# Multimodal Sentiment Analysis of Tamil and Malayalam

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# The Shared Task

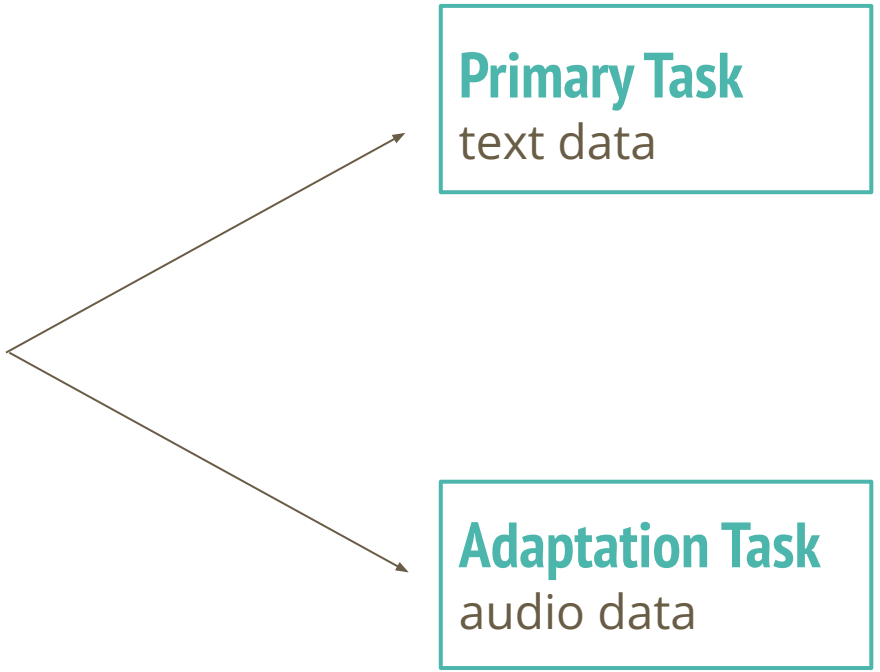
Multimodal Abusive Language Detection and Sentiment Analysis:
DravidianLangTech@RANLP 2023 shared task hosted on CodaLab

two multimodal (text, audio, video) subtasks:

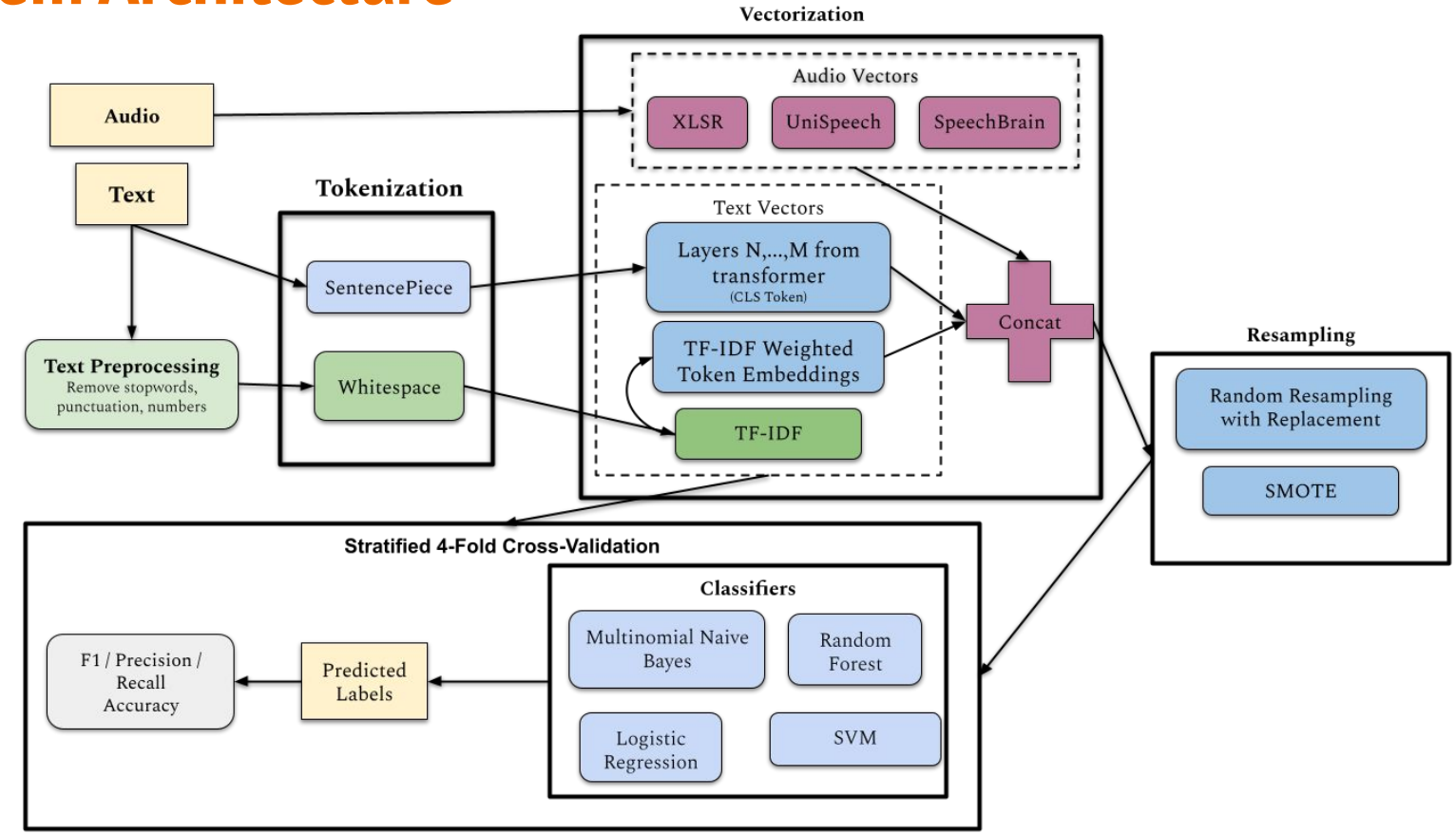
1. abusive language detection in Tamil
2. **sentiment analysis in both Tamil and Malayalam**

