

Automatic selection of crowdsourced GNSS smartphone data for atmosphere sounding

Pan, Yuanxin; Kłopotek, Grzegorz; Soja, Benedikt

ETH Zurich, Switzerland

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Abstract

Smartphones have been transformed into portable GNSS (Global Navigation Satellite System) receivers since Google's release of the Android 7 operating system. The GNSS data recorded by billions of such devices have great potential for scientific studies, with unprecedented spatiotemporal resolution. However, access to large-scale GNSS smartphone data is currently limited and the data processing is challenging. The project CAMALIOT (Application of Machine Learning technology for GNSS IoT data fusion) aims to address these issues to facilitate the usability of crowdsourced GNSS data for weather forecasting and space weather monitoring. The large amount of GNSS data from the CAMALIOT crowdsourcing campaign is of heterogeneous quality. In order to cope with this data processing challenge, we developed an automatic data selection algorithm using machine learning (ML). In this study, the classification performance of different ML models is compared. The importance of different data quality indicators is also examined. Initial results show that the ML-based classifier can achieve an accuracy of 95% on real data from the campaign, without the need to set explicit thresholds for the quality indicators. Based on the selected smartphone GNSS data, tropospheric parameter estimation experiments are conducted and presented as well.