Update Meeting 2
Progress Report
P.I.X.E.L. Team

Subsystem Progress:

Camera Control and User Interface

- LED Flash
    - Current Progress
        - We switched from the LED driver to a potentiometer for adjustable flash brightness. The LED will receive power from the battery when the user takes a picture, which will be controlled using a MOSFET transistor from the stock library.
    - Next steps
        - We will pick the potentiometer to use in the final design, based on the layout of the camera and its case.
        - The location of the flash will be determined based on the PCB layout so that the flash is close to the actual camera lens.
- Buttons and switches
    - Current Progress
        - We added an ON/OFF switch, WiFi/Bluetooth switch, reset, and boot buttons.
        - We added resistors to the switches and buttons.
    - Next Steps
        - Determine locations for layout.
        - Improve software debounce.
- SD Card
    - Current Progress
        - We found an Adafruit SD card module that does not use external regulators or level shifting circuits.
    - Next Steps
        - Add the SD card connector with the correct resistors and capacitors to the schematic based on the above module and this Amazon Module.
- Display
    - Current Progress
        - We have decided to not use a touch screen display to save pins. We decided to use an app to enter WiFi credentials.
    - Next Steps
        - We will look into packets for SPI for the startup of the display, rather than the GFX library, for faster display times.

        - We will look for a slightly larger display that still uses the same SPI interfacing as the one with which we have been testing.

Power

- Current progress
    - Selected DC/DC converter for 3.3V logic level power (manufacturer offers 3.3V and 5V versions of the same chip).
    - Took out DC/DC converter for 5V logic level as we no longer need it for selected micro SD card
    - The intent of the current power supply design (submitted in the last assignment) is to cause both converters to ignore the battery power if there is USB power being supplied. If there is only battery power, it is necessary to then step up/down the battery voltage to the 3.3V logic levels.
    - Added strapping pins for the ESP32 and decoupling capacitors.
    - Added a second battery LED circuit so that each battery's voltage can be monitored individually.
- Next steps
    - Pick the right inductor, Schottky diode, resistor, and capacitor for DC/DC converter (datasheet requires components not stocked in EIH).
    - Design/pick holder for the batteries in the camera casing design.

Cloud

- Current progress
    - We were able to upload photos to a Google Drive folder from the ESP32 by sending the images to a web server and then using a Python script to go from the web server to drive.
    - The photos are now viewable on our EE Senior Design website.
    - We developed a Python script that implements an AI facial recognition library to sort uploaded photos using a dictionary.
- Next steps
    - The Python script currently runs out of Google Colab, which is not a permanent solution. Eventually, we want to switch to a Python API.
    - The AI photo recognition algorithm works well but could be improved, so we want to test other parameters and possibly implement feedback.
    - After the photos are sorted by the Python script, we need to send the sorted photos to display on the Senior Design site.

Overall System Progress:

- PCB layout and case prototype
    - Current Progress
        - We mapped out the layout of the camera, deciding to have the shutter button in the upper right corner, mounted on the camera itself rather than the PCB for better user experience. We also decided the placement of the additional user buttons, LCD screen, and camera module.
    - Next steps
        - Continue working on and finish PCB layout with finalized schematic.
        - Add mounting holes and fiducials.
        - Start developing a 3D model of the camera case.