P.I.X.E.L.

Precise Image eXtraction and Enhancement Lab

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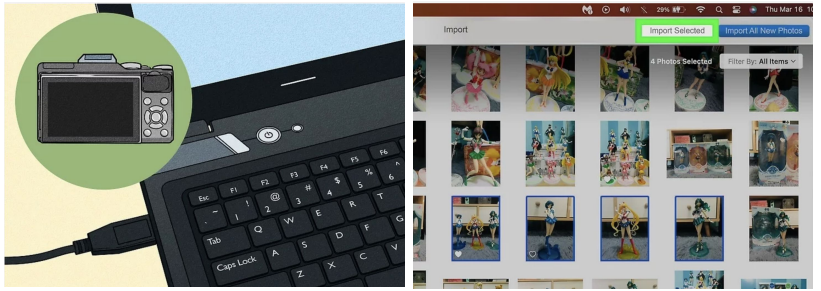
Introduction

Our project focuses on optimizing the functionality, efficiency, and user experience of a digital camera, leveraging modern technologies to deliver smarter image capturing and sharing capabilities.

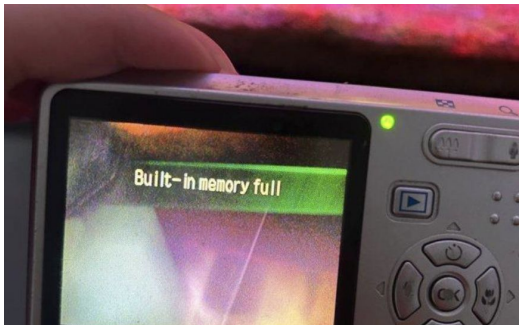
Problem Description

Digital cameras face limitations that hinder usability:

- Lack of seamless image accessibility and sharing
- Incompatibility with newer devices
- Limited internal memory
- Challenges with self-timer photos
- Lighting issues with the flash

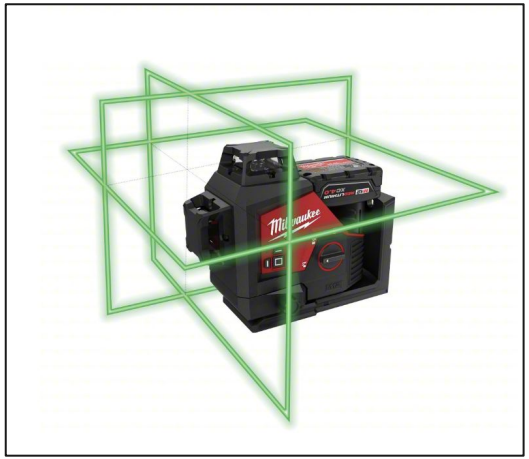


Labor intensive process of uploading/sharing photos



Proposed Solution

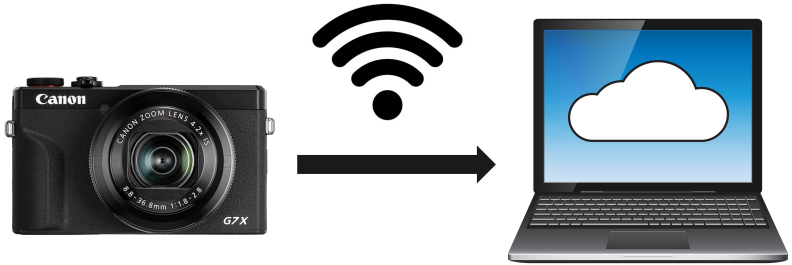
1. Instant Image Upload and Sharing
    a. WiFi upload to cloud-based album or website
    b. AI facial recognition to sort images for certain people
    c. Micro SD card for saving photos if not connected to WiFi
2. Self-Timer and Framing Device
    a. External handheld clicker device with bluetooth button
    b. Rectangular box projected with laser line levels
3. Adjustable Flash Brightness
    a. Potentiometer controlled LED driver



