PREDICTIVE MAINTENANCE ON HOIST COMPONENTS

Health Index Extraction of a Wire Rope from Multivariate Time Series

Pro²Future

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MOTIVATION & GOALS

Condition monitoring of hoist components is **essential** within an industrial process not only for the overall load carrying task but also to guarantee **personnel safety**. Inspection techniques of **very complex mechanical components**, such as wire ropes, are **quite costly**, as they require expensive testing equipment and usually **downtimes** are inevitable. Exact monitoring of **internal wire rope breakages** is of paramount importance, as it may dictate the right time for wire rope replacement, thus **increasing** the reliability and **decreasing** the maintenance costs. By exploiting the existing monitoring data (e.g., torque, load, velocity), we extract a robust **Health Index** for the wire rope, which accurately **quantifies** the structural degradation of the wire rope. Further, based on the past degradation pattern we build a **prediction model** for **online** deployment of our proposed approach.

Project FactBox

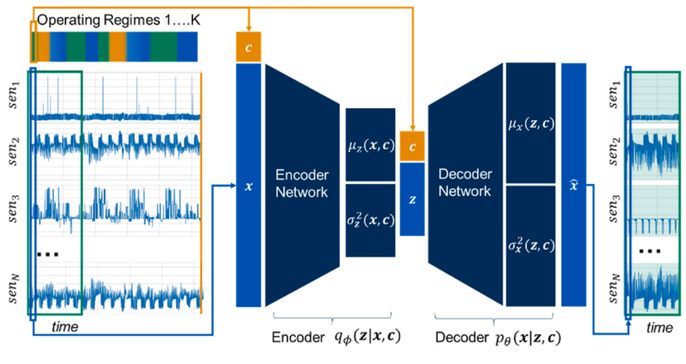
Project Name PREMAC-2
Project ID MFP II 3.1.3
Duration 24 Months

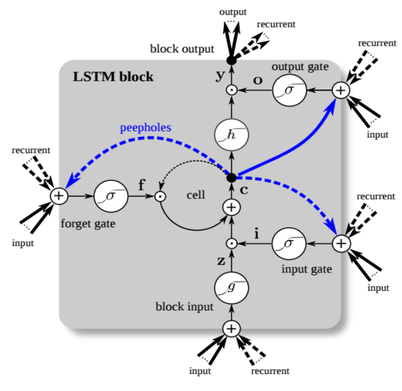
Area 3
Cognitive Decision Making

Project Lead
DI Dr. Belgin Mutlu

APPROACH

Develop an end-to-end algorithm for **time series segmentation**, **causal selection** based on an interventional channel defined from **domain knowledge** and construction of a **Health Index** via **deep learning** techniques.





CONTRIBUTION

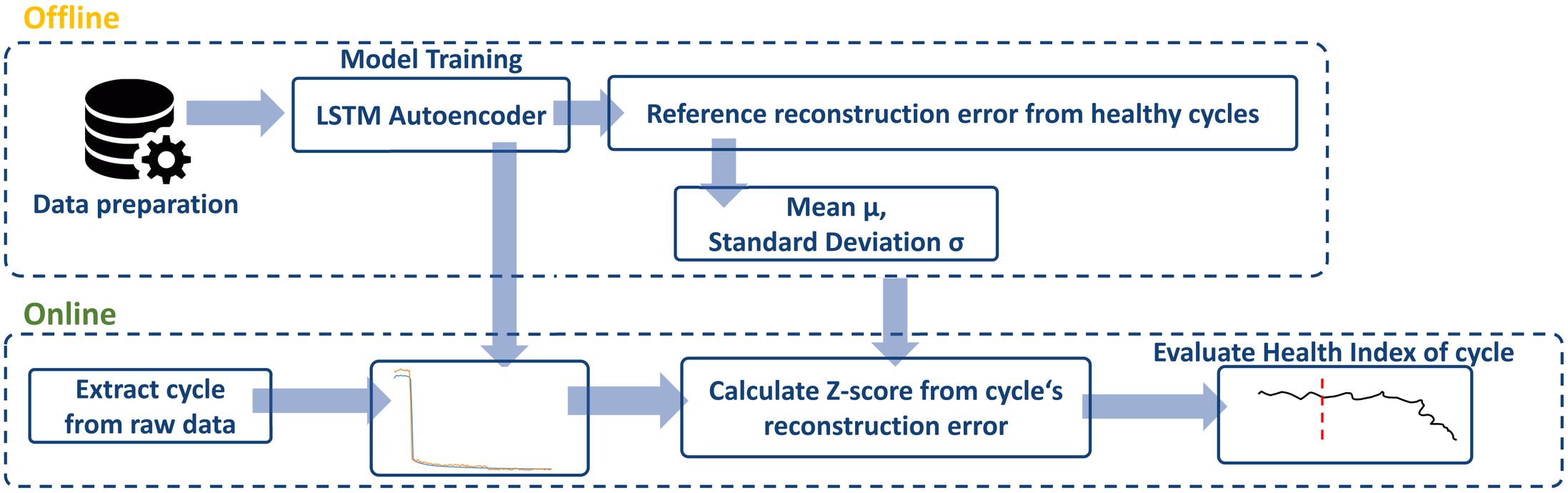
Scientific contribution

- Channel selection via causal strength quantification
- Health index extraction with deep learning techniques
- Wear monitoring of structural components with high accuracy
- Failure prediction based on past time series data

Economic contribution

- Prevent unexpected accidents with potential loss of human lives
- Reduce overall operational costs from regular inspections
- Optimize decision making for maintenance planning activities
- Eliminate downtimes of production flow process

FRAMEWORK



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