Novel Approach to Design and Implement a Multi-Language Converter Using Machine Learning Techniques

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Abstract—This paper describes the multi-language translator application which fills in as a mediator connecting two people holding a conversation using various languages. This framework can translate any language which is written or spoken by a client to any language in which the client needs. To achieve this task, our system works on three separate models: voice to text conversion model, text to voice conversion model and translated model. Our translator will help the tourist and businessmen traveling to foreign countries with alien language which is the primary correspondence obstruction between the individual situated in various nations. It will be beneficial for them to find restaurants, toilets, hotels, libraries, etc.

Keywords—Translator, Machine learning, Model, Voice-to-text (vtt), Text-to-voice (ttv).

I. INTRODUCTION

The improvements in the field of Science and Technology have made this world a Global village. Modern modes of transportation and communication have bridged the gap between different countries. Modern transportation facilities advanced enough to carry people from one side to the other side of the globe in hours and the communication is fast enough to carry the sound to anywhere in the world in seconds. Different countries have different cultures and without communication, the country is over closed that may cause disaster.

As the human history have proven again and again, the people who don’t share our culture or language we consider them as our enemies, and if we are not able to understand others, and express our feeling and emotions the xenophobia take place [2].

The difference of language proves to be the biggest barrier in bringing this interconnected world further closer to each other where people are bound with each other through economics and commercial interest [3].

So it has become very important that we come up with effective ways to break communication barriers between the people speaking different languages. This application will help break the communication barriers for people travelling abroad to foreign countries. It will be helpful for students, businessmen and people who like travelling to new destinations. This translator will help people in transportation through different destinations, visiting historical places, reading the local newspapers and signboards and understanding the true sentiment of the people. Often in foreign country, People get stuck at strange places because they are not familiar with the local language and it is impossible for them to read the different enlisted bus routes. With this translator you can either write in the sentence from Urdu or any foreign language and it will translate that sentence into your desired language. Furthermore this translator also works on voice notes meaning you can
read a sentence from Urdu and it will translate it into any foreign language. This translator will greatly help in making communication easier for the people.

II. METHODOLOGY

The methodology of multi-language translator application is presented in figure 1. This application depends on three main parts: text to voice conversion, voice to text conversion and translation model. First in the application, user will select how he wants to give the message (text or voice). If he selects the voice then the message goes first to vtt model which converts the voice into text and then translation model or if he selects the text then directly the message goes to translation model. In the last if the user wants output in text then it gives directly output or if the user needs in voice then the input from translated model go towards to ttv model which converts text into voice and then it gives an output.

![Flowchart of the methodology of the system](image-url)
A. **Text to voice**

Text to voice conversion model is a framework in which you input the text in any language which is first analysed then processed and understood and after that model converts the text in to voice. The model of text to voice is shown in figure 2.

![Text to voice generation model](image)

**Fig. 2. Text to voice generation model**

B. **Voice to text:**

Voice to text framework is utilized for conversion of voice into text. In it voice is an input, then model extracts the features from that voice and after seeing acoustic and language model it decodes the information into text. The framework is shown in figure 3.

![Voice to generation model](image)

**Fig. 3 Voice to generation model**

C. **Translated model:**

Translated model converts the message in to specified language. It uses neural machine translation model which first encode the input into context and then decode it into specified language. The process of translated model is shown in figure 4.
III. CLASS DIAGRAM

Fig. 5 Class diagram of an app

IV. FUNCTIONAL REQUIREMENT

A. Obstacle Avoidance

Obstacle avoidance is the important aspects of this project. Without any movement of the robot, the system become restricted and fragile. Ultrasonic sensor provides an easy method for the measurements of distance. This sensor used for obstacle avoidance applications that allow you to measure path between moving or stationary objects. For the echo return pulse ultrasonic sensors are used and measure the time as well, and returns the result to the microcontroller as a variable-width pulse from the same I/O pin. Ultrasonic sensor can work with in 3m to 3cm range with any lighting condition.

B. Smart language recognition

Language of chat is automatically recognized by the application.
C. Do Not Translate Capability:

Cannot be capable of translating every word such as slang languages name of countries and human names. In this application, user can mark the proper nouns or the words which he or she does not want to translate. For example, the word “Pakistan” should not be translated.

D. Comprehensive Dictionaries:

For more perfect translation, specialized dictionaries can be downloaded that contain specific topics.

1) Driver and Passenger: Most of the times drivers find them self in situation where the passengers travelling with them don’t know the same language or at least not fluent in it, this makes it very difficult for them. Especially when the passenger doesn’t know the name of its exact destination.

2) Customer and Employee: Many times people from rural areas of Pakistan come to shop in urban areas to shop and find them self on the pity of others because they are not able to communicate effectively because of the language they speak are not understood by the salesman.

3) Doctors and Patients: Doctor is considered as a noble profession, they help people in the time of sorrow and grief, but sometimes they find themselves bounded by the scenario from helping people in need. For example whenever there is some kind of natural calamity when they have to travel from their region to some far reached and remote areas the barriers of language plays an important part.

4) Tourist: Whenever we plan our trip our first concern is language, we hope that we knew the language so that we could have been familiar the people, with their cultures could have introduced them to our culture and make the world free from xenophobia, we could have shop freely, could have visited any place of our.

V. APPLICATION USER INTERFACE

The application user interface of our system is shown in figure 6.

Fig. 6 User interface of an app
VI. COMPARISON

Table 1. describes the comparison among the different similar systems and propped system

<table>
<thead>
<tr>
<th>Proposed design</th>
<th>[1]</th>
<th>[4]</th>
<th>[6]</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 15 can be translated</td>
<td>Only Arabic is translated</td>
<td>4 language is translated</td>
<td>5 Indian regional languages</td>
</tr>
<tr>
<td>70% to 80% accuracy</td>
<td>70% to 80%</td>
<td>60% to 76% accuracy</td>
<td></td>
</tr>
<tr>
<td>1-2 sec to translate a sentence</td>
<td>2-3 sec to translate a sentence</td>
<td>1-2 sec to translate a sentence</td>
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</table>

VII. CONCLUSIONS

The purpose of smart translation application is to connect people of different countries by breaking the language barrier. It will help tourist, passenger’s doctors, and even employees who are facing the language issue this system will definitely help them to communicate with each other. Through this application you can even learn new languages.

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REFERENCES