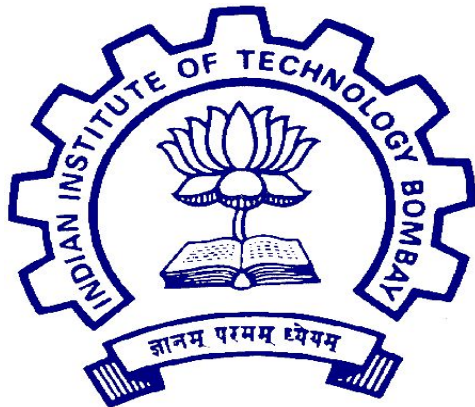# CONVERSATIONAL AI

CS772: Deep Learning for NLP: Project Topic discussion

Team - 26
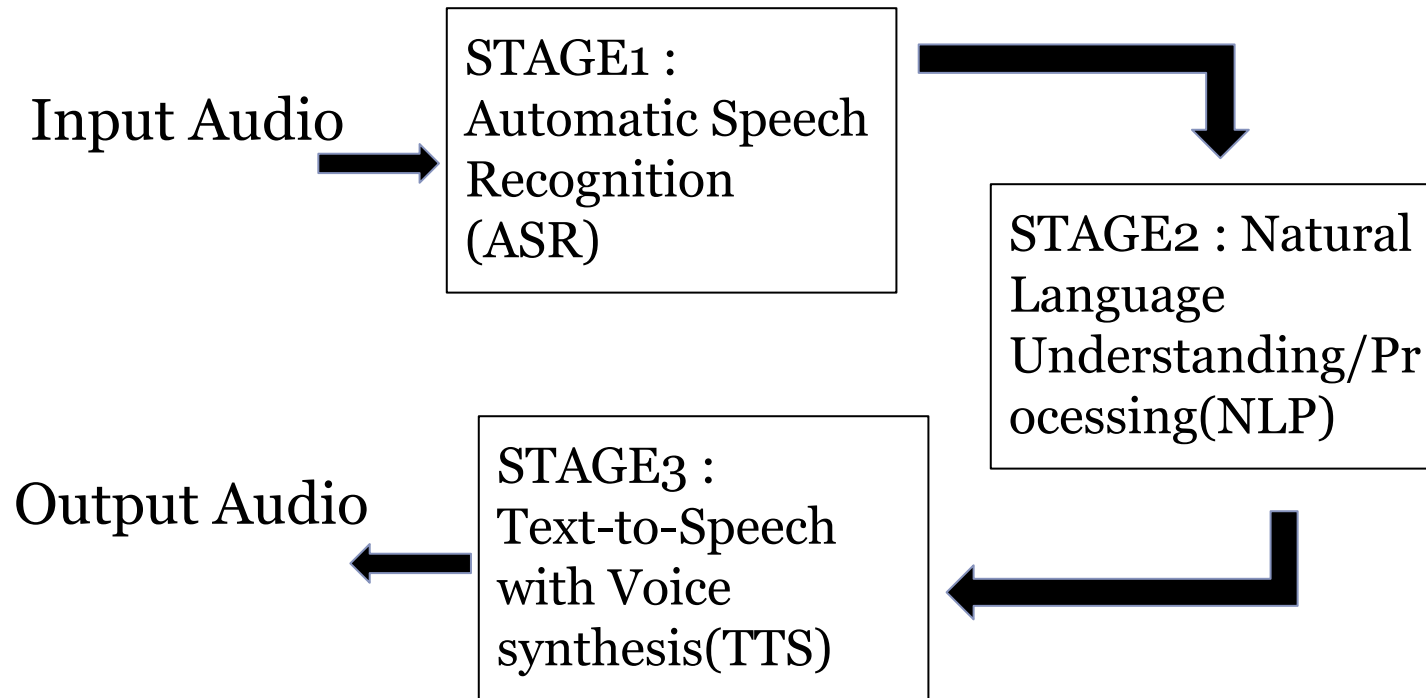Chesta Pahuja (19i190008)
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Nimay Gupta (180050068)

Problem statement

- Goal : Build an interactive web application based GUI demonstrating our proof-of-concept which can hold conversations with users and suggest course of action in case of COVID-19 symptoms and queries
- Seq2Seq based conversational agent (voicebot) that can answer queries from patients regarding topics related to COVID-19.
- User input: Query (either text or speech)
- Output: Response (either text or speech)
- Architecture: BART for Dialogue generation

CONVERSATIONAL AI ARCHITECTURE

Input Audio →

STAGE1 : Automatic Speech Recognition (ASR)

→

STAGE2 : Natural Language Understanding/Processing(NLP)

Output Audio ←

STAGE3 : Text-to-Speech with Voice synthesis(TTS)

←

We would be experimenting with the combinations of different pretrained models for each stage:

I.   ASR: SpeechRecognition
II. NLU: BART Pre-trained Model, fine-tuned on **COVIDDialog-English** dataset for dialogue generation
III. TTS: Google TTS

DATA

COVID Dialogue English Dataset: The dataset was scraped from online resources like healthcaremagic.com, covidquesitons.ca, and various other online articles.

