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Analyzing Speech Recognition for Individuals with Down Syndrome

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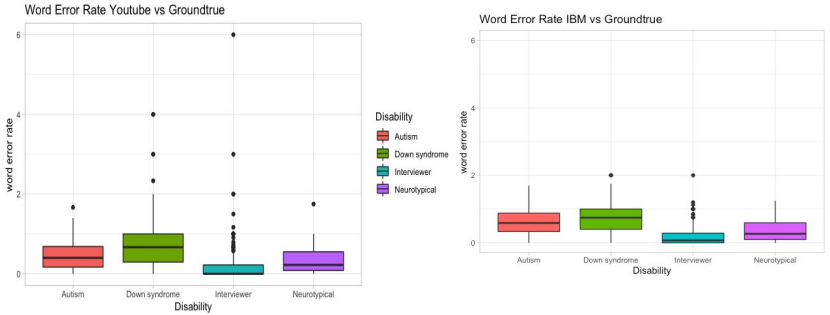
Introduction

- Speech recognition technologies are the base for voice assistants
- Speech recognition technologies are trained on "typical speech" patterns[1].
- They have trouble recognizing speeches from people with speech differences such as people with Down Syndrome[3].

Results

Boxplots comparing the word error rate[4] among different participants



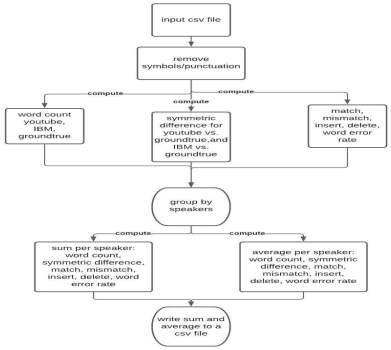
Ground True:*I feel like I'm hit by a lovebug or something.* A female with DS

YouTube:*what I feel like I'm here like a like here something..*

IBM Watson: *I feel like I'm hit like yellow blanket or something.*

Methods

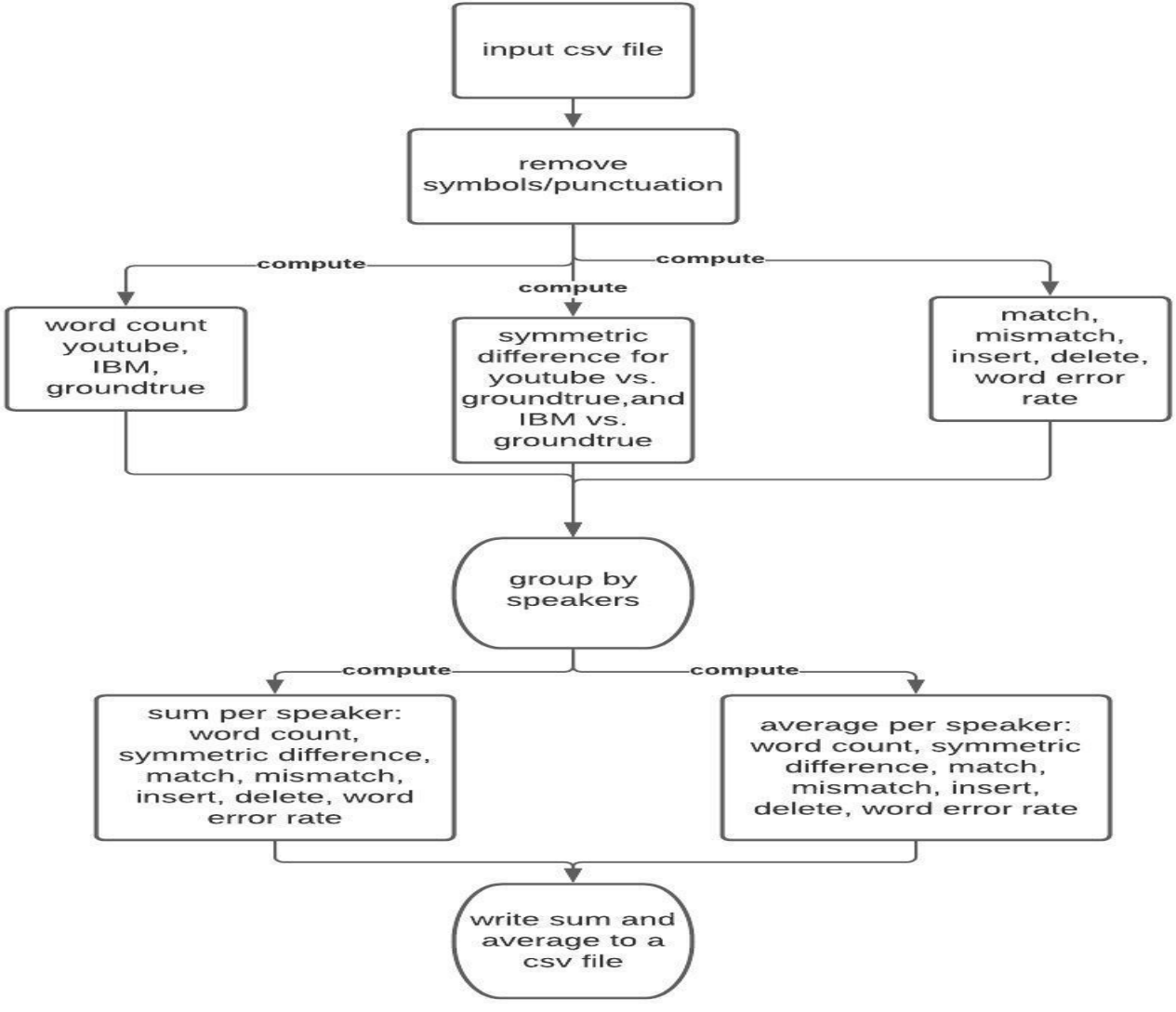
- 10 YouTube videos with interviews of 15 people with Down Syndrome and 6 neurotypical.
- Get transcript from YouTube and IBM Watson
- Develop a python script to compare the match, mismatch, insert, delete, and word error rate [2] of people from different groups.



Conclusion

- **Interviewer:** highest match, lowest word error rate, lowest mismatch, insert, delete,
- **Neurotypical:** high match, low word error rate, low mismatch, insert, delete
- **Down Syndrome:** lowest match, highest word error rate, highest mismatch, insert, delete

People with disabilities like Down Syndrome are the ones who need voice assistant the most. Speech recognition technologies should be more inclusive


input csv file
remove symbols/punctuation
compute
compute
compute
word count youtube, IBM, groundtrue
symmetric difference for youtube vs. groundtrue,and IBM vs. groundtrue
match, mismatch, insert, delete, word error rate
group by speakers
compute
compute
sum per speaker: word count, symmetric difference, match, mismatch, insert, delete, word error rate
average per speaker: word count, symmetric difference, match, mismatch, insert, delete, word error rate
write sum and average to a csv file

References

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- [3] Yingxin Pan, Danning Jiang, Lin Yao, Michael Picheny, and Yong Qin. 2010. E ects of automated transcription quality
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- [4] Alisha Pradhan, Kanika Mehta, and Leah Findlater. 2018. " Accessibility Came by Accident" Use of Voice-Controlled
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