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Life Alert System for Vulnerable Adults who Live Alone

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Life Alert System
for vulnerable adults who live alone

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INTRODUCTION

As medical technology and the standard of living have improved, the number of vulnerable adults who live alone has increased. Asking for help themselves may be impossible if they have a medical or life issue. Some accidents may go unnoticed for individuals living alone. When accidents regarding vulnerable adults occur, it may take days or weeks to become known by family or neighbors.

To solve this problem, a life alert system was designed for vulnerable adults in their homes. To demonstrate the system, a fusion of different sensors were set up in a booth to detect the user's motion over an extended time period. When the system through the sensors considers a possibility that an accident has occurred, a camera turns on and shows the accident scene through a website. An emergency response agency, a social work agency, or family member is alerted to this website when the camera turns on. This allows a prompt reaction to assist the vulnerable adult.

METHOD

An ATMEGA-128 AVR, a PIR sensor, four Ultrasonic sensors, and an IP camera were used.

- ATMEGA-128 is an 8-bit microcontroller used to manage the whole system.
- The PIR sensor determines whether the adult is in the room or not, detecting their movement.
- The four ultrasonic sensors determine the adult's posture.
- The IP camera adjusts to show people who are viewing the accident scene.
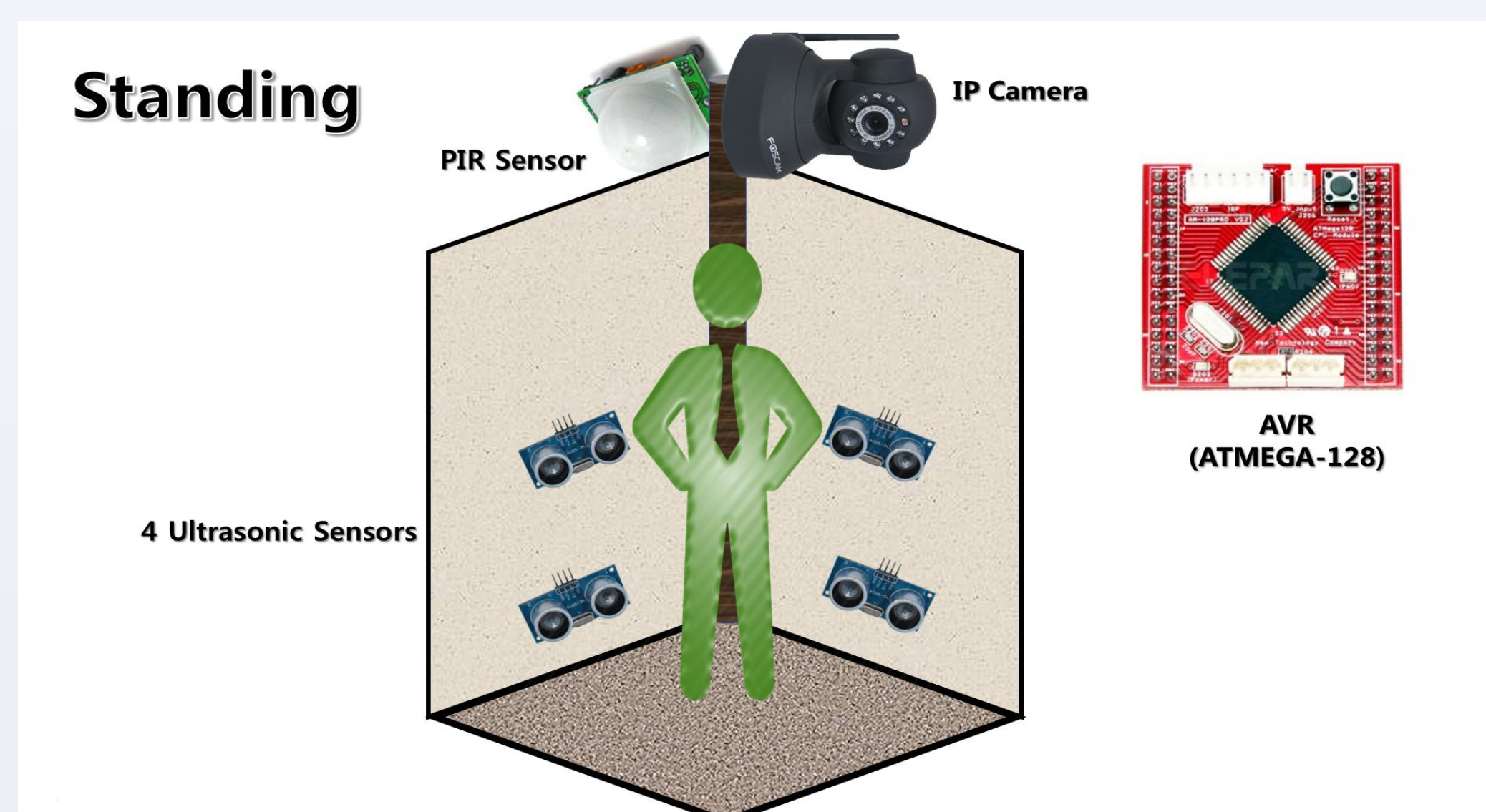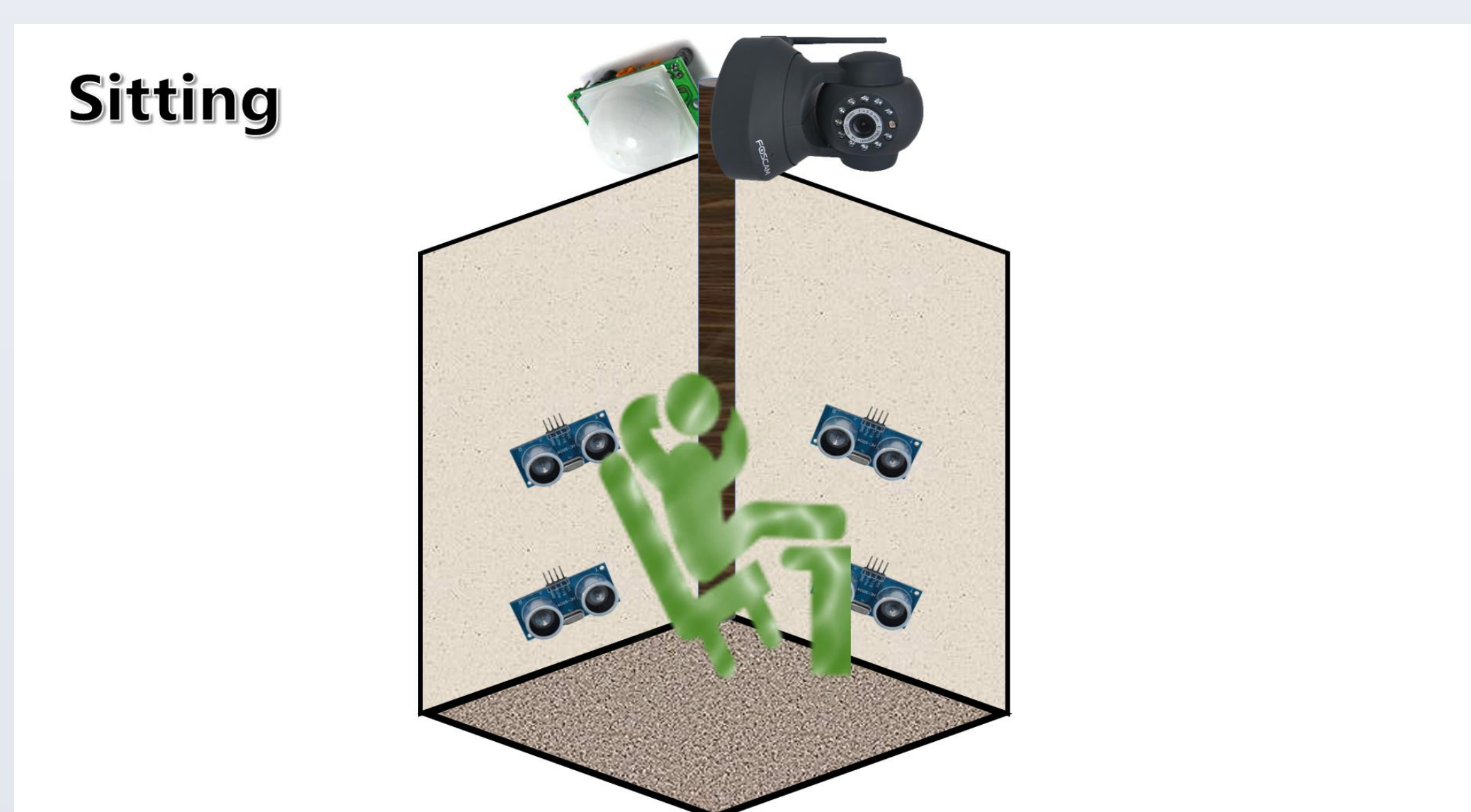
Circuit Diagram
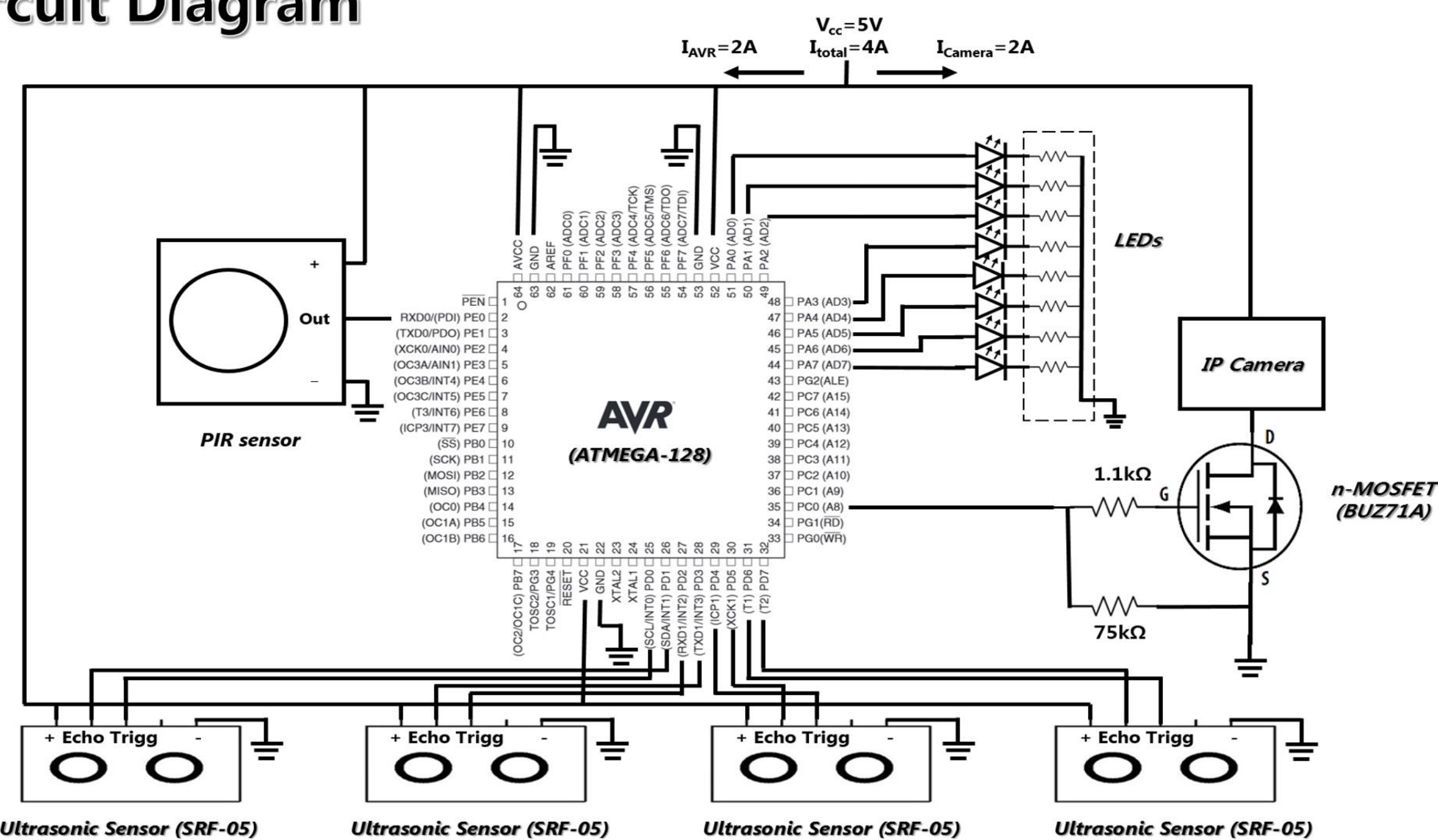
Flow Diagram
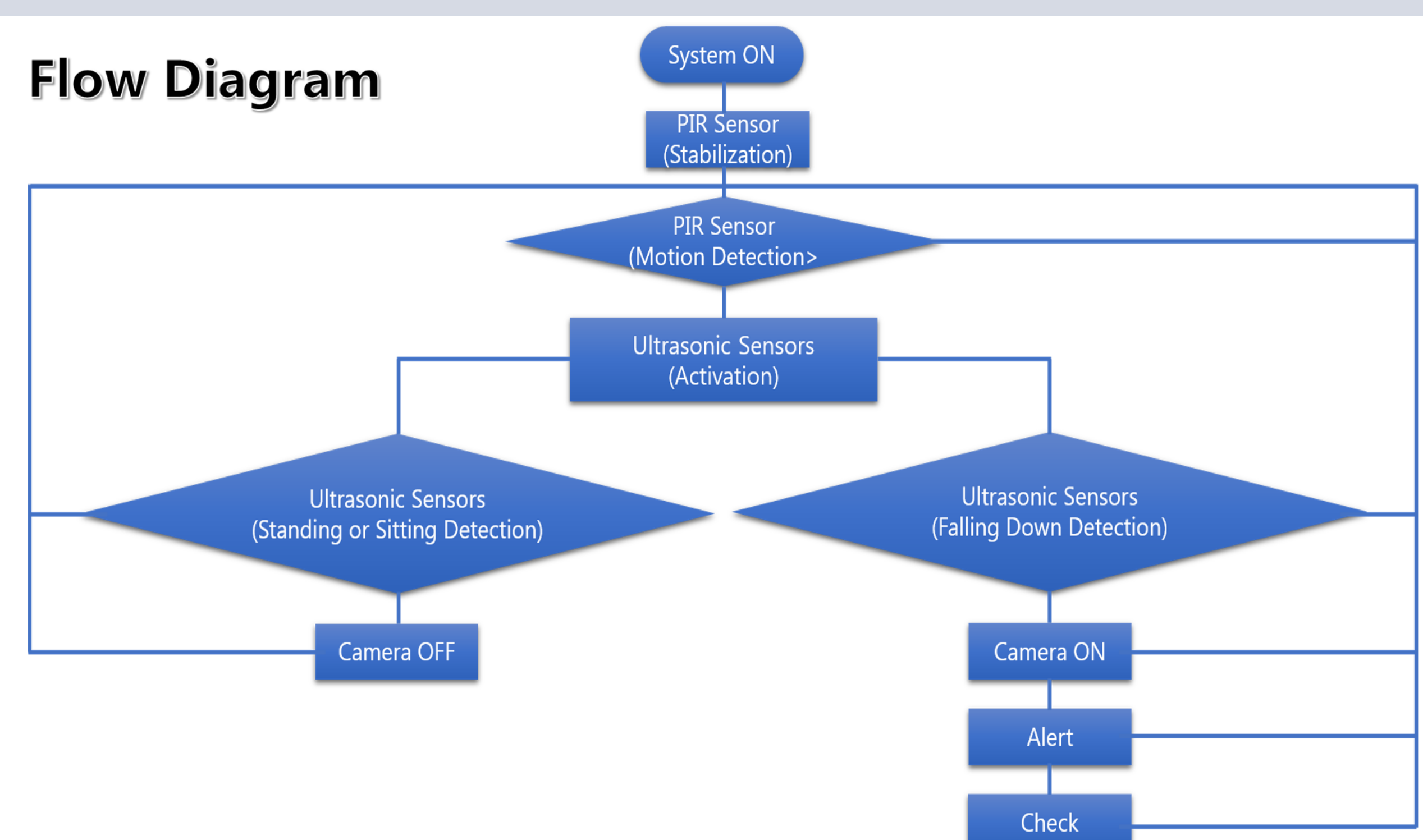
Let's assume that there is a vulnerable adult in a room.

