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ESE 111 Final Report

LaundryPro is a device that remotely tells a user whether a laundry machine is available or in use based on the vibrations of the washing machine. The concept behind LaundryPro is a network of accelerometers on Arduinos that can be placed on the inside doors of washing machines or dryers. The data from each one will be uploaded in real time to a website that reports the availability of washers and dryers. Users can check this website to see when machines are available before they make the trip to the laundry room. This will greatly benefit college students who have to share laundry machines.

As proof of concept, our implementation uses two Arduinos. When the machine is being used, there is shaking or vibration detected by the accelerometer. Thus, the total magnitude value for acceleration will be greater than a threshold value and the Arduino will send a message that the machine is in use. If the total magnitude is lower than this threshold value, the washing machine may be changing cycles or it may be finished. The Arduino will assume the machine is still in use and only changing cycles for a given amount of time. After that time passes with no movement the Arduino will conclude that the laundry is done and send the message that the machine is available.

When someone is taking their laundry out of the washer or dryer, it will cause shaking. To make sure this isn't interpreted as the machine being in use, there will be a photoresistor on the Arduino. The photoresistor changes resistance based on the ambient light in the environment. This causes a change in voltage which is reflected by a change in the reading from the digital pin on the Arduino. If the reading is above a certain threshold value, that means the photoresistor is sensing light and the door is open. If this is the case, the Arduino enters a state where it does not measure vibrations. If the reading is below the threshold value, the LaundryPro is not detecting light and the machine door must be closed. The Arduino goes to the measuring state in which it is checking for vibrations.

The last step in the process is the networking of the two Arduinos, the transmitter, which is in the laundry machine, and the receiver, which is in a remote location and needs to be notified of the state of the machine. The technology used for this purpose is called an X-Bee. X-Bees can transmit and receive bits through the serial monitor. The transmitter sends one bit if the washing machine is in use and a different bit if it is available. The receiver uses the information from these bits to determine what to tell the user about the machine. The receiver then prints a user-friendly message on an LCD screen about the laundry machine. The ideal model of LaundryPro would use ethernet shields to update a website.