

Florida International University

Fall 2024 Senior Design Project

GeoMapper

Students: Alex Jong A Kiem
Mentor: Antonio Hernandez, Florida International University
Instructor/Faculty: Masoud Sadjadi, Instructor Florida International University

PROBLEM

Create a simple, user-friendly platform for professionals and travelers to document, organize, and share field observations, discoveries, and insights through a geotagging app. Geotagging is the process in which geographical coordinates are assigned to digital media. We were tasked with creating a java-based desktop application that generates Geospatial Format files from geotagged digital Media which can be opened by geospatial software programs such as Google Earth.

APPLICATION FUNCTIONS

- Manage Media**
 - Select and import single or multiple media files for processing
- Geographical Data Extraction**
 - Automatically extract geographical information (e.g., GPS coordinates) from imported media.
- Metadata Editing**
 - annotations, longitude, latitude, and title
- Project saving and loading**
 - Save current progress as .gmp
 - Open previously saved projects
- KMZ/KML file generation**
 - Generate KML and KMZ files compatible with geospatial software for visualization and analysis.

```
@Override Alex Jong *
public ByteArrayOutputStream export() throws TransformerException, ParserConfigurationException, IOExcept
    ByteArrayOutputStream byteArrayOutputStream = new ByteArrayOutputStream();
    try(ZipOutputStream zipOutputStream = new ZipOutputStream(byteArrayOutputStream);
        ObjectOutputStream oos = new ObjectOutputStream(zipOutputStream)){

        //write mediaList into zip
        List<Media> mediaList =project.getMediaList();
        ZipEntry mediaListEntry = new ZipEntry(name: "mediaList");
        zipOutputStream.putNextEntry(mediaListEntry);
        oos.writeObject(mediaList);
        zipOutputStream.closeEntry();

        //write userMedia into zip
        Path userMediaPath = Paths.get(first "UserMedia");
        Files.walkFileTree(userMediaPath,new SimpleFileVisitor<Path>(){ new *
            @Override new *
            public FileVisitResult visitFile(Path file, BasicFileAttributes attrs) throws IOException {
                Path relativePath = userMediaPath.relativeize(file);
                zipOutputStream.putNextEntry(new ZipEntry(name: "UserMedia/" +relativePath.toString()));
                Files.copy(file, zipOutputStream);
                zipOutputStream.closeEntry();
                return FileVisitResult.CONTINUE;
            }
        });
    }
    return byteArrayOutputStream;
}
```

Code for generating a project save file

TECHNOLOGIES USED



INDIVIDUAL CONTRIBUTIONS

- BACKEND**
 - Collaboratively designed the class/package/data structures for the Springboot Java backend
 - Implemented KML/KMZ file generation using Java libraries for DOM manipulation, XML handling, and compression.
 - Implemented save and load project functionality, enabling users to store their progress as .gmp files
 - Designed and developed REST API endpoints using controller classes to handle HTTP requests and responses from the frontend
 - Implemented exception handling with Springboot global exception handler and custom exception classes
- FRONTEND**
 - Contributed to the design, layout and implementation of the web-based user interface
 - Collaborated with frontend developers to integrate backend API's with the user interface using the Axios HTTP client
 - Identified and resolved bugs across both backend and frontend

ACKNOWLEDGEMENT

The material presented in this poster is based upon the work supported by XXXXX (name of the project sponsor: federal, state or local government, or corporate partners, where applicable). We/I thank XXXX for his/her/their assistance and mentorship that I/we received throughout the senior design project.