

Supplementary Material

Online tool wear monitoring via a deep-kernel Gaussian process regression algorithm

Guangxian Li^{1,2}, Hui Xu¹, Meng Liu¹, Wencheng Pan³, Xiangkun He⁴ (✉), Wei Wei¹ (✉)

1 School of Mechanical Engineering, Guangxi University, Nanning 530004, China

2 School of Engineering, RMIT University, Mill Park 3082, Australia

3 School of Computing and Engineering, University of Huddersfield, Huddersfield HD1 3DH, United Kingdom

4 Shenzhen Institute for Advanced Study, University of Electronic Science and Technology of China, Shenzhen 518110, China

Corresponding authors

Emails: xiangkun.he@uestc.edu.cn (Xiangkun He); weiwei@gxu.edu.cn (Wei Wei)

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Appendix I. Feature extraction results for different processing parameters

Figs. A1-A4 show the characteristic images of the cutting forces under different machining parameters: (a1)-(c1) correspond to the time-domain signals of the cutting forces at the initial, steady and intense wear stages, (a2)-(c2) correspond to the frequency-domain signals of the cutting forces at the initial, steady and intense wear stages, and (a3)-(c3) correspond to the initial wear, respectively, wavelet-domain signals of cutting force for the initial wear, steady wear and intense wear stages, respectively.

