

Executive Summary



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1. Title of the Project: Development of Instrumental Measures for Oral Skill in Any Language
2. Date of Start of the Project: October 1, 2020
3. Aims and Objectives: To research and develop a system that reliably predicts human expert judgements of oral skill in constrained speaking contexts, realized as a complete software implementation involving both device and cloud server components for assessment/monitoring as well as language training functions. The system would be flexible enough to be easily customized to new content and even a new language and usable by diverse groups of language learners across age groups, native tongues and skill levels.
4. Significant achievements (not more than 500 words to include List of patents, publications, prototype, deployment etc), Patents and Publications:

Patent filed: Indian patent examination report received and response submitted in December 2021. Patent Application No. 201921041761 titled 'SYSTEM FOR AUTOMATIC ASSESSMENT OF FLUENCY IN SPOKEN LANGUAGE AND A METHOD THEREOF'.

Publications:

- (i) Kamini Sabu and Preeti Rao " Prosodic Event Detection in Children's Read Speech", Published in Computer Speech and Language, Feb 2021.
- (ii) Kamini Sabu and Preeti Rao " Automatic prediction of confidence level from children's oral reading recordings", Proceedings of Interspeech, October 2020, Shanghai, China.
- (iii) Kamini Sabu and Preeti Rao " Predicting Children's Oral Reading Proficiency with Prosody Modeling", Under Revision for Computer Speech and Language.
- (iv) Vaidya Mithilesh, Kamini Sabu, and Preeti Rao, "Deep Learning for Prominence Detection in Children's Read Speech", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP). IEEE, 2022.

- (v) Kamini Sabu, “Automatic Assessment of Fluency in Children’s Oral Reading using Prosody Modeling”, Ph.D. thesis, I.I.T. Bombay, July 2022.
- (vi) Mithilesh Vaidya, “Assessing Comprehensibility of Children’s Read Speech with Deep Learning”, M.Tech. thesis, I.I.T. Bombay, July 2022.

Prototype and Deployment:

1. Collaboration with Pratham Education Foundation for Hindi ASER literacy test automation. Our auto assessment codes for para and story have been installed on the Pratham cloud infra. Front-end app has been developed by Pratham Digital team. The submitted audio is processed and scoring parameters are returned for validation by the facilitator. Two pilots have been conducted with Parakh in UP/Rajasthan and Pune respectively during the period February-March 2022. Different usage scenarios, response time and assessment outcome accuracy (with reference to the corresponding facilitator judgment) were documented. Based on the report, Pratham plans to release the Parakh app on the Playstore for public use. An agreement with IIT Bombay to facilitate use of the IITB scoring IP in the released Parakh app is under discussion.
2. Interaction with WPP CSR Foundation India for developing an oral reading assessment product for their skilling program in English communication. There is a special emphasis on evaluation of reading fluency with emphasis on expression (prosody). A facilitator-centric app (‘Happy Lingo’) has been developed as part of the product ecosystem. Field data collected over 6 months from WPP schools has been processed and reports for 1200 students from 10 schools was made available to WPP. WPP Foundation also commissioned a research report on marketability of the App by a social research agency. The report provides clear evidence of the need for the oral assessment product and recommends additional components such as benchmarks for interpretation of scores and intervention strategies to be packaged with the App.
3. Interaction with Kendriya Vidyalaya schools: Based on an introduction to the Deputy Commissioner of KVS Mumbai region, the IITB team was invited to conduct oral reading assessment for the students of Classes 3,4 and 5 across 10 KV schools in Maharashtra and Goa regions in September 2022. Level-appropriate texts were selected from Reading cards stories from the English 400 Reading Programme by EFLU. Teacher training was conducted through a hybrid workshop as well as Whatsapp group instruction. Altogether 2500 students were recorded and individual as well as cohort reports were prepared. The cohort reports demonstrate the impressive potential of such exercises for benchmarking.

5. Concluding remarks

The project is progressing well in a direction that aligns with the needs of the so-far identified beneficiaries. The focus is now completely on developing Hindi and English language reading assessment tools. We are hoping to replicate the methodology with a third language, Marathi. We are looking actively for implementation partners to help with beta testing and bring in insights related to useful features for future development. The support from the Fellowship has been enabling and is greatly appreciated.