Analysis of Machine Learning for Detect Concrete Crack Depths Using Infrared Thermography Technique

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Abstract

Recently, much research with high-tech technology is being conducted in building inspection. In previous studies, thermography technology quickly and accurately inspected the concrete crack defects, and several machine learning models can reliably predict the crack depths. In this study, the most proper model would be proposed according to the concrete crack by evaluating the adaptability of the seven machine learning models. The models also predicted the crack depths, and the data were applied to each machine learning considering concrete temperature and external parameters. In machine learning, less critical features were ignored by filtering existing data to find useful features related to crack depths. Machine learning models are evaluated, and the structures of the models were investigated to determine the feature importance and part dependence. Those enabled us to decide the most proper machine learning according to the cracks.

Keywords: Infrared thermography technique; Building inspection; Thermal camera; Crack depth prediction; Machine learning.

1 Introduction

Various industries are changing with the fourth industrial revolution. In the construction industry, digital technology is gradually expanding due to the development of modern technology in multiple directions. Especially as interest in non-contact methods increases, research is being actively conducted using various NDT equipment and commercialized. Furthermore, in areas such as building inspection and maintenance, the conventional damage detection method of the