Department of Computer Information Systems
CS-406 Final Year Design Project
Proposal for the Final Year Design Project
(To be submitted within the four week after the start of Fall semester)

F/SOP FYDP/07/00

1. Proposed Title

> BEHAVIORAL MONITORING USING VOCAL SENTIMENT ANALYSIS

2. How would you categorize this project? [Tick only <u>ONE</u>]
   a. An effort to facilitate an existing Research/ Industry Project
   b. An effort to facilitate developing a Research/ Industry Funded Proposal for possible Funding
   c. An effort to facilitate Master's/ PhD project objectives
   d. An exploratory study
   e. An experimental study for better lab utilization/ development

   f. A capstone project for students allowing them to apply their learning ✔
   Other (please specify): _____

3. What characteristics of the Complex Engineering Problem (CEP) are applicable to this project? [Tick <u>one or more, if applicable</u>]
   a. Range of conflicting requirements: technical, engineering or other issues.
   b. Depth of analysis required: have no obvious solution and require abstract thinking

   c. Depth of knowledge required: require research-based knowledge ✔

   d. Familiarity of issues: Involve infrequently encountered issues ✔
   e. Extent of applicable codes: standards and codes devised by the professional bodies
   f. Extent of stakeholder involvement and level of conflicting requirements

   g. Consequences: Impact over the society ✔
   h. Interdependence: problems due to dependability

4. Brief Outline

Communication through voice is one of the main components of affective computing in human-computer interaction. Humans produce vocal sound which can be characterized by acoustic features like pitch, timbre, loudness and vocal tones. Human emotions can be differentiated on the basis of varying characteristics. Detecting human emotions from speech and analyzing them is potentially beneficial for improving human conversational skills. Using the current knowledge of sentiment analysis available, this proposed model handles speech data and extracts human emotion information like happiness, sadness, angriness etc. As the importance of providing services increases, vocal sentiment facilitates to monitor the human behavior. There are certain scenarios where human behavior leaves an imprint on others. This proposed model focuses on an application which takes human voice into account, processes it, extracts sentiments and give complete emotional insights to relevant higher authorities.

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5. Objectives

The objective of this proposed model is to automate the time consuming task of supervisors i.e. to monitor the interactions of their employees with customers by extracting sentiments from their vocal data. We aim to develop a mobile based application which implements this model and returns a detailed insight on person's emotion over different instances.

6. Scope

- Call Center Supervisors:

  Interaction between employees and customer has to be monitored by the supervisors to ensure quality of every call. Supervisors can use this model for this task and based on the insights provided by our model, they can act accordingly.

- Emergency Scenarios (hospitals, police stations, fire stations etc.):

  In case of emergency, caller agents should use a considerate tone to avoid any chaos. Supervisors can use this model to assess their behavioral compatibility in critical scenarios.

- Any organization where behavioral monitoring is needed

7. Methodology

This project requires following methodologies and tools:

Data Collection:

A voice dataset is collected that contains some basic but important features. With the help of which more accurate classification of the sentiments will be done. Tools will also be selected on the basis of programming language that will be used. Most probably, JUPITER NOTEBOOK, GOOGLE COLABORATORY and VISUAL STUDIO CODE
will be preferred because their interfaces are quite descriptive that may help in demonstration.

Data Cleaning and Feature Extraction:
Data cleaning and feature engineering will be required for a good model with high accuracy. All the unnecessary data and redundant features will be removed from the dataset. All those features will remain in the dataset that can be added in sensitivity list.

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Modeling and Training:
An efficient model will be chosen after testing different models/classifiers like SVM, HMM, CNN and some other neural network models. Predictive analysis is totally based on the accuracy of model that will be predicting the sentiments.

Report Generation using Data Analysis:
Based on the sentiments extracted by the deep learning model a detailed report will be generated using data analysis and visualization techniques. This report will provide enough insights to monitor the emotions of relevant people.

