

SecureCam

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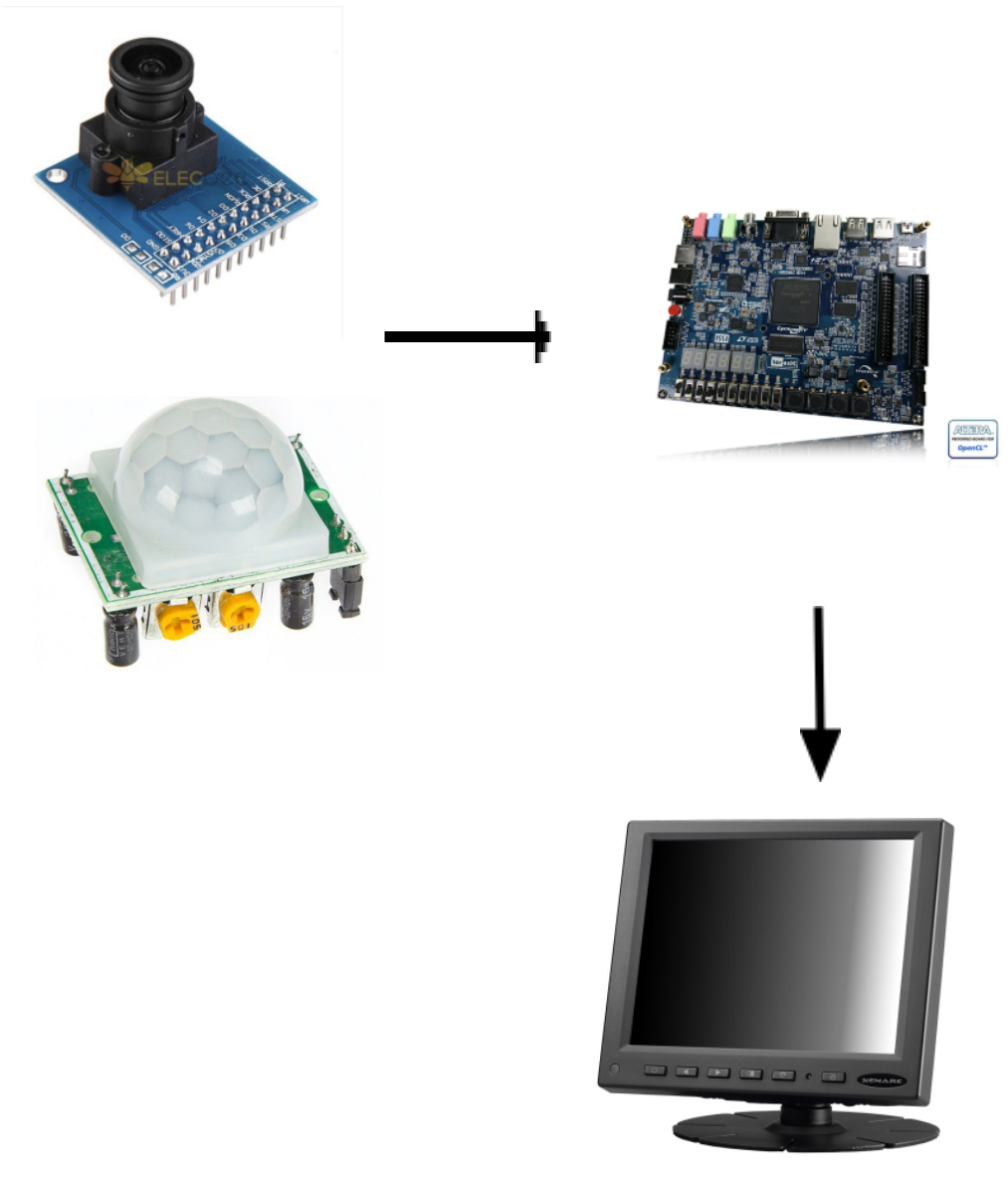
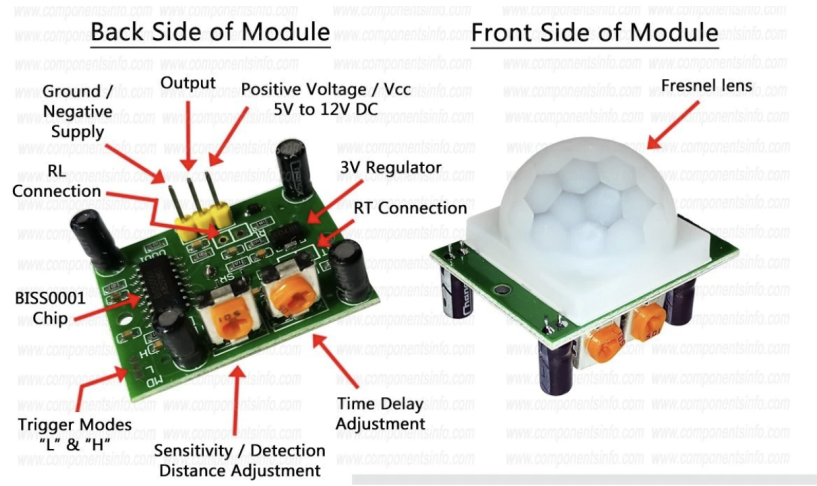
For our project, we plan to implement a security camera that is capable of live video feedback as well as motion detection. The camera module has to be compatible with FPGA boards. Our plan is to use the OV7670 (see below) camera module and interface it with the FPGA using the GPIO pins.



Figure 1: OV7670 Camera Module

The communication between the camera module and the FPGA would be through I2C. The camera would have to be initialized. Our plan is to look at the datasheet of the camera and set the value of each of the control registers to the appropriate value. Once that's done, we would have to obtain pixel data from the camera. A single pixel has 16 bits corresponding to the RGB565 protocol, 5 bits for red, 6 bits for green, and 5 bits for blue. The video from the camera will be displayed on a VGA monitor.

To detect motion, we will use a PIR (Passive Infrared) sensor. Once the PIR sensor senses motion, the camera will be triggered to take a picture, thus functioning as a security camera. The pictures taken would be stored in a SD card. The data would have to be extracted from the SD card and the binary output converted to an image. This image is then displayed to a VGA monitor for the user.



Hardware:

- De1-SoC FPGA
- OV7670 Camera Module
- PIR Sensor
- VGA Monitor

Software:

- Python/C compiler
- Quartus
- MATLAB

References

1. <https://community.element14.com/challenges-projects/design-challenges/summer-of-fpga/b/blog/posts/security-camera-1-project-proposal-629530496>