Camera Connection Guide

COMS W4733

This guide has four parts:

1) How to configure the router
2) How to configure the camera
3) How to power the camera from the iRobot Create battery
4) How to capture and edit an image from the camera in MATLAB

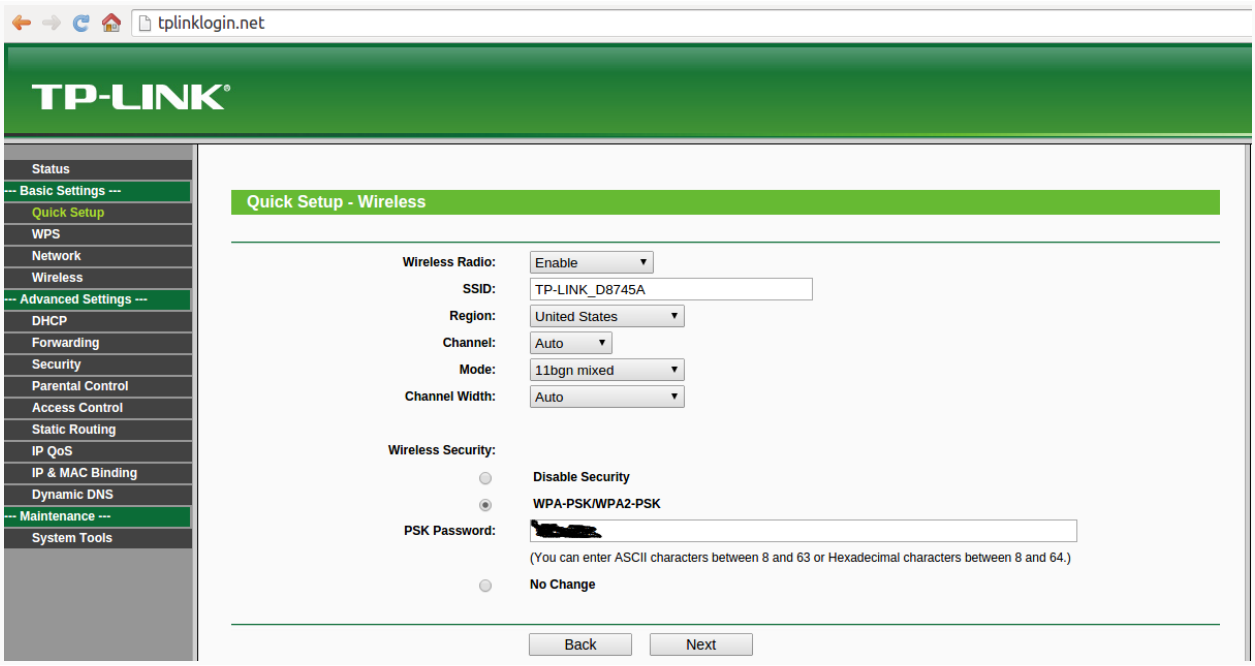
TP-LINK TL-WR720N Router

Linksys WVC80N Camera
UserGuide:
http://downloads.linksys.com/downloads/userguide/WVC80N_V10_UG_NC-WEB,1.pdf

