PROBABILISTIC PHASE VOCODER AND ITS APPLICATION TO INTERPOLATION OF MISSING VALUES IN AUDIO SIGNALS (WedAmOR6)

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Abstract :

We formulate the phase vocoder −− an audio synthesis method very closely related to inverse short time Fourier Transform synthesis −− as a Gaussian state space model and demonstrate simulation results on interpolation of missing values. The audio signal is modelled as a superposition of quasi−sinusoidal signals generated by a linear dynamical system. The advantage of our ``generative" perspective is that it allows a full Bayesian treatment of the problem; e.g. one can perform the analysis while arbitrary chunks of sample values are missing or model parameters are unknown. To perform audio restoration, we derive an expectation−maximisation (EM) algorithm that infers the expectations of missing samples and maximum a−posteriori model parameters. We demonstrate the validity of our approach on a set of challenging real audio examples and compare to existing methods.

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