



**INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS**

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SHORT ABSTRACT

Misarticulated stops are commonly produced by the individuals living with cleft lip and palate (CLP), hearing disorders, motor speech disorders, and cognitive impairment. Speech technology based system for the evaluation of misarticulated stops can be used as an assistive tool by speech language pathologists during the treatment of individuals with speech sound disorders. Due to the presence of diverse acoustic characteristics, automatic detection of misarticulated stops is a challenging task. Motivated by the importance of events in speech analysis, an event-synchronous framework is proposed for the processing of misarticulated stops. The proposed approach involves the processing of speech signal anchored around a specific event, which carries the significant information about the deviant articulation. The present work considers the glottal closure and vowel onset events for the processing of misarticulated stops. The features extracted around these events are used for the screening of misarticulated stops from normal and classification of the category of misarticulation. The applications of event-synchronous features are demonstrated for evaluation of misarticulated stops produced by CLP children.

The major contributions of the current thesis are as follows:

- SPF-based time-frequency representation is proposed for the spectro-temporal analysis of speech. In particular, SPF is used for the epoch extraction and processing of CV transition regions.
- A VOP-based framework is proposed for the screening of misarticulated stops produced by CLP children from normal.
- A method for the detection of nasalized voiced stops is proposed using epoch-synchronously computed spectral, spectro-temporal, excitation source, and periodicity features.
- A hierarchical framework is developed for the automatic classification of glottal, nasalized, and devoiced stops by combining the proposed event-synchronous features.