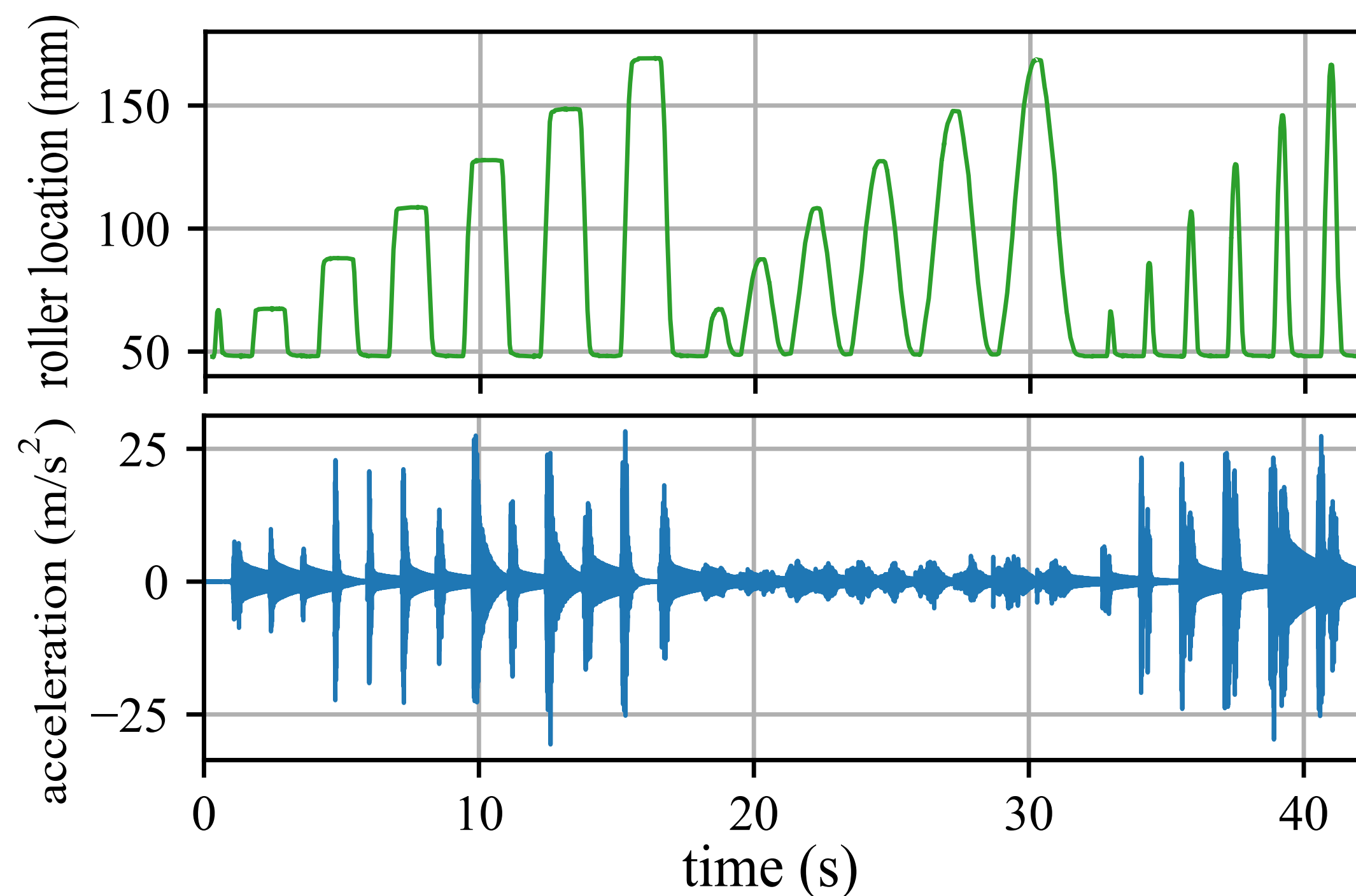
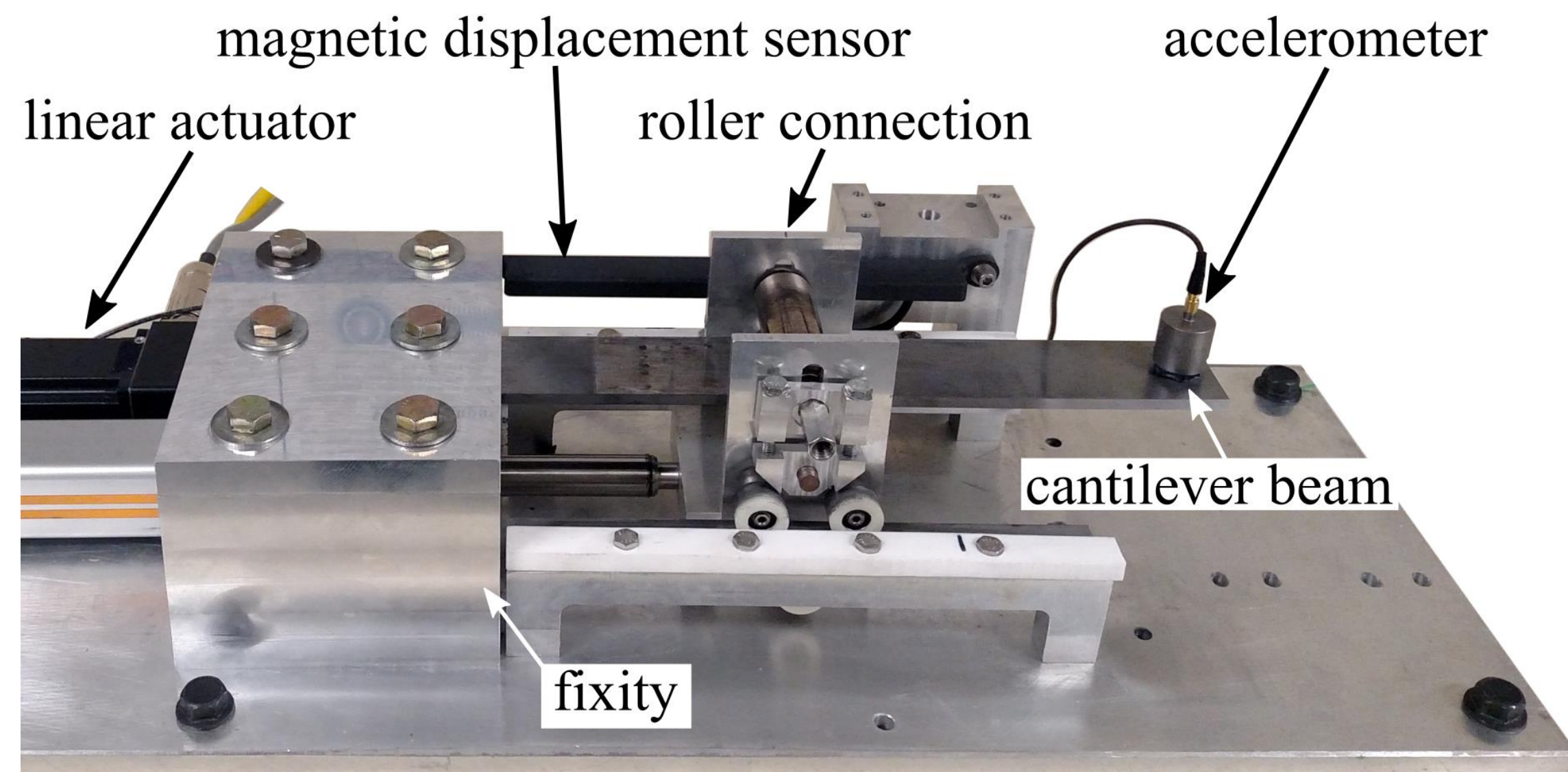


Introduction