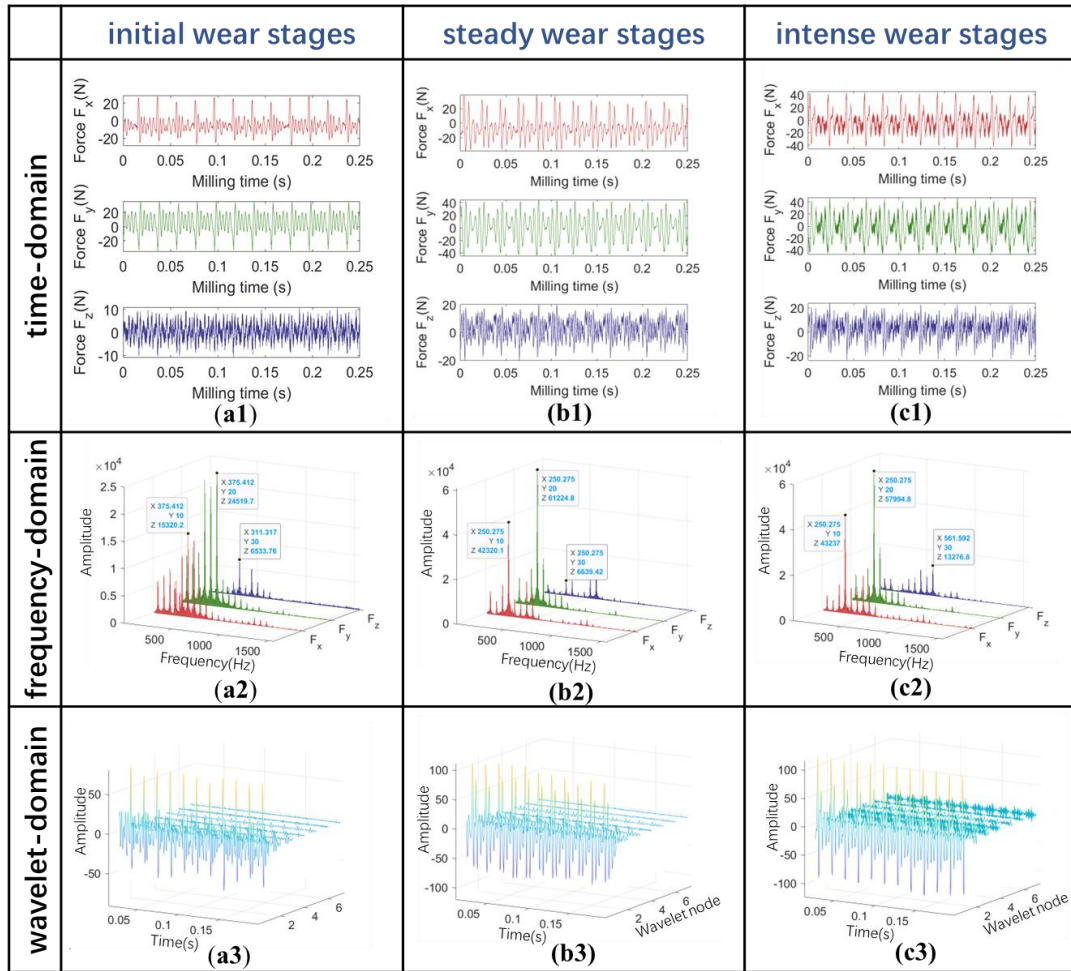


Fig. A1 Cutting force signal processing results for T1 data set

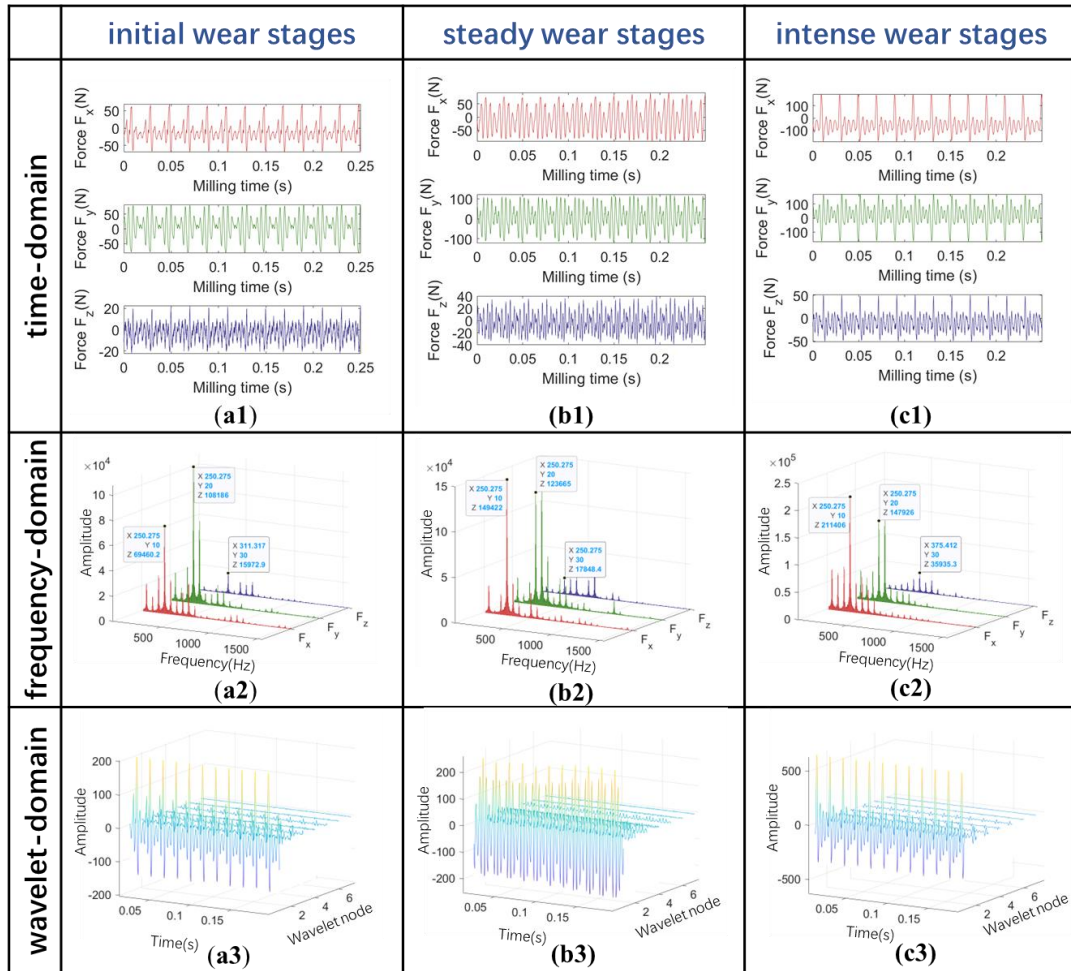


Fig. A2 Cutting force signal processing results for T2 data set

