TU Clausthal

Bachelor-, Master- und Doktorandenseminar
des Instituts für Informatik

Detection of Outliers in Time Series of Neighboring PSI Points using Density-based Clustering and Geostatistical Methods

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The Persistent Scatterer Interferometry (PSI) technique can measure ground movements with millimeter precision. The measurements of PSI are stored in a geographic information system (GIS) and are presented as a set of points (called PSI points) that contain their geographical coordinates and their attributes in a time series, which forms an observation map in the target ground area. Due to anthropogenic activities or technical issues, PSI points could contain unnatural effects. Those affected by such unnatural effects are called outliers. They need to be detected and eliminated in order to prevent incorrect observations of ground movements.

PSI points are generally well-measured. Only few points have flaws, and they are different from well-measured points in measurement results or time series. Finding differentiation is a way to detect outliers. A clustering algorithm is a tool which can recognize the homogeneity in an amount of data. With homogeneity, differentiation will be presented. However, most clustering algorithms take only one or two aspects into account. For example, DBSCAN (Density-Based Spatial Clustering of Applications with Noise) algorithm takes into account spatial positions without attributes, ASCDT, a density-based spatial clustering algorithm considering both spatial proximity and attribute similarity, takes into account spatial positions with attributes, but not in time series. Spatial point patterns take into account spatial positions with time series but no attributes. PSI points contain not only spatial data and their attributes, but also a time series of its attributes. Hence, in our research, clustering is used only to determine homogeneous areas. A radial basis function is used to characterize and generalize the attributes. A trend test is applied to characterize the trend. With these three separated methods, all aspects are being take into account.

Dienstag, den 29.11.2016, 14:30 Uhr im Besprechungsraum 106, IfI, Julius-Albert-Straße 4

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