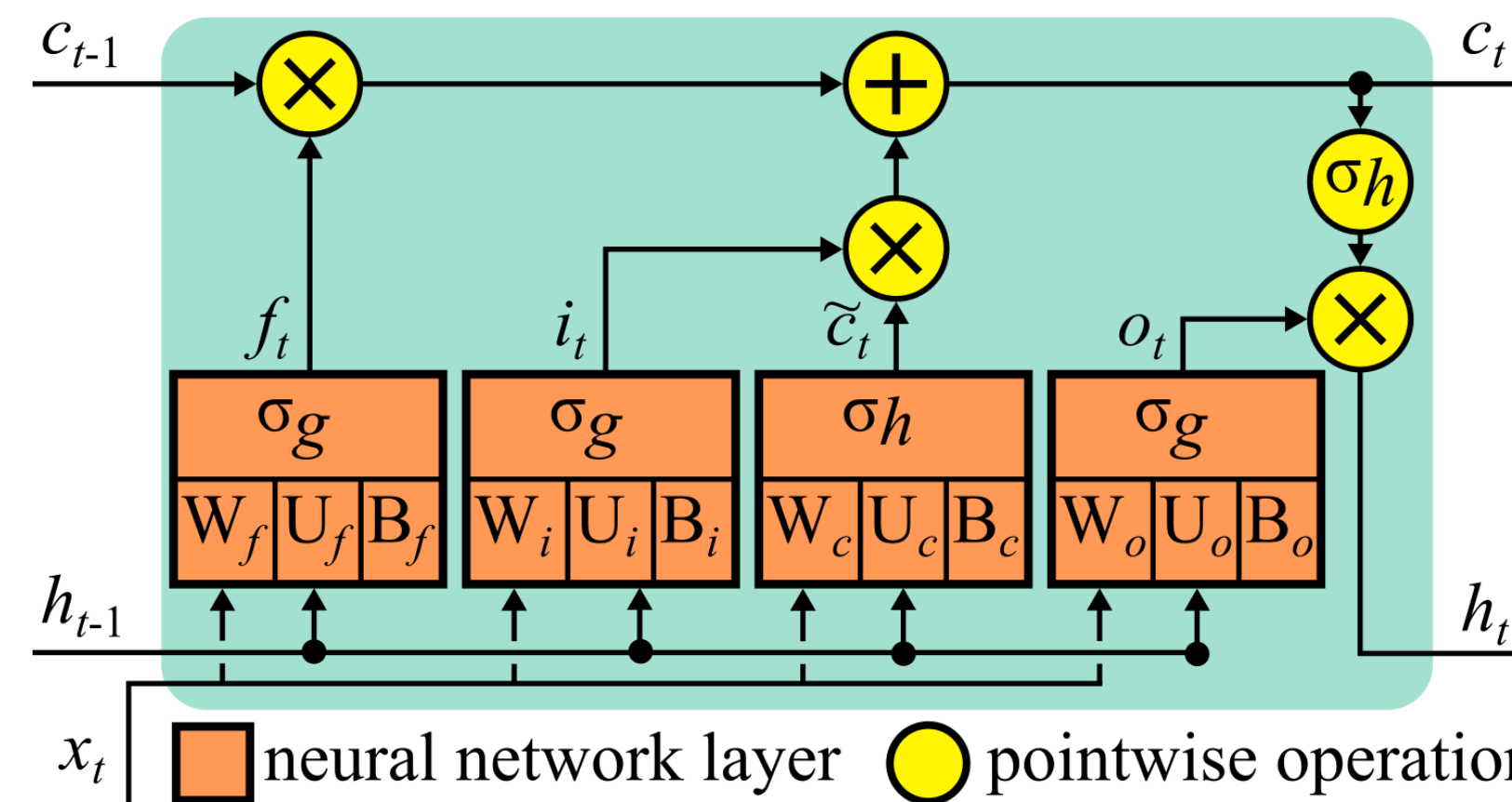
- High-rate dynamic structures are subjected to impact loading with accelerations greater than 100 g over time periods of less than 100 milliseconds.