- #dialogs 603
- #utterances 1,232

URL: https://github.com/UCSD-AI4H/COVID-Dialogue

Example:
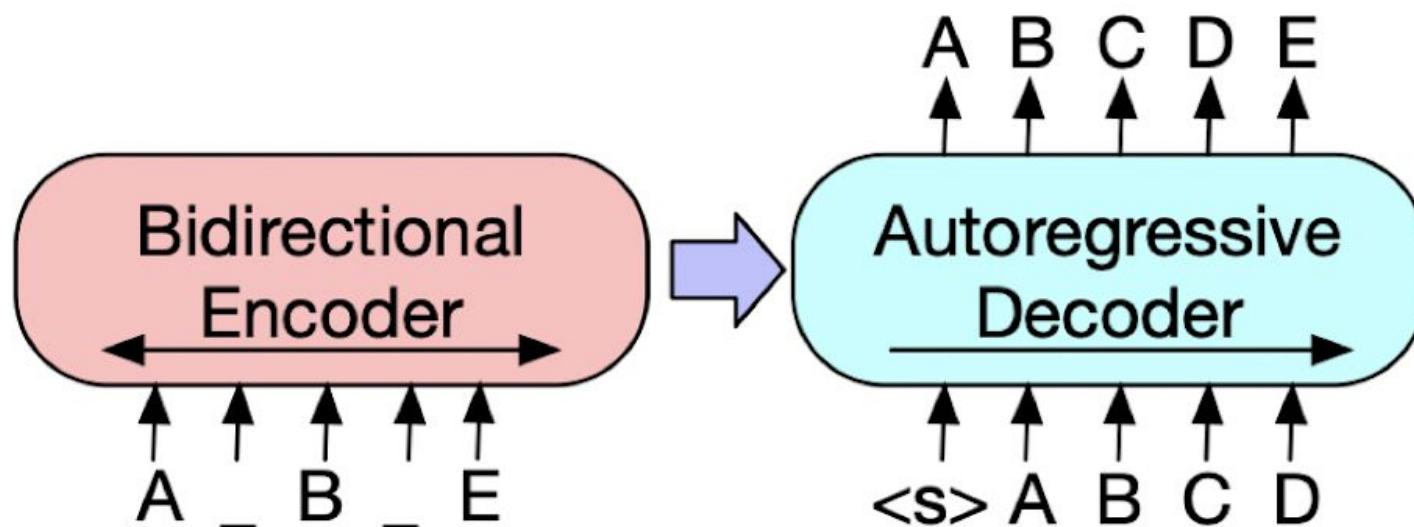
```
Id = 16
Dialogue
```

Patient: My dad last week was vomiting and had diarrhea now this week it has turned into runny nose and a cough...no fever....any chance it's Covid-19?
Doctor: Symptoms of COVID-19 are usually the same as a cold or the flu, with diarrhea being uncommon.

The COVID-19 infection is worldwide. The goal is to keep people separated so that the clinics and hospitals are not overwhelmed. Patients with medical symptoms should see their primary care doctor on VIDEO or by PHONE, and get instructed to go to a clinic or ER only if not treatable by video or phone.

BART (1987)

BART (2019)

EVALUATION METRICS

- BLEU
- METEOR
- NIST

APIs USED

- Simple Transformers
- NLTK
- FLASK, ngrok(for hosting the app)

RESULTS

Score/Model ->	BART
Perplexity	19.50909910624414
BLEU-2	0.08818504096754846
BLEU-4	0.2969596621892416
NIST-2	2.9554469605590388
NIST-4	3.168242770773636
METEOR	0.05976766396499536

Demo: http://863c5f75c359.ngrok.io/

Short query:

Input speech/text:

Can I go for Coronavirus testing if my nose is
blocked and I have traveled from a high risk country?

BART output speech/text:

Yes. Yes, you should definitely get tested.
Would you like to video or text chat with me?

Long query:

Input speech/text:

Can coronavirus symptoms be mild for
some people versus severe ? for example, could
it just involve being very fatigued, low grade
fever for a few days and not the extreme symp-
toms? or is it always a full blown cold and struggle to
breathe?

BART response:

Symptoms vary. Some may have no symptoms at all,
others may have severe symptoms. The severity of the
symptoms varies depending on the severity of
infection. Some cases may be life threatening, others
less so.

Conclusion and Future Work

- Try nlpaug and augment the train dataset using synonyms
- Use Dialo-GPT, MBART(an improved version of BART)
- Make this a multilingual interface

INPUT-OUTPUT

An example dialogue

Patient:

I'm finding difficult to maintain precisely 6 ft in grocery stores. Today, as I was leaving, someone entering the store that was (possibly) 3 ft away was coughing lightly and I took a shower when I got home. I'm a hypochondriac. Possible covid-19?

Doctor:

In brief: It is possible. You can self quarantine yourself for 2 weeks. If develop and symptoms especially fever and cough get tested. Since you consider yourself a hypochondriac I suggest to wear an N-95 or surgical mask to prevent similar situations.

References

1. https://developer.nvidia.com/conversational-ai
2. https://arxiv.org/pdf/2005.05442.pdf