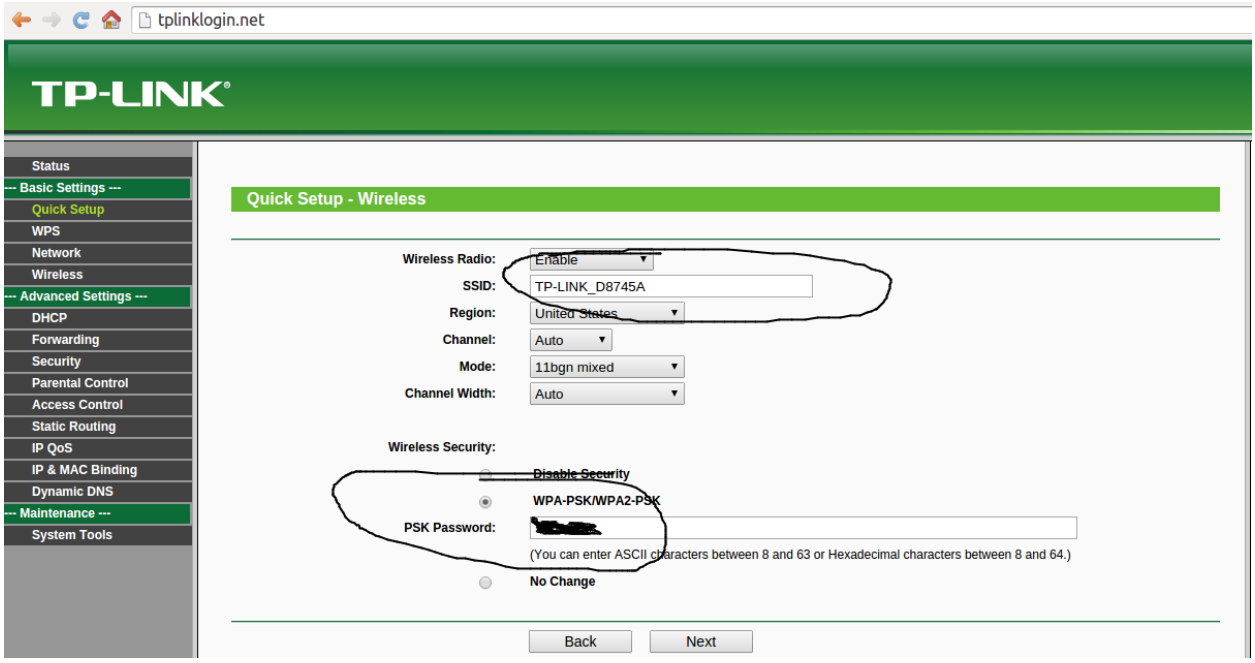
EasyN F-M136 Camera
UserGuide:
http://www.easyn.com/download/FS%20Quick%20Installation%20Guide.pdf

Part 1: Configure the Router

a) Plug the router in.
b) Connect to that wireless network, or directly to the router via ethernet.
c) Go to: http://tplinklogin.net/ . (If you do not see the TP-LINK dashboard and instead see some random webpage, please make sure you are connected to your router and not some other wireless network)
d) The very first time you configure the router you should run through Quick Setup under Basic Settings. This will require you to connect the router to the internet using the blue WAN port on the back.
    i. **Auto-Detect** - Let the Router automatically detect the connection type your ISP provides.
    ii. Enable Security, and set a password.

