Contactless Classroom Deliver Robot (CCDR) to reduce the Risk of the Spread of Germs in Schools.

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PROBLEM STATEMENT

With students returning to in-person learning, it is crucial that they are ensured a safe environment to learn in. Therefore we must come up with a solution to minimize the spread of germs and viruses (like COVID-19) in classrooms, see Figure 1.

Figure 1: CDC Visual on the spread of COVID-19 in the U.S.

BACKGROUND

Our Contactless Classroom Delivery Robot (CCDR) assumes that the classroom is able to have a grid system set up using tape on the floor. The IR sensors detect the reflectivity of the surface and the tape to keep the robot along the path. For the IR sensors to communicate with the motors, the Arduino Mega will activate the motors using the L298N motor driver. Once the barcode scanner scans the barcode, the robot will stop and calls the PIR sensor function which will detects motion and the servo will open the box compartment. Using a delay, the box compartment will close 15 seconds after opening the box. The controller takes an input from the teacher and the robot executes the function. A 12V UVC light will be active while the box compartment remains closed to sanitize the contents.

SUMMARY OF WORK

We are building a robot to avoid the close contamination among teacher and students within the classroom to create a safe environment for both. To accomplish this we have implemented IR sensors and a barcode scanner to help robot move around in the class as shown in Figure 2, after given a command from the keypad attached to the robot's chassis. To reduce contact points, the PIR sensor and servo allow us to utilize a contactless motion detecting door opener. An example of the robot's functionality from teacher to student can be seen in Figure 3.
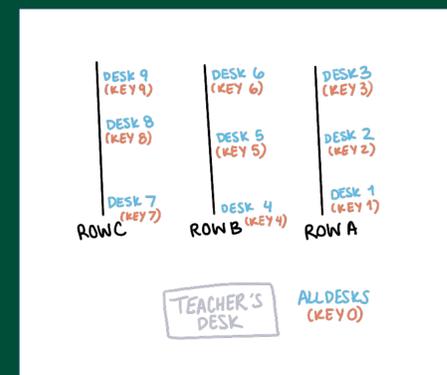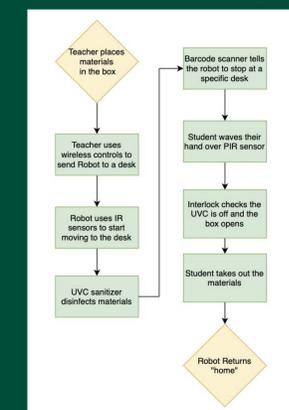

Figure 2: Classroom Path Robot will Follow

Figure 3: Example Flowchart of Robot's Functionality

IMPACT ON COMMUNITY

This CCDR provides a unique solution to in person learning, by allowing students and staff to have a safe learning environment. Students that could not attend in person learning before, are now able to do so with the help of our contactless classroom delivery robot.

- Students will be able to return to in person learning.
- Schools can return to normal operation safely and comfortably.
- The spread of germs in schools will be minimized with our robot.