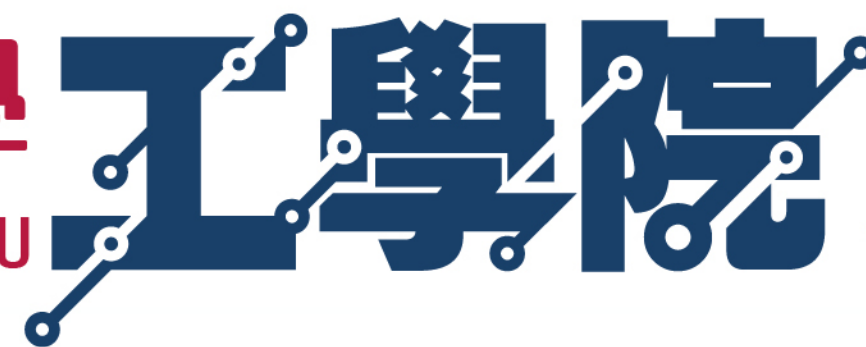


國立中山大學
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聯合專題競賽與展示

資訊工程學系

Department of Computer Science and Engineering

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TSM-Net: 以對抗式時序壓縮自編碼器為基礎的音訊變速演算法 TSM-Net: Temporal Compressing Autoencoder with Adversarial Losses for Time-Scale Modification on Audio Signals

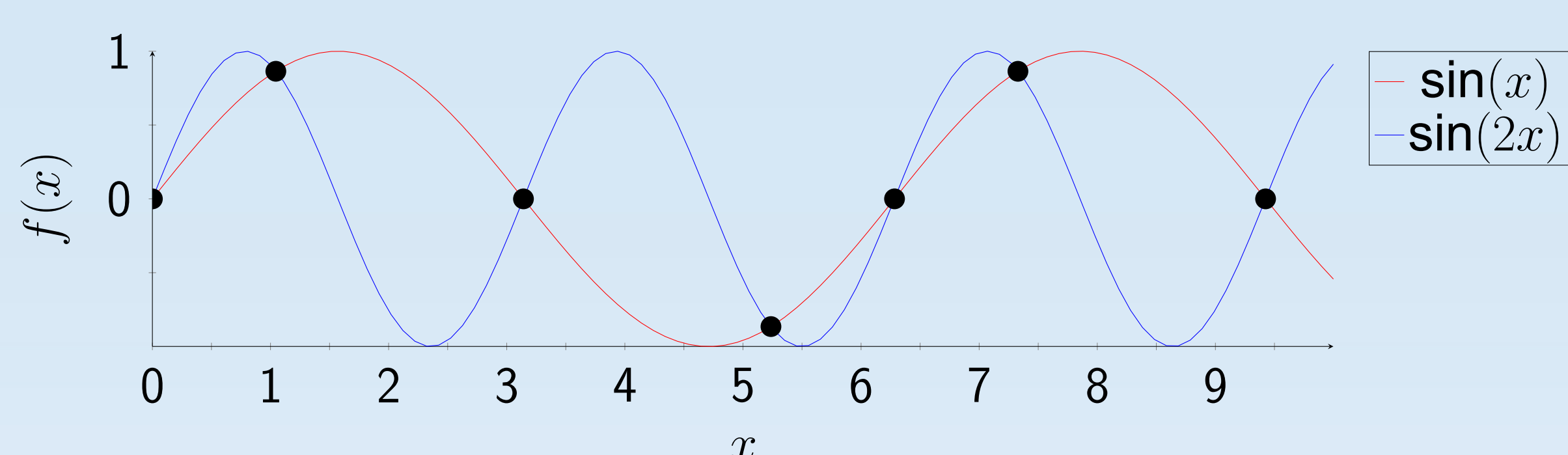
Introduction

With the advance of technologies and digitalization, we can store and reproduce multimedia content nowadays. An ubiquitous application regarding audio signals called time-scaled modification (TSM) is used in our daily life. It's also known as playback speed control in the video streaming platforms such as YouTube. With the power of artificial intelligence (AI) and modern computation hardware, however, we haven't discovered any method using AI to refine TSM algorithm and leverage the quality of the synthetic audio to the next level.

