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A complete AI driven voice and
chat system for assisting air-
travel passengers



The current problem

Airports today are basically a great culmination effort to show us that the world has infact become a global village. We can find people of different languages, size, colour and shape. It was said that language was a key factor that contributed to the diversity of the planet and prevented many people groups with a different tongue to communicate effectively. This has been resolved for the most part due to technical advancements in this and the last decade. Today, we have several freely accessible services that allow people to communicate with each other.

Many such examples can be found even in the lingua franca of the world, English, with the different countries across continents speaking this language.

As many airports today move towards becoming all English, with hardly one regional language available for communication, it becomes really important to in As a result it becomes really difficult for non-native speakers to access the services at the airports where majority of the services are in native level English.

We at Serendipity noted this promising and significant issue to work upon, and applied our part to unite and power-up the air-travel community.



Our Solution

A complete AI driven voice and chat system for assisting air-travel passengers

We used a 2 dimensional Convolutional Neural Network for the purpose of data analysis and classifying the different accents. This finally leads us into enabling to identify the user's dialect

Sampling, classifying, and analysing differing dialects

For our purpose, we used the Speech Accent Archive, a dataset presented by the George Mason University

Implementing a Deep Learning Model using a 2D-CNN

This deep learning model enables us to find out the accent of the user after analysing the previously assessed datasets.

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Taking voice/chat based input from user

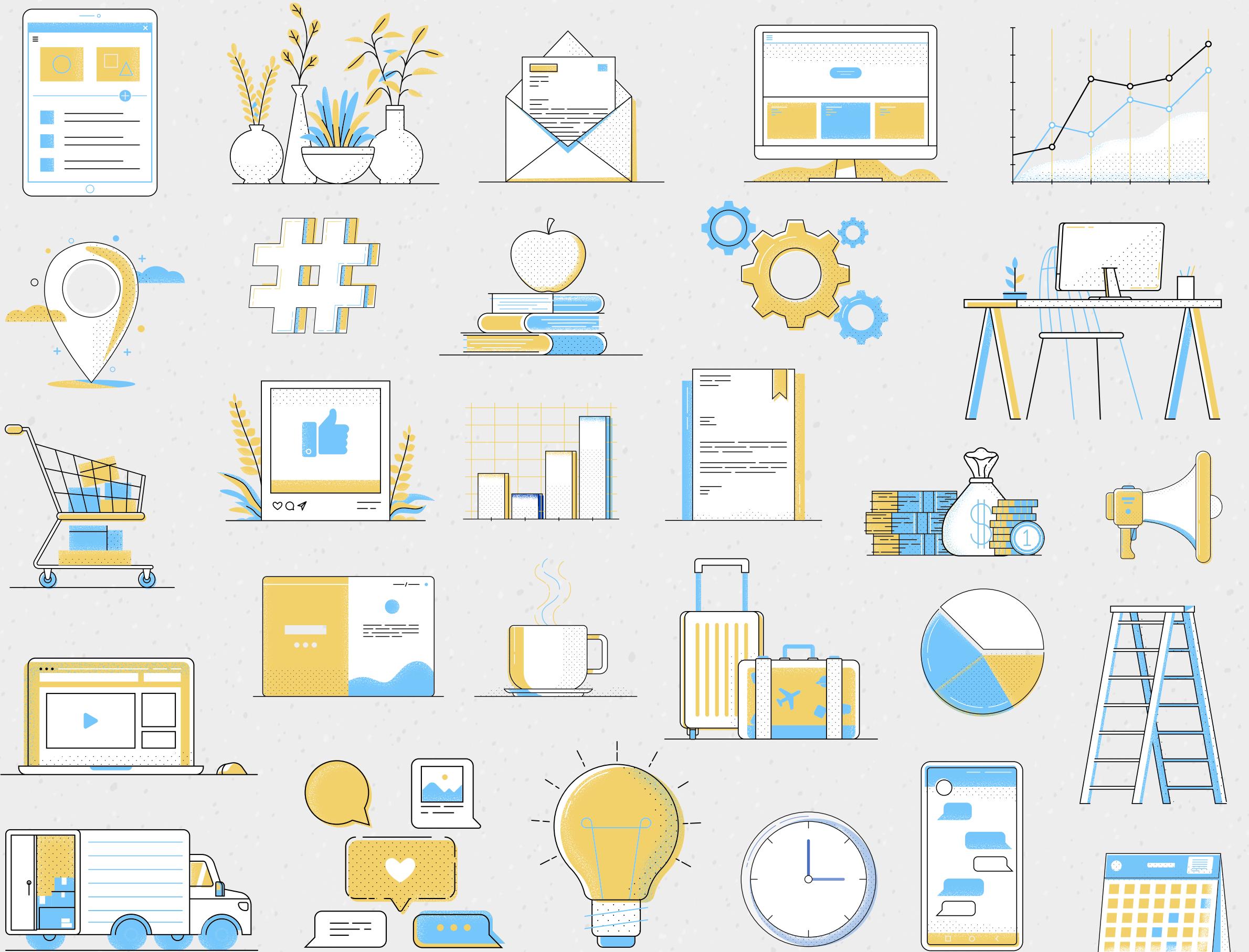
The voice input can be taken from as simple a source as Google Assistant, we use a Dialogflow and GCP based implementation of a standard Deep Learning Trained Google Action.

Reply back in the user's own dialect

My responding back with the required information in the user's customary dialect, we are able to effectively communicate without having to doubt about whether the traveller got the information.

