Scenario As-Is: Current Challenges in Indoor Navigation for the Blind

Currently, blind individuals face significant obstacles when navigating indoor spaces, which hinders their independence and mobility. Key challenges include:

- **Orientation and Starting Location:** Determining the starting point within a building can be difficult without visual cues. Blind individuals often rely on memory or assistance from others to identify their location.
- **Pathfinding:** Finding the correct path involves navigating complex hallways and turns, which can be challenging without sight. Traditional aids like canes provide limited information, primarily detecting immediate ground-level obstacles.
- **Safety Concerns:** Safety is important. Without the ability to visually detect obstacles, there is a risk of collisions, trips, and falls. Braille indicators, while useful, are static and cannot signal temporary hazards.
- **Time Efficiency:** Reaching a destination in a timely manner can be stressful, especially in unfamiliar environments or when under time constraints.
- **Route Familiarity:** Repeatedly traversing the same route helps build familiarity, but changes in the environment or navigating new routes require constant adaptation.
- **Technology Utilisation**: While some digital aids exist, they may not fully cater to the nature of indoor navigation, lacking real-time updates and comprehensive sensory feedback.

Scenario To-Be: The NaviSense App Solution

- **Intuitive Start Location Identification:** Upon opening NaviSense, users will be greeted with an audio message that confirms their current location using GPS and indoor positioning technologies. This removes the guesswork from identifying their starting point.
- **Intelligent Pathfinding:** NaviSense will guide users through complex indoor spaces with audio directions. By processing real-time data from the phone's sensors and indoor maps, NaviSense can direct users along the safest and most efficient paths.
- **Enhanced Safety Measures:** The app will include features such as obstacle detection using the phone's camera and sensors, providing audio and haptic feedback to alert users of potential hazards and safely navigate around them.
- **Learning and Adaptation:** NaviSense will remember frequently travelled routes and will learn to suggest these to the user over time. It will also adapt to changes in the environment, such as temporary obstructions, updating its guidance accordingly.
- **Reduced Dependence on External Aids:** By leveraging NaviSense, users can gain more autonomy and reduce their reliance on guide dogs, human assistance, and braille indicators, which may not be uniformly available in all indoor environments.
- **Emergency Support**: In case of an emergency, users can shake their phone to immediately call a predefined emergency contact and share their location.