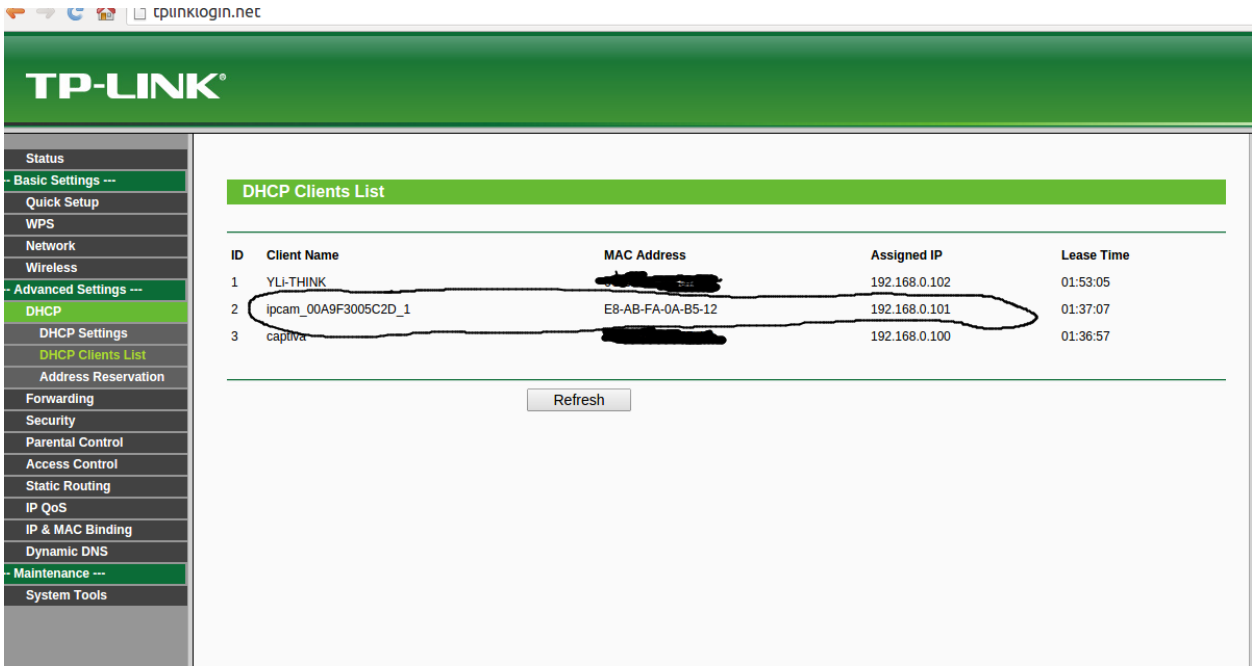


e) Take note of your password and SSID for the router. The camera needs this information in order to be able to connect to the router.



Part 2: Configure your Camera

a) Connect the camera to the router via an ethernet cable and power it on.
b) Determine the camera's MAC address and current IP address :



c) Enter that IP address in your browser. You will need to login with the default camera username and password. If these appear to be set to something other that factory default, then find the reset button on the camera and use a paperclip to hold it down for 30 seconds while the camera is powered on.

   i. Linksys Camera: Enter IP address (ex: http://192.168.0.101) then click advanced configuration and make sure you can login.

   ii. EasyN Camera: Enter IP address with port 81 (ex: http://192.168.0.102:81). Sign in to Server Push Mode.

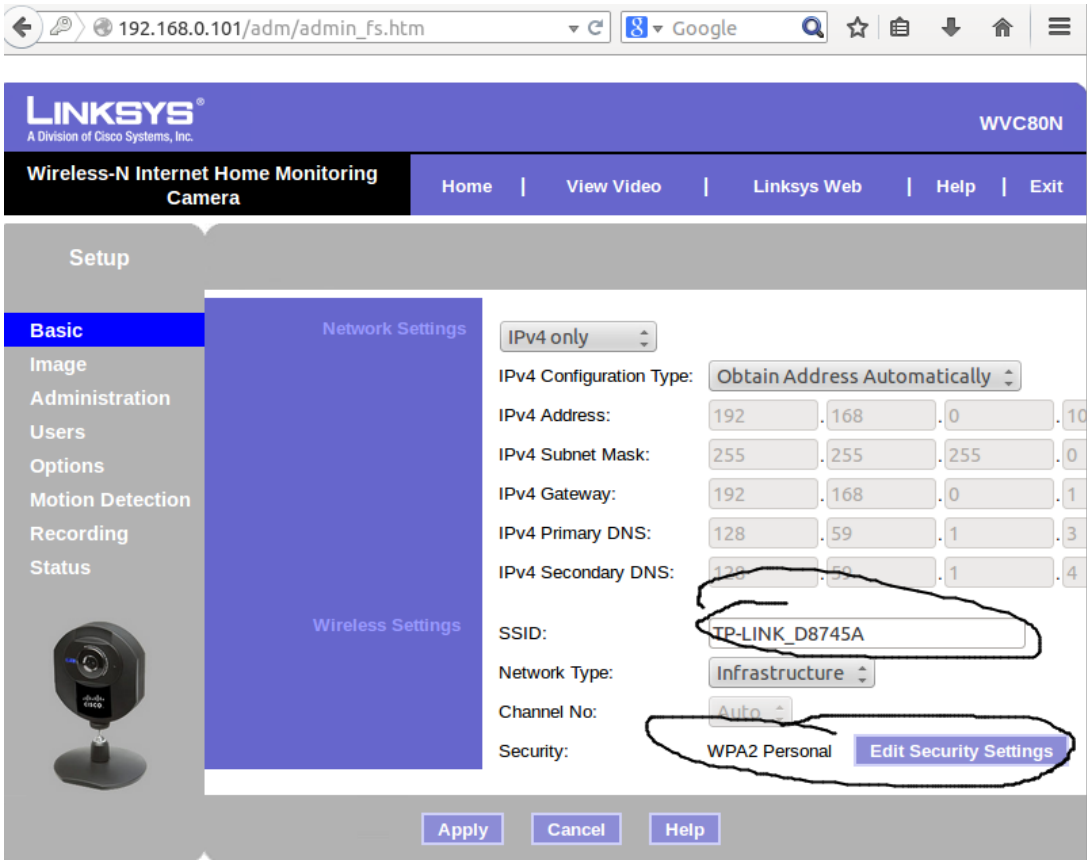
d) Verify that you can capture an image from the camera

