North South University

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

PROJECT PROPOSAL

Smart Blind Stick Using Ultrasonic Sensor and Arduino Uno

Course Information
Operating Systems Design
CSE323 (Section 5)
Fall 2025

Submitted by

Student Name	**Student ID**
Saif Mohammed	2121913042
Humayra Rahman Nipa	2121128042

Submitted to
Dr. Mosabber Uddin Ahmed [MUA3]
Adjunt Professor
Department of Electrical and Computer Engineering
North South University

Submission Date
September 27, 2025

1. Objectives

- Create a portable smart stick to assist visually impaired individuals.
- Detect obstacles using an ultrasonic sensor.
- Provide audio and visual alerts based on obstacle proximity.
- Use an Arduino Uno R3 for efficient system control.
- Improve user safety and independent mobility.

2. Required Components

Serial No.	Component Name	Cost (BDT)
1	Arduino Uno R3	790
2	HC-SR04 Ultrasonic Sensor	100
3	Piezo Buzzer	20
4	LED	5
5	9V Battery	75
6	LM7805 Voltage Regulator	15
7	Jumper Wires	65
8	Breadboard	100
	Total	**1170**

3. Software and Hardware Details

3.1. Software Details

- Arduino IDE for coding, compiling, and uploading.
- Programming in C/C++ to manage sensor input and output responses.
- A lightweight control loop mimicking basic OS task management.

3.2. Hardware Details

- **Arduino Uno R3**: Main controller processing input from sensors and sending output signals.
- **HC-SR04 Ultrasonic Sensor**: Detects obstacles and sends distance measurements.
- **Piezo Buzzer**: Emits sound alerts to warn the user.
- **LED**: Provides visual indications when obstacles are detected.
- **Battery**: 9V portable power source for the entire system.
- **Voltage Regulator (LM7805)**: Maintains stable 5V output for safe component operation.
- **Jumper Wires**: Enable circuit connectivity.
- **Breadboard**: Used for assembling and testing the prototype.

The system is mounted on a walking stick with the ultrasonic sensor placed at the front to detect oncoming obstacles. When an object is detected within a certain range, the microcontroller activates the buzzer and LED to alert the user. The compact design and low power consumption allow for prolonged usage.