University of Glasgow | School of Engineering

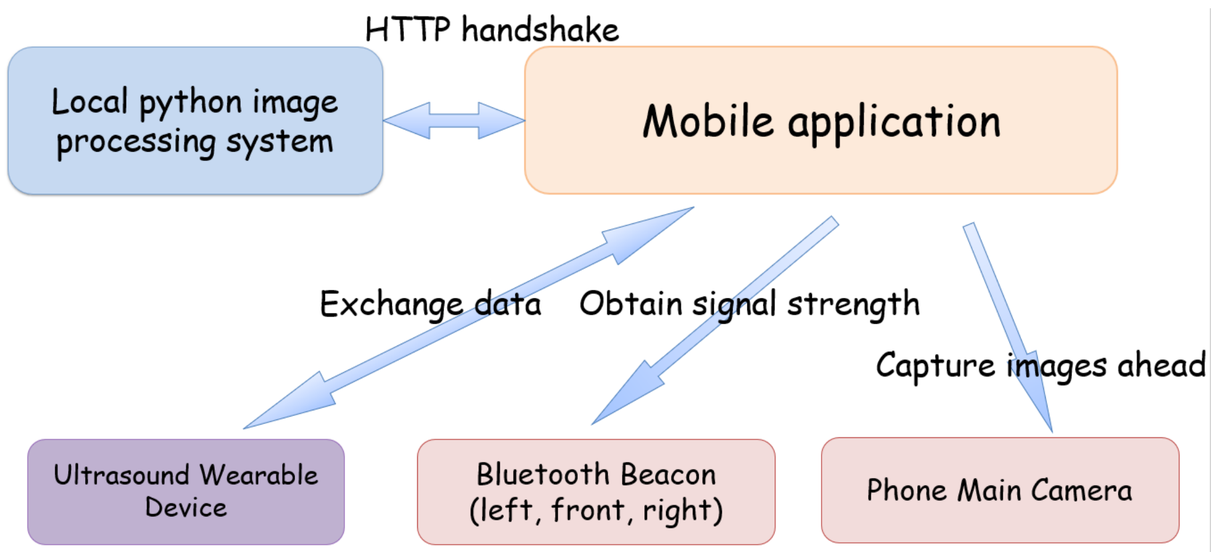
Last 10 metres travel aid for blind people

Blind Navigation Assistance System Based on Bluetooth, Ultrasound and Obstacle detect System

Introduction

GPS can guide blind people to arrive at a destination within about 10 meters, but it cannot directly tell users where the entrance is. The purpose of our design is to help users find the entrance in the last 10 meters.

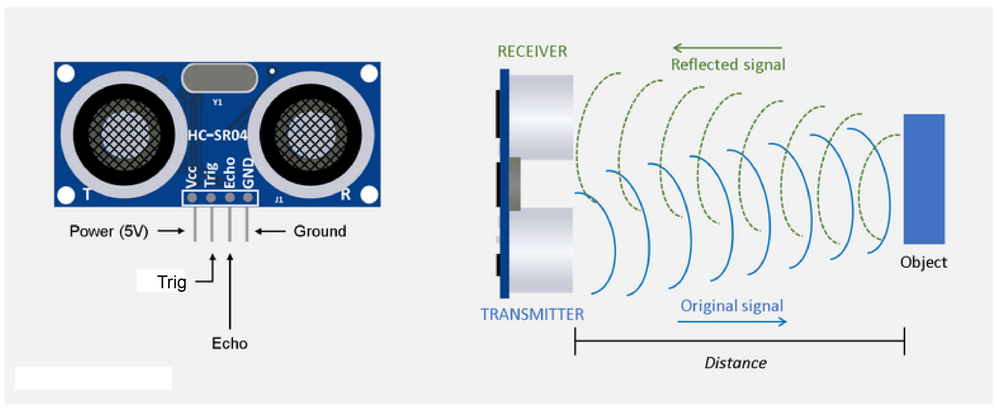
Introduction to the principle



How to provide directional guidance

- By detecting the signal strength of Bluetooth beacons to calculate the distance between the user and the beacon and using this distance to provide directional guidance.