# The Shared Task

- 5 categories:
  - Highly Negative
  - Negative
  - Neutral
  - Positive
  - Highly Positive
- distances between categories unknown/not well-defined



# System Architecture



# Audio Vectorization

- Wav2Vec2 + CommonVoice
  - Wav2Vec2-XLSR-53 (FAIR)
    - 53 languages
  - UniSpeech (Microsoft)
    - 60 languages
  - CommonVoice includes Malayalam and Tamil
- M-CTC-T
  - SpeechBrain
    - We used the SpeechBrain/M-CTC-Large from Meta
    - **1B** parameter transformer encoder
    - Trained on **60** languages from CommonVoice and VoxPopuli

# Majority Class Baseline

| | | Acc/Micro F1 | Macro F1 |
|---|---|---|---|
| **Mal** | **Dev** | .61 | .15 |
| | **Test** | .30 | .09 |
| **Tam** | **Dev** | .60 | .15 |
| | **Test** | .50 | .13 |

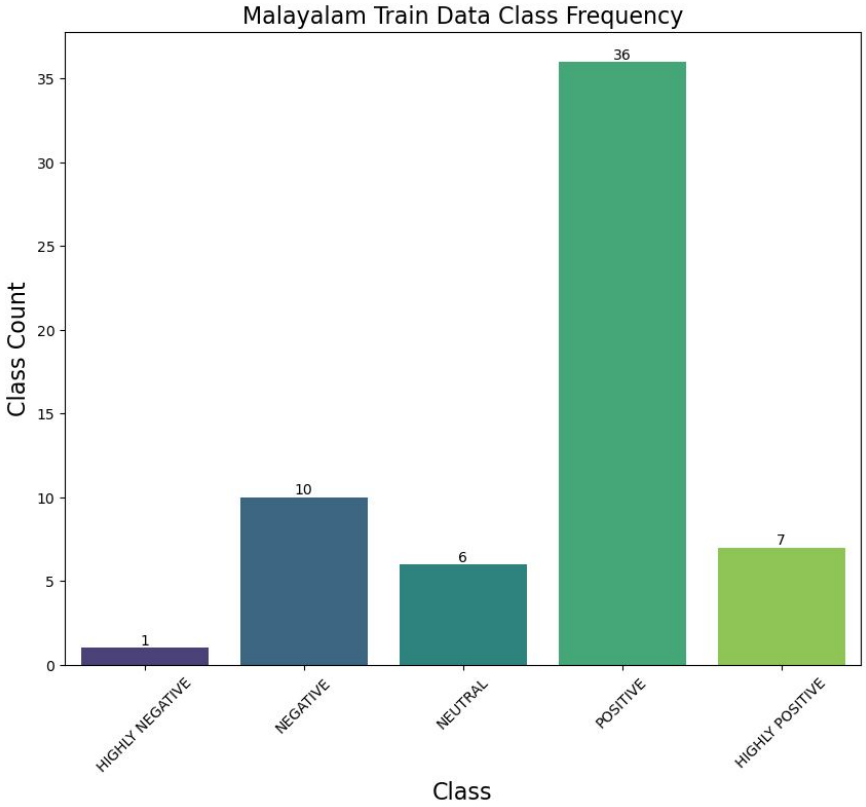
# Results

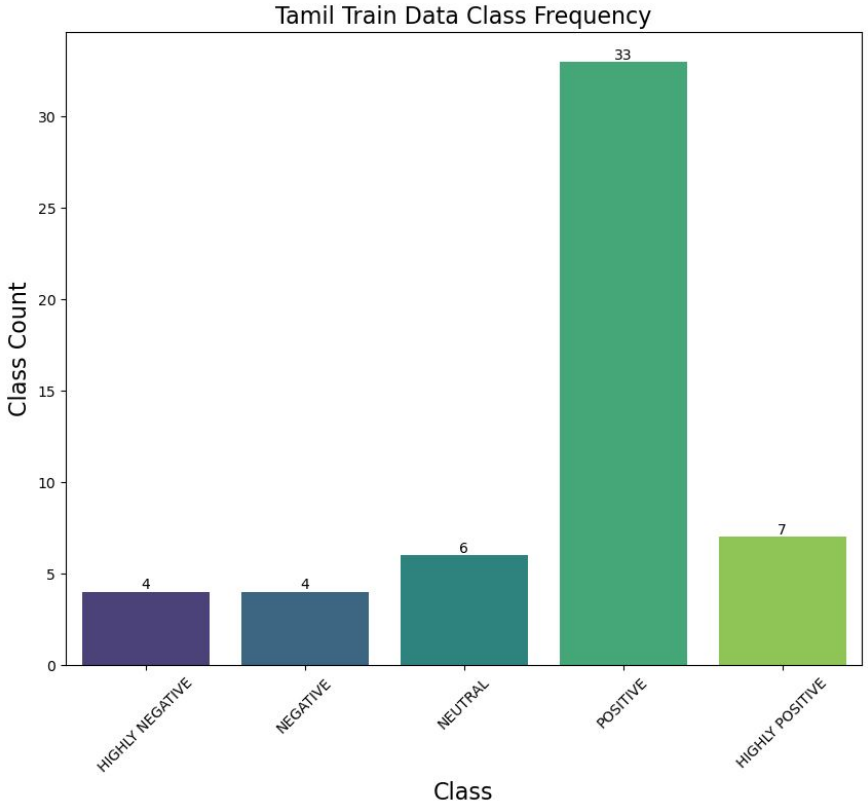
| | | D3 (Text Only) | | D4 (Audio+Text) | |
|---|---|---|---|---|---|
| | | **Acc/Micro F1** | **Macro F1** | **Acc/Micro F1** | **Macro F1** |
