M1QP – Interrupt-Based Sense-Think-Act System

1. Reflection

I assembled a super chilled Interrupt-based Sense-Think-Act object on an Arduino. It operates in three stages; Sense, Think and Act. In the Sense part I connected a PIR motion sensor, a push button and an ultrasonic distance sensor all flashing real time data into the board. Think has some logic on it: the LED is only lit when the PIR detects motion and the button has been hit or the ultrasonic has detected something in the 30 cm vicinity: a complete decision loop is present.

I came to know the major one about interrupts -only pins 2 and 3 allow you to connect interrupts with the Arduino Uno. Then I connected my button and PIR to those pins and called attachInterrupt. It implies that, when the motion appears or the button is switched off, the system will respond in real-time, there is no necessity to continue working with ping-ping. It occurred to me how convenient interrupts can be with real-time stuff - they make things nippy. The ultrasonic sensor did not require an interrupt, I simply read it with a conventional digital I/O and timing.

There were a few hiccups that I encountered during the build. To begin with, the interrupts were misbehaving due to the fact that I had sensors in the wrong pins. Then I attempted to insert pins 0 and 1 into objects - it turns out that they are serial guys and thereby disrupted serial message transfer. Bad understanding of INPUT PULLUP and miswired things also contributed to the jumpiness of the button readings. I got everything sorted by rechecking the pin specifications, rearranging the parts to the right pins, which have the capability of the interrupt, and adjusting the right pull-ups to make the button steady. Serial Monitor came to the rescue to monitor the variable values and identify the point that the logic bug is stagnated.

Overall, this project gave me a good push on my learning about system design, real time interrupt handling and logical decision flow. It also honed my problem solving skills and offered me an actual experience in assembling a clean embedded control system using the Sense-Think-Act paradigm.