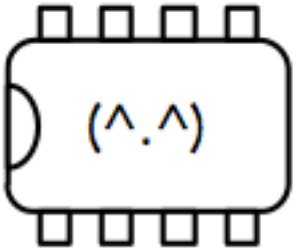
LED Experiment ch2



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LED Experiment #2

This document is a supplement to com.zenmcu.0031-0_(zenai-community-of-robots).pdf.

The purpose of the test is determine if I can use an LEDs as light sensors and measure the approximate brightness of the incident light. The intended use case is to have two of them, one on each side of a robot, to detect relative brightness on both sides, and then turn towards (or away from) the light.

For whatever reason the results I got with LED Experiment #1 were unstable and discouraging. So I decided to just use the ADC and measure the voltage. I think this will work because light falling on an LED produces a small voltage which can be measured with a volt meter, or an ADC.

So I recoded the light sensing experiment to use the ADC.

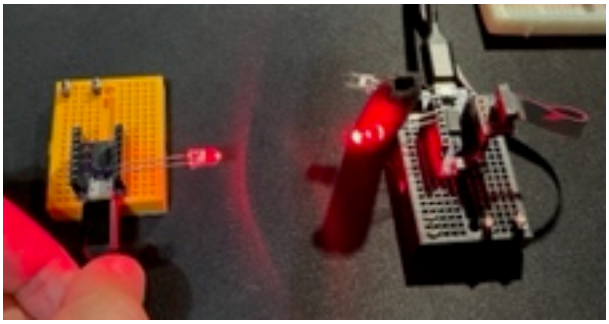
Light falling on the LED induces a current. So reading this using the ADC is kind of abusing the ADC. But I thought it might be interesting. I set it up single ended, 8 bits, and measured the ambient light using a 5mm red LED. The readings were pretty stable. I removed the LED and fidgeted the power etc (things which made exp #1 behave erratically) and I still got the same ambient readings.
I also swapped out the LED for another one (also unstable on exp #1) and measured just about the same ambient light values / average. So this method of sensing incoming light is promising.

Next I illuminated the sensing LED with a similar red LED and took measurements. The results here were encouraging as well. So I don't forget, the basic setup is 5mm red LEDs, 8 bit resolution, vref is 1/2 vddana, and I tried using gain div2 to halve the input and get full scale, but the input is actually so low that the 'dark' reading was less than 128. So I changed to gain 2x to get dark to read about 255.

For the moment, this is an ugly way to abuse the ADC to sense brightness: **brite =255 -adc()**

The next step is to use two LEDs to try to sense which direction to turn to face the light. I used red LEDs because they seem to work better than the others I have tried, though I admit I have not rigorously and exhaustively tested all of the LEDs I have on hand. But the experiment worked, and I have demonstrated to myself that using two LEDs for phototaxis/ tropism is at least feasible.

But after some discussion with a friend I think that using a timer is a better solution.



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