Emergency Contact Network Application

Website: https://safety-application-9um9mrum2-patricko5.vercel.app/

GitHub: https://github.com/patricko5/safety-application

Executive Summary

The application Emergency Contact Network is designed to leverage an underlying graph data structure in effectively managing the network of contacts, in which all contacts can be related to others, reflecting the social relationship. The main functionality allows users to call for help through the network using the breadth-first search algorithm in order to get the nearest available support basing on the connectivity of contacts. This reports the process of the development of a project that itemizes the technologies used and gives out the main features and results to be achieved from the execution of this application.

Introduction

Background

Whenever there is an emergency, a person usually needs to call his friend, relative, or any other contact for help. Traditional ways might prove too long to bear fruit, or else they just may not work, especially when the caller is under stress or in danger. The Emergency Contact Network App solves this problem by creating a fast and intuitive way to find the help available within your social network.

Objectives

- To develop a web-based application that models a user's network of contacts using a graph data structure.
- To implement a user-friendly interface for adding contacts, establishing connections, and seeking help.
- To utilize a breadth-first search algorithm for efficiently finding available help within the network.

Methodology

Technology Stack

- Frontend: Developed with React.js to provide a responsive and interactive user interface.
- State Management: Managed application state using React Hooks for contacts, connections, searches.
- Data Structure: Implemented a graph data structure to model the network of contacts and their connections.

Development Process

1. Main Functionality Requirement Analysis: The functions such as Contact Management, Connection Establishment, and Help Seeking required for the application were identified.
2. Design: Outline the architecture of the application, including the graph data structure of the network and the UI layout.
3. Implementation:

    a. Developed the “Contact” and “ContactGraph” classes for modeling the network.
    b. Implemented the UI components for adding contacts, connecting them, and seeking help.
    c. Integrated the breadth-first search algorithm for finding help within the network.
4. Testing: Conducted manual testing to ensure functionality and usability, making adjustments based on findings.

Key Features

- Contact Management: Allows users to add new contacts to their network, specifying their ability to provide help.
- Connection Establishment: Users can create connections between contacts, reflecting their social relationships.
- Help Seeking: It uses breadth-first traversal to be able to traverse the network and find a contact closest to a source that can provide help.

Results

The "Emergency Contact Network App," graphically illustrates how the graph data structure can be applied to model and transverse complex networks in practical scenarios. The application described is designed for easy management of contact networks to seek help in case of emergencies. It epitomizes the putting into practice of principles of computer science, such as graph theory and search algorithms, to solve an important social need.

Conclusion

The application Emergency Contact Network will, therefore, propose a useful, quick, and effective way, with its purpose set, to find emergency help among contacts of the user's network. This project demonstrates to students how important the data structures and algorithms are in cases when they must come up with practical solutions to problems from reality. In the future, it might be improved to integrate real-time location services, expand network visualizations, and add more safety features.

References

1. React Official Documentation. https://reactjs.org/docs/getting-started.html
2. "Breadth-First Search." Wikipedia. https://en.wikipedia.org/wiki/Breadth-first_search
3. Kleinberg, J., & Tardos, É. (2005). Algorithm Design. Pearson Education.
4. "Social Network." Wikipedia. https://en.wikipedia.org/wiki/Social_network
5. “Graph Representation.” Vis.js. https://visjs.org/