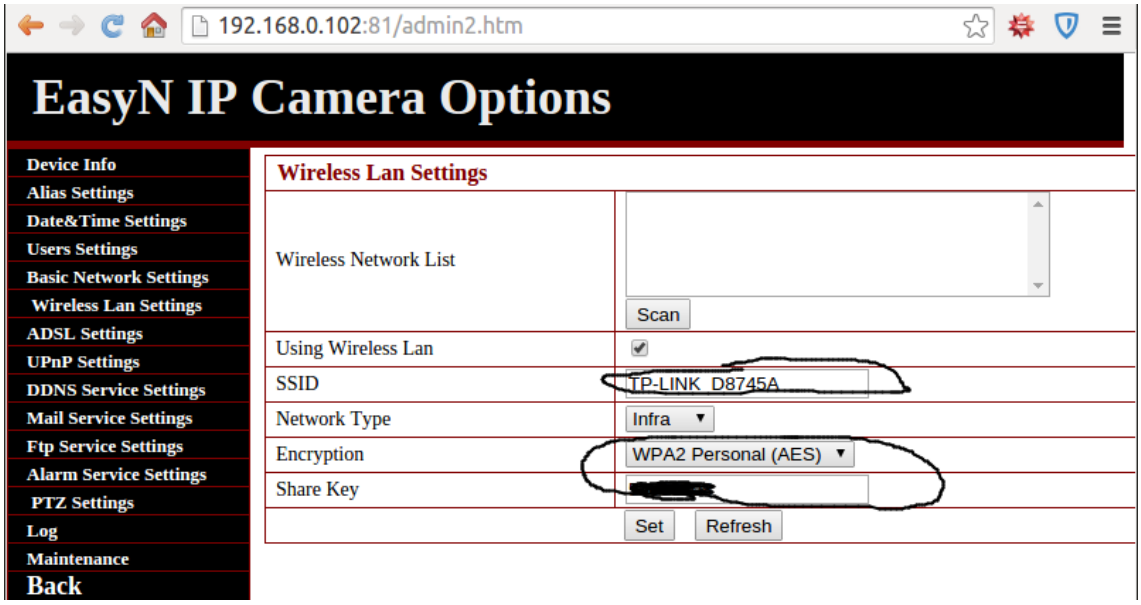
   i. Linksys Camera: http://[INSERT IP_ADDRESS]/img/snapshot.cgi?
   ex: http://192.168.0.102/img/snapshot.cgi?

   ii. EasyN Camera: http://[INSERT IP_ADDRESS]/snapshot.cgi?
   ex: http://192.168.0.101:81/snapshot.cgi?

   Note: the EasyN camera uses port 81, while the Linksys camera uses default port 80.

e) Give the camera the SSID and password for your wireless router. Just like you need the SSID and password to use the router wirelessly, your camera needs it as well.





f) Turn off the camera, unplug the ethernet and turn the camera back on.

g) Verify that the camera is able to connect to the internet wirelessly by going to http://tplinklogin.net/ and looking under DHCP clients checking that your camera is listed.

