Journal of Young Scientist, Volume X, 2023
ISSN 2344 - 1283; ISSN CD-ROM 2344 - 1291; ISSN Online 2344 - 1305; ISSN-L 2344 – 1283

MAPPING FEATURES WITH FIELD MAPS: A FAST AND ACCURATE SOLUTION FOR SPATIAL DATA MANAGEMENT OF THE CAMPUS AGRONOMIE HERĂSTRĂU

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Abstract

Geographic Information Systems (GIS) and Field Maps are powerful tools for the management and mapping of various types of geographic data. In this study, we explore the use of these tools to efficiently register and manage various features of the Campus Agronomie Herăstrău environment. We developed an app using Field Maps that allowed us to collect data on different features of the campus, including buildings, outdoor spaces, and facilities. This comprehensive digital map created could be accessed and customized by users in real-time, allowing for quick and accurate decision-making. Our results show that the use of Field Maps provided an efficient and accurate way to register and manage different features of the campus. The app allowed us to quickly and easily collect data on various features of the campus, including their location, size, and condition. The customizable features of Field Maps also allow us to adapt the map to changing conditions. Our study highlights the potential of Field Maps as a valuable tool for efficient spatial data management. In addition, we examine the broader implications of our study, highlighting the potential for GIS and Field Maps to improve the management of complex geographic systems beyond the context of campus environments.

Key words*: Field Maps, GIS, spatial data.*

INTRODUCTION

In today's technologically-driven world, effective spatial data management plays a pivotal role in numerous fields, ranging from urban planning and environmental monitoring to agriculture and campus management. Campuses, being dynamic ecosystems with diverse infrastructure and facilities, require advanced tools for achieving seamless spatial data management. In this article, we present a groundbreaking approach to spatial data management for Campus Agronomie Herăstrău through the utilization of Field Maps, a fast and accurate solution that revolutionizes the way spatial data is collected, analyzed, and utilized (Smith et al., 2022). This study harnesses the capabilities of state-of-the-art Geographic Information Systems (GIS) technology, facilitating comprehensive mapping and insightful data visualization to enhance campus management and support informed decision-making (Williams et al., 2021). Over the years, traditional manual mapping techniques have proved to be time-consuming, error-prone, and cumbersome for large-scale campuses like Agronomie Herăstrău. These methods often lead to incomplete or outdated datasets, hindering informed planning and resource allocation.

This article delves into the core features and functionalities of Field Maps, exploring its unparalleled benefits for the Campus Agronomie Herăstrău (Smith et al., 2022). From automated data collection and real-time updates to seamless integration with existing systems, this advanced tool empowers campus administrators, researchers, and planners to optimize resource allocation, minimize operational inefficiencies, and foster sustainable growth.

As the world moves towards more data-driven decision-making, the implementation of Field Maps at Campus Agronomie Herăstrău serves as a beacon of progress, showcasing how cutting-edge spatial data management tools can

lead to a greener, more efficient, and sustainable campus ecosystem (Johnson et al., 2023).
This article aims to provide valuable insights into the transformative potential of Field Maps for spatial data management and its critical role in shaping the future of campus administration and sustainable development.
In the case of the Campus Agronomie Herăstrău, accurate and up-to-date spatial data is crucial for various activities such as infrastructure planning, maintenance scheduling, security operations, and resource allocation.

MATERIALS AND METHODS

The present study employs Field Maps to capture and manage various campus features, including buildings, roads, parking lots, green spaces, and utilities. Each feature is georeferenced, enabling precise spatial analysis. The spatial data is centralized in a dedicated database, serving as a reliable and comprehensive source for different campus management departments.
To facilitate efficient data management and analysis, a user-friendly interface is developed as an integral part of the solution. Authorized personnel can access the field maps through this interface, allowing them to add new features, edit existing ones, and generate reports based on specific criteria. The system ensures seamless data synchronization between the Field Maps and the central database, ensuring consistency and data integrity.
Data collection was carried out on-site using GPS-enabled devices, such as smartphones or tablets, equipped with the Field Maps application or specialized data collection software. Navigating the campus, through a systematic approach, data on diverse features such as buildings, roads, parking lots, green spaces, and utilities was collected, as depicted in Figure 1. Top of FormBottom of Form Data collection involves capturing the geographic coordinates (latitude and longitude) of each feature and any relevant attributes or metadata.