Standing

1) In this case, the adult is standing. First, the PIR sensor will detect the adult which means the adult is in the room. Then the four ultrasonic sensors will detect that the adult is standing. The IP camera will not be turned on because no accident has occurred.

Sitting

2) In this case, the adult is sitting. The sensors and the camera function the same as if the adult were standing.

Falling Down
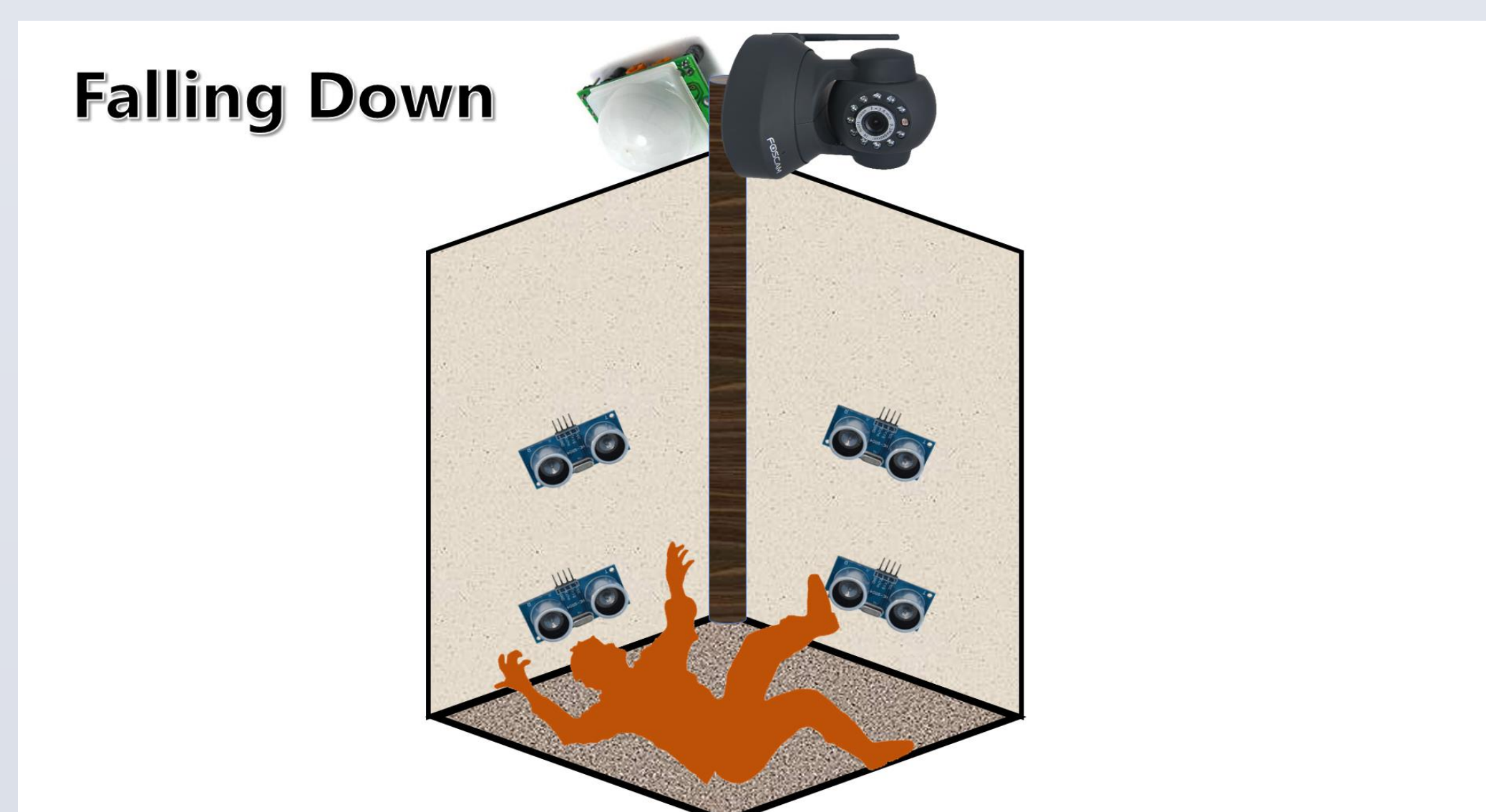
3) The adult has fallen down. In this case, only the two bottom ultrasonic sensors will detect the adult which means that the adult has fallen down. The system considers a possibility that an accident has occurred. At this time, the camera will be turned on.