h) Verify you can capture an image wirelessly

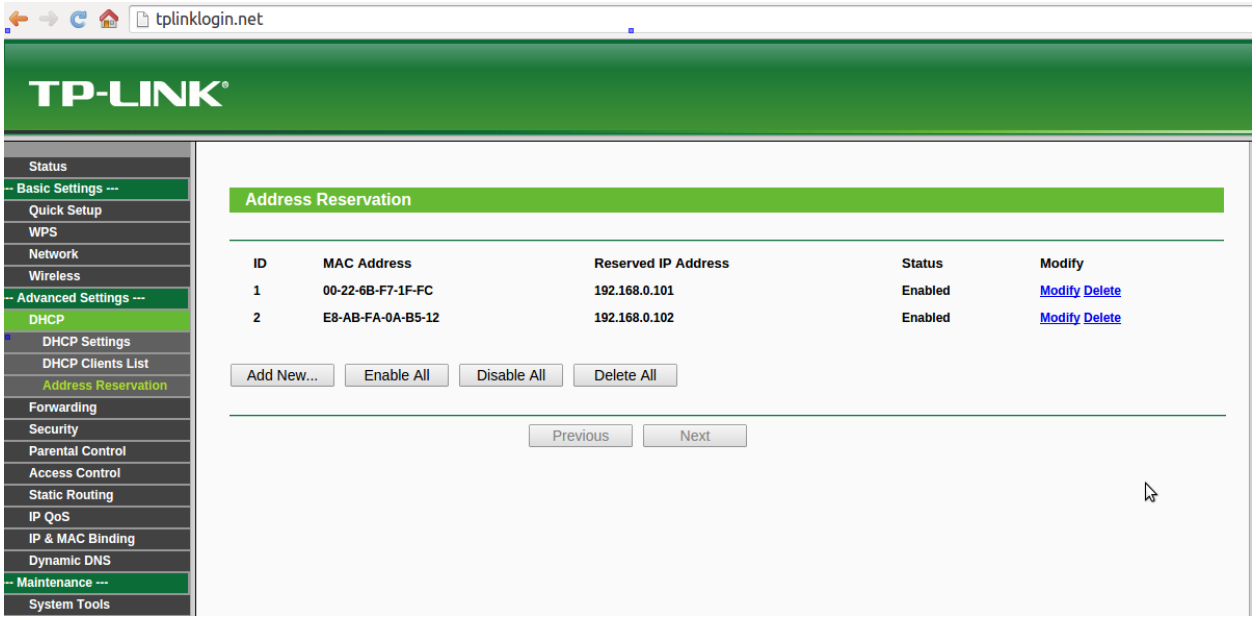
i. Linksys Camera: http://[INSERT IP_ADDRESS]/img/snapshot.cgi?
ex: http://192.168.0.102/img/snapshot.cgi?

ii. EasyN Camera: http://[INSERT IP_ADDRESS]/snapshot.cgi?
ex: http://192.168.0.101:81/snapshot.cgi?

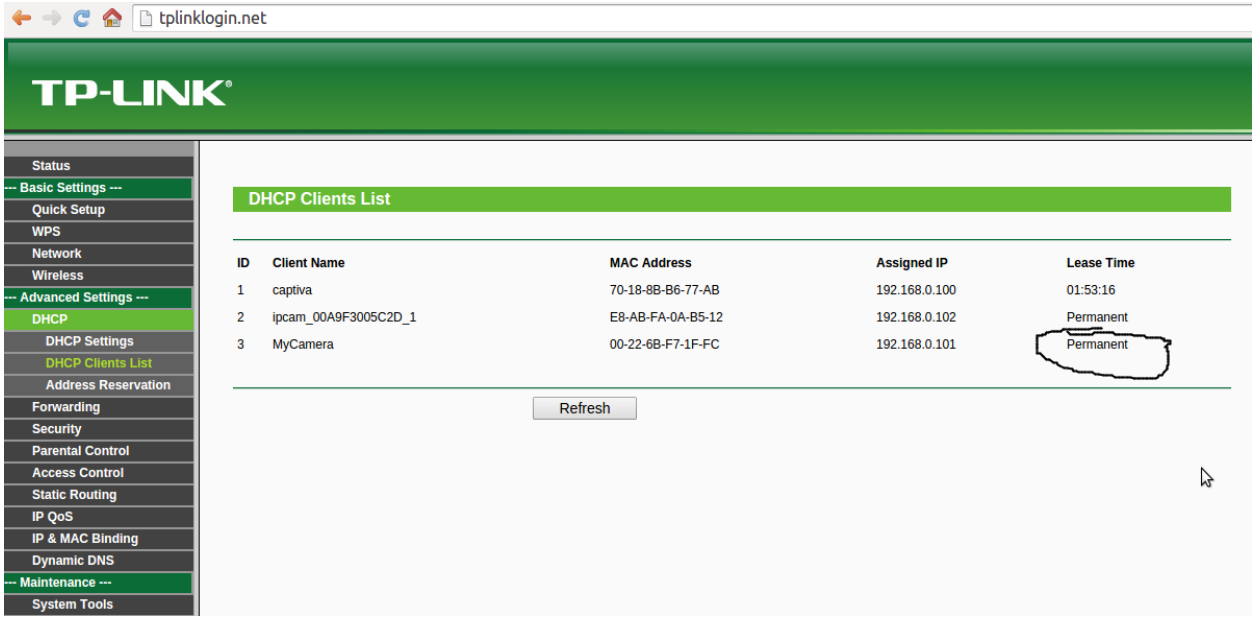
Note: the EasyN camera uses port 81, while the Linksys camera uses default port 80.

i) Reserve an IP address for your camera

i. Go to "DHCP->Address Reservation" Configure router to always assign a specific IP for your camera's MAC address. This way you can hardcode the IP and not have to worry about it changing every time you turn everything back on.



