SHONGLAP: A Large Bengali Open-Domain Dialogue Corpus

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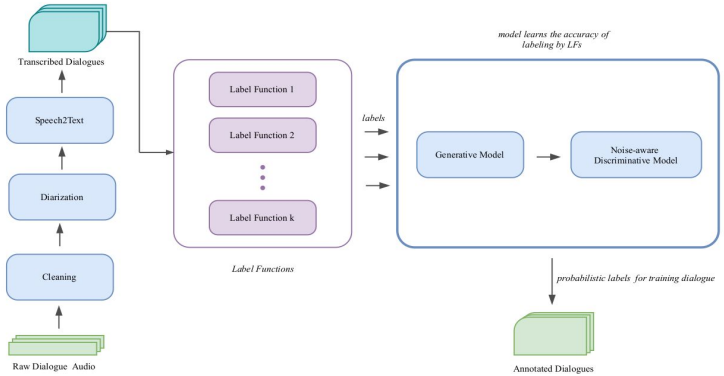
Introduction

- High-quality **dialogue datasets for low-resource languages** like **Bengali** are rarely available. Thus existing neural open-domain dialogue systems suffer from data scarcity.
- We propose a **framework** to prepare large-scale open-domain dialogue datasets from publicly available audio employing weak-supervision which is particularly suitable for low-resource settings.

Publicly available audio → Bengali open-domain dialogue dataset

Our Approach



- **Cleaning.** Political discussion and debate audio from various public sources.. We convert the raw audio files to 16kHz mono channel WAV audio after noise removal.
- **Speaker Diarization.** ECAPA-TDNN based model used for speaker diarization of the dialogues
- **Speech-to-Text.** wav2vec2.0 based speech to text engine trained on Bengali transcribed audio
- **Punctuation Restoration.** We follow (Alam et al., 2020) which is a layered architecture consisting of a pre-trained BERT variant, a bidirectional LSTM and finally a linear layer on top of it.
- **Speaker Role Labeling.** Weak supervision based technique used for speaker role labeling.

Weak Supervised Speaker Role Labeling

- Each dialogue in the corpus consists of multiple speakers
- Most of the dialogues include a speaker who acts as "Host"
- label functions applied to unlabeled (without the speaker role label) dialogue corpus.
- Considerations while designing label functions:

number of questions asked | descriptiveness of the replies | utterance sentiment

- Accuracy of the labeling functions are learnt on the fly and weights are assigned to the corresponding outputs.
- The generative model generates a collection of probabilistic training labels that are used to train a strong, flexible discriminative model for a better generalization beyond the labeling functions.

Corpus Description

- 7703 dialogues in total covering mostly political debates and multi-party discussions in **Bengali** language

Statistics	Count
Total number of sentences	66413
Avg. duration (in minutes)	5.62
Avg. speakers per dialogue	2.68
Avg. turns per dialogue	7.6
Avg. number of questions per dialogue	2.14

- **Sentiment** analysis results

Positive	36.20%
Negative	24.36%
Neutral	39.44%

- **Key Topics** found using LDA

Election | International | Bangladesh | Economics

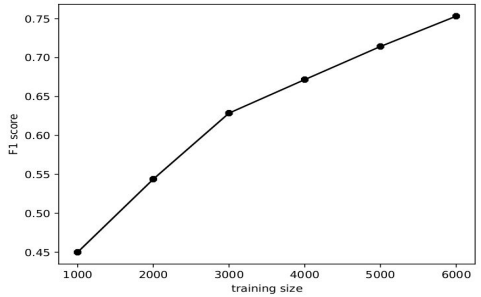
- Top (political) keywords using GloVe ***Politics, Social, Economics, Society, Culture, Practice, Rules, Leftist etc.***

Evaluation

- Our task is to classify biased speakers from the utterances
- Using SHONGLAP dataset, we fine-tuned BanglaBERT on our downstream task.
- Performance of model fine-tuned on our dataset (after 3 epochs)

Accuracy	0.735
Precision	0.7328
Recall	0.735
F1 Score	0.733

- Effect of training data size on test F1 score



Conclusion and Future Directions

- A weak-supervision based novel framework to prepare and annotate large-scale open-domain dialogue corpus for low-resource languages
- Using the framework, we prepared a large Bengali open-domain dialogue corpus: **SHONGLAP** which improves BanglaBERT's performance during fine-tuning for downstream tasks.
- The approach can be extended to collect and prepare an even larger dialogue corpus covering a wide range of topics.
- Tasks like *dialogue-summarization*, *agreement-disagreement modeling*, *dialogue state tracking*, *open-domain dialogue generation*, *mining similar dialogues* in the context of **Bengali** will be explored in depth.

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