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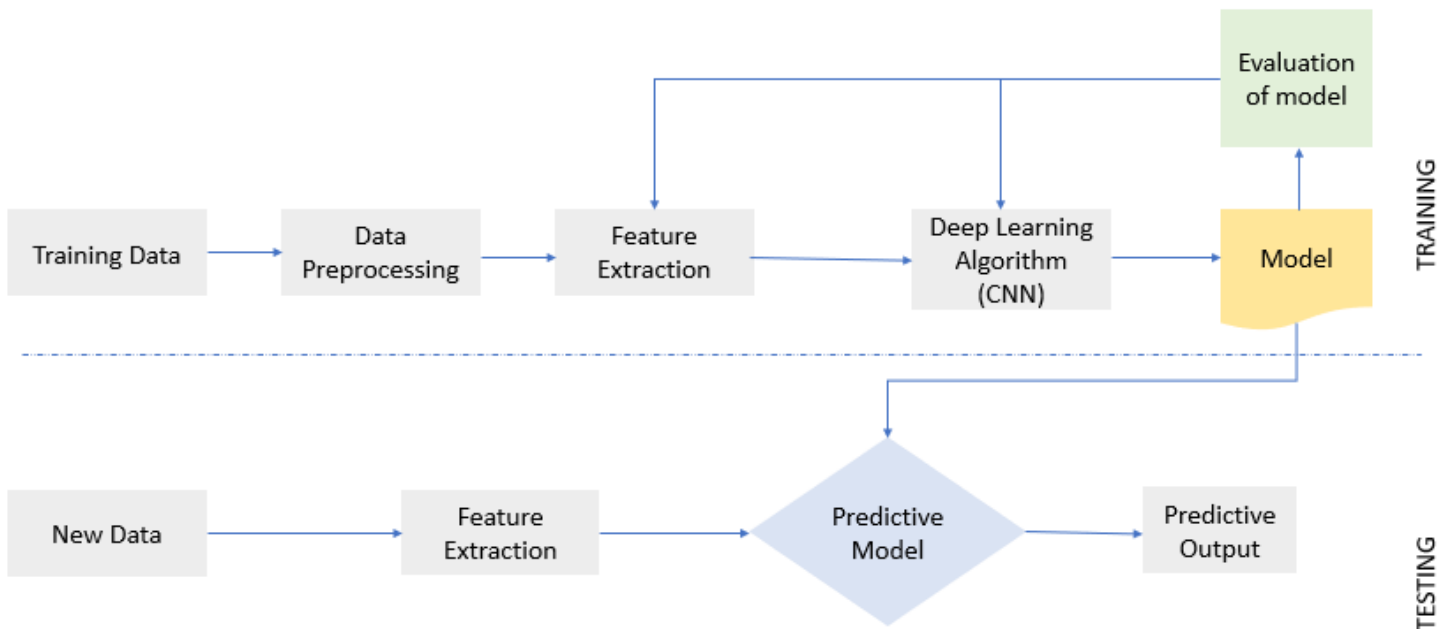
8. Expected Outcomes of the proposed project

A mobile application infused with a deep learning model which takes human voice as input, extracts vocal features using Sentiment Analysis and generates a detailed report of emotional behavior.

No.	Elapsed time (in months) from start of the project	Milestone	Deliverables
1.	1st and 2nd month	Literature Review	SRS Document
2.	3rd, 4th, 5th month	Feature Extraction, Model Training	Deep Learning Model (CNN)
3.	6th, 7th month	Mobile Application Development with Cloud Deployment	Mobile Application
4.	8th month	Integration and Testing	Final Project
5.	9th month	Documentation	Final FYP Report

