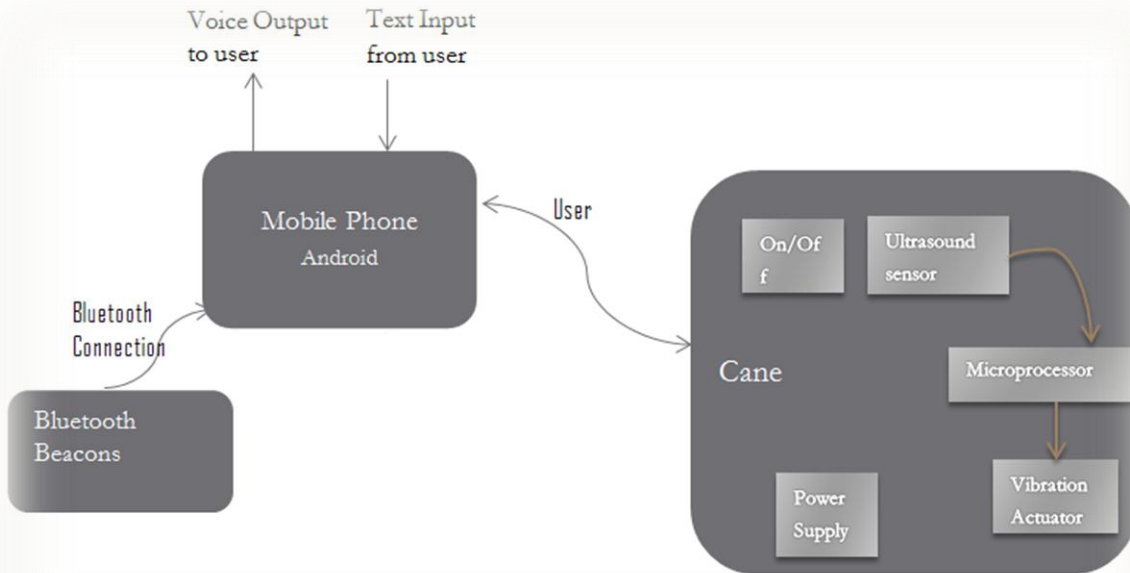


Deliverable D3 – Architecture - MyGuide

System Architecture



Hardware Architecture

Ambient Sensors	Bluetooth Beacons	Detect power from Android and transmits information back to Android; Located in Polito Hallways
	Ultrasound sensors	Mounted on cane for detecting obstacles.
Vibrations server (Microprocessor + Vibration actuator)		It regulates the vibration actuator for signaling upcoming obstacles.
Power Supply		Located inside the cane. A rechargeable battery will be used for this purpose.
On/Off Switch		Mounted on cane and works as a power switch to turn the cane on/off.
Mobile Phone (Android)		Used for processing information about user location after receiving data from the Bluetooth beacons.

Software Architecture

Data Collection Software	<ul style="list-style-type: none"> Collecting data from microprocessor of the ultrasound sensor. Collecting data from the iBeacons for navigation.
Mobile Application (on Android cellphone)	<ul style="list-style-type: none"> Includes virtual map Processing for positioning Voice Input Voice output
Microprocessor	<ul style="list-style-type: none"> Obstacle Detection Software

Selected components

Hardware Components

Off-the-Shelf

Vibration actuator
Two Bluetooth Beacons
Battery (Li ion) – 5v
On/Off Key
Ultrasonic sensor
PCB
Arduino

AD-HOC

Cane only

Software Components

Android SDK
Arduino framework
Estimote SDK for android
JGrapht graph library for java

Open issues

1. The beacons do not tend to provide a steady reading of the distance. The data keeps fluctuating in every reading, making it difficult to exactly pinpoint the location of the person.
2. The obstacle detection system would also detect passerbics as obstacles.
3. Used moving average to smooth the fluctuating reading, but the system response time decreased.