

Ontology-based sharing of structural health monitoring data

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1 Abstract

A structural health monitoring system installed in a bridge produces a vast amount of sensor data that is analyzed and periodically reported to a bridge owner at an aggregate level. The data itself typically remains in the monitoring service of a service provider; it may be accessible to clients and third parties through a dedicated user interface and API. This paper presents an ontology to defining the monitoring model based on the Semantic Sensor Network Ontology by W3C. The goal is to enable an asset owner to utilize preferred tools to view and access monitoring data from different service providers, and in longer term, increase the utilization of monitoring data in facility management. The ultimate aim is to use BrIM as a digital twin of a bridge and to link external datasets to improve information management and maintenance over its lifecycle.

Keywords: monitoring; bridge information model; linked data; ontology; facility management

2 Introduction

Facility management of infrastructure assets requires capabilities to perceive the condition and health of the asset, to comprehend the observations and their implications with suitable

analysis methods, and to take proper actions based on findings. Information thus flows from assets via observations to findings (Figure 1). It is a dynamic situation awareness process progressing from *perception*, *comprehension* and *projection* to a *decision* to take proper *actions* that again affect the situation [1].