**PROGRESS REPORT FOR
AQUAPHOTN'S MEGATRAINING PROJECT 25**

Heading

Date: 13/8/2024

To: Aquaphoton Academy

From: Amr Zeina, Ibrahim Ismail, Mahmoud Morsi, Mohamed Yousry, Yassin Khaled.

1-Introduction

Overview of Today's Progress We have developed the Arduino IDE code and design on Tinkercad, but it is not yet complete because we haven't integrated the GUI. Additionally, we have created our own schematic symbols and footprints needed for the PCB design. We have scheduled a meeting for 10 PM to finalize a date for purchasing components and testing the method of programing the ATMega 328 p tomorrow.

2-Scope

- Hardware (Ibrahim Ismail & Amr Zeina):

  Created the Symbols and footprint for Atmega328 and Also schematic for the microcontroller by adding the crystal, capacitor, reset button, led for power indicator , regulator 7805 and made the symbols and footprint for these components

  Also Created the symbol and foot print for the L293D Motor Drive

- Firmware (Mahmoud Mohamed & Yassin Khadrawy):

  We have developed the Arduino IDE code for car which has two modes manual and automatic .We control its speed using 3 colors of rgb led and we have created design on Tinkercad and we added a lot of components like rgb led and two channel motor driver but our code is not yet completed because we haven't uet integrated the GUI.

- Software: (Mohamed Yousry):

  worked on video stitching process algorithm using openCV library to process video frames using cv2.stitcher_PANORAMA (may use another stitcher later) and also working on improving and speeding up the frame processing by using multi CPU threading
  refrences: - https://pyimagesearch.com/2016/01/25/real-time-panorama-and-image-stitching-with-opencv/
  - https://stackoverflow.com/questions/68323829/video-stitching-using-open-cv
  - https://docs.opencv.org/3.4/d8/d19/tutorial_stitcher.html

3-Status

Challenges Faced

- Hardware: while creating the footprint for the Atmega328 and L293D we faced a challenge to know the pads sizes as it is not specified in the data sheet
- Software: delay in output stitched video between every frame processing per second (low FPS) which I solved by using CPU multi-processing and cv2.Stitcher_PANORAMA which is faster than the defeault stitch
- Firmware:While developing ide code for a car with two modes of operation: manual and autonomous with three speed levels ,there was some confusion to do autonomous one and using ultrasonic sensor and giving it fixed distance that car's distance to wall shouldn't exceed it but After conducting extensive research, we succeeded in implementing this.

4-Conclusion

Significant progress was made in hardware design and software development. We created necessary schematic symbols and footprints, and improved video stitching performance using OpenCV. The upcoming offline meeting tomorrow will finalize component procurement and programming ATmega method.