

Concept and Development of a mobile Client for Online Geospatial Data Acquisition

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ABSTRACT

This paper addresses a concept and development of a sophisticated, open standards-based mobile geodata acquisition system for field workers, for example in geology, geophysics or other geotechnology fields. This research work is being carried out as part of a bundle research project called “*Advancements of Geoservices*” funded by the German Ministry of Education and Research (BMBF-Bundesministerium fuer Bildung und Forschung) and German Research Foundation (DFG-Deutsche Forschungsgemeinschaft). The project consortium comprises University of Vechta (*Research Centre for Geoinformation and Remote Sensing*), University Karlsruhe (*Institute for Photogrammetry and Remote Sensing*), EML (European Media Laboratory) Heidelberg and University of the Bundeswehr Munich (*AGIS GIS Lab*).

The system is conceptualised for use in landslide monitoring applications. In cooperation with local authorities (Landesamt für Geologie, Rohstoffe und Bergbau, Baden-Württemberg; Bayerisches Geologisches Landesamt; Wasserwirtschaftsamt Rosenheim) two test areas have been selected near Balingen and Rosenheim, Germany. These areas have unstable surfaces in which rock masses, soil and other loss material may fall, at anytime, from the mountain slopes and may be hazardous to people using the nearby roads, walking paths or to other close infrastructures. For that reason, the authorities installed permanent surveying systems, for example on-site extensometers (installed in cracks, gaps or ditches in the active landslide parts of the mountains) or automatic total stations, which register any surface movements. These systems generate alarm messages in case of significant changes in the measured values.

In case of an alarm, a responsible person has to go to the site and verify whether the alarm is true or false. For that reason, the proposed mobile client system should support the decision-making process in the field and should also enable mobile users to carry out their field-work with the following functionality. The geologist obtains a map for navigation in the field for locating measurement points or active zones. For these features of concern or interest he wants to download previous measurements for comparing them with the newly acquired observations. If any significant changes occur, there may be the need of updating and acquiring new features like new cracks or gaps. The geometry of the new features can be obtained by geodetic measurements and the attribute values should be filled in automatically or interactively. During this data acquisition process, some quality measures or checks should be handled on the client, e.g. validation of the entered values of the attributes. Afterwards the features should be created and then send to the database for updating. The client should also be able to support higher dimensions (e.g. 3-D, 4-D) of spatial data. For example the 3-D data has to be visualized using an Augmented Reality component being developed by the University of Karlsruhe.

Within this project, concepts and methodologies for in-field acquiring, accessing, quality checking and online updating of geospatial data for the geosciences are currently being investigated. Some of the conceptual work items are interoperable access to heterogeneous databases in the field, standardized integration of sensors like GPS and total stations, development of an open client architecture, implementing a generic data model, development of use cases for insert and update of spatio-temporal information, and concepts for quality management for the whole workflow of online data acquisition.

These concepts are being evaluated by implementing a prototype that will be presented in the paper.