



runlinc Beginners Project 8: IoT Camera Streaming (STEMSEL Version)

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Introduction

Aim

This project teaches you how to include vision in your runlinc projects by live-streaming a video from your phone’s camera or any other IP camera that can connect to WIFI and stream it to runlinc.

Background

Streaming is the idea or method of transmitting and/or receiving of data continuously over a network. Streaming is used in many applications and it is the most notable in multimedia. This is due to multimedia requiring a large amount of data for a computer or an electronic to start processing or play the media. But then, you might think, isn’t downloading and streaming the same thing? They are similar indeed. But one significant difference is that downloading, in general, requires you to have the file/data first downloaded into your device’s memory or storage before the file can be used which in many cases will take a rather significant space on your device’s storage or memory space. Whereas, streaming does not intend to store the files but start to use the data and discard them quickly once they are used instead, thus, it is more effective by not storing data. You can see this visually, in figure 1.

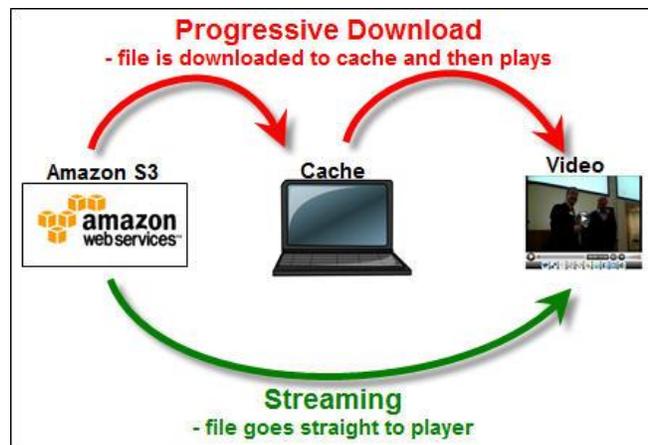


Figure 1 A visualization between download vs streaming.

This can have implications for devices with small memory. With video files quickly have megabytes of data for a few seconds of recording, devices such as runlinc on STEMSEL with only a small amount of flash memory, streaming is necessary. But the downside of streaming is that since the data is not stored, the data must be streamed again to use it.

By using the knowledge of streaming, cameras can be used remotely by streaming data to the host. In this project, we'll utilise this application to turn a camera into a remote camera. Furthermore, streaming cam isn't limited to such applications only. It has security and safety applications such as checking home when a sensor has sensed someone is at home when you are not at home; and with digital processing, it has applications in AI and robotics like recognition which will be further explained in another project.

Plan

In this project, we can set up security cameras to protect your property using the camera of your phone, even give a new life to your old phones and use them as the camera and then stream the data from the camera to runlinc to show the video on the camera live.

runlinc Background

Runlinc is a web page inside a Wi-Fi chip. The programming is done in the browser and sent to the chip over Wi-Fi. The runlinc web page inside the Wi-Fi chip will command the microchips to do sensing, control, data logging Internet of Things (IoT). It can predict and command.

Part A: Design the Circuit on runlinc

Note: refer to runlinc Wi-Fi setup guide document to connect to runlinc.

For this project, we won't be using any input or output (I/O).

Part B: Preparation

We will be using a mobile phone for this project.

- **If using an iPhone**, it is best to use the free app called “IP Webcam Home Security Camera” from the app store. There are other apps that you can use if you wish, but this was the one tested.
 - Once downloaded, open the app and allow the application to access your camera. Tap on the Camera button. This will activate your camera and open it on your phone. At the bottom of the image, there should be an IP address, you can use it to have it stream onto a web browser.
- **If using Android**, the app is “AirDroid” from the app store, it is also free. “IP Webcam Home Security” is also possible and follows the method above.
 - For AirDroid tap on the “AirDroid Web” button. This will take you to 2 options. Under option 2, you will find your IP Address.

Note: Make sure both the browser device and the phone are on the same local network. Make sure there is only one camera connection at a time.

In your web browser type in the IP address similar to this: “192.168.1.1777:8888” to check that it works.



Figure 2 Expected view of IP Webcam (Android).

Part C: Program and Run the Circuit

Go to runlinc and in the HTML block type in the following code:

```
<h2 style="text-align: center;">Robot Camera View</h2>
<iframe style="position: absolute; height: 100%; width:100%; border: none"
src="http://****:8888/"></iframe>
```

Replace the asterisks with an IP address that looks like this: `http://192.168.137.63:8888`

runlinc V1.0

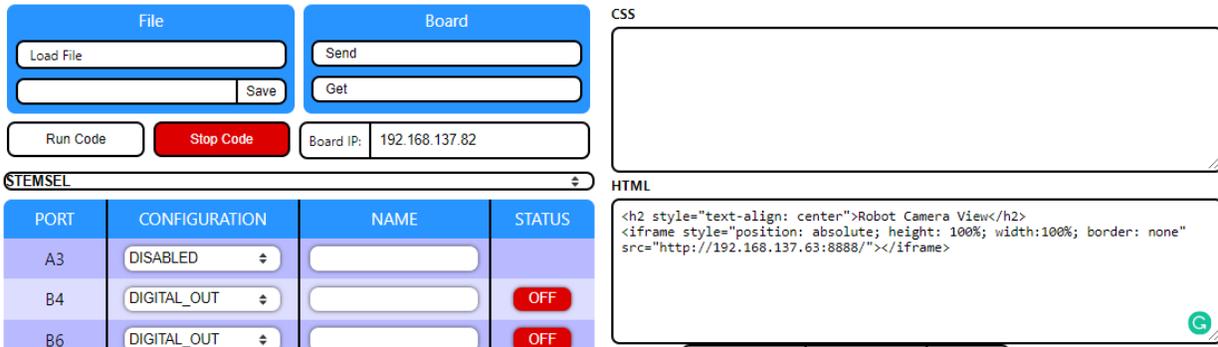


Figure 3 Expected runlinc result.

The best way to make sure it will work is to copy and paste the code in from here and change the correct address details. If it doesn't work, go through your code and check for any errors like double-ups of words or incorrect spelling.

Make sure to fill in the " http://" with the IP address from figure 2.

You should get something like figure 4 below. Click on the camera icon in the bottom left corner to start streaming the camera.

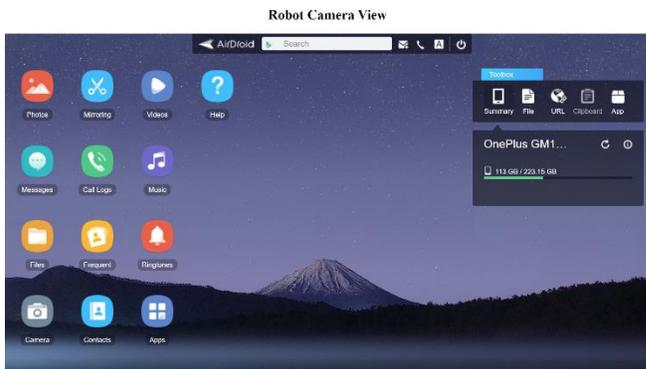


Figure 4 Expected HTML result.

If you encounter any jerking of the image close the app on your phone and then re-load it, this will refresh the connection and should remove the image jerking around or not sinking.