ARPA: Accessibility-focused Route Planning Assistant

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Moving around a city can be challenging for walking impaired people, with many preferring to adhere to already known roads or walk around only with a personal assistant. Different factors of the urban environment play into it, including types of kerb, sidewalk width, and presence of street furniture. Many of these factors affect different categories of people differently, and often the needs are contrasting. For example, while an older adult prefers having street furniture to rest at, wheelchair and blind users prefer encountering none.

Academic research has studied ways to offer routing solutions to navigate urban environments. Still, they often rely on private and hand-gathered data, or, if they use public datasets, they only work in small spaces that have been carefully mapped, not taking into account the unreliable or limited coverage of public data. On the other hand, publicly available solutions often offer limited customisation capabilities and do not consider the user's feedback into the route, only proposing the route the algorithm established as the best.

Building upon this established research, this dissertation aims to find out to what extent is it possible to create a routing algorithm that can provide routing to walking impaired persons, taking into account their specific needs, showing them the accessibility information for each step of the route while also letting them have control of the final route, using publicly available datasets for accessibility information.

To achieve this, a customisable walking-focused routing algorithm that provides an individualised route that addresses their needs is presented. The accessibility information is gathered from the OpenStreetMap project. Users are prompted with questions about their needs, and the answers will then be used as weights for the A* algorithm used when creating the route. When making a route, all the accessibility information used will be shown to the user to account for missing or unreliable information. Based on this additional information, the user can veto specific road parts they do not feel comfortable taking and get offered alternative solutions until a satisfactory route is found.