



1 Introduction



Stride Smart is a web-based navigation system that provides optimized walking routes based on unique criteria, such as thermal comfort, accessibility for wheelchair users, air quality, green spaces, safety, and touristic attractions. It was created during the M100 Cities hackathon: InnovateTech for Climate with the objective to encourage pedestrian mobility as an alternative to vehicular transport by offering users personalized, enjoyable routes.

2 Features

In order to identify key community needs, we made a survey that revealed that clean air, more green spaces, and the avoidance of excessive heat would enhance walking experiences. Respondents also noted the limitations of existing navigation apps, such as lack of real-time data, pollution information, and diverse route options.

-  Nature Path
-  Accessible Adventure
-  Thermal Comfort
-  Clean Air
-  Safety Trail
-  Discover & Explore
-  Navigators' Reports

3 Data Collection



The data based on which our routes are calculated were provided in different formats, such as raster maps representing thermal comfort insolation maps and GeoJSON files contouring tree-covered areas. Python scripts that enabled the analysis and classification of the rasters' pixel values, and the computation of the areas of different geometrical types representing green spaces. The system also incorporates dynamic, real-time updated data, facilitated by 32 air quality sensors in Cluj-Napoca provided by Strop de Aer. Data visualization on the map is possible through overlays.

4 Algorithms



Stride Smart uses two AI based algorithms that are also efficient in terms of time and space complexity: a customized version of the A* search algorithm, and Ant Colony Optimization, which uses 200 virtual ants that find the most optimal walking route in 10 iterations.

5 Technologies & Implementation

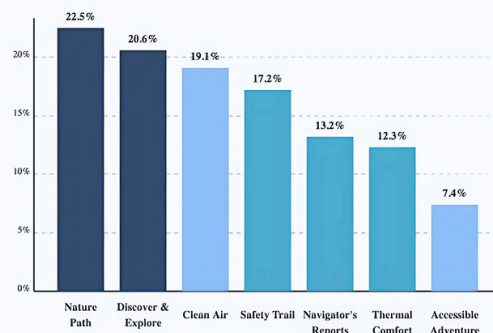
The programming languages used are Python (backend) along with JavaScript, HTML and Tailwind CSS (frontend). The custom costs for the graph edges used in the A* algorithm are calculated differently for each route option.

6 Testing & Feedback



Stride Smart was tested by groups of individuals who interacted with the application and provided valuable feedback about the user experience. The favourite routes can be seen in the graph. Participants also highlighted the usefulness of data visualization through overlays. Suggestions included improving map legend readability and improving the map interaction experience.

Among our features, which interests you the most? (select all that apply)



Follow us to see our future improvements!

