

An Indian-Australian research partnership

Project Title: Spoken translation systems for resource scarce languages

Project Number IMURA00780

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& Department of Humanities and Social Sciences

Research Academy Themes:

Highlight which of the Academy's Theme(s) this project will address?

(Feel free to nominate more than one. For more information, see www.iitbmonash.org)

1. **Advanced computational engineering, simulation and manufacture**
2. Infrastructure Engineering
3. Clean Energy
4. Water
5. Nanotechnology
6. Biotechnology and Stem Cell Research
7. **Humanities and Social Sciences**

The research problem

Spoken translation is a wide area of research and is one of the areas with lot of research potential. Due to the diversity in languages and variations in its spoken dialects it has become more challenging problem. Spoken translation requires both the speech recognition component as well as machine translation component. In this proposal, the aim is to address this problem of spoken translation for a under resourced

language, Konkani.

Konkani is an Indo-Aryan language spoken along the western coast of India. It is one of the scheduled language of India and the official language of the state of Goa. The official script of Konkani is Devanagari script. However, there is large number of speakers who write in Romi script (Roman Script) and speak in the same tone (a little different tone). Apart from these, there are other scripts used for writing in Konkani, viz., Kannada script, Malayalam script, etc. There are various dialects of Konkani across Goa and neighboring states like, Maharashtra, Karnataka and Kerala. These dialects are, Canara Konkani, Goan Konkani, Karwari, Malvani, Mangalorean, Chitpavani, Antruz, Bardeskari, Saxtti, Daldi, Pednekari, etc., There is a phenomenal change in the pronunciation and tone as we move from south Goa to north Goa. One important differentiating character of Konkani language is its pronunciation is nasalized.

Very few resources are available for this language. Especially, the speech recognition systems, speech to text system, text to speech system are rarely available for Konkani.

This project proposes to develop a spoken translation system which collects different speech dialect samples of Konkani and learn a mapping to standard Konkani. This standard Konkani will be processed through a Speech-To-Text system in Konkani, passed through Text-To-Text converter (from Konkani to target language) and Text-To-Speech convertor in the target language. The final output will be a spoken translation from Konkani to other target language, like Marathi, Hindi, etc. Additionally, this system can be embedded and explored more for the education domain which can help to fill the teaching and learning gap of Konkani and related languages.

Project aims

Project aims to develop a Spoken Translation System using the speech processing and machine translation techniques for a resource scarce language like Konkani. This project will also deal with research challenges which may arise and analyse how it affects the spoken translation.

Expected outcomes

- Spoken Language Translation System
- Development/Enhancement to Speech to Text systems (e.g., Konkani speech to Konkani text)
- Development/Enhancements to Text to Text systems (e.g., Konkani to target language like Marathi, Hindi, etc.)
- Development/Enhancements to Text to Speech systems (e.g., target language text to target language speech)
- Dialect mapping system
- Application in language learning and education domain

How will the project address the Goals of the above Themes?

This project falls under the theme 'Advanced Computational Engineering, Simulation and Manufacture' and 'Humanities and Social Sciences' under the 7 themes mentioned above. The areas like speech recognition, speech processing, machine translation falls under the Natural Language and Speech processing research area under the area of Artificial Intelligence under the umbrella of Advanced Computational Engineering, while Language structure falls in the area of Humanities and Social Sciences.

Capabilities and Degrees Required

The minimum educational qualifications are:
Master's degree in Engineering/ Technology; or
Master's degree in Science; or
Master's degree in Computer Applications; or
Bachelor's degree in Engineering/Technology/Science and a valid GATE score

NOTE: Candidates without a valid GATE score or research fellowship can be considered for admission if they have a minimum of two years professional experience. Competition for places is high and a competitive selection process is applied to all applicants.

Potential Collaborators

Please visit the IITB website www.iitb.ac.in OR Monash Website www.monash.edu to highlight some potential collaborators that would be best suited for the area of research you are intending to float.

To be decided by IITB-Monash Research Academy.

Please provide a few key words relating to this project to make it easier for the students to apply.

Konkani, Speech Recognition, Natural Language Processing, Speech Processing, Machine Translation