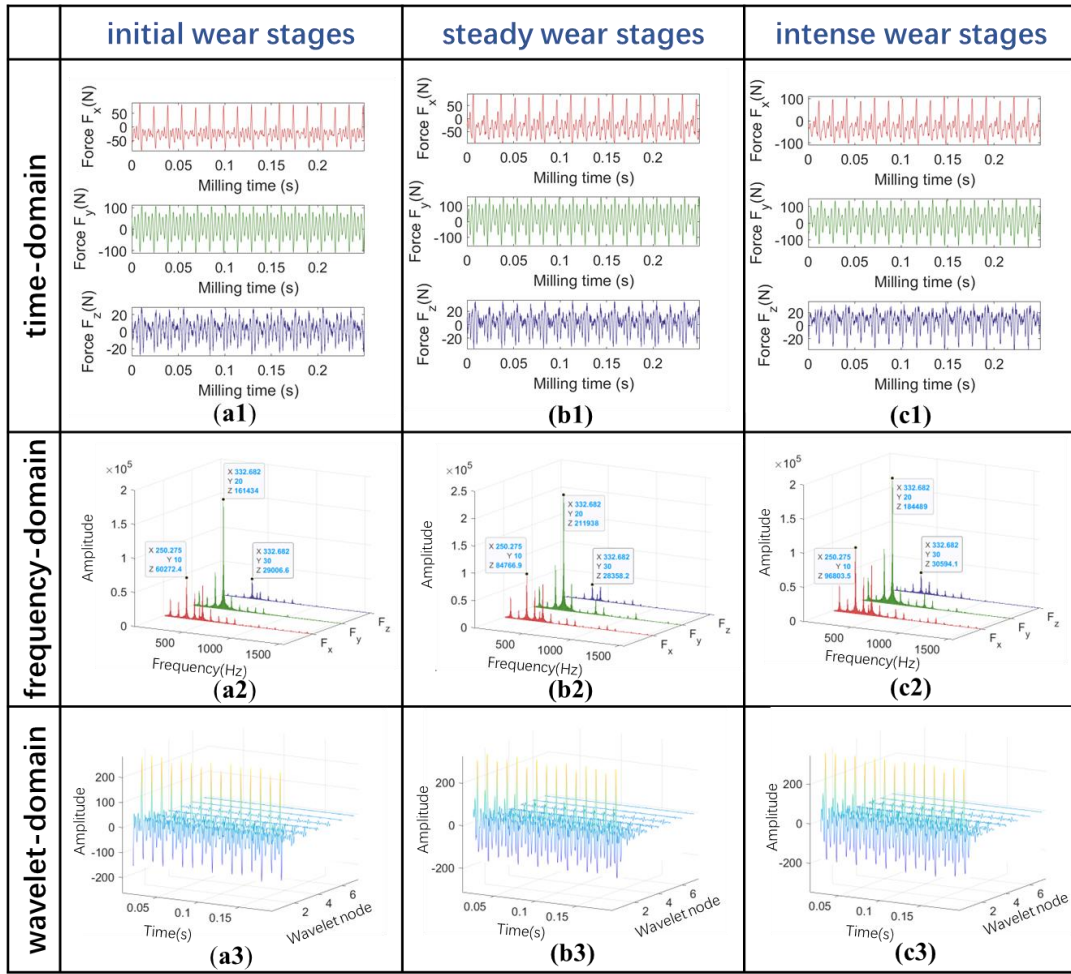


Fig. A3 Cutting force signal processing results for T3 data set

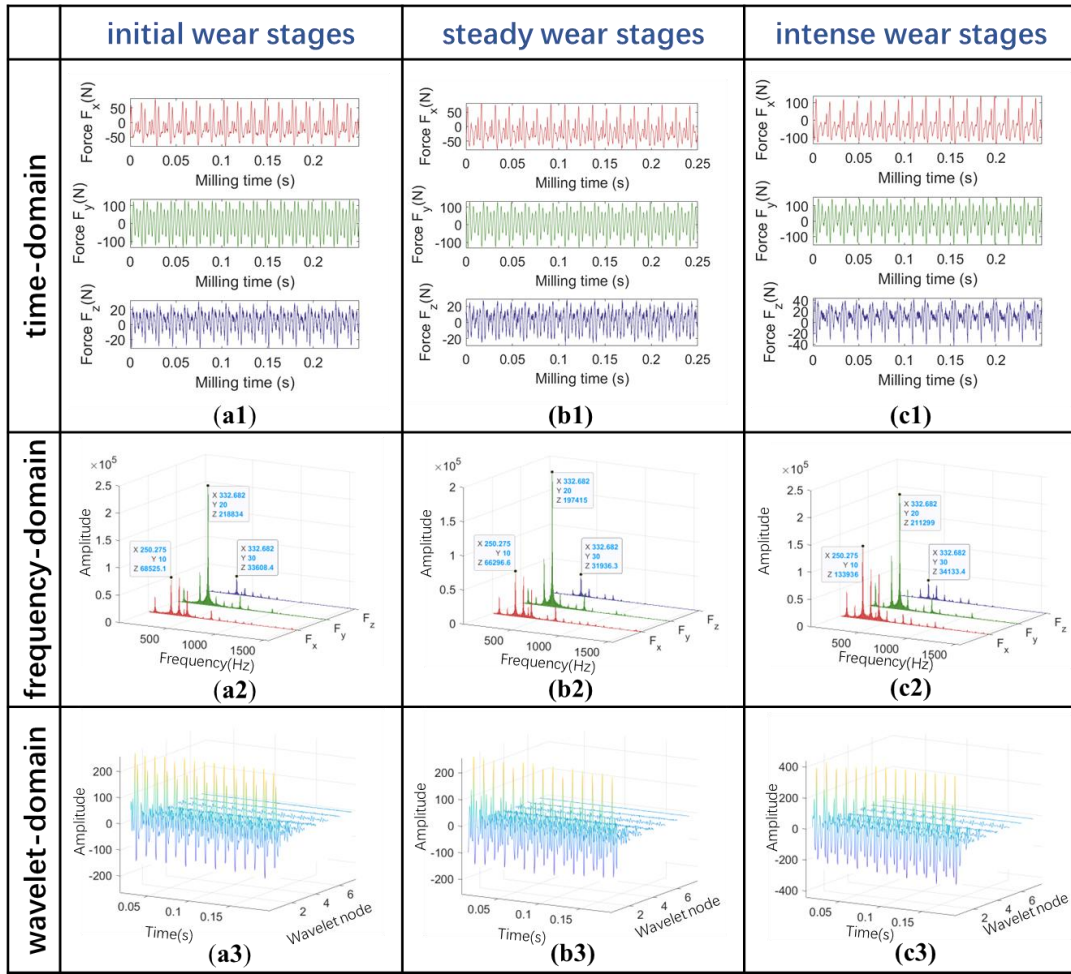


Fig. A4 Cutting force signal processing results for T4 data set

Appendix II. Comparison results of models with different processing parameters

Figs. A5-A8 represent the results of the prediction performance of the DGPR model compared with other five models: CNN, DNN, BPNN, SVM, and GPR in the four cutting tests.