- Goal: create a data-driven model capable of producing low-latency state prediction from a time-domain signal.

DROPBEAR Testbed

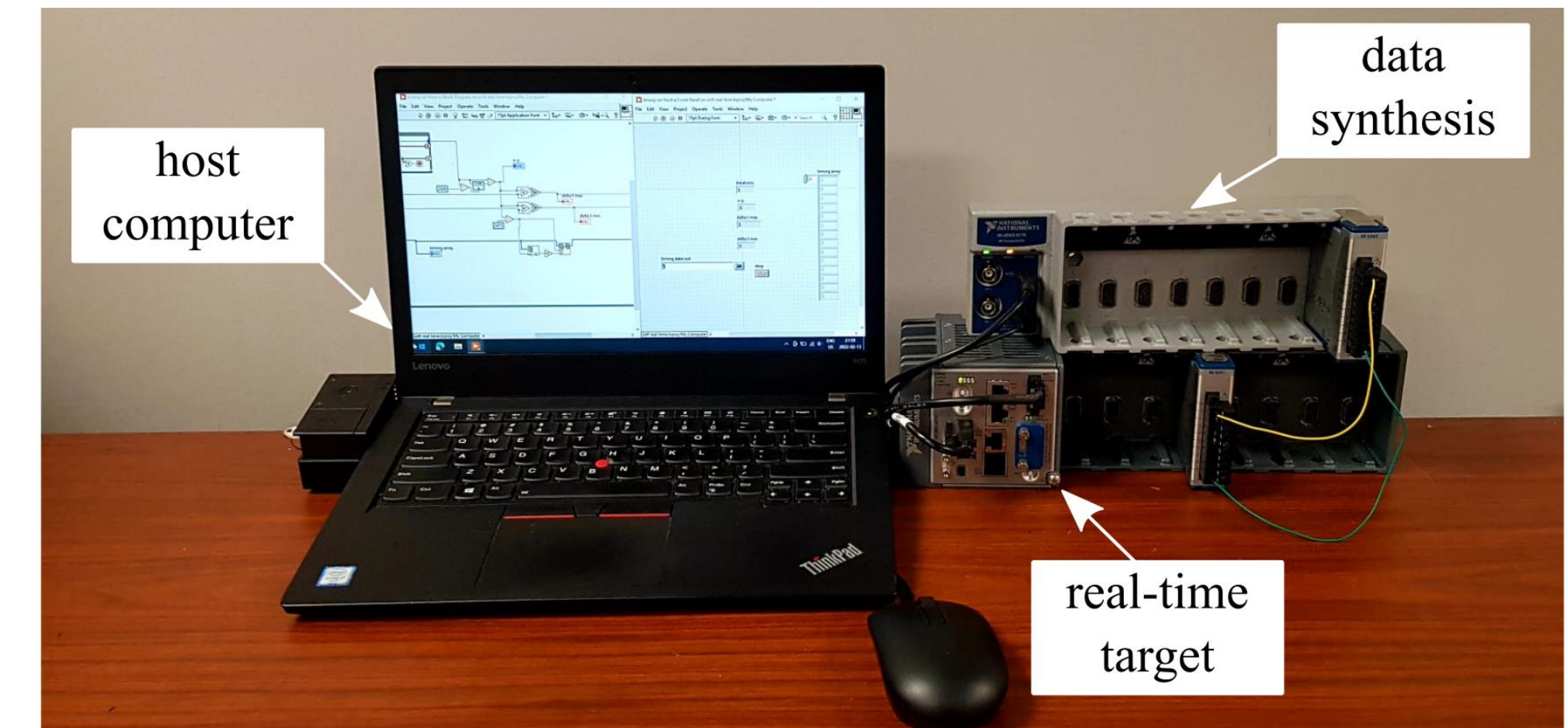
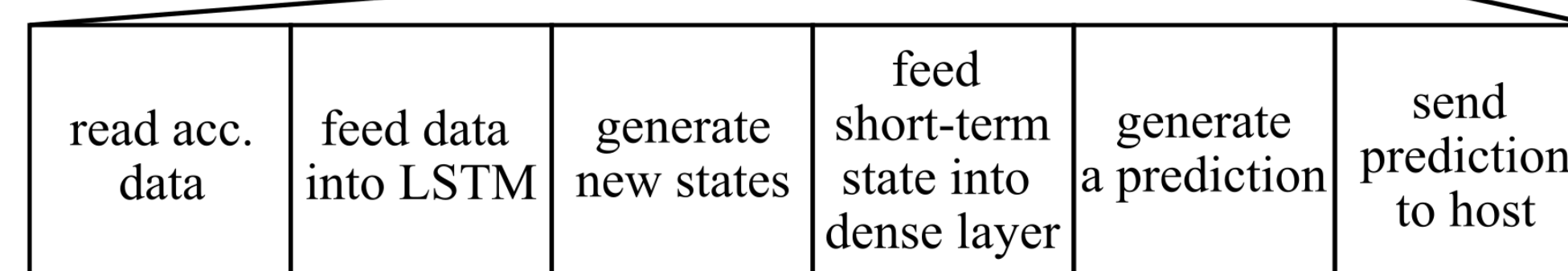
