The present study indicates that if we combine:

- an explicit articulatory modeling of real-time MRI articulatory speech data

Our model is verified in segmentation experiments of tract variable gestures using Vector Quantization (VQ), Gaussian Mixture Models (GMM), Hidden Markov Models (HMM) and Coupled Hidden Markov Models (CHMM) of multiple-stream recordings.

We model the couplings between three tract variables, i.e., lip aperture, tongue tip constriction degree and velum, using a coupled hidden Markov model.

Our work focuses on:
- extraction/measurement of articulatory gestures from real-time MRI sequences of the vocal tract
- multi-stream spatiotemporal articulatory modeling, that can account for gestural overlap and inter-articulator coupling

The presented study indicates that if we combine a) an explicit multi-stream transcription (gestures) with b) appropriate techniques to extract articulatory trajectories from real-time MRI data and c) the appropriate statistical models, we are well-positioned to derive phonological information automatically from a rich set of articulatory data and C) coupled Hidden Markov Models (CHMM) that can account for gestural overlap and inter-articulator coupling.

In this direction, we adopt the viewpoint of articulatory phonology [2] which is based on the description of an utterance “as an organized pattern of overlapping articulatory gestures”.

So, what is the goal of this work? To computationally model speech production in a way that it would allow us to:
- gain a deeper understanding of the underlying speech system by exploiting rich articulatory data (e.g., as acquired by real-time MRI)
- discover new or strengthen suggested links between articulatory observations and theoretical expectations.

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A gesture is a goal-directed action of constrictions forming by a vocal tract articulator [2].

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- extraction/measurement of articulatory gestures from real-time MRI sequences of the vocal tract
- multi-stream spatiotemporal articulatory modeling, that can account for gestural overlap and inter-articulator coupling

We model the couplings between three tract variables, i.e., lip aperture, tongue tip constriction degree and velum, using a coupled hidden Markov model.

Our model is verified in segmentation experiments of articulatory observations for previously unseen utterances. We compare with HMMS, GMMs, VQ.

The presented study indicates that if we combine:

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