A Method for the Assessment of Deformation Measurements by means of Case-based Reasoning

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ABSTRACT:

In the last years the number of man-made objects and human activities located in areas that are known to be involved in deformation processes has increased continuously. According to that the number of objects and humans that are involved in the consequences of such deformations is increasing too. To lower the risks of getting involved in such deformations theres an extended need for rapidly working and easily usable deformation measurement systems. Hereby deformation measurements are covering objects from the field of civil engineering, (e.g. buildings, bridges, dams), but also unstable slopes and other geological formations.

Common deformation measurement systems are able to achieve a high degree of automation in the measurement and analysis of data representing the amount of changes. But the classical geodetic deformation analysis is only covering a part of the whole process of a deformation investigation. The evaluation of the resulting information of such a deformation measurement is a further important part and still characterized by a low degree of automation. Often this evaluation is done by a measurement expert, or a group of experts, by interpreting the movement vectors and formulating models for the movements.

The paper at hand presents the development of a new method for automating the evaluation of the deformation measurement results and assessing the behaviour of the monitored object. Therefor a technique from the field of artificial intelligence is used, the so called case-based reasoning. This technique is an learning problem solving approach and maps the human way of solving problems by using problem recognition and solution reuse.