- The Speech awareness unit ought to be the first to get the enter voice and convert it to a textual content transcript for Natural language processing unit input System should be able to get the voice from the user in a trained language.
- Digital sampling of the enter speech in a educated language.
- Spectral evaluation of digitized speech enter understand phrases and utterances

Convert speech into text and keep as textual content transcripts.



Progress at the Moment



Progress Status

Completed	Further Improvements
The speech to textual content conversion module is made the usage of the Speech Recognition python library and is carried out on vs code. This module applied for audio taken from a microphone. and for the Sinhalese language so that real-time Speech to textual content Conversion is feasible for voice data.	Improve the UI as user friendly.

SPEECH SYNTHESIS COMPONENT

Sampath GADM
IT16061880

ASD.AI

Research Question

There are many TTS systems exist for many languages. Most of them are developed to cater with English language and not in Sinhala language.

There is a general lack of awareness among Sri Lankan society regarding kids with ASD.

The existing voice synthesizers are not consisted of every verbal language on earth.

Objectives

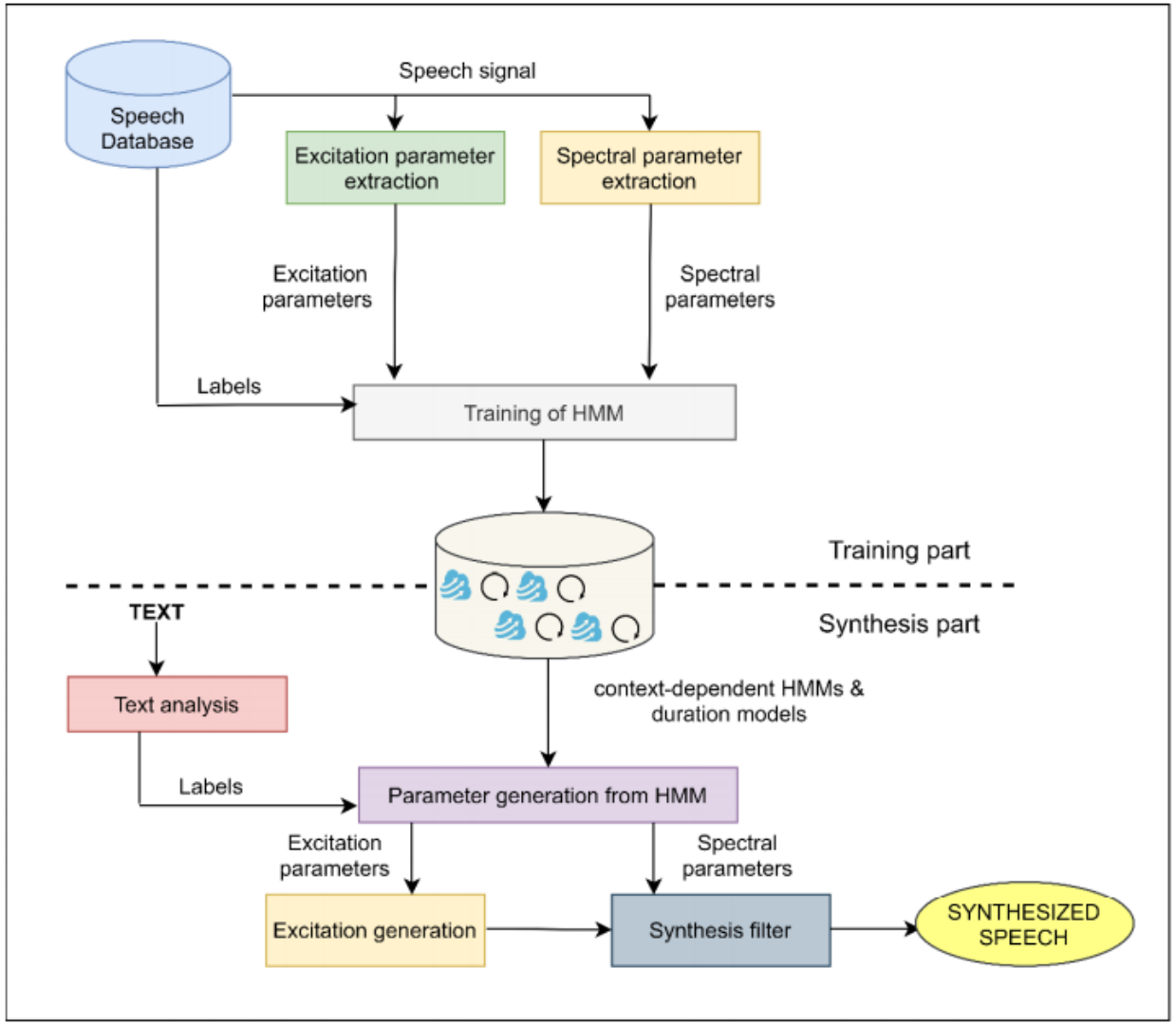
To develop a fully featured complete Sinhala Text to Speech system that gives a speech output similar to human voice while preserving the native prosodic characteristics in Sinhala language.