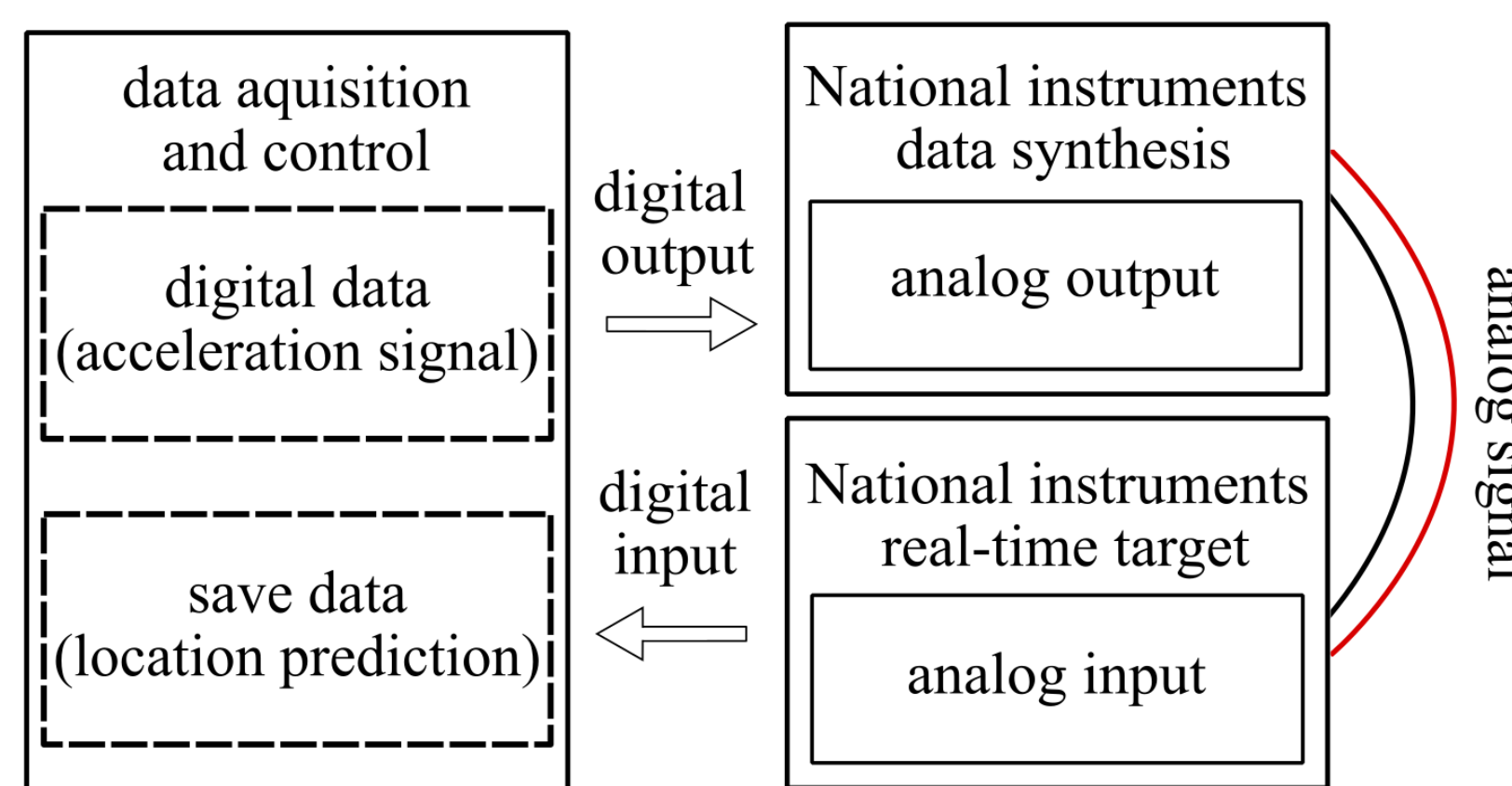
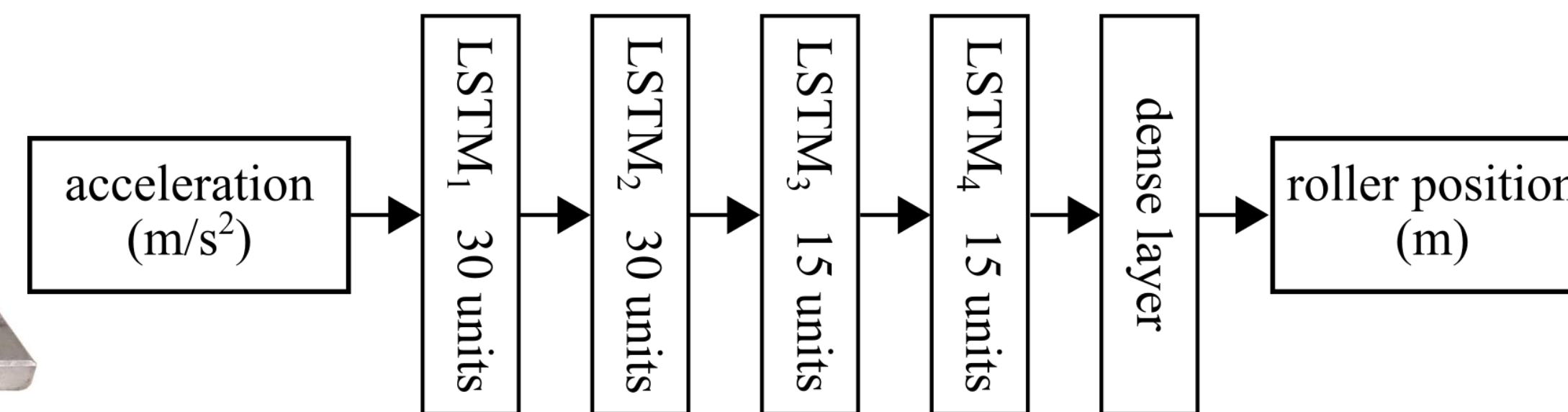


Model Development

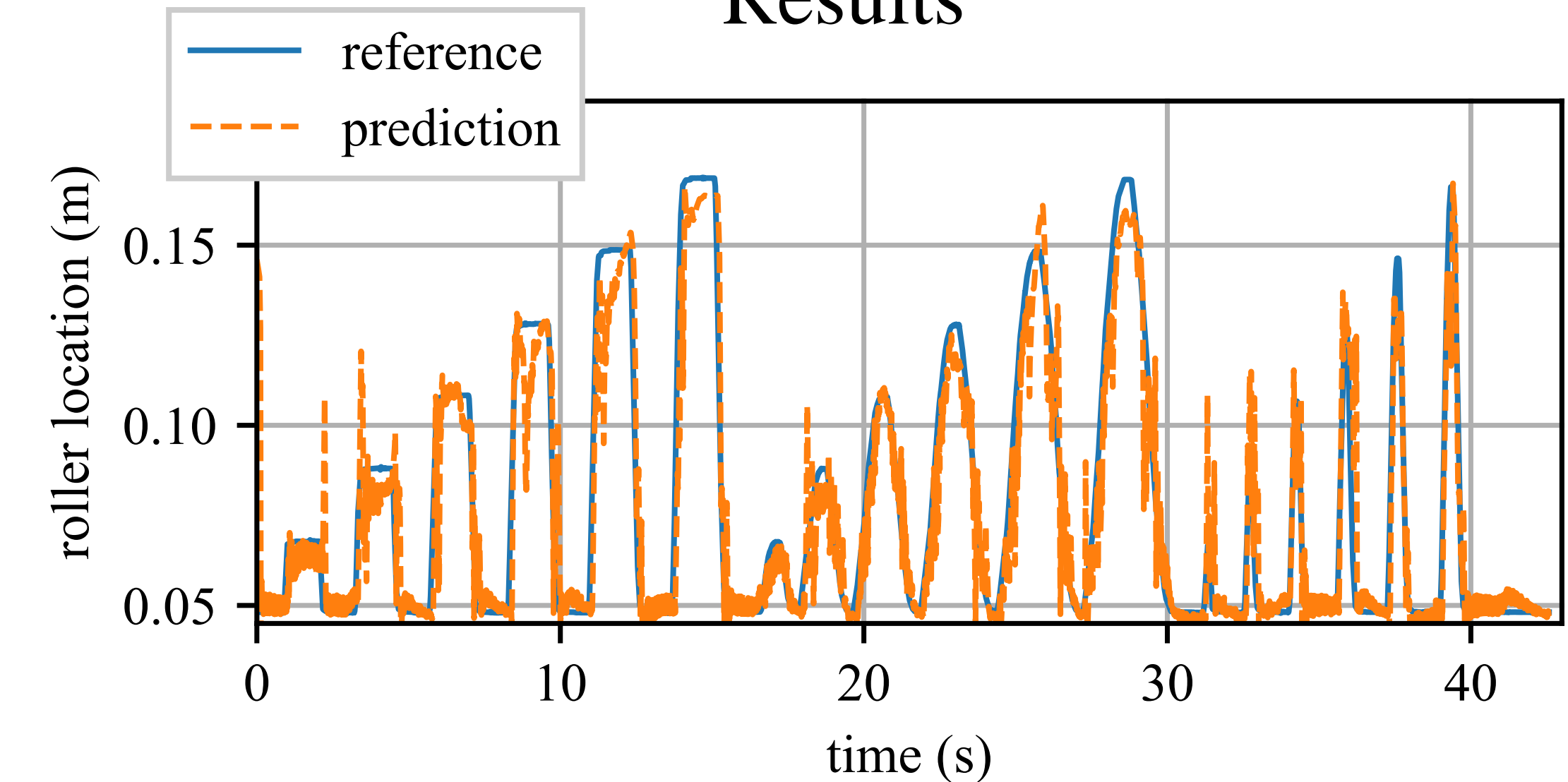
- Long short-term memory (LSTM) is a commonly used recurrent neural network architecture.



- The deployment of LSTMs to edge computing devices results in significant constraints in the size of the model.



Results



- Results show a SNR_{dB} of 43.2 and an RMSE of 12.8 mm.

Dissemination

[1] Progress Toward Data-Driven High-Rate Structural State Estimation on Edge Computing Devices. *Proceedings of the ASME 2022 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference.*

[2] A publicly available LabVIEW package for implementing LSTMs.

