RETURN PATH NAVIGATION

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Introduction:

GPS is known as the most popular system for navigation and positioning. However, its use is impossible in some overbuild or blocked environments, such as indoor environments, since multipath effects, location, and navigation in indoor areas are hard to achieve. Recently, the development of indoor positioning systems has attracted significant attention.

The magnetic-based positioning method has attracted interest for indoor location and navigation because it is less sensitive to propagation-dependent disturbances, penetration, and multipath effects when compared to radiofrequency (RF)-based methods. The propagation of the magnetic field is a complex process. It does not only depend on the medium but also the frequency and the power of the magnetic field. A reliable navigation environment was always required in GPS-denied environments such as underground mines and caves. Underground, indoor, and harsh environments, which are complex, mutable, and hard to model, prevent high accuracy positioning and navigation. In this paper, a novel positioning system suitable for such environments is proposed. This paper aims to solve this navigation problem by recording the movement of a compass application, hence mapping a path. The data obtained from the application is analyzed and processed to form a return path. This mapped path will be provided to the user to return to the original position.

Objectives:

Creating a comprehensive and cost-effective navigation system for underground environments. This project aims to make a simple and user-friendly application, which helps in navigation in unexplored areas using a magnetic field. The application should be able to effectively track the user’s movement consisting of the user's direction and distance of travel from the starting point of the user’s path. This recorded path is used to help users navigate back to the start point without possibly needing GPS, which is by simply providing the path in reverse directions.

Methodology:

A simple compass application record's the user's movement by keeping track of the person's direction and range of time in that direction. This recorded data is then compared

to the previously recorded one if it exists and presents the user with a return path to the starting position.

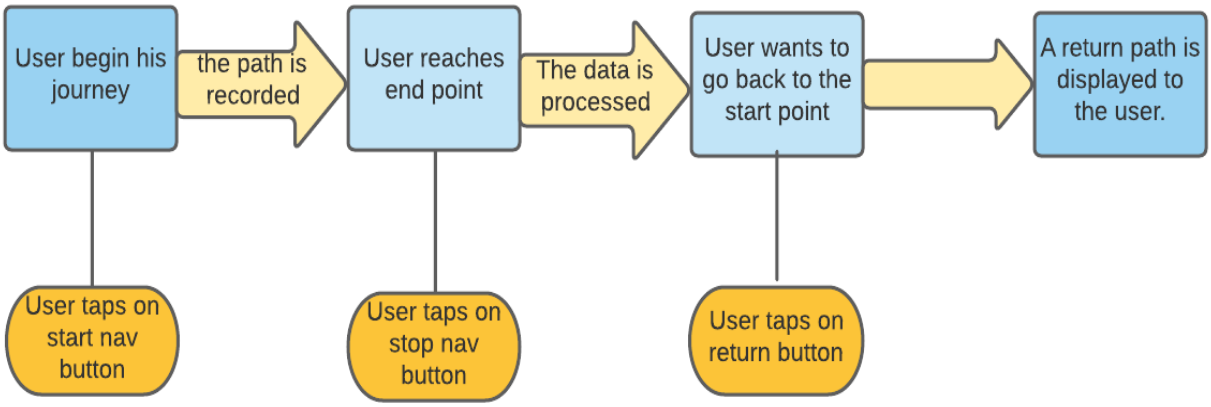

Fig 1. Workflow of the application

The above illustration describes the flow of work of the application. The application presents the user with a start button to start tracking the user's movement. The tracking is done till the user reaches the endpoint and taps on the stop-navigation button. When the user wants to return to the start point, he/she is supposed to tap the return button which presents the user with the necessary directions and path to return to the start point.

Conclusion:

In this project, a simple navigation system based on magnetism is proposed. This application is thought to satisfy the application of navigation in GPS-denied underground environments. When the height parameter is taken into consideration the application will have the potential to help miners, deep-sea divers, and truckers in places where GPS is not accessible.

Reference:

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