Real-time monitoring of train wheels and track conditions based on the time series analysis and multivariate data analysis

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Introduction and background:

For railway track monitoring, several types of sensor technology have been used, including laser technology , camera technology and inertial sensors (accelerometers, gyrometers, and so on). The current study describes a system for monitoring the condition of railway tracks and wheels in real time. Experimental vibration signals were recorded on a freight train and placed a sensor on a cabin. The feature selection was performed, resulting in the identification of a frequency band that appears to provide credible information regarding the fracture. Reliable multivariate data analysis was chosen using the knowledge of the features picked.

Problem description and objective:

Maintaining safe and reliable train operations is necessary for regular examination of railway track health. Cracks, rail discontinuities, burnt wheels, and misalignment generated on the rails as a result of non-maintenance, pre-emptive investigations, and delayed identification pose a serious threat to rail transport safety. The old method of manually examining rail tracks using a railway cart is inefficient and subject to human mistakes and bias. This research intends to improve the old railway system to overcome these concerns by implementing an automated method. The main objective of this thesis is to predict the fault in railway tracks and give an indication or alarm to the driver that there is a breakage in the railway line. For this, vibrating sensors are used to detect breakage in the railway track
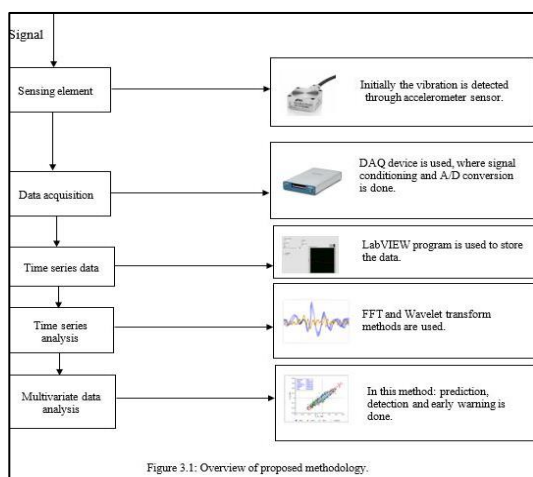

Figure 3.1: Overview of proposed methodology.

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