If this has been done correctly, after rebooting your router if you go to DHCP Clients List, your camera's IP should be marked as permanent:



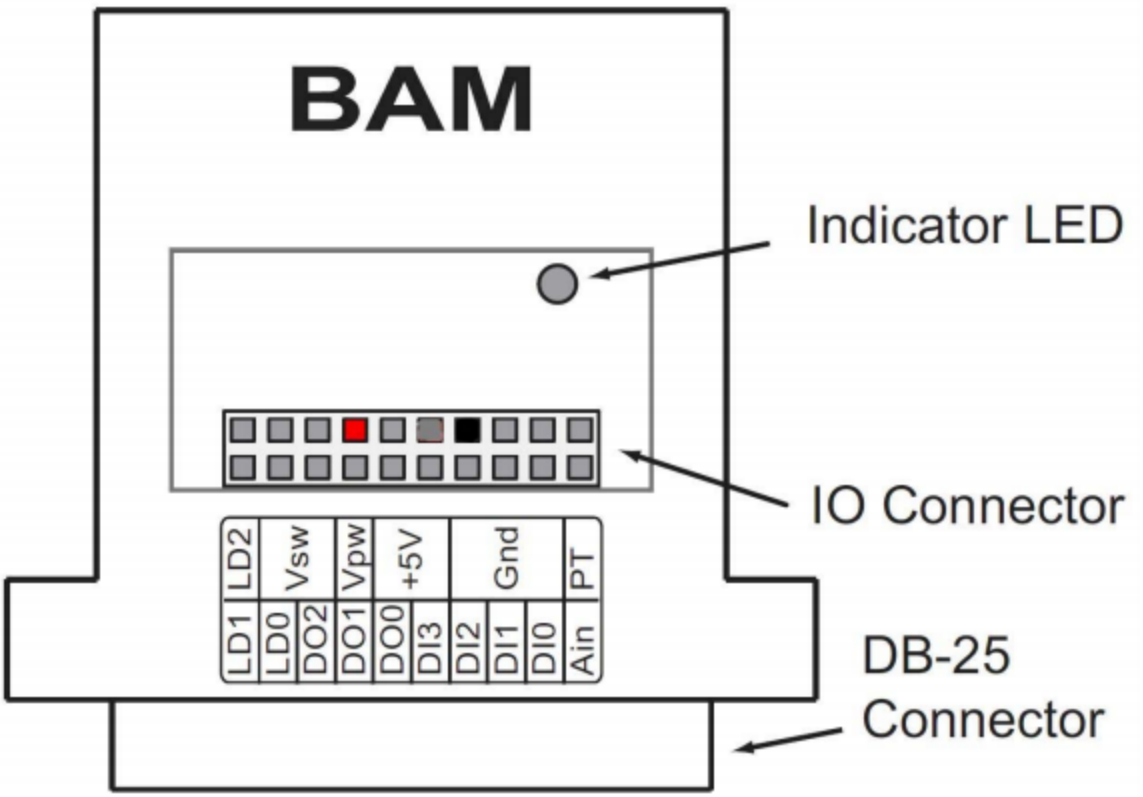
j) Disable DDNS and UPnP

i. Linksys Camera: Under Options make sure DDNS and UPnP are both disabled

ii. EasyN Camera: Under UPnP settings make sure "Using UPnP to Map Port" is NOT checked. and under DDNS Service Settings make sure "DDNS Service" is None.

Part 3 : Power your Camera using the Robot's Bluetooth Adapter Module

To connect the black power supply box to the Bluetooth Adapter Module (BAM), plug the red wire into the Vpw slot on the front of the BAM and the black wire into the ground pin as illustrated in the figure below.



