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Inventors

Michael Simeone

David Little

George Boben

Shashank Kapoor

Deepan Nedumaran

Contact

Shen Yan
shen.yan@skysonginnovations.com

Language-Based Failure Detection Tool for Large-Scale Maintenance Operations

Background Properly maintained support systems are crucial to the successful execution of daily operations for nearly all large-scale organizations. Furthermore, unforeseen sub-system failures are often highly disruptive, resulting in lost productivity and decreased earning potential. Therefore, it is imperative for maintenance personnel to quickly and effectively correct failures, preferably before they ever become an issue. Real-time sensor technology and Internet of Things (IoT) integration helps to achieve this, but steep implementation costs make this solution impractical for most organizations. Invention Description Researchers at Arizona State University have developed an automated forecasting tool that processes historical work-order text and returns statistically significant trends of keywords to expose potential problem areas. The user can then interpret this information with their expertise and reallocate resources accordingly, thereby reducing future (1) high-impact failures and (2) recurrent issues in building systems. To process text data, punctuation and non-informative words are first removed and then modeled by a Latent Dirichlet Allocation (LDA) algorithm that matches each work order to an assortment of topics defined by a list of keywords. Following this, topics of low coherence are removed before performing historical trend analysis and time-series projection of future activity.   Potential Applications •   Maintenance operations •   Work order analysis •   Smart building systems •   Facilities management Benefits and Advantages •   Customizable to each business through defining of key words, significance of prevalence changes, and length of projection •   Low cost •   Does not require specialized computing hardware •   Uses readily available text data Profile of Dr. Michael Simeone