

ESTABLISHING AN EARLY GNSS WARNING SYSTEM USING THE RANDOM FOREST CLASSIFIER

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Abstract

Precise Point Positioning (PPP) improves the accuracy of the GNSS measurements allowing using this technique in (deformation detections and monitoring) applications. The Early Warning System (EWS) using the PPP measurements could be a possible solution for the pre-mentioned applications, especially in isolated areas, However, The PPP GNSS measurements suffer from different error sources, consequently using machine learning algorithms improves the ability of the EWS. In this research, we investigated the ability to use the Random-Forest Classifier (RFC) as a probable tool for the EWS to detect horizontal movements ranging between 2-20 centimeters. This study assesses the RFC in terms of the probabilities of initiating true detections, out of service, initiating false alarms, and RFC accuracy. Our results show that the RFC model is able to detect the true horizontal movements with the probability equal to 90%, the probability of false alarms is equal to 2%, in addition to the probability of the EWS being out of service with 0.5% and the overall accuracy 94% of the model. From our results, we derived the ability to use the RFC as a tool for EWS.