SSP Course Project Mid Submission

End Of Phrase Detection

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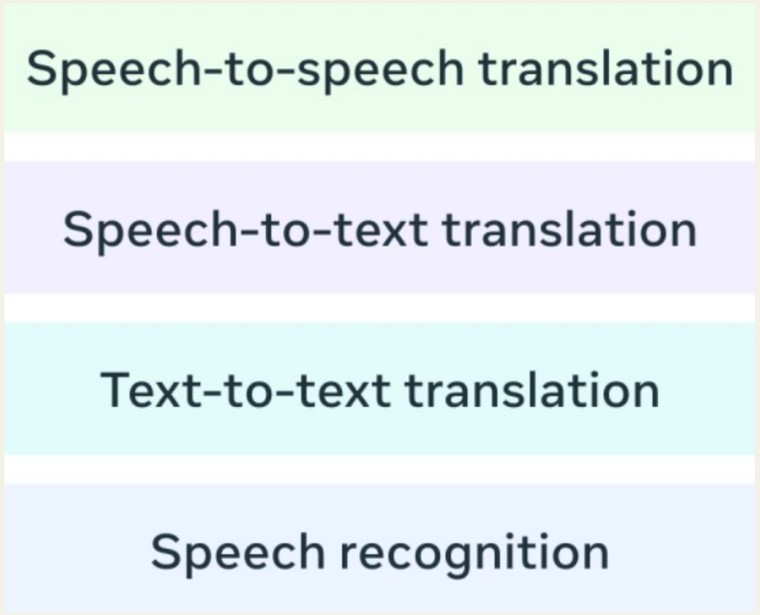
Agenda

Introduction

- While humans naturally recognize pauses, punctuation, and intonation in a natural spoken language, computers need assistance

- In Speech to text Translation we loose all the punctuation and context which can be preserved by detecting the phrase endings



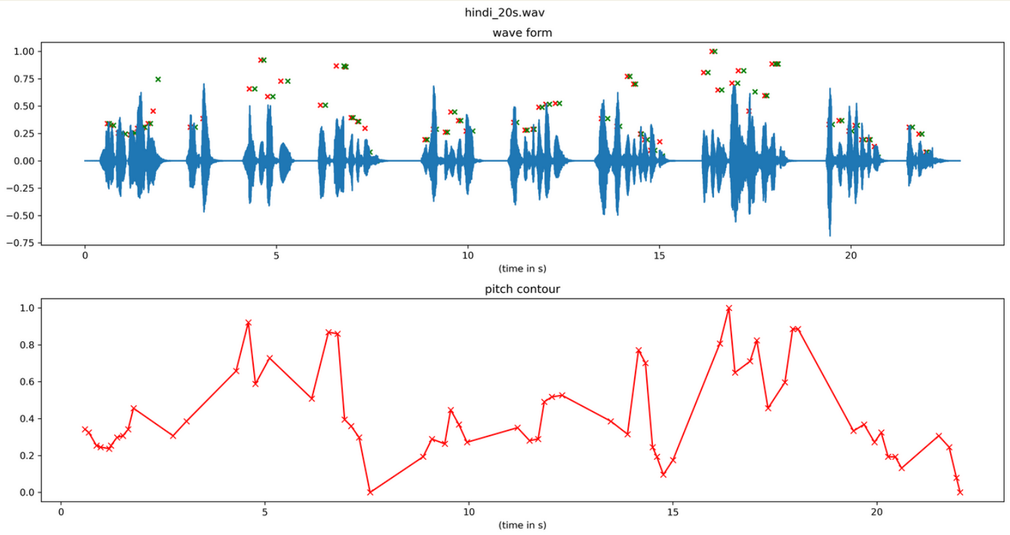
Key Challanges

- Identifying silences in speech as potential phrase endings is a fundamental approach of End of Phrase Detection.
- But it is important to note that not all silences indicate the end of a phrase. They could be pauses for commas or full stops.
- For this differentiation, a deeper analysis of pitch contour trends is necessary.

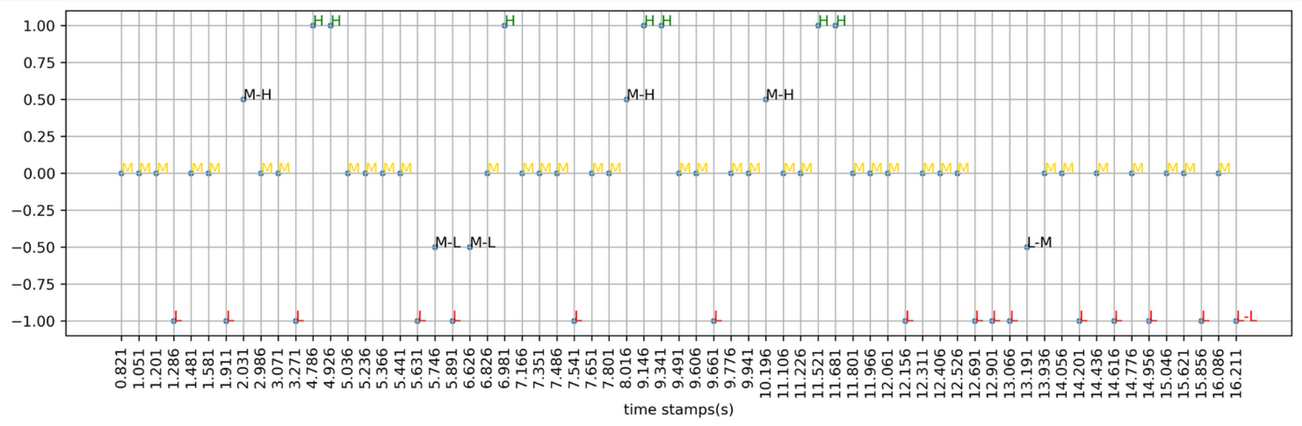
Methods and Approaches

- Extracting information from pitch in speech is a complex process due to its noise.
- To simplify pitch contours, we employ the prosogram, which identifies nuclei of salient pitch areas and categorizes them into Low,Mid or High labels
- We try to develop rules to predict clause and sentence boundaries based on the changing trend of these pitch labels.