To develop a TTS system with the ability to maintain a real-time conversation with Autistic kids.

To develop a TTS system to pronounce the given text with proper rhythm, melody.

To find correct pronunciation, for different contexts in the text and to find correct intonation, stress, and duration from the text.

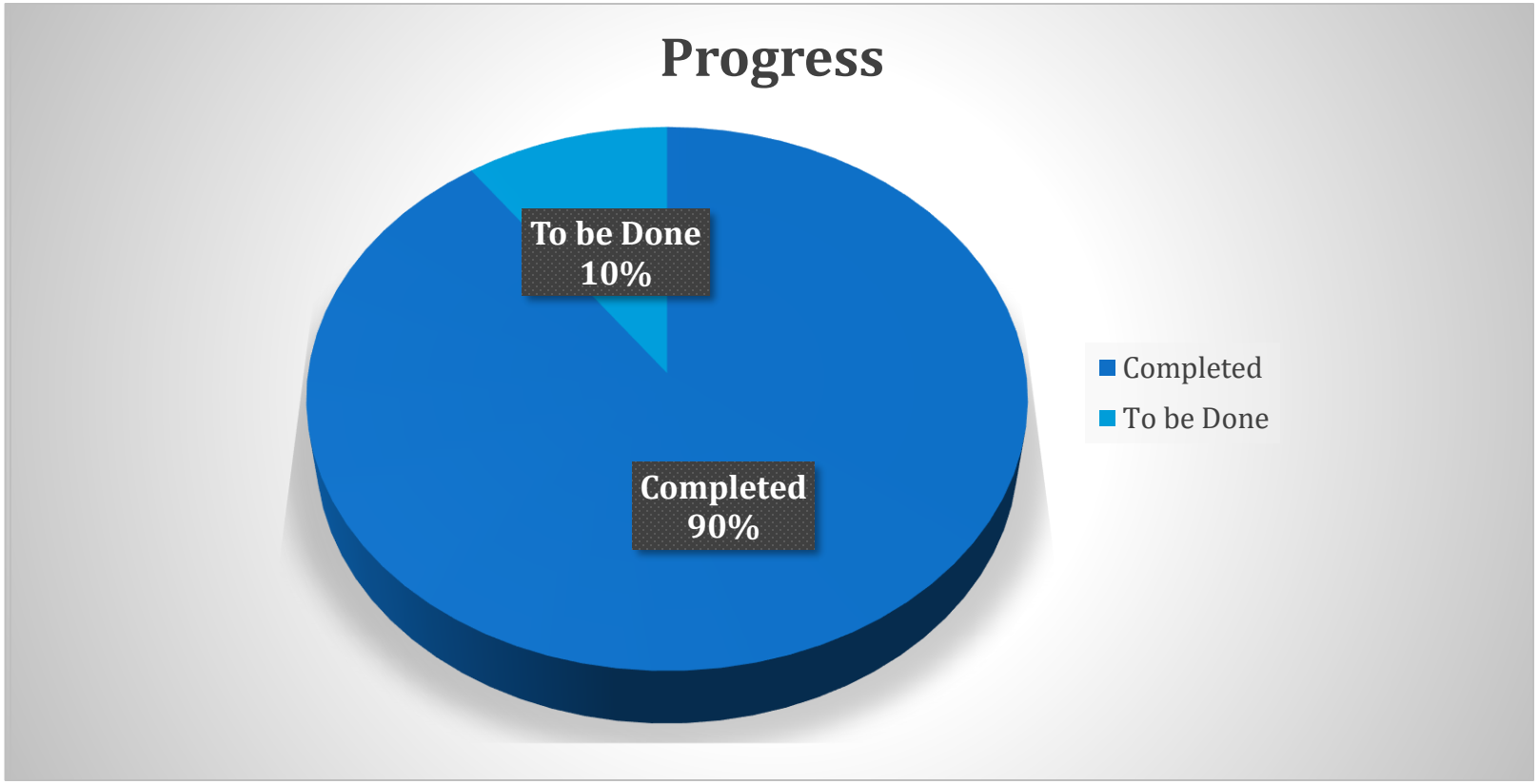
System Diagram



Methodology

- The system has mainly two parts; Training part and Synthesis part
- There is a speech database in training part which is used to excitation parameter extraction and spectral parameter extraction.
- After that model will be trained with HMM.
- In the synthesis part there are context dependent HMMs & duration models.
- The given text will be analyzed first and generated the parameter from HMM.