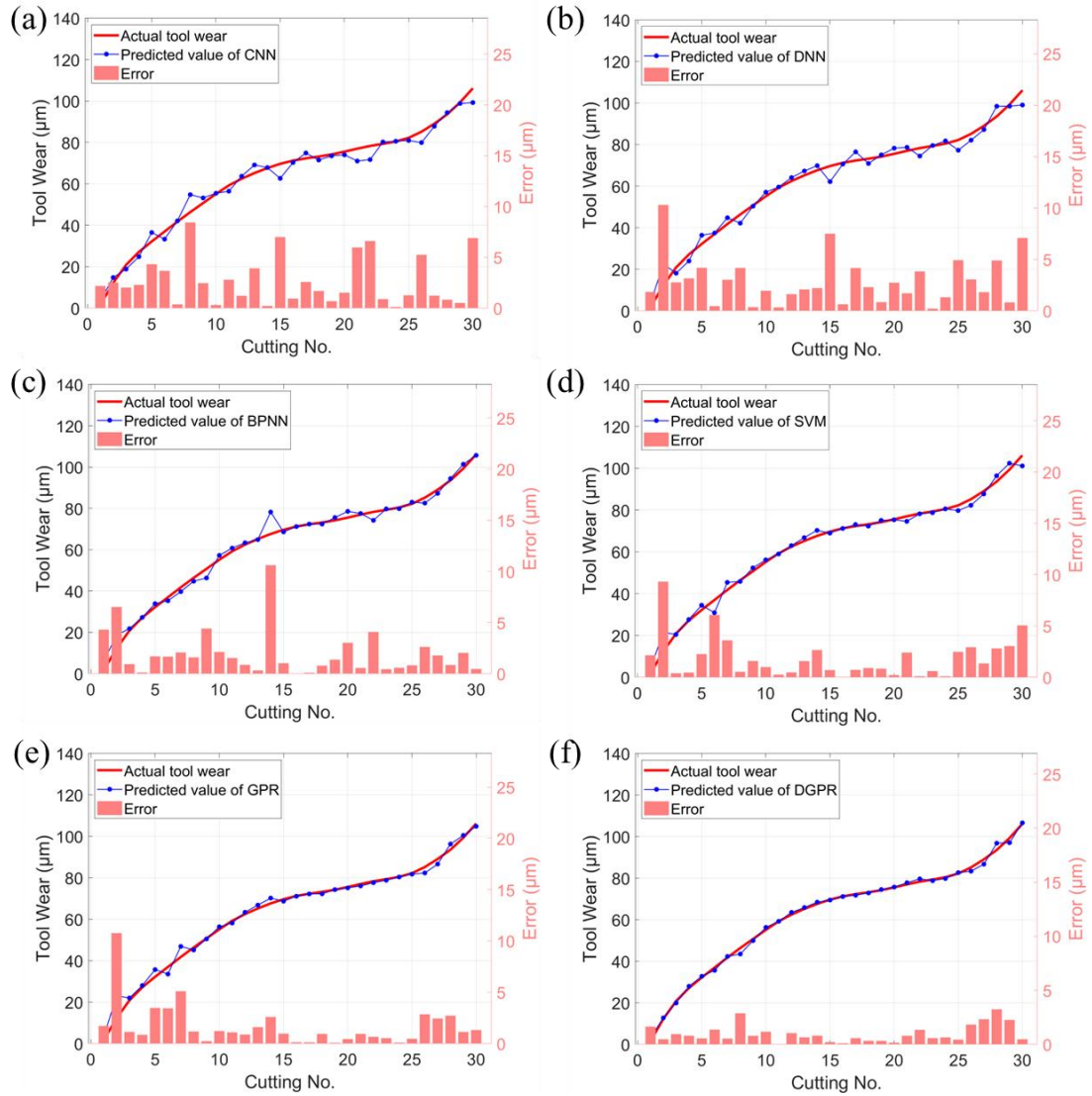


Fig. A5 Performance comparison results of different models in dataset T1

