Shedding light on a Picasso

Activity 2: Optional extension

A nice extension project is to build a rotation platform and program it to cycle through the filters.

Materials

- Construction instructions for the platform
- Software for a laptop/PC
    - Source code: Picasso_b4j_SourceCode.zip
    - Executable: Picasso_b4j_Executable.zip
- sketch_Picasso.ino
- Arduino board
- 5 V power supply (or direct-current power jack cable female connector)
- 1 servo motor (we used MG996R Servo)
- Hook-up wires
- Breadboard
- Paper boxes

Procedure

1. Construct the rotating platform following the construction instructions and upload the sketch "sketch_Picasso.ino" to the Arduino microcontroller.

2. Connect the laptop/PC to the camera and the Arduino microcontroller.
   To reproduce what the camera records on the computer screen in a continuous video stream, we have created a program using free b4j software,[1] while the camera is connected via a router to the computer. With this program, we can control the various functions of the camera, for example, day–night mode or black-and-white display. Finally, with this program, we can send commands to the Arduino microcontroller to rotate the platform.

3. Download "Picasso_b4j_Executable.zip", unzip this file and execute the program "Picasso_b4j.exe".

(Note: each camera uses its own communication protocol. You might have to modify the source code to connect the program to the camera.)

4. Place the pictures in front of the camera.

5. Rotate the platform, using the software, to place one filter in front of the camera. Examine which areas of the painting are darker than the others and try to figure out why this is happening.

6. Optional:

    a. Follow the step-by-step guide "Intensity Normalization.pdf" to get the intensity normalization.

    b. Follow the step-by-step guide "Graph Of Intensity.pdf" to get the graph of intensity.

References

[1] The B4J software used: https://www.b4x.com/b4j.html

Resources

- See construction instruction here:
  https://sites.google.com/view/scienceonstage2024/rotating-platform-construction-guide
- Download the software for the PC/laptop here:
  https://drive.google.com/drive/folders/14iB_mVKMwvymLNSbG3XV27kkgEueGi4P?usp=drive_link
- Download the sketch here:
  https://drive.google.com/file/d/1KtNZ2Z0-RM30rHrWgu2mMTfmTKjfSm2g/view?usp=drive_link