Laser Level Example Image

Features for Demonstration

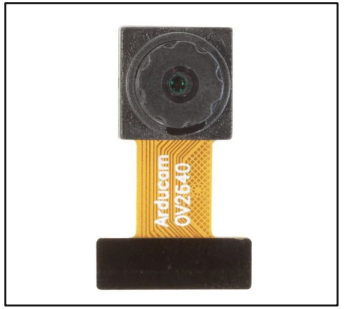
1. Take photo
2. Automatically upload images over Wi-Fi
3. Remote control button to take photos
4. Lasers to outline field of view
5. AI facial recognition to group photos of the same person
6. Adjustable flash brightness
7. OLED display to preview images and view photos after capturing
8. GPS data associated with each image



In addition to actually taking a photo, one of the main features we plan to demonstrate is automatically uploading images to a shared website or album over Wi-Fi.

Available Technologies

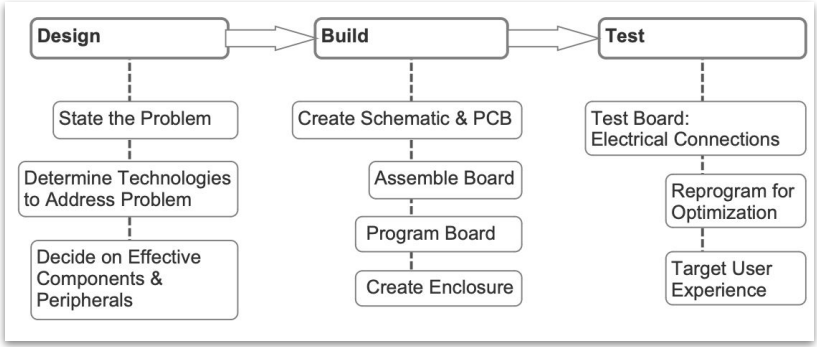
- ESP32-S3-WROOM-1-N4R8
- 3D printing (for camera case)
- Arducam OV2640 Camera Module
- Google Drive or custom website designer
- OpenCV
- Flash LED driver
- Color OLED display
- Bluetooth button
- Laser line levels
- LEDs, push buttons, potentiometer, 5V LiPo battery



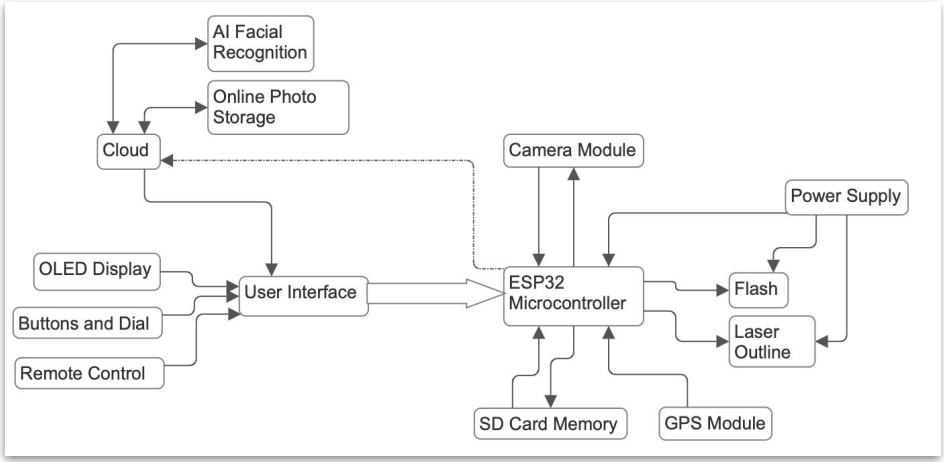
Arducam Module

Bluetooth Button

Engineering Content



Engineering Process



Camera System

Conclusion

- Bridges the nostalgic charm of digital cameras with the convenience of interconnected technology
- Simplifies tasks like photo uploads and organization for effortless memory sharing
- Addresses common limitations with features like laser framing, remote control, and AI-driven tools
- Provides tools to elevate image quality and foster creative expression in modern photography

Thank you!