SafeVision increases ease of use and improves safety by preventing obstacle collisions. Optical distance sensors are attached to the arm which measure the distance to obstacles around the arm. The sensor data is analyzed by the main computer system to intelligently decide when to safely stop the arm and resume operation.

The sensor placement, as shown by the red dots in the left figure, are important in guaranteeing detection of all obstacles. The sensors are connected to the custom PCB with EMI shielded wires to help prevent electrical interference.

**Key Components**

**STM32F767ZI**
- Arm® 32-bit Cortex®-M7 CPU
- Up to 216 MHz clock speed
- Four I2C buses in Fast Mode

**VL53L0X Time-of-Flight Sensors**
- Two meter range, 25 degree FoV
- Eyesafe Class 1 laser device
- I2C for parallel busses

**FT232RQ**
- USB to serial UART interface
- RS232 protocol
- Transfers sensor data from MCU to main control system

**Shielded Wires**
- Prevent electrical interference from high-current motors during the I2C communication

Promising in-person tests show that the arm stops with a single sensor detection. Virtual tests show that the arm stops for obstacles safely with a full setup. An android app was also developed to allow for remote control of the arm. Future work includes testing the physical arm with all sensors.