On The Promise And Pitfalls Of Repurposing Existing Language Technologies For Endangered Language Documentation

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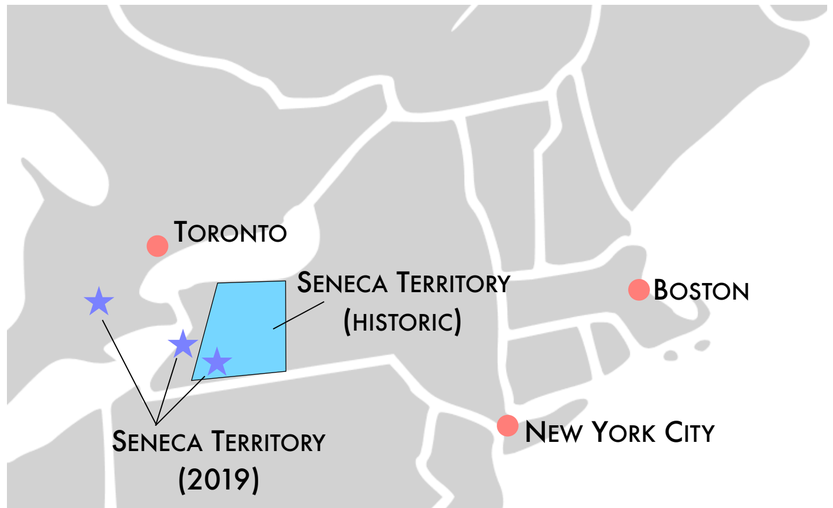


ONÖDOWA'GA:' GAWËNÖ'

- **Seneca**: Haudenosaunee (Iroquoian) language family
- **~50** first-language speakers, **~100+** learners
- **11,000+** Seneca people living in USA and Canada
- Language spoken in **Eastern USA and Canada**
- **Polysynthetic** morphology, highly agglutinative
- **Active immersion programs** for children and adults
- Urgent need for **documentation and preservation**

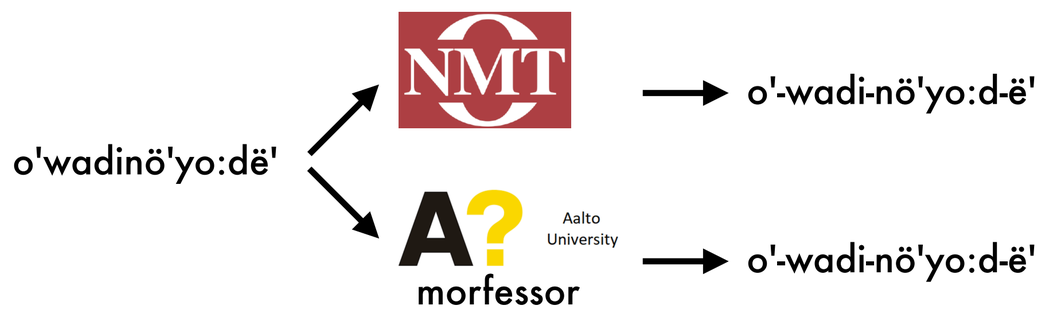
SPEECH RECOGNITION FOR TRANSCRIPTION

- Adult immersion students and instructors record elders regularly to produce instructional materials.
- Dozens of hours or recordings remain untranscribed.
- Automatic speech recognition (ASR) could aid in transcription of this data.
- Three ASR toolkits used to build models and generate transcripts of 2 hours of recordings.

- All three toolkits were challenging to install and run.
- All three resulted in poor accuracy (40-90% error) when run with default configurations.
- Even with extensive modification of training data and architectures, results were poor.
- Existing toolkits are designed for large corpora of high-quality recordings.
- In-house neural architecture for low-resource, variable quality data outperformed (20% error).

AUTOMATIC MORPHOLOGICAL PARSING

- Complex morphology and morphophonology in Seneca
- Immersion programs require accurate parses and examples of inflection in real world contexts.
- Two common packages for generating morphological parses from manually parsed examples.



- Both packages yielded weak accuracy (50-70% error rate).
- Rule-based FST required detailed prior knowledge of Seneca and much more human annotation and labeling but resulted in substantially lower error rates (10-20%).

CONCLUSIONS

- State-of-the-art methods require more data than is typically available for an indigenous language.
- Needs of indigenous language communities are very different from industry academic computing researchers.
- Tools, methods, and architectures designed specifically for this purpose and this kind of data are needed.
- Close collaboration between indigenous communities, linguists, and computer scientists is crucial.

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