# Using Linear Models of Speech Trajectory in the Reconstructed Phase Space to Extract Useful Features for Speech Recognition System

Yasser Shekofteh [a], Farshad Almasganj [a]

[a] *Amirkabir University of Technology, Iran*

In this paper, a new speech feature extraction method is proposed to improve the performance of speech recognition systems. This method is based upon the modeling of speech trajectory, taking advantage of multivariate autoregressive (MVAR) method, and application of some linear transformation methods which are needed for the dimension reduction purposes such as linear discriminant analysis (LDA), heteroscedastic LDA (HLDA), and locality preserving projection (LPP). Since the reconstructed phase space (RPS) is a proper domain to represent true dynamics of chaotic signal, it is utilized to produce the trajectory of speech signal in a high dimension space. In addition, the mentioned linear transform techniques are used to decorrelate and reduce the dimension of final RPS-MVAR feature vectors. Our experimental results show that overall system with the proposed features achieved 9.5% absolute improvement of phoneme accuracy compared to the baseline features in the clean condition.