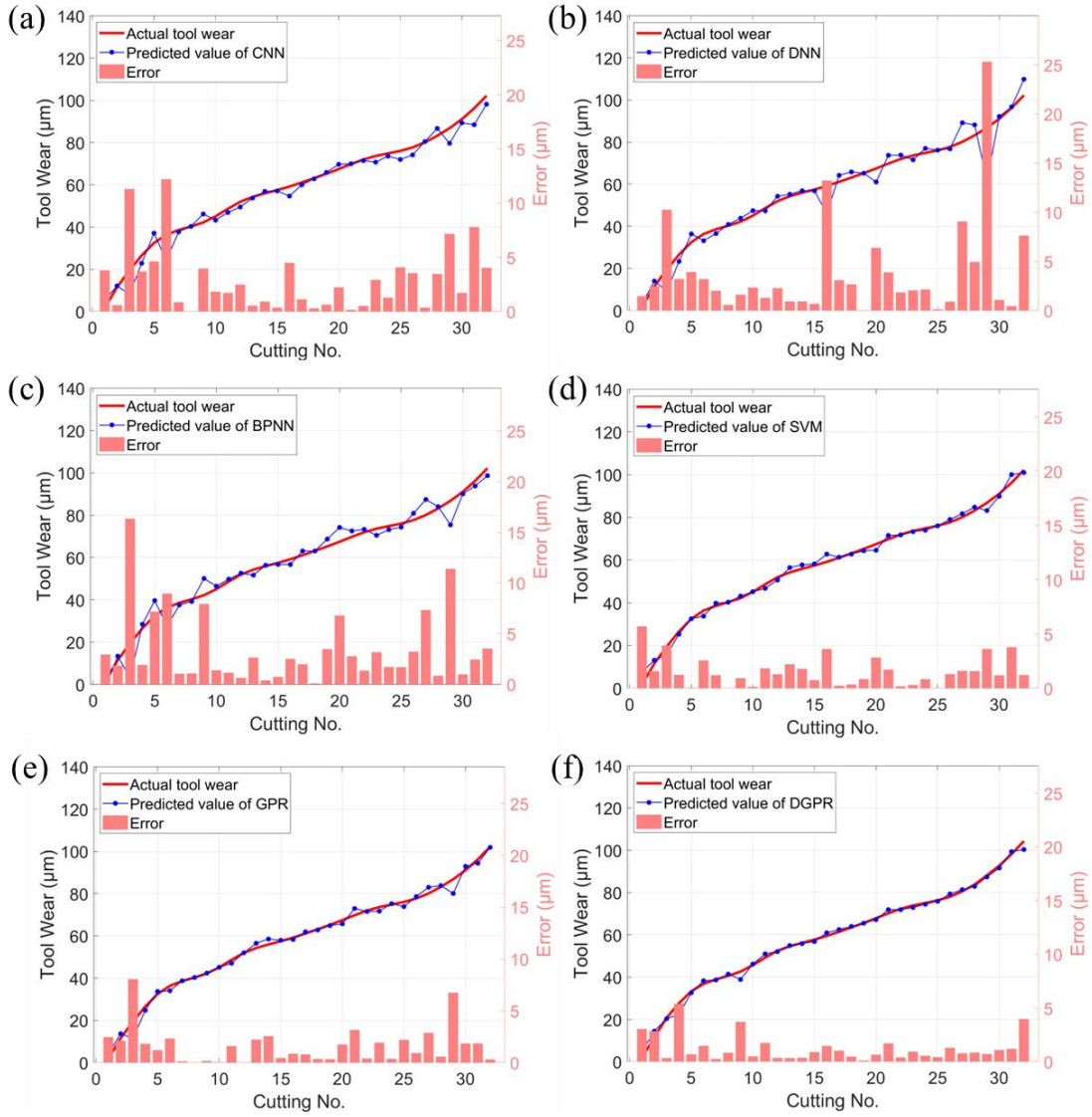


Fig. A6 Performance comparison results of different models in dataset T2