- Then the synthesized speech will be created using the generated excitation parameters and spectral parameters.

Progress at the Moment



Progress Status

Completed	Further Improvements
• Completed implementing Deep Voice 3 and Wave NET implementation in English language. • Implementation of this system for Sinhala language.	• Improve the UI as user friendly.

Natural Language Processing Component

IT18081794
HERATH H.M.D.N

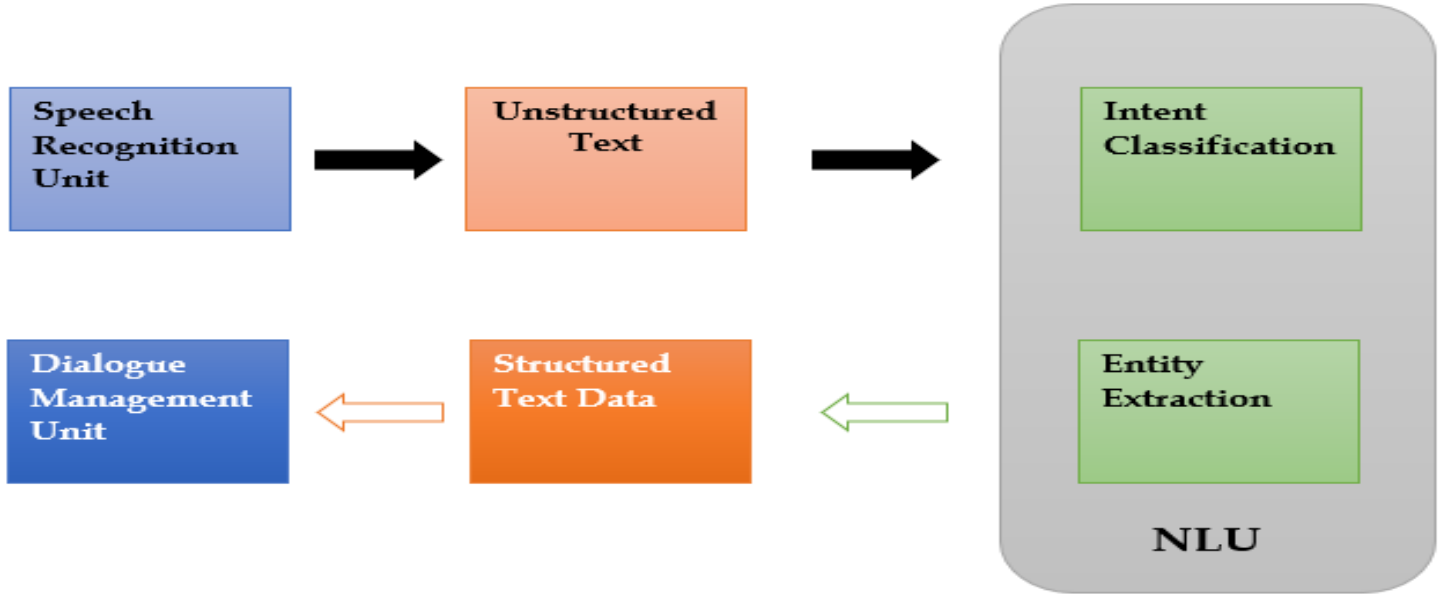
Research Question

- NLP is the approach where computers can understand and process human languages
- Absence of standard ASD screening tools in SL
- Limitation in gathering required prevalence data due to difficulties in screening capacity
- Need for a screening tool with a higher efficiency and ease of use
- Screening tool should be customized to Sinhala language support

