

Embedded sensor system for automated cable tension monitoring using deep learning

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ABSTRACT

This study aims to develop the automated wireless cable tension monitoring system using smart sensors, possible to measure the tension under the varying tension conditions. A peak-picking algorithm tailored to cable vibration is proposed using a Faster R-CNN, one of region-based CNN methods, to apply the vibration-based tension estimation method to automated cable tension monitoring. The developed system features embedded processing on smart sensors, including data acquisition, power spectral density analysis, automated peak-picking, and tension estimation. A series of laboratory tests are conducted on a cable to verify the operation of proposed automated monitoring system under the variety of tension forces. The experimental results validate the proposed system for automated cable tension monitoring with different tension conditions.

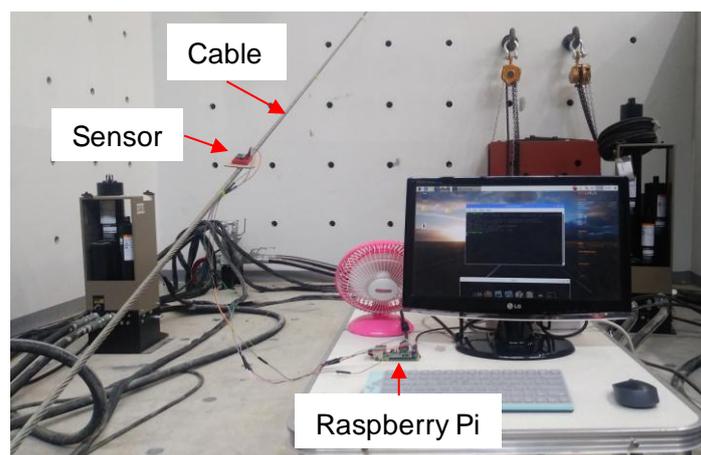


Fig. 1 Experimental setup

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