Part 4: Capturing and Editing Images using MATLAB

1) Reading an image from the camera:

   You should be able to capture an image from the camera using the same urls that were entered into the browser:

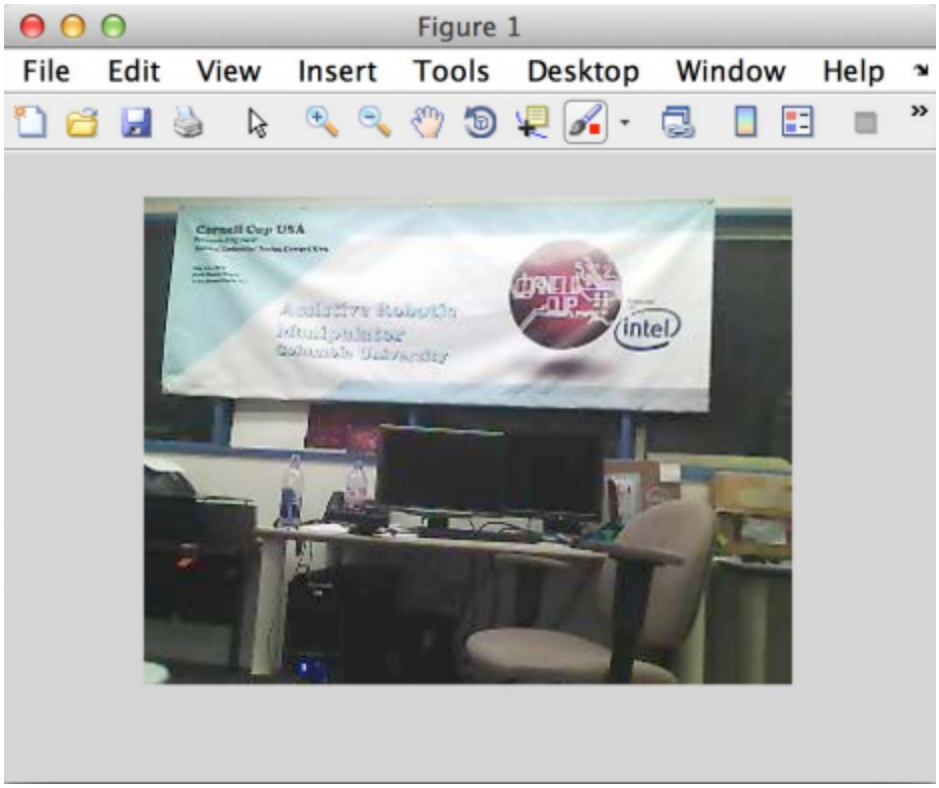
```
%linksys camera:
%example: image =
%  imread('http://192.168.0.102/img/snapshot.cgi?')
image = imread('http://[IP_ADDRESS]/img/snapshot.cgi?');

%easyn camera:
%example: image =
%  imread('http://192.168.0.101:81/snapshot.cgi?')
image = imread('http://[IP_ADDRESS]/snapshot.cgi?')
```

We have had issues where the above url's worked in the browser, but not through MATLAB, if this is the case, then pass the camera's username and password as part of the url in order to capture an image:

```
image =
imread('http://[IP_ADDRESS]/snapshot.cgi?user=admin&pwd=&resol
ution=16&rate=0');
```

