Geophysical Research Abstracts
Vol. 21, EGU2019-6441, 2019
EGU General Assembly 2019
© Author(s) 2019. CC Attribution 4.0 license.

In-situ Visual Analysis of Geochemistry through Augmented Reality

Ulrich Engelke (1), Casey Rogers (1), and Jens Klump (2)
(1) CSIRO, Data61, Australia, (2) CSIRO, Mineral Resources, Australia

Hyperspectral imaging, as a fast and cheap method of mapping the composition of geological materials, is a key enabler for scientific discoveries in the geosciences. Being able to do this in a real-world context, possibly in real time, would be a game changer, enabling accelerated discovery of geological phenomena. Making in-situ geological information in the hyperspectral range visible to the human eye is getting closer to reality with the advent of advanced augmented reality (AR) devices.

Modern AR headsets overlay high quality graphical information onto the real world context and enable the user to perceive the visual information being presented in direct relation to its physical references. State of the art devices, such as the Microsoft HoloLens, offer onboard computing and are largely independent from other computing devices, thus facilitating mobility during exploration unlike older tethered devices. They furthermore offer a range of powerful interaction techniques including voice, gesture, and gaze control to interact with the overlay information. This wide variety of human-machine interactions opens a large system design space that enables application development targeted to the user's needs.

In this work, we explore the feasibility of using the Microsoft HoloLens for visually analysing the geochemistry of rock surfaces. Specifically, we discuss some of the requirements and design aspects of such a system and present a prototype implementation. We further discuss some of the technical limitations that we observed, such as the limited field of view of AR headsets and the required subsampling of large data sets to facilitate real-time processing.