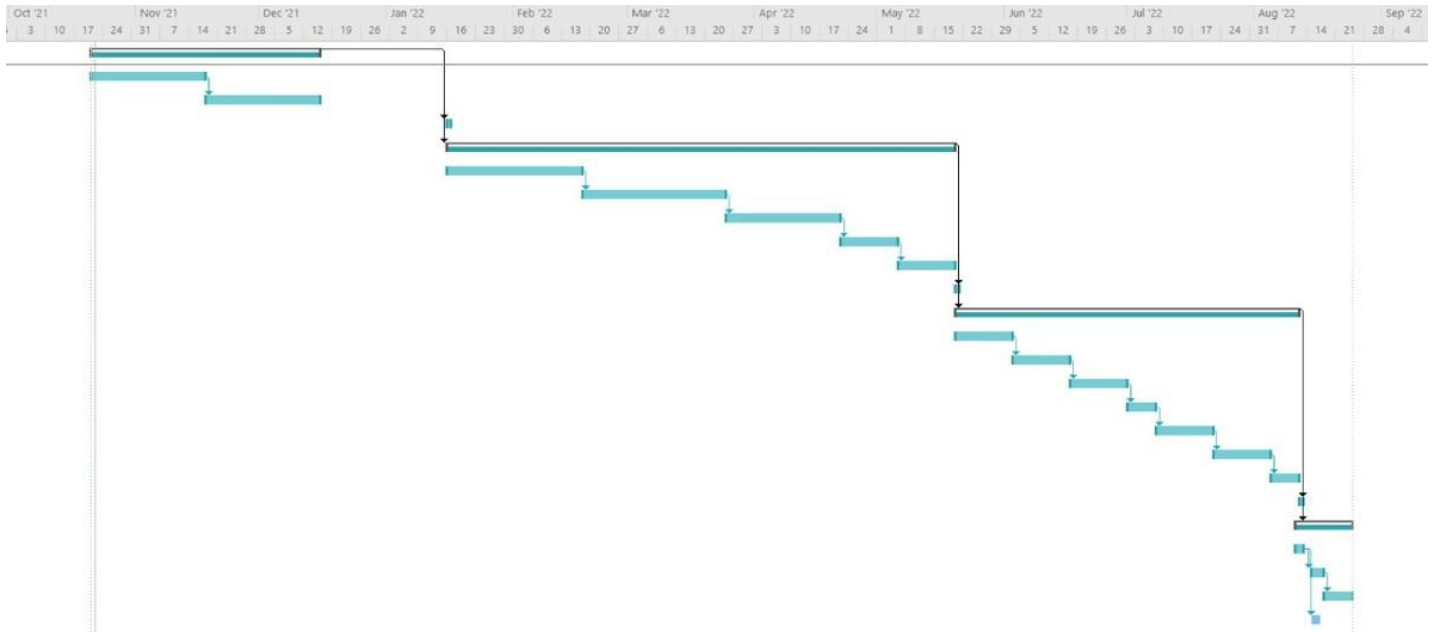### 9. Expected Budget

The dataset, tools and softwares all are available open source hence there is no significant budget of this project.

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10. Attach Gantt Chart for the Project Work

	ⓘ	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		📌	◢ **Literature Review**	**40 days**	Thu 10/21/21	Wed 12/15/21	
2		📌	Data Collection	20 days	Thu 10/21/21	Wed 11/17/21	
3		📌	Data Organization	20 days	Thu 11/18/21	Wed 12/15/21	2
4		📌	Research	1 day	Sun 1/16/22	Sun 1/16/22	1
5		📌	◢ **Feature Extraction, Model Training**	**90 days**	Sun 1/16/22	Thu 5/19/22	1
6		📌	Feature Exploration	25 days	Sun 1/16/22	Thu 2/17/22	
7		📌	Feature Extraction	25 days	Fri 2/18/22	Thu 3/24/22	6
8		📌	Feature Analysis	20 days	Fri 3/25/22	Thu 4/21/22	7
9		📌	Training Model	10 days	Fri 4/22/22	Thu 5/5/22	8
10		📌	Testing Model	10 days	Fri 5/6/22	Thu 5/19/22	9
11		📌	Deep Learning Model Complete	1 day	Fri 5/20/22	Fri 5/20/22	5
12		📌	◢ **Application Development**	**60 days**	Fri 5/20/22	Thu 8/11/22	5
13		📌	Mobile App frontend development	10 days	Fri 5/20/22	Thu 6/2/22	
14		📌	API Development	10 days	Fri 6/3/22	Thu 6/16/22	13
15		📌	Voice Recording Development	10 days	Fri 6/17/22	Thu 6/30/22	14
16		📌	Testing of APIS	5 days	Fri 7/1/22	Thu 7/7/22	15
17		📌	Testing frontend	10 days	Fri 7/8/22	Thu 7/21/22	16
18		📌	Integrating model with App	10 days	Fri 7/22/22	Thu 8/4/22	17
19		📌	Integration testing	5 days	Fri 8/5/22	Thu 8/11/22	18
20		📌	Integration Complete	1 day	Fri 8/12/22	Fri 8/12/22	12
21		📌	◢ **Documentation**	**10 days**	Thu 8/11/22	Wed 8/24/22	12
22		📌	App documentation	2 days	Thu 8/11/22	Fri 8/12/22	
23		📌	Model documentation	3 days	Mon 8/15/22	Wed 8/17/22	22
24		📌	Final FYP Report	5 days	Thu 8/18/22	Wed 8/24/22	23
25		🖢	FYP Submission	2 days	Mon 8/15/22	Tue 8/16/22	22

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Name of Industrial Advisor (if any): ____NIL____

Recommendations and Approval:

Chairperson (Head of FYDP Review Committee) Sign with Date:

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