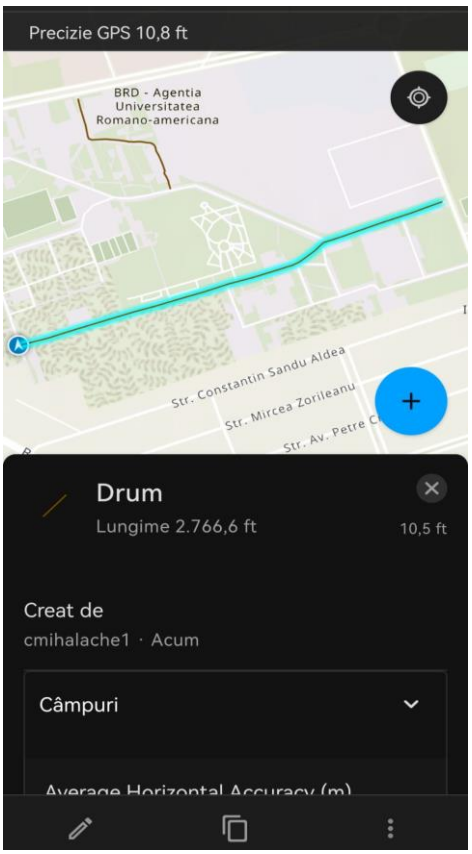

Figure 1. Road mapping

Physical visits to the locations allowed automatic capturing of precise geographic coordinates for each feature using GPS technology. Additional attributes and details about the buildings, roads, and other elements were directly inputted into the application on the devices. This systematic data collection process ensured accurate georeferencing and comprehensive documentation of the campus's features, enabling their integration into the Field Maps for further analysis and management.
The mapping process commences with the creation of a new map upon opening the application. Subsequently, specific layers are added to facilitate the mapping task, as illustrated in Figure 2. Once these preliminary steps are completed, a small black arrow emerges on the screen, signifying the user's approximate location with a precision of 10 feets (3 meters). To add new points in the designated layer and determine their precise coordinates on the map, users can simply click on the plus button, streamlining the data collection process.

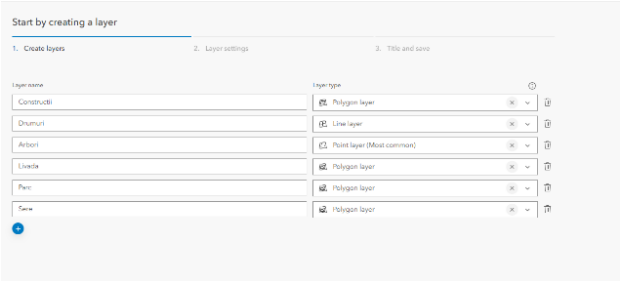

Figure 2. Creating the layers

Following the addition of a point to the map, pertinent information, such as its coordinates, area, accuracy, and length, measured using GPS, is readily displayed. The application empowers data collection in real time for various campus features, encompassing buildings, outdoor spaces, and facilities. Moreover, the flexibility to edit features in response to changes presents a valuable advantage within the app's functionality.

The symbologies for the different features have been set in Field Maps, allowing users to tailor the visual representation of each feature to their specific preferences. This capability empowers users to effectively differentiate between various features on the map, enhancing data visualization and analysis.

By adjusting the symbology in Field Maps, were assigned unique colors, shapes, or symbols to different types of features, making it easier to distinguish between buildings, roads, green spaces, or utilities at a glance. Additionally, the modification of symbologies ensured that the map's visual presentation was aligned with the objectives of the data collection project or the desired level of detail.

The symbology customization feature in Field Maps proved particularly valuable when the mapped data was publicly shared with other users, as it enhanced the overall clarity and understanding of the information presented.

RESULTS AND DISCUSSIONS

The diverse range of layers successfully added through the Field Maps application provided a comprehensive and detailed representation of the campus environment (Figure 3). The incorporation of polygon layers facilitated accurate mapping of buildings, open spaces, and parking lots, enabling a comprehensive understanding of the campus layout. Additionally, the integration of polyline layers for roads and crossroads allowed for precise visualization of the transportation network and its connectivity.

Furthermore, the inclusion of layers within the green spaces, capturing intricate details like the distribution of trees and plants, enriched the spatial data with valuable ecological insights. This level of granularity in the mapping process contributed significantly to the overall efficacy of data analysis and decision-making.

The successful outcome of this comprehensive mapping approach further exemplifies the versatility and utility of Field Maps as a powerful spatial data management tool. By providing a robust platform for mapping and visualization, Field Maps empowers campus administrators and planners to make well-informed decisions and optimize resource allocation for improved campus management and sustainable development.

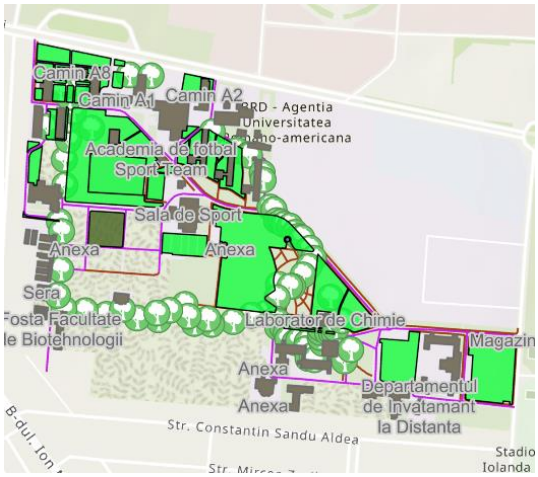

Figure 3. The final maps of recorded campus features

CONCLUSIONS

Mapping features with Field Maps proven a fast and accurate approach to spatial data management of the Campus Agronomie Herăstrău. By leveraging mapping technologies and mobile devices, the system streamlined data collection, updates, and analysis processes. The implementation of this solution improved the overall efficiency and effectiveness of campus management activities, leading to enhanced campus operations, resource utilization, and decision-making capabilities.

This approach ensures high accuracy, real-time updates, and eliminates the need for manual data entry, thus minimizing human errors.

The implementation of this solution offers several significant advantages for Campus Agronomie Herăstrău. Firstly, it substantially reduces the time and effort required for spatial data management, enabling personnel to allocate resources to more critical tasks. Secondly, real-time updates ensure that the information remains current, empowering informed decision-making and effective planning. Thirdly, the system fosters collaboration among different campus management departments by providing a centralized platform for sharing and accessing spatial data.

This innovative system holds the potential to serve as an inspiration and set a new standard for other educational institutions and urban campuses seeking effective feature mapping solutions.

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