TATA MOTORS
Connecting Aspirations

SYMBIOSIS
INSTITUTE OF TECHNOLOGY (SIT)

TATA

AI Hackathon 2019

Round 01 : E – Hackathon (Aug 17th to Sep 8th)

Background:

Globalisation and economic development has lead to an increase in the purchasing capacity of people. This has resulted in increased demand for vehicles both in the passenger vehicle segment and in the commercial vehicle segment. Increased demand has also lead to an increase in competition within the automotive industry. Effective Customer Lifecycle Management and Customer Relationship Management have become areas of prime focus for retaining and enhancing market share. Automobile companies have setup call centres / contact centres to feel the pulse of the market through customers and to gain an understanding of customer expectations as well as pain points. These call centres / contact centres help to track and understand interactions with customers, right from the initial negotiations with the dealer and order placement to delivery and after-sales support.

Problem Statement 01

Currently, call center agents interact with customers and try to facilitate and fulfil the customer needs. As part of the solution, you need to classify the customer conversations into different categories of calls linked with automotive industry (i.e., new vehicle purchase enquiries, test drive request, breakdown assistance, road side assistance etc.) for necessary action by the business.

Requirement:
You need to evaluate audio clips from a contact center conversation between the customer and the contact center agent and classify the calls into different categories listed below:

1. **New vehicle purchase enquiries** (i.e., Enquiry on latest or future or existing product features, price, availability, closest showroom to drop in for purchase or exchange, etc.)
2. **Test drive requests** (i.e., Calls for booking test drives, follow up calls with customers to schedule the same, confirmation that test drive has been done as per schedule or with delayed schedule, etc.)
3. **Breakdown** (i.e., Customer calling contact center to report vehicle break down and providing his location details for repair or breakdown assistance, Road assistance mechanic reaching out to customer and reaching location with preliminary input on vehicle condition)
4. **Feedback** (Feedback collected post sales /service on vehicle delivery on customer sales/ service experience)
5. **Vehicle Quality** (Complaints of the vehicle parts not functioning properly, repetitive complaints, etc. - except breakdowns and failures)

Note :

The solution should be developed using an open source platform.
Conversations can be in English, Hindi or a mix of both English and Hindi.
For the calls which give multiple categories as a result (e.g.. Suppose result is “New Vehicle purchase” and “Test drive request”) , select the category which has more probability or correlation.
You can refer to some of the libraries and datasets on the internet for intent identification for the conversations.
Some audio clips are given for your reference. However you can use any other technology or methodology to solve the problem.

The **output** is to be stored in a single file in .csv format with the results stored in separate lines against each input file name. The file should be saved as **TeamName_RegNo.csv**
An example of contents in a .csv output file is given below for reference:
file1.wav , Test Drive Requests
file2.wav, Feedback
file3.wav, New Vehicle Purchase

Problem Statement 02 :

Good customer service at a call center is not just about dealing with calls in a timely manner and keeping up with documentation of the calls. It is about making sure the customer's issue is resolved for which an agent must consider the customer's emotional state when speaking with them. The ability to identify and manage your own emotions and the emotions of others is termed as Emotional Intelligence. This trait is vital for the success of a call center agent. The greater the ability to read and perceive a customer's emotions, the better will be the service provided ; resulting in satisfaction to both the calling agent and the company for which the call center is operating. Psychologist Paul Eckman had identified six basic emotions that he suggested were universally experienced in all human cultures. The emotions he identified were happiness, sadness, disgust, fear, surprise, and anger. All other emotions are a mix of these basic ones.

Requirement

Evaluate audio clips of conversation between a call center agent and a customer and classify the emotions / sentiments of both the individuals into seven categories namely:

<<Happy>>, <<Sad>>, <<Disgusted>>, <<Fearful>>, <<Surprised>>, <<Angry>> and <<Neutral>>

Note:

- **The solution should be developed using an open source platform.**
- **Conversations can be in English, Hindi or a mix of both English and Hindi.**

The **output** is to be stored in a single file in .csv format with the results stored in separate lines against each input file name. The file should be saved as **TeamName_RegNo.csv.**

An example of contents in a .csv output file is given below for reference:

```
file1.wav , person01, happy, person 02, sad,
file2.wav, person 01, angry, person 02, neutral
```

Reference for emotion related data:

Surrey Audio Visual Expressed Emotion (SAVEE) database: http://kahlan.eps.surrey.ac.uk/savee/

University of Toronto Databases: http://www.cs.toronto.edu/~complingweb/data/karaOne/karaOne.html and http://www.cs.toronto.edu/~complingweb/data/TORGO/torgo.html

Reference: https://www.researchgate.net/post/emotion_recognition_from_human_voice_databasedataset

Evaluation Process

During the evaluation process, a set of audio files extracted from actual conversations will be uploaded to a shared folder.
Categorization and emotion detection have been performed on these audio clips and the result forms the benchmark set.
The solutions uploaded by different teams would be evaluated against this benchmark set.

Evaluation Criteria

1) Accuracy of result vis-à-vis benchmark output
2) Time of execution for the entire dataset
3) Scalability of the program
4) Complexity of the solution
5) 10 minute presentation over skype (for shortlisted teams ONLY)

Instructions to the teams

1) Teams can attempt Problem1 or Problem 2 or both of them.
2) Each problem statement will have separate docker files labeled based on the problem statement attempted.
3) The uploaded solution (Docker file) should be able to read all the audio files in the given file path (folder containing input .wav files) and perform categorization (for problem statement 01) or emotion detection (for problem statement 02) on each audio file. The result is to be stored as specified for each problem statement.
4) Build and run your docker before submitting. Make sure the output file is saved as **TeamName_RegNo.csv**
5) During evaluation the solution should be able to read Audio clips (which are actual call center conversation) in .wav format. The link to a shared folder is given from which the audio clips have to be read and processed. Some sample audio clips for different categories is given in the link provided. Please include code in your source file which can download the zipped files provided in the folder link and extract it. Reference code in Python has been given in slide no 6 .
6) A presentation has to be submitted along with the solution for each problem statement. The format is given for reference which should cover approach used, Solution architecture, training methodology, testing methodology used and accuracy attained during testing by team

Support

Please reach out to us at aihackathon@sitpune.edu.in

Python Equivalent code to download zipped file is given for reference .

```
## To download the zip files to local folder
## A folder with name "data" would be created
import requests, zipfile, io
zip_file_url = "https://ai-hackathon-upload.s3.ap-south-1.amazonaws.com/public/data.zip"
r = requests.get(zip_file_url)
z = zipfile.ZipFile(io.BytesIO(r.content))
z.extractall()
```