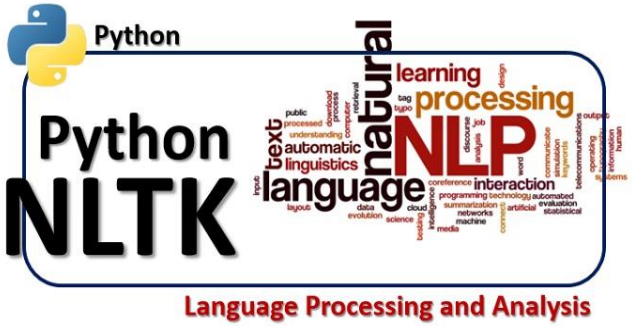
Objectives

- **Develop a customized NLP tool with Sinhala language support as a component of Machine Learning based automated autism screening tool**
- Reduce or eliminate error-prone, inefficient human intervention
- Efficient and robust performance
- Increase availability
- Simultaneous user access
- Cost effectiveness
- Increase overall quality and the productivity of the service

Individual System Diagram



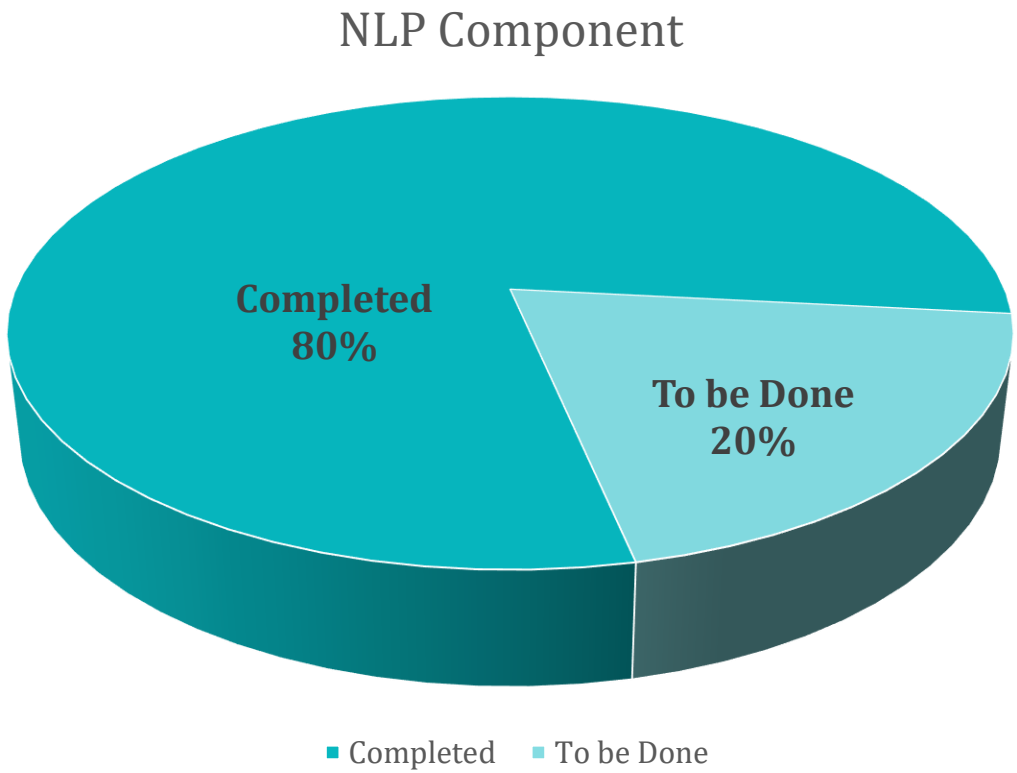
Methodology



- Why NLTK

- Supervised learning model
- Customizability with other languages
- Ensures the privacy of datasets
- Ability to plug in pre-trained models for unique datasets
- Ability to handle multiple intents in a single message
- Out-of-the-box model testing capabilities to be more accurate over time

Progress at the Moment



Progress Status

Implementation has been further enhanced to Sinhala language and works as an integrated system.

Implementation will be further trained for accuracy.

DEMONSTRATION

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THANK YOU!