Multifactorial Optimization, Personalized Navigation

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With the growing presence of networks and network structure models, algorithms for optimization, most notably the Dijkstra's algorithm, play a crucial role in the society. However, this algorithm is one-dimensional and only consider a single factor, not suitable for many real-world problems that require a consideration of many factors. In addition, a multifactorial variant of the Dijkstra's algorithm would introduce many features incompatible to single factor algorithms such as more personalization, as users are given more choices to choose from and now have an option to prioritize certain factors to meet their demands. This project incorporates this idea by extending the Dijkstra's algorithm to consider multiple factors and relevant features and components extracted from these factors to allow a multifactorial optimization of a path. To demonstrate the effects of a multifactorial optimization, the optimization will be performed on a traffic network. This free and easily implemented extension would allow a more personalized optimization of a route or a scenario of any network, which could not only bring more convenience to the user but could also promote public safety, especially in navigation, where calculated routes would guide drivers away from hazardous areas such as areas of high crime and severe weather.

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