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Seismic classification-based method for recognizing epicenter-neighboring orbits

Sicong Zang^a, Dechang Pi^{a,b,*}, Xuemin Zhang^c, Xuhui Shen^c

^a*College of Computer Science and Technology, Nanjing University of Aeronautics and Astronautics, Nanjing Jiangsu, China*

^b*Collaborative Innovation Center of Novel Software Technology and Industrialization, Nanjing Jiangsu, China*

^c*Institute of Earthquake Science, China Earthquake Administration, Beijing, China*

Abstract

From the point of view of the Fourth Paradigm, this paper attempts to find a recognizing method based on DEMETER (Detection of Electro-Magnetic Emissions Transmitted from Earthquake Regions) satellite data for epicenter-neighboring orbits during strong shocks. Detection points or small regions are used as research objects in numerous studies on seismic activities recognition. Due to the infrequency of strong shocks, the number of non-seismic data is far larger than the abnormal one, which results in the underfitting during the training of recognition model. Additionally, data located along the edge of seismic regions can hardly be classified into abnormal dataset or non-seismic one. A sloppy classification can badly reduce the accuracy of model. Hence, it is desired to put forward a more suitable approach to make better use of original data. In this paper, a seismic classification-based method for recognizing epicenter-neighboring orbit is proposed to address these problems. Unlike the existing approaches, our method regards the satellite orbits as the analyzing objects, which avoids the underfitting performance caused by the unbalanced data distribution. Moreover, error correcting output coding (ECOC) strategy is utilized to transform the recognizing problem into a series of binary classifications. By means of safe semi-supervised support vector machines (S4VMs) with kernel combination, the unlabeled orbits help obtain

*Corresponding author

Email addresses: SCZang.deadmephisto@gmail.com (Sicong Zang), dc.pi@163.com (Dechang Pi), zhangxm96@hotmail.com (Xuemin Zhang), shenxh@seis.ac.cn (Xuhui Shen)

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