| | | | | | |
| **Mal** | **Dev** | 0.53 | 0.40 | 0.54 | 0.27 |
| | **Test** | 0.3 | 0.14 | 0.61 | 0.15 |
| **Tam** | **Dev** | 0.28 | 0.26 | 0.54 | 0.29 |
| | **Test** | 0.35 | 0.19 | 0.5 | 0.13 |
| **Best Model** (Combined Mal+Tam Train Data) | | | | | |
| **Dev** | | 0.58 | 0.33 | 0.60 | 0.35 |
| **Mal** | **Test** | 0.30 | 0.16 | 0.61 | 0.15 |
| **Tam** | **Test** | 0.35 | 0.19 | 0.5 | 0.13 |

# Issues & Successes

- Very small Dataset!
  - Malayalam: **60** train/dev instances
  - Tamil: **54** train/dev instances
- Imbalanced Dataset!
  - E.g. Hard to train on only *one* HIGHLY NEGATIVE Malayalam instance
- Test set fundamentally too small to evaluate inference
- Gained insight into the transformer models we used for embedding data
- Learned a lot
  - Rolled out workflow for testing many experiments using Hydra and sklearn Pipelines
  - Can use in future projects
- Combining Malayalam and Tamil worked better for audio data!

# Class Imbalance 😭



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