

Supplementary material for “Dynamic imaging using a deep generative SToRM (Gen-SToRM) model”

Qing Zou, Abdul Haseeb Ahmed, Prashant Nagpal, Stanley Kruger, Mathews Jacob

I. EXPERIMENTAL RESULTS

In this supplementary material, we show some additional experimental results for the reconstruction of free-breathing and ungated dynamic MRI using deep generative SToRM model. The experiments are based on two datasets, which are challenging due to the irregular respiratory motion as well as the motion of the subjects during the acquisition of the data.

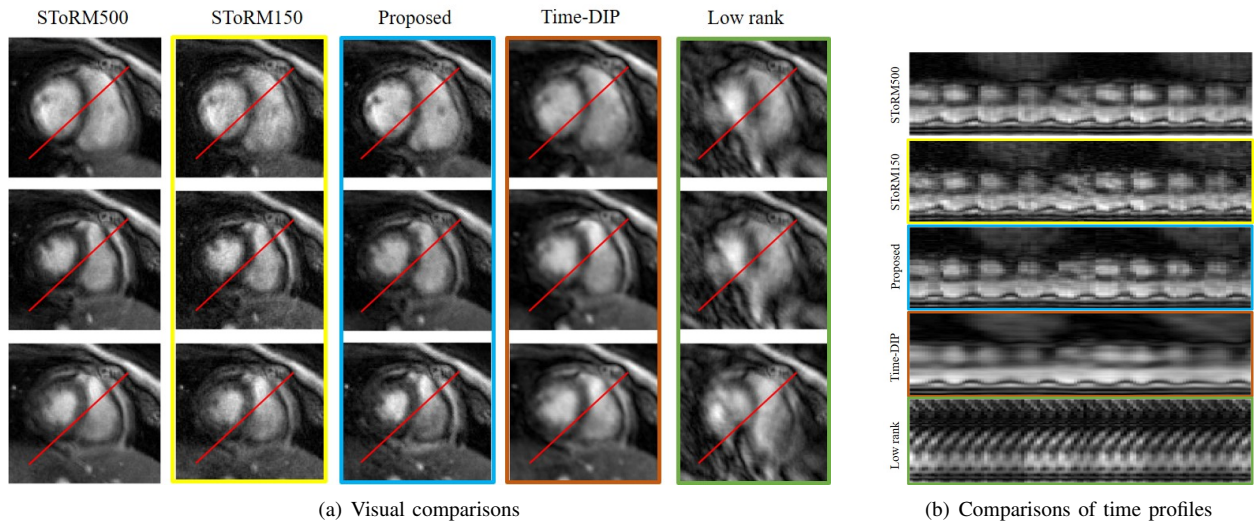


Fig. 1. Comparisons with the state-of-the-art methods on the first dataset. The first column corresponds to the reconstructions from 500 frames ($\sim 25s$ of acquisition time), while the rest of the columns are recovered from 150 frames ($\sim 7.5s$ of acquisition time). The top row corresponds to the diastole phase, while the third row is the diastole phase. The second row is an intermediate one. Fig. (b) corresponds to the time profiles of the reconstructions. We choose $d = 40$ for the proposed scheme. The Brisque scores for STORM500, STORM150, the proposed method, Time-DIP and low-rank method are 25.9, 27.5, 20.3, 32.6 and 41.6 respectively.

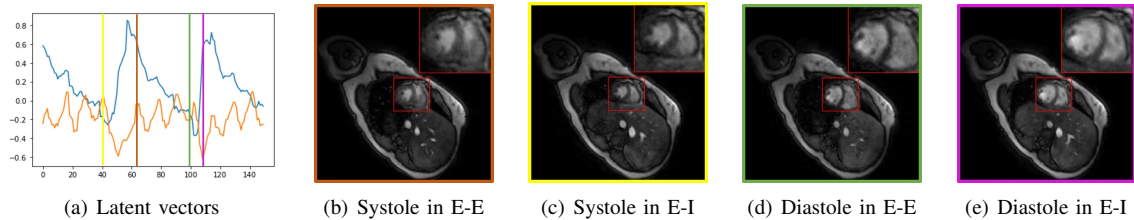


Fig. 2. Illustration of the framework of the proposed scheme with $d = 40$ on the second dataset. We plot the latent variables of 150 frames in time series. We showed four different phases in the time series: systole in End-Expiration (E-E), systole in End-Inspiration (E-I), diastole in End-Expiration (E-E) and diastole in End-Inspiration (E-I). The latent vectors corresponding to the four different phases are indicated in the plots of the latent vectors.

Qing Zou is with the Applied Mathematics and Computational Sciences (AMCS) program at the University of Iowa, Iowa City, USA (e-mail: zou-qing@uiowa.edu). Abdul Haseeb Ahmed and Mathews Jacob are with the Department of Electrical and Computer Engineering, University of Iowa, Iowa City, USA (e-mail: abdul-ahmed@uiowa.edu and mathews-jacob@uiowa.edu). Prashant Nagpal and Stanley Kruger are with the Department of Radiology, University of Iowa, Iowa City, USA (e-mail: prashant-nagpal@uiowa.edu and stanley-kruger@uiowa.edu). This work is supported by NIH under Grants R01EB019961 and R01AG067078-01A1. This work was conducted on an MRI instrument funded by 1S10OD025025-01.