Problem statement

The aim is to develop a “talking” bot, one that can listen to the user, pay attention to his/her intent and make a meaningful reply, as if you are talking to a human being.

Depending upon the frame of time we can get, we can upgrade to a better version of the talking bot but the primary aim remains to implement the most basic bot that can meet our expectations and understand how to use natural language processing for various different tasks. The ultimate objective will be to learn a new programming paradigm that can open up new opportunities for the students.

The problem of talking bot implementation can be broken down into 4 major parts:

- Converting speech to machine-understandable text.
- Processing text to infer intent, emotion, nature of the response(positive, negative or neutral) or some other useful feature.
- Generating a reply based on the inferred features.
- Making a reply.

We will go through all the components one by one in the coming few weeks and try to implement a basic version of each component as programming assignments.

Plan of action

- Assuming that the overall project has been divided into 5 weeks, there will be one major Programming Assignment and 1-2 minor assignments with deadlines of 2-3 days per week.
- The first 2-3 weeks are aimed at learning and developing the basic skills/tools they would need for this project.
- The programming assignments are based on the most basic components of the chatbot that can be plugged into the actual project with a little modification.

Week 1: 8th - 15th May 2020
PA: Implement a basic customer care chatbot using AIML.
(Deadline 15th May, extended to 16th May)
Reading task 1: Week 1 and 2 of Neural Networks and Deep Learning.
Reading task 2: Week 3 and 4 of Neural Networks and Deep Learning.
(The programming assignment for this week was anonymously peer-graded)

Useful links:
Course: https://www.coursera.org/learn/neural-networks-deep-learning
AIML: https://www.tutorialspoint.com/aiml/index.htm

Week 2: 16th - 23rd May 2020
PA: Implement a model (Glove or some version of Word2vec) to train word embeddings and use this trained embeddings layer to train an IMDB review classifier with fewer data and iterations. (transfer learning) (Deadline 23rd May)
Reading task 1: Week 1 and 2 of Sequence models.
Reading task 2: Natural Language processing with Tensorflow. (complete)

Useful links:
Sequence Models: https://www.coursera.org/learn/nlp-sequence-models/
NLP with TensorFlow: https://www.coursera.org/learn/natural-language-processing-tensorflow/
Keras Documentation: https://keras.io/api/

Week 3: 23rd - 30th May 2020
PA: Implement Speech Recognition. (Deadline 30th May)
Reading task: Week 3 of Sequence models.

Useful links: Alphabet level speech recognition described in sequence models week 3.

Week 4: 30th May - 7th June 2020
PA: Implement a basic NLP chatbot that infers the users intent to match a more general pattern and generate a reply accordingly. For example, “Can you suggest a good place to eat” and “Is there a nice restaurant nearby” both indicate that the user wants the bot to suggest him a restaurant, so the network can classify the user’s intent into a few known categories and feed that intent to an AIML reply generator.
(This is the most basic of the many possible ways)
(Deadline 7th June)
Reading Task: A few blogs and journals on NLP for chatbots. Innovative ideas are welcome.

Useful links: Gonna give ‘em sections from this blog
https://medium.com/@BhashkarKunal/conversational-ai-chatbot-using-deep-learning-how-bi-directional-lstm-machine-reading-38dc5cf5a5a3

Week 5: 8th June - 15th June
Task: Improve the chatbot pipeline and reduce the latency of input and output. Finally, combine the speech recognition, reply generating, and voice output layer(use gTTL API) to complete the talking bot. (Deadline 15th June)
---- No readings ----

Work Done till now

1. Environment setup: setting up the python environment with required libraries and Cuda environment for those with compatible GPU.
2. Implementation of basic chatbot based on if-else type logic using AIML with input and output in the form of text. The objective was to specialise it in certain tasks like ordering a pizza.
3. Learning about neural networks and sequential models for learning and developing the basic skills/tools needed for this project from Coursera courses.
4. Training of word embeddings using different models (word2vec, Glove), testing it using embedding visualiser and using it for transfer learning on the IMDB review classification which has a small size.