2) Display a captured Image:

```
imshow(image);
```



3) Index layers on an image

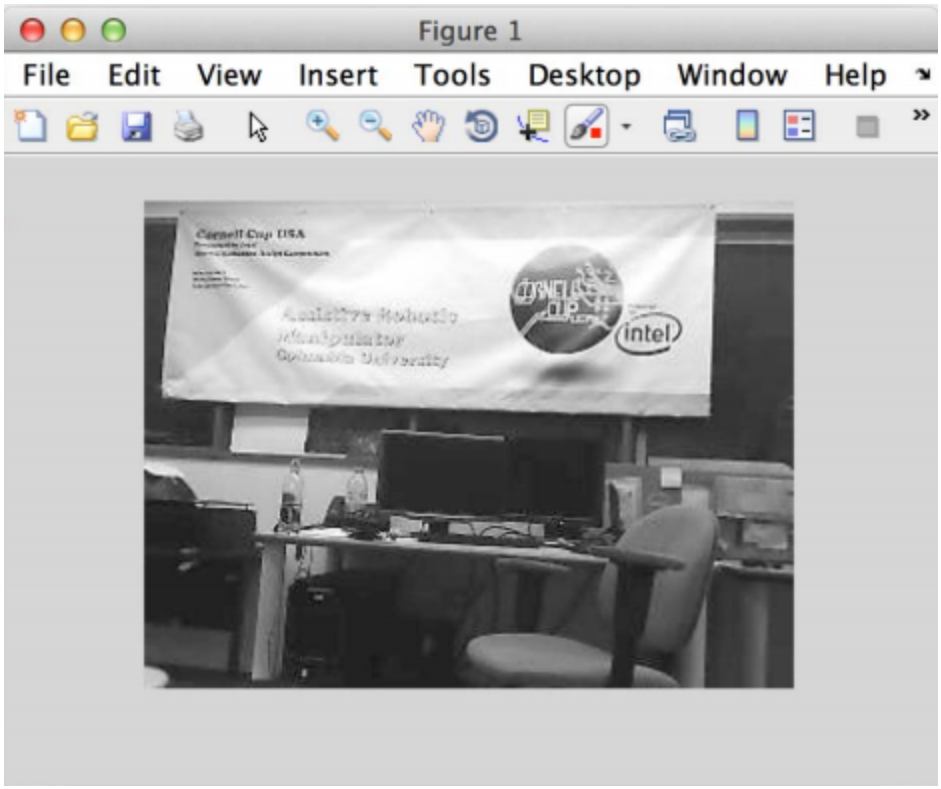
```
red_layer = image(:, :, 1);
green_layer = image(:, :, 2);
blue_layer = image(:, :, 3);
```

4) Find the resolution of the image

```
resolution = size(image);
resolution = resolution(1:2);
```

5) Convert an RGB image to Grayscale

```
gray_image = rgb2gray(image);
```



6) Draw on an image

```
draw_image = image;
draw_image([50:100], [50:100], :) = 0;
```

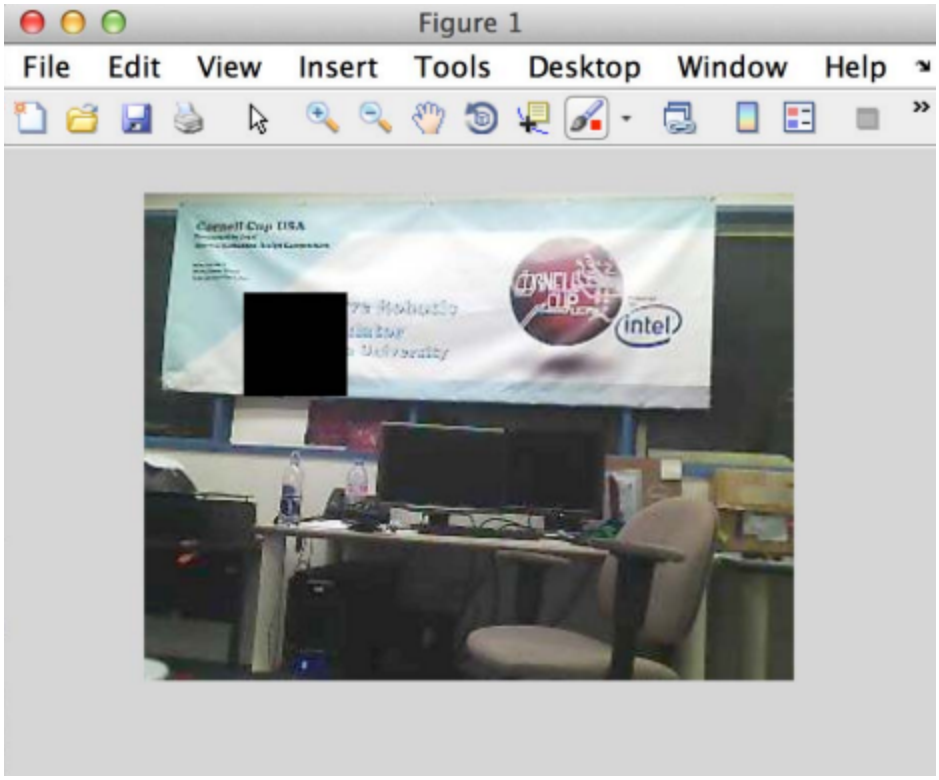


Figure 1
File Edit View Insert Tools Desktop Window Help
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