The Dataset

All of the speech files used for this project come from the Speech Accent Archive, a repository of spoken English hosted by George Mason University. Over 2000 speakers representing over 100 native languages read a common elicitation paragraph in English.

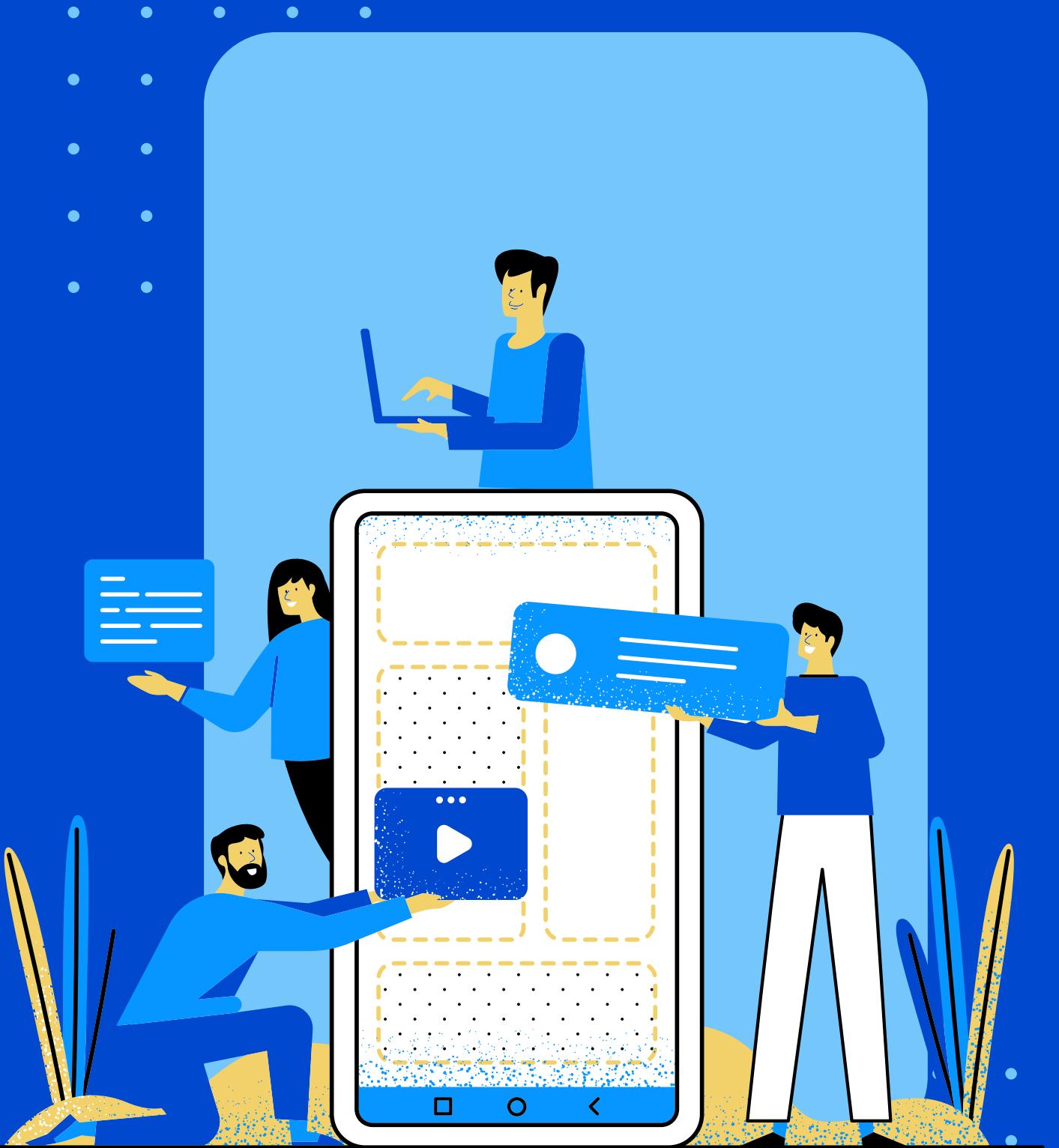


The Deep Learning Model

The so-called '2D CNN Model'

The dataset contained .mp3 audio files which were converted to .wav audio files which allowed easy extraction of the MFCC (Mel Frequency Cepstral Coefficients) features to build a 2-D convolution neural network.

The MFCC was fed into a 2-Dimensional Convolutional Neural Network (CNN) to predict the native language class.



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Results

Well, we went rather promising,

This project was able to achieve an accuracy of over 75% and used 13 MFCC features of each sample which were fed into the 2-D CNN.

The final accuracies are: -

- 96.6% when English samples were given
- 65% when Arabic samples were given
- 50% when Mandarin samples were given



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Smartphone Integration

Allowing the users to the plethora of services...

Now, having an idea about the individual's dialect/accent, we integrate the application with Google Assistant, that can help with resolving several of the traveller's doubts and can even reply back in his own customary dialect, thus avoiding any confusion on the part of the user of the service.

We then made a virtual voice/chat based assistant part by using specific Google Services, Dialogflow, GCP (Google Cloud Protocol) and Actions SDK for Google Assistant. Integrating our application with Google Assistant ensures that the service is available with anyone with access to a smartphone in the airport premises.



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So there you have it...

The Assistant can provide information about the flight, the boarding time, the boarding gate, and even the luggage counter when integrated with the required airport authorities. It can even inform the user about the Wi-Fi services, money exchange facilities, available cab services, the present weather conditions, all without typing a single bit of information, and with the comfort of the individual's own dialect.

