Crack identification for rigid pavements using unmanned aerial vehicles

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Abstract. Pavement condition assessment is an essential piece of modern pavement management systems as rehabilitation strategies are planned based upon its outcomes. For proper evaluation of existing pavements, they must be continuously and effectively monitored using practical means. Conventionally, truck-based pavement monitoring systems have been in-use in assessing the remaining life of in-service pavements. Although such systems produce accurate results, their use can be expensive and data processing can be time consuming, which make them infeasible considering the demand for quick pavement evaluation. To overcome such problems, Unmanned Aerial Vehicles (UAVs) can be used as an alternative as they are relatively cheaper and easier-to-use. In this study, we propose a UAV based pavement crack identification system for monitoring rigid pavements' existing conditions. The system consists of recently introduced image processing algorithms used together with conventional machine learning techniques, both of which are used to perform detection of cracks on rigid pavements' surface and their classification. Through image processing, the distinct features of labelled crack bodies are first obtained from the UAV based images and then used for training of a Support Vector Machine (SVM) model. The performance of the developed SVM model was assessed with a field study performed along a rigid pavement exposed to low traffic and serious temperature changes. Available cracks were classified using the UAV based system and obtained results indicate it ensures a good alternative solution for pavement monitoring applications.