Hindi Example (20 s)



Pitch Contour



Prosogram

- We have quantized the Pitch Contour into H,M and L to create a Prosogram

Observed Trends

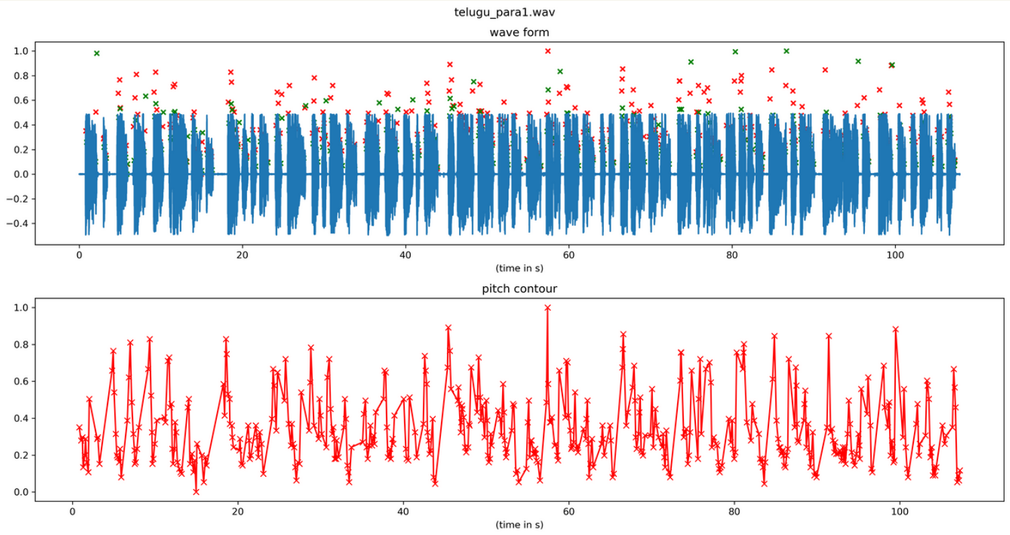
- L -> M -> _L : Comma
- L -> H -> _M/L : Comma
- M -> H -> _M/L : Comma
- M -> L -> _M/H : Sentence Boundary
- H -> M -> _H : Sentence Boundary
- H -> L -> _M/H : Sentence Boundary

Observed Trend

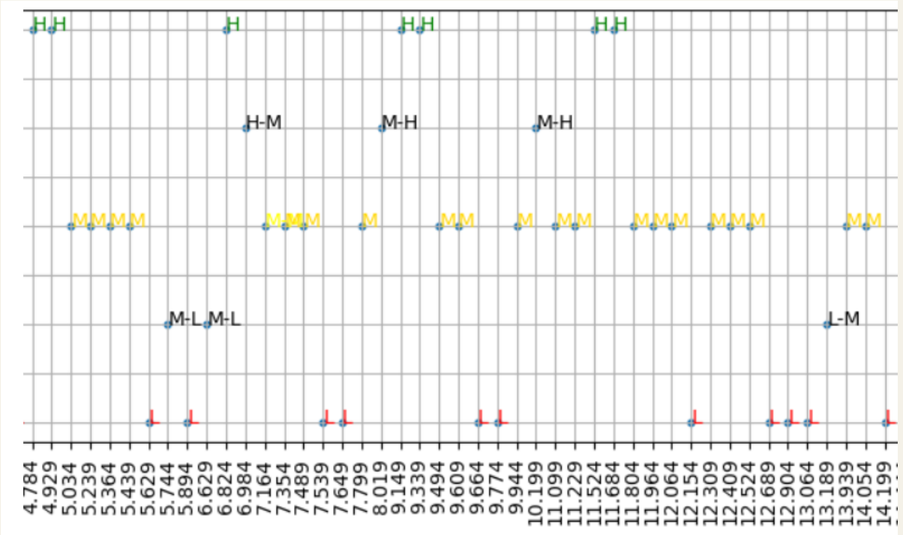
Time	Label	Trend	Prediction
2.747	M	-1	Comma/Phrase Boundary
4.292	H	1	Sentence Boundary
4.767	M	-1	Comma/Phrase Boundary
5.112	H	1	Sentence Boundary
6.147	M	-1	Comma/Phrase Boundary
6.557	H	1	Sentence Boundary
6.952	M	-1	Comma/Phrase Boundary
9.092	M	1	Sentence Boundary
14.502	M	-1	Comma/Phrase Boundary
16.892	H	1	Sentence Boundary
19.427	M	-1	Comma/Phrase Boundary

- A rising tone for commas and a falling tone for sentence boundaries.

Telugu Example



Pitch Contour



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Further Plan

- **Refining Prosogram Analysis:**
  - We propose a focused approach: consider trends near silence regions for punctuation identification as all rises and falls in the prosogram are not associated with punctuations.

- **Extending Analysis to Emotional Speech:**
  - We aim to apply a similar analysis to emotional speech and explore how emotional cues affect phrase boundaries and punctuation patterns.

References

Tanmai Khanna, Ganesh Mirishkar, Dipti M. Sharma, Anil K. Vuppala.
Exploring the role of pitch in predicting clause and sentence boundaries.
R & D Showcase 2020.

THANK YOU

TEAM

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