**Innovative application of IoT technologies to improve geotechnical monitoring tools and early warning performances**

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The integration of Internet-of-Things principles, giving the possibility to connect different physical sensors through a communication network, is becoming increasingly important in several fields of application. In fact, the advantages deriving from the improved interaction and information sharing play a leading role in new technologies development. Within the geotechnical framework, one of most productive application of the IoT approach is related to monitoring systems, which can significantly benefit from the possibility to exploit more proficient and reliable connections between sensors, control units and representation devices. In particular, these advantages allow for the development of advanced Early Warning Systems (EWS) able to communicate with high efficiency the occurrence of a potentially critical event, getting even closer to a *real-time* approach. An innovative application of IoT technologies to geotechnical monitoring is presented, involving the integration of modern devices with data loggers that can be controlled from remote, dedicated software implementing machine-learning algorithms, and web-based visualization platforms. The result of these components integration is a fully automated and network-connected system, defined Internet of Natural Hazards (IoNH). The proposed approach has been applied to different case studies in order to exploit its early warning capabilities. In particular, the IoNH system is able to manage a wide range of sensors that can act as triggering mechanisms, leading to the activation of predefined safety measures depending on the ongoing event evolution. One of these applications deals with the installation of a mechanical trigger on a rockfall barrier, in order to detect an impact on the structure and consequently read all installed sensors, alerting those responsible of the monitoring activity. Another case study includes the monitoring of a building with tilt-based sensors, automatically identifying the overcoming of predefined alert thresholds. Consequently, the software is able to disseminate automatically a message in case of an overcoming of these levels and to activate different alarm devices (e.g. sirens, traffic lights, etc.).

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