MapONE Web Application: One System for Planetary Map Sources

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Problem Statement

Planetary Science Community
The planetary science community develops and distributes cartographic research on the solar system. Scientists often use these planetary maps to survey space exploration sites and collect other related research. The client, the United States Geological Survey (USGS) Planetary Geologic Mapping (PGM) Program, assists the community by developing tools and resources to better access planetary data for these purposes.

Map Publication
The community faces challenges in collecting maps across multiple platforms. There are currently two venues for publication:

- USGS
- Online Science Journals

For online sources, researchers have to search through hundreds of individual journal articles to locate maps which is often time-consuming. Nevertheless, USGS is responsible for providing the community with data on all planetary maps regardless of how they are published. Thus, the project team's goal is to collect and display source data on these publications, so researchers can quickly and accurately locate non-USGS maps.

Solution Overview

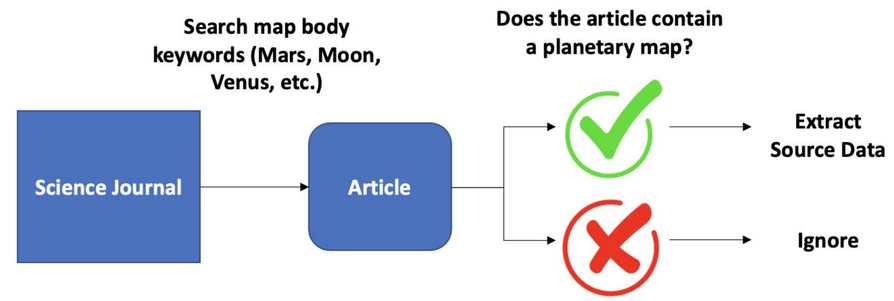
MapONE is a web application that displays metadata (source name, source link, map body, article title, author(s), and publication date) on these non-USGS source publications. The application must:

1. Search through online science journals
2. Locate articles containing maps
3. Extract source metadata when a map is identified
4. Save data into a database
5. Display data to users

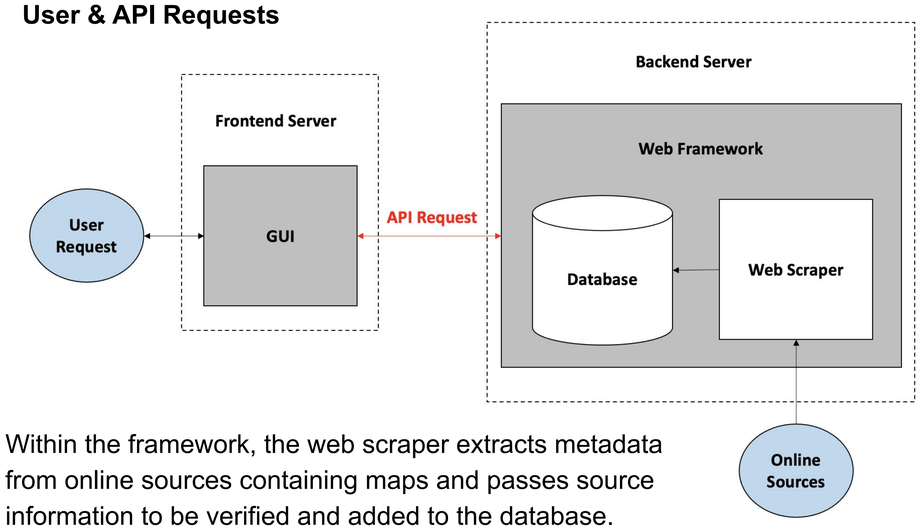
User Impact: Instead of using time to independently locate maps, researchers can now view, save, and request maps using MapONE.

Software Architecture & Implementation

Web Scraper Workflow



User & API Requests



Within the framework, the web scraper extracts metadata from online sources containing maps and passes source information to be verified and added to the database.

Technologies

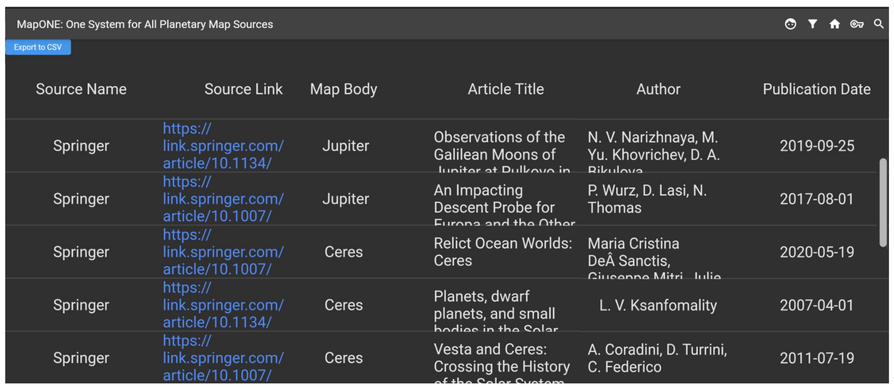
Languages: Python, Dart
Frontend GUI: Flutter
Backend API: Django
Database: SQLite
Machine Learning: Keras
Hosting Platform: Heroku

Future Work

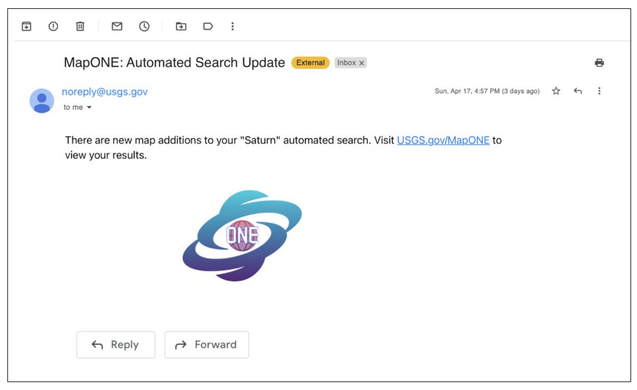
As MapONE expands, integrating community input and validation is an area for refinement. In the future, users should be able to:

- Add map summaries & related attachments
- Add database entries for maps that did not get detected by automatic searches

Feature Highlights



View Source Data on Main Page



Receive Email Notifications on New Map Additions