

# Multipulse LPC articulatory modeling in the Wisconsin X-ray microbeam speech production database

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## Abstract

Multipulse modeling of articulatory movements can provide a flexible and intuitive representation of the dynamic behavior of speech articulators. Such a representation can be proven especially useful for the exploitation of the significant amounts of rich articulatory data that are collected via vocal tract imaging techniques such as real-time MRI or X-ray microbeam. Original multipulse LPC articulatory modeling studies only focused in a limited set of articulations by a single speaker as these were imaged using X-rays. In this work, application of the multipulse modeling framework in the Wisconsin X-ray microbeam speech production database is investigated. This database contains articulatory data, i.e., trajectories of points on the tongue and lips during multiple articulations as well as hard palate tracings, from 57 speakers. The original measurements are converted to constriction degree measurements and it is assumed that the corresponding trajectories can be modeled as the output of a low-order linear system when it is excited by a sequence of pulses of variable amplitudes. Pulse locations are determined using optimal matching pursuit and all pulse amplitudes are re-optimized every time a new pulse is introduced. Modeling similarities and differences are presented both across multiple utterances by the same speaker and across speakers.

Reference code: 161-898 pin : 0BIYE