We proposed a novel TSM approach. While traditional methods use framing technique and spectral approaches use short-time Fourier transform to get high-level units. TSM-Net, our neural-network model encodes the raw audio into a high-level latent representation called Neuralgram. Since the resulting Neuralgram is a two-dimensional image with real values, we apply some existing image resizing techniques on the Neuralgram and decode it using our neural decoder to obtain the time-scaled audio.

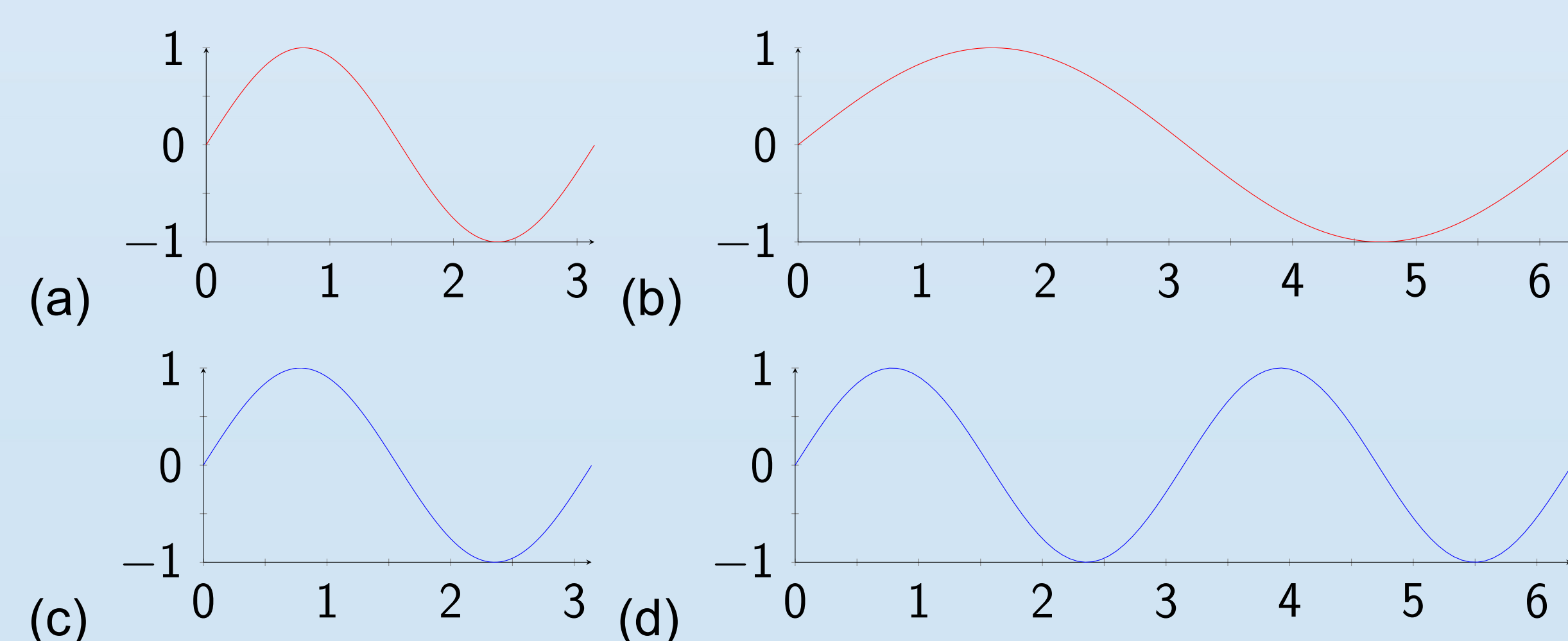
Related Works

Modeling audio is not a trivial task for neural networks. Models that directly generate raw audio waveform are known as vocoder which can be conditioned on some high-level abstract features such as linguistic features or spectrograms. In applications like text-to-speech (TTS) pipeline, the network often predicts the speech spectrogram of given texts, then uses a vocoder to get the raw audio.



Methodology

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Experiment

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Conclusion

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