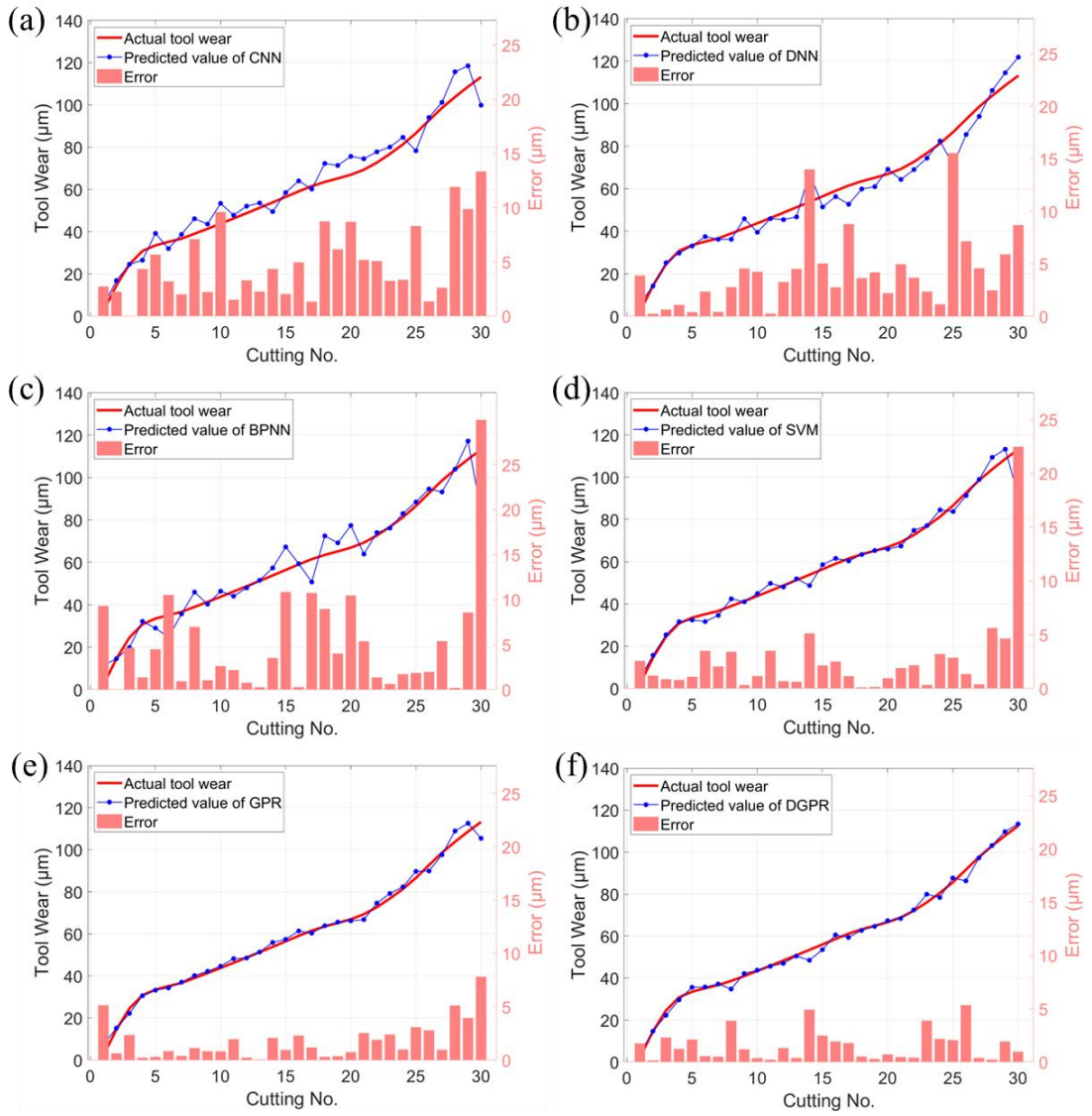


Fig. A7 Performance comparison results of different models in dataset T3

