Incorporating Geoscience, Field Data Collection Workflows into Software Developed for Mobile Devices

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Abstract

Modern geoscientists work in a data-driven environment to investigate the natural world in situ, within The Earth, and by managing data collections in the light of existing advances in technology. In many cases, geoscientists are required to work with large datasets including hundreds of thousands of points of data. In order to effectively collect and manage such data it is necessary to work with the mobile devices, a mobile app that coordinates the collection of GPS, photographic, and orientation data, along with field observations. Additionally, this app should allow the user to work offline and synchronise when back online.

GeoAssist is an application designed to examine how collecting geoscience field data can be efficiently organized into a mobile device. The components of a traditional field notebook and map are still central to the design. A digital mapping interface that utilises the onboard GPS and downloaded basemap functions as the main workspace. When new geo-data is collected, a citation, a series of reproducible and adaptable data fields, a report and downloadable maps are secured for quick and organized input. When the field work is complete, the raw data can be exported as a pdf and a summary report of all stations can be exported as a pdf along with the map data. The final report can be uploaded into a database where future investigators can easily query and access the data. Quick links make accessing the app, company, camera, and note-taking tools very convenient. Field investigators using a separate camera and/or GPS device, the data can be altered enter manually. Furthermore, we hope that future investigators incorporate this application to their field devices.

Field Trip to Yosemite and Owens Valley - Aug 4-8, 2014

The purpose of this trip was to address some of the data challenges unique to field geologists by bringing computer scientists out in the field and showing them how field geologists work and collect their data, all in the hopes of facilitating the conversation between these two different communities.

Participants

Mary Lohman, Matt Mookerjee, Sophia Andrade, Kathy Lohman, Mike Williams, Jodi Halverson, Frode Halverson, Ian Lumsden, Frankвесik, Mike McCormick, Adam Sommershein, Nicole Golumbic, Joe Sowalsky, Kevin Min, Dan Veier, Steve White, Steve Gereba, Nik Grantham, Terry Kuiper, Brie Howard, Jim Bevington, Penn Forest, Joanna Walsh, Olinda Perez, Mike Roland, Field Work Team.

Day Activities


Day 2: Wawona Fault, how to use a geologic map and measuring planar orientations using a stereonet compass. Day 3: determining the Inference of a sample to see if it is a single-suture two types, and how to create a strain ellipsoid. Penn Forest, checking rock types and field notes.

Notes

Day 1: Our first day of field work on the first day of the field work, the open and very hot.

Day 2: Our second day of field work, the day was very hot and humid.

Discussion

Day 3: Our third day of field work, the day was very hot and humid.

Day 4: Our fourth and final day of field work, the day was very hot and humid.

Survey

The survey was conducted in 2014 on the CSUN campus. It was completed by a total of 129 participants. The questions in the survey were based on the GeoAssist application. The data collected from the survey was used to evaluate the effectiveness of the GeoAssist application and to identify areas for improvement.

Conclusions

- Development of a scientifically-qualified field application is essential.
- To develop a digital platform to collect field data, a firm understanding of workflows and the necessary tools is needed.
- Data standards and conventions need to be established by a representative community of geoscientists.
- Converting a managed field data database system will require collaboration with the cyberinfrastructure community.

The GeoAssist application is a useful tool for geologists. It allows for easy data collection and management, which is essential in the field. The application can help geologists to record and save their data, which can be used for future reference. Additionally, it can help in the education of future geologists.