First in this process was to acquire said Raspberry Pi. In this case, I found one my friend wasn't using for our project, it came with the board itself and some cables, and a microSD for the OS to be on. Included, the Logitech C270 camera is commonly available and can be purchased from basically any online tech selling store. However, it was important to ensure compatibility with Raspberry Pi, as not all webcams are supported out of the box. Documentation on cameras that are supported is easy to find, linked below. Once acquired, the next step is to install the Raspbian OS on the Raspberry Pi, following the official Raspberry Pi documentation. This ensures that the system is set up with the recommended operating system. After installation, it's important to update Raspbian to the latest version to ensure compatibility and security patches. The Logitech C270 camera can then be connected to one of the available USB ports on the Raspberry Pi, ensuring it is securely connected and recognized by the system. The OS acts like a linux subsystem, and to find if the camera is connected and recognized wasn't the easiest task. You can see if a camera is connected if you go into terminal, and type two commands: cd /dev/ and ls -l. If you see a video0 and/or video1, this means there is a connected camera that is recognized and available for use. Unfortunately, you cannot use Raspbian OS integrated camera systems like rpicam and libcamera, as these are created for the dedicated RPI cameras that they offer (non-usb). In our case, we needed a better camera than those from RPI, so I had to shift some things to make and work with YOLOv8 without using a TCP camera stream for use.

In the process of setting up the Raspberry Pi, you may encounter low voltage warnings, especially if the power supply is insufficient or unstable. In this case, our is. I had to go out and buy another power supply for the Pi as this one in use is inefficient. Resources such as those provided by pimylifeup.com offer guidance on resolving this issue, typically by using a high-quality power adapter to ensure stable power supply to the Raspberry Pi. With the Raspberry Pi and Logitech C270 camera set up, users can proceed to install necessary packages for YOLOv8, a popular object detection framework. The official Ultralytics documentation for Raspberry Pi provides guidelines on installing these packages, including Python dependencies, CUDA, and other essential libraries. Following this, users can set up YOLOv8 using the Ultralytics quickstart guide, which involves cloning the repository and installing it via the terminal (CLI). It's important to ensure that the Raspberry Pi meets the system requirements specified by YOLOv8, including compatible hardware and software dependencies, which should be able to process YOLOv8 object detection if it's 3+. A lot of

processing power is cut out from the Pi if the power supply is inefficient, which is extremely important for this case.

In addition to setting up YOLOv8, users need to configure and test the Logitech C270 camera with the Raspberry Pi. Resources like digikey.com or mankier.com offer guidance on camera configuration and testing. Tools like fswebcam can be utilized to capture images or videos from the connected camera. Overall, acquiring a Raspberry Pi 3 and a Logitech C270 camera is straightforward, with both items readily available from various sources. Installation and setup processes, including installing Raspbian OS, connecting the camera, and configuring YOLOv8, require basic hardware knowledge but can be accomplished with the help of official documentation and online resources. Resolving low voltage warnings is crucial for stable operation, ensuring uninterrupted usage of the Raspberry Pi and connected peripherals. Finally, integrating the Logitech C270 camera with YOLOv8 enables accurate and reliable object detection applications on the Raspberry Pi platform. This is key for the project as we need the best resolution possible for our system that we are creating.