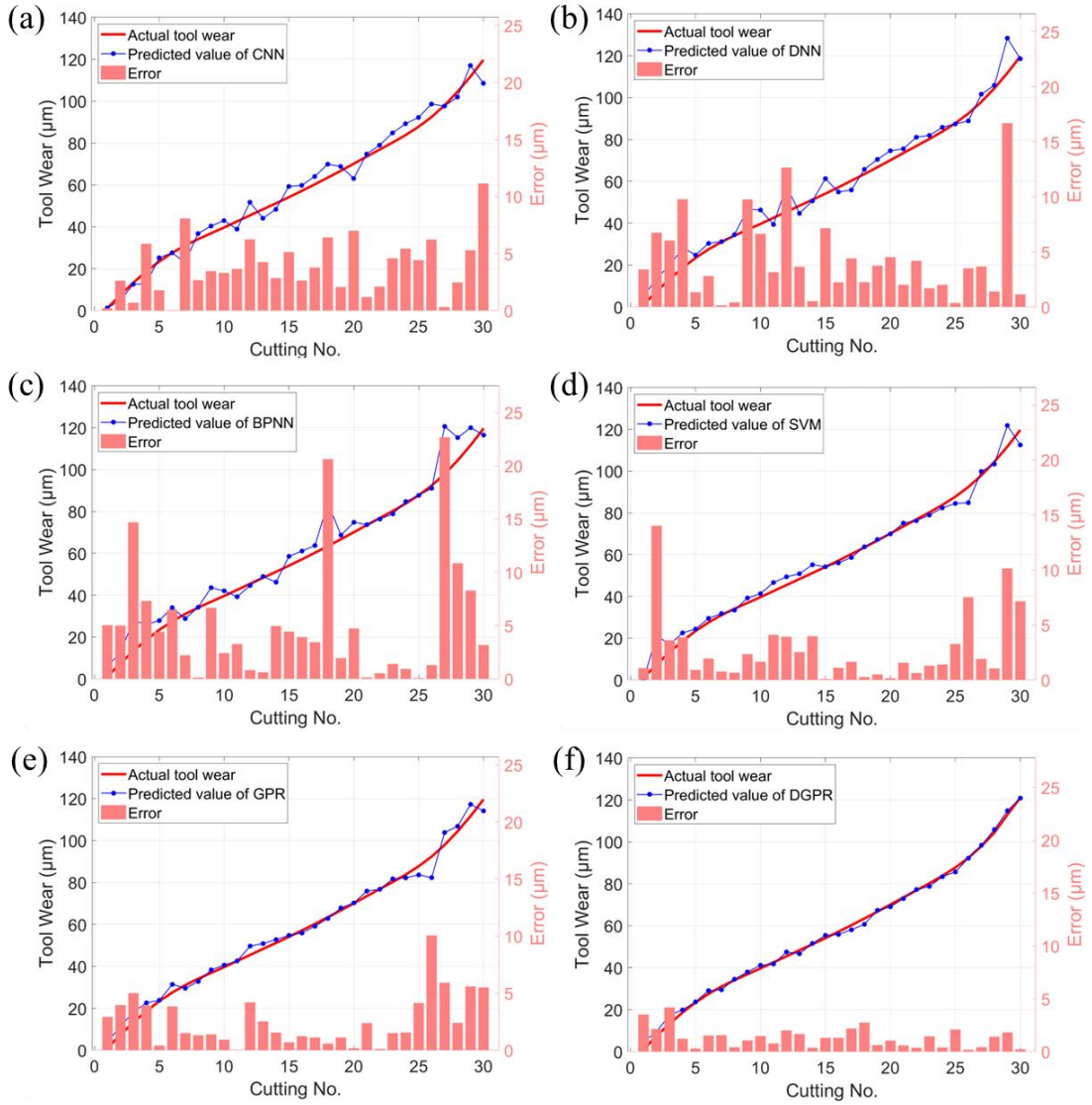


Fig. A8 Performance comparison results of different models in dataset T4