Group - 11

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Experiment 9

Camera Module Interface

Aim:

a. Interfacing a camera module (OV7670)
b. Importing the image as a text file and displaying an image on PC
c. Add a push switch to trigger camera when to take an image

Apparatus Required:

1. Arduino Uno Board and USB
2. OV7670 Arduino Camera Sensor Module STM32
3.10K resistor X 2
4. 4.7K Resistor X2
5. Breadboard

Specifications of Camera Module

Optical size 1/6 inch
Resolution 640x480 VGA
Onboard regulator, only single 3.3V supply needed
Mounted with high quality F1.8 / 6mm lens
High sensitivity for low-light operation
VarioPixel® method for sub-sampling
Automatic image control functions including: Automatic
Exposure Control (AEC), Automatic Gain Control (AGC), Automatic White Balance
(AWB), Automatic Band Filter (ABF), and Automatic Black-Level Calibration (ABLC)
Image quality controls including color saturation, hue, gamma, sharpness (edge
enhancement), and anti-blooming
ISP includes noise reduction and defect correction
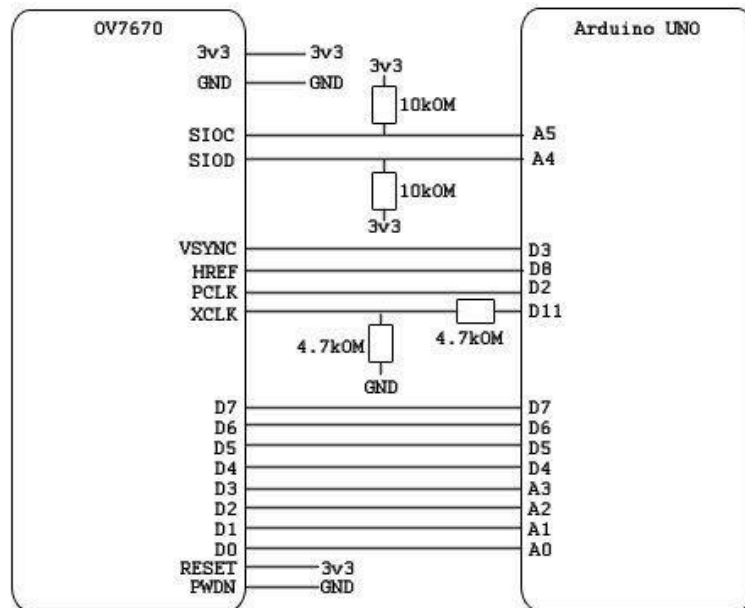Supports LED and flash strobe mode
Supports scaling
Lens shading correction
Flicker (50/60 Hz) auto detection
Saturation level auto adjust (UV adjust)
Edge enhancement level auto adjust
De-noise level auto adjust

Circuit Diagram:

Procedure:

Parts a and b:

- We make the necessary connections as shown in the figure, keeping in mind we use 3.3V power for this module, thus we use pull up resistors.
- We find out what USB port our Arduino is connected to, something like COM4 or COM5. Then we have to create a new folder in our Local Disk (C:). This will be our camera module's image saving destination. Name this folder as out.
- We download and install java SDK 32bit and download the file corresponding to the port the arduino is connected to.
- We place the "win32com.dll" in the "...\jdk1.8.0_74\jre\bin" directory
- We also place the "comm.jar" in "...\jdk1.8.0_74\jre\lib\ext" and the "javax.comm.properties" in the "...\jdk1.8.0_74\jre\lib" directory.
- We open cmd and the change the directory to the location where Java/jdk1.8.0_74\bin is installed
- We use the command 'java code.SimpleRead' to capture the pictures

Part c:

We add a push switch across 5V supply and resistor(1K) connected to ground(0V) (a pull-down resistor) to enable us to give command to the camera module when to capture an image, and take output from the point above the resistor to the pin 13, such that when the switch is not pressed, the potential of the point above the resistor is 0V (disconnected from 5V supply) (pin 13 is LOW), and when it is pressed, it is connected to 5V and so pin 13 is HIGH, and therefore we can check for logic level at pin 13 to decide whether to take an image or not by adding an 'if' condition inside the loop() function.

Codes and Captured Images:

Code: https://drive.google.com/drive/folders/15zX-10RryzpoC2IaltIjs1udFBy_qHS7?usp=sharing

Photos: https://drive.google.com/open?id=10Zqwb6CK-I4VcGUd1nlSgFJgCfLM2_Nx

Discussions

The camera module was interfaced with the computer and necessary changes and steps were taken to capture the image and store it in the designated folder at different instances. We used Java to read and capture the image. Adjustments were made to get an image from the module that could be recognised.

References: https://www.instructables.com/id/OV7670-Arduino-Camera-Sensor-Module-Framecapture-T/