Alert

4) An emergency response agency, a social work agency, or family member is alerted and a link provided to view the camera will be sent to their email when the camera turns on. They can check this using their smartphones, tablets, or computers.
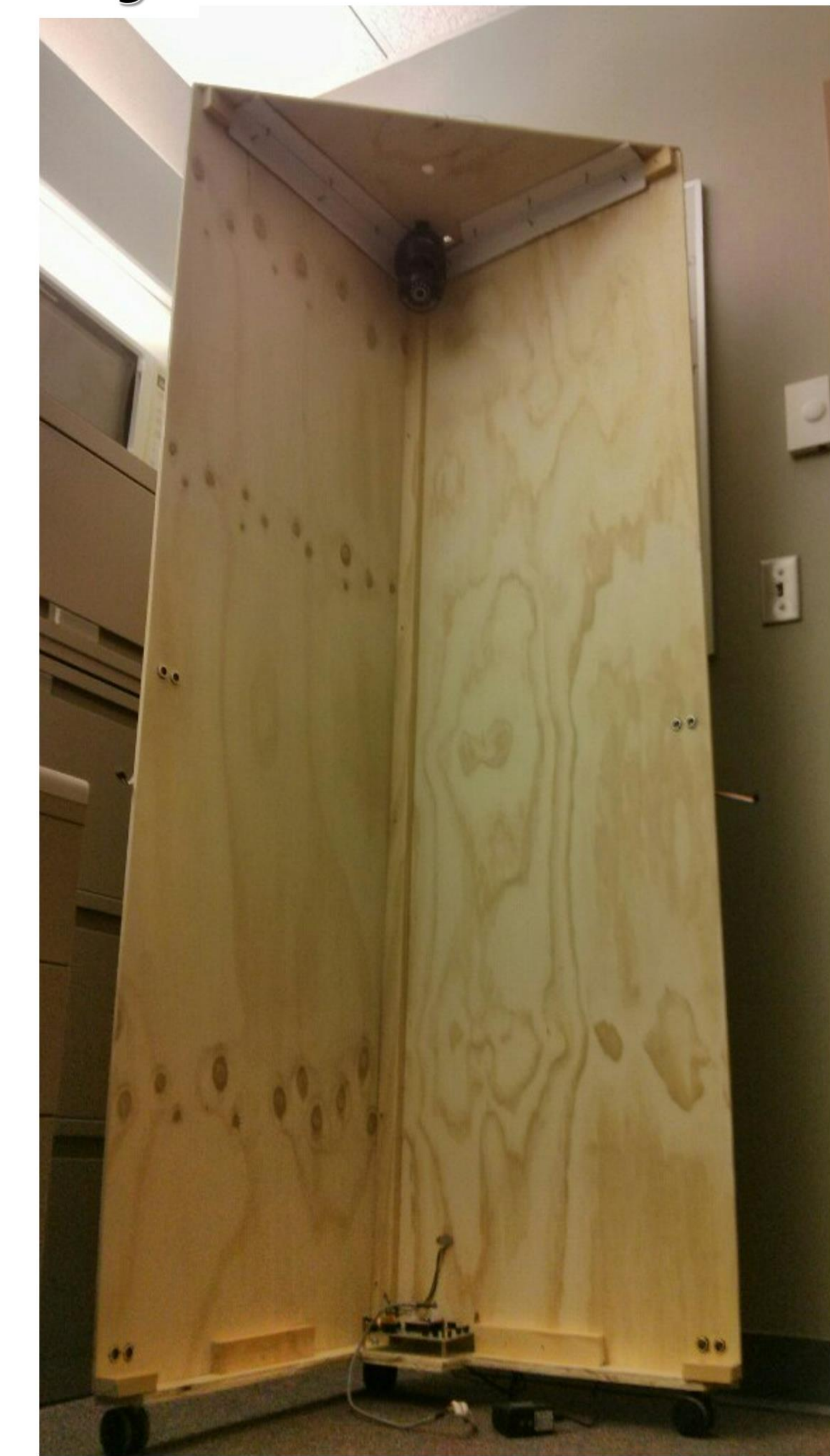
Check
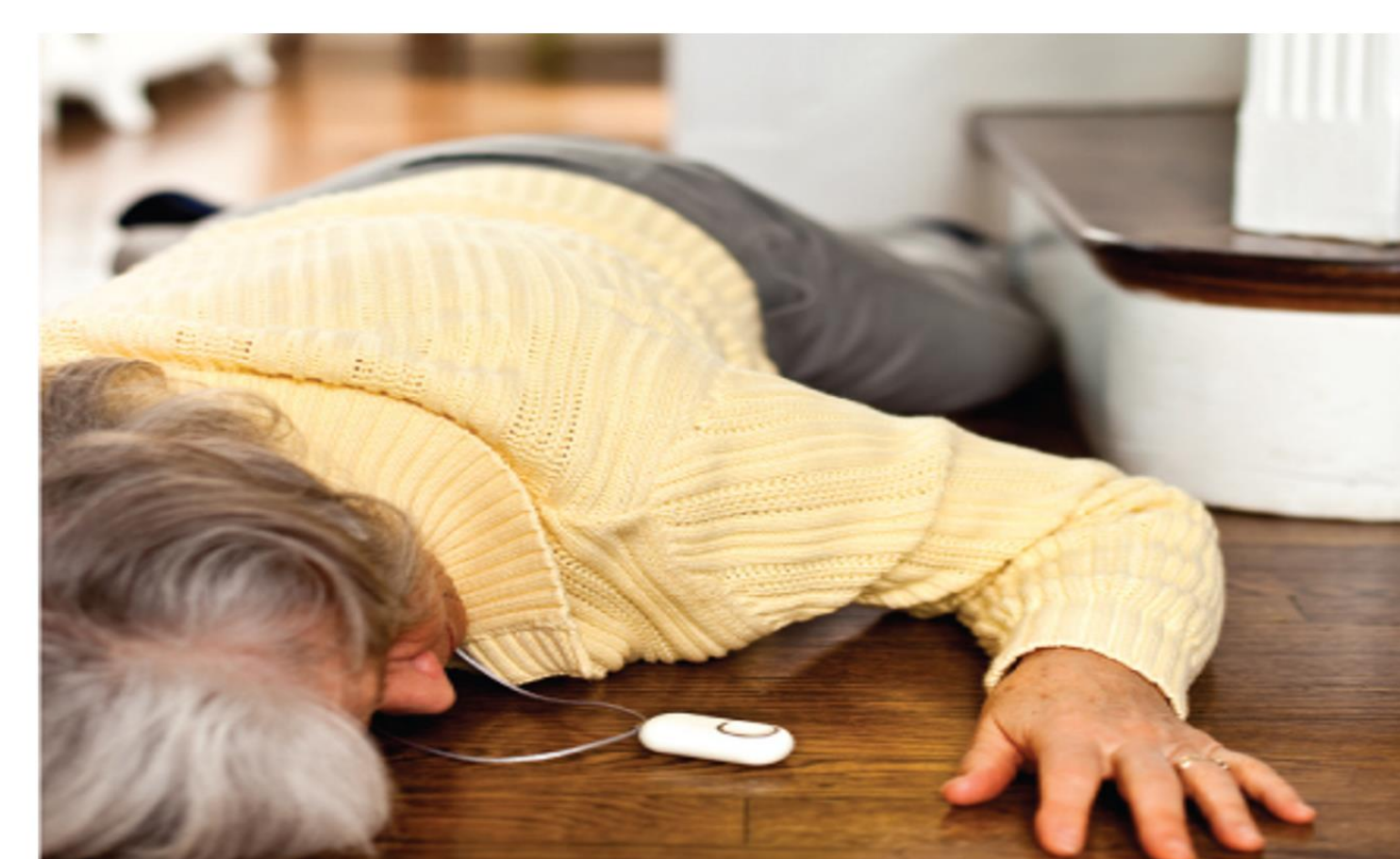
5) They can check the accident scene in real-time. This allows a prompt reaction to assist the vulnerable adult.

RESULTS

Final Design

CONCLUSIONS

This project is meant to give vulnerable adults a chance to live alone without the fear of falling and being unable to receive aid.

Today, there are wearable devices to detect one's heart rates, blood pressure, and location. If one has a medical problem, the wearable devices can report to someone. However, due to discomfort or other reasons, people do not want to wear the devices in their homes. Compared to the wearable devices, this system gives the user comfort. A fusion of different sensors can be applied to detect many different situations and movements.

Only if the vulnerable adults have a medical or life issue, the camera turns on to let people know about the situation. People are unable to view the vulnerable adult before the problem happens. This can protect the user's private life.

However, a constraint is that the current system is not useful if there is furniture in a room. To solve this problem, we can apply image processing technology instead of using the ultrasonic sensors.

This system is useful not only for the vulnerable adults who live alone, but for people with disabilities or any people who live alone.

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