How to measure the distance between the user and obstacles

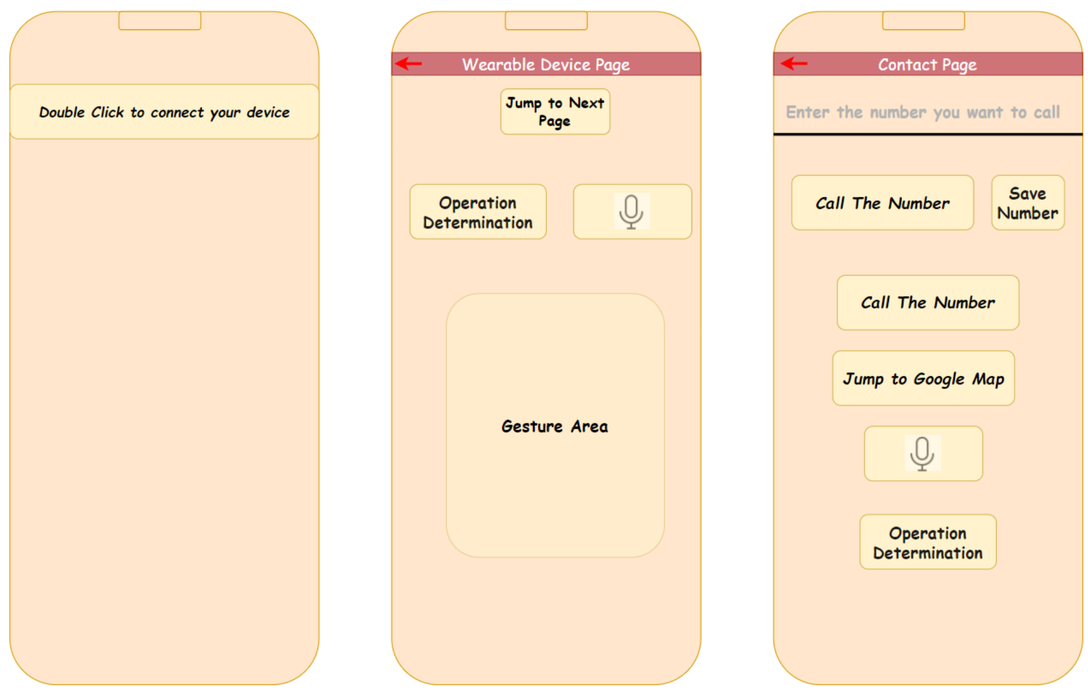


- The ultrasonic sensor sends high-frequency sound waves above the audible range of human ears. The signals propagate to the object surface and reflect. The receiver of the ultrasonic sensor receives the reflected signals. By calculating the round-trip time of the reflected signals, the distance can be derived.

How wearable devices exchange information with mobile apps

- The mobile phone connects via Bluetooth to the wearable device to exchange information.

Introduction to the functions



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Considering that blind people turn on accessibility mode when using mobile phones, our mobile application is developed based on accessibility mode. Our app supports gesture input, voice input and output, as well as haptic feedback. Each key will vibrate when pressed to alert the user.

Page 1

- This page's voice guidance on the phone will tell you how to connect the device.

Page 2

- Successfully entering this page indicates the device is successfully connected.
- This page updates the user's location every 8 seconds to help the user find their way around.
- The obstacle alarm distance can be set by voice. You can ask by voice how far away obstacles are ahead.
- The above tasks can also be accomplished through gesture controls.
- The above operations can all be done by voice commands.

Page 3

- Dial and save emergency contact numbers. Once saved, you can directly dial them next time.
- Directly open Google Maps navigation.
- The above operations can all be done by voice commands.

Conclusion

Currently this blind navigation system can guide blind people to find the entrance within the last ten meters.
However, due to the propagation characteristics of Bluetooth signals, the system may make wrong judgments when there are obstructions blocking the signals.