IMPROVING COLLECTION MANAGEMENT IN THE MONNIG METEORITE COLLECTION. R. G. Mayne¹, J. Huther², Y. Tyagi², B. Danysh³, R. Perkins², M. O’Connor³, T. Truong², and B. Wei². ¹Monnig Meteorite Collection, Texas Christian University, 2950 W Bowie Street, Fort Worth, TX 76109 (r.g.mayne@tcu.edu) ²Department of Computer Science, Texas Christian University, Suite 341, 2840 W Bowie Street, Fort Worth, TX 76109.

Introduction: Collection Management Software is a vital tool in sample-based science and a key part of any scientific collection of meteorites. However, this software is often designed as a one-size-fits-all solution, which can be used for all collections within a museum. As a result, much of the commercially available software for collections management is not ideal for the curation needs of extraterrestrial materials. Platforms are often vendor-specific, contain redundant and unnecessary functionality, and require significant time to be invested in staff training.

Over the past two decades, The Monnig Meteorite Collection has utilized FileMaker Pro for the management of the Collection. FileMaker Pro was chosen as it allows the user to design a custom solution to fit their specifications. However, this either requires that the administrator stays current on all updates and functionality of the software, or continual investment in external support for the system. The current database was designed in 2014 and is no longer meeting the needs of the Monnig Collection or the users of the database, who are primarily sample-based scientists and collectors. After consultation with industry experts, curators, and users of the database, it was decided that an update of the current database was not the best approach for the Collection, instead a new custom database that meets the needs of both the Curator and the user was commissioned.

This project introduces the development of a comprehensive database and user-friendly web application portal, marking a substantial improvement over the existing legacy system.

Project Overview: The primary aim of the Monnig Meteorite Database Project, hereafter referred to as MMDP, is to offer a detailed and robust database for the Monnig Meteorite Collection. It will feature an enhanced catalog search portal, enabling users to explore and search the collection through various parameters and filters. The system is also designed to aid gallery curators and administrators by providing detailed views of collection items, tracking sample history, and managing loans, all within a secure and user-friendly interface.

MMDP seeks to preserve the wealth of knowledge encompassed within the Monnig Meteorite Collection. The digital database and search tool will facilitate research and offer broad access to the collection for researchers, collectors, educators, and students. This initiative is set to serve as a valuable educational and scientific resource, equipped with extensive functionalities.

The database is being developed as a senior design project in the Department of Computer Science at Texas Christian University (TCU). The senior design project is a year-long program required of all Computer Science and Data Science graduates, where they work with external clients to develop and implement workable solutions to the briefs provided.

System Development and Preparation: In the Fall 2023 semester, the MMDP Team focused on data preparation and outlining the project scope into needs (must have features for launch), wants (features that are not required at launch but the capability to add them later is required), and wishes (features that are not required). Inconsistencies in the legacy data were identified and corrected; these included repeated entries, varied date formats, typographic errors, and missing fields. Python was utilized for data cleaning, and the team standardized data and organized it into relational database tables using PostgreSQL, hosted on Azure cloud for maintenance and backup.

Development will continue throughout the Spring 2024 semester and the outdated and insecure legacy portal will be replaced with a newly developed web application. This application is being built using Spring Boot for backend operations, and HTML5, CSS, and the VueJS Framework for a responsive front-end UI, ensuring accessibility across various devices. The current launch date for the new collections management system is May 2024.
**Functionalities:** MMDP will address the need for functionality for both the administrators of the database (primarily the Curator in this case) and the external user (Figure 1). The required parameters for both of these audiences are described below.

*All users* of the database will be able to:

1. perform parameterized searches using criteria such as Name, Monnig Number, Class, Group, Clan, Country, and Observed Fall or Found (Figure 2a).
2. filter and modify search results directly on the search result page (Figure 2b).
3. find accessible detailed information about each meteorite sample, including images, from the search results via individual display pages for each sample.
4. download all the search results based on the given constraints with a single click from the search results page.

*Administrators* will be able to:

1. have access to specialized functionalities that are secured and restricted from regular users. Upon logging in, they are presented with a portal offering various database management options.
2. view more detailed information about samples than regular users, including the sample's history and loan information. They have the ability to add new meteorite samples or create subsamples.
3. perform data manipulation tasks, such as deleting or modifying existing sample records.
4. have control over the media associated with samples, allowing them to add or delete media.
5. administrators able to create, view, update, and delete history entries for each sample. This historical data management is a key new feature not possible in the current system.
6. Access loan management capabilities include adding, modifying, archiving, and accessing archived loan entries for samples.
7. print labels for samples, which can be used for curation in the vault.

**Summary:** The MMCD stands as a model of integration, combining domain expertise, data best practices, and user-centric design. This project offers a template for other universities, museums, galleries, and research centers aiming to enhance their functionalities and provide a seamless, user-friendly experience for accessing and managing meteorite data collections.

Embodying the spirit of scientific collaboration, this initiative is open to opportunities for collaboration to expand the platform's capabilities or to implement similar solutions in other institutions.

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