How to build a Loc camera with panning.

Document created 3-6-2020

Rev A: 9-6-2020 – hardcoded WIFI credentials are replaced with log-on box.

Rev B: 19-6-2020 – code changes – and detailed setup and configurations for Blynk and ESP8266

Rev C: 21-11-2020 – code moved from this document to GitHub.

https://github.com/JensKrogsgaard/cameraWaggon/blob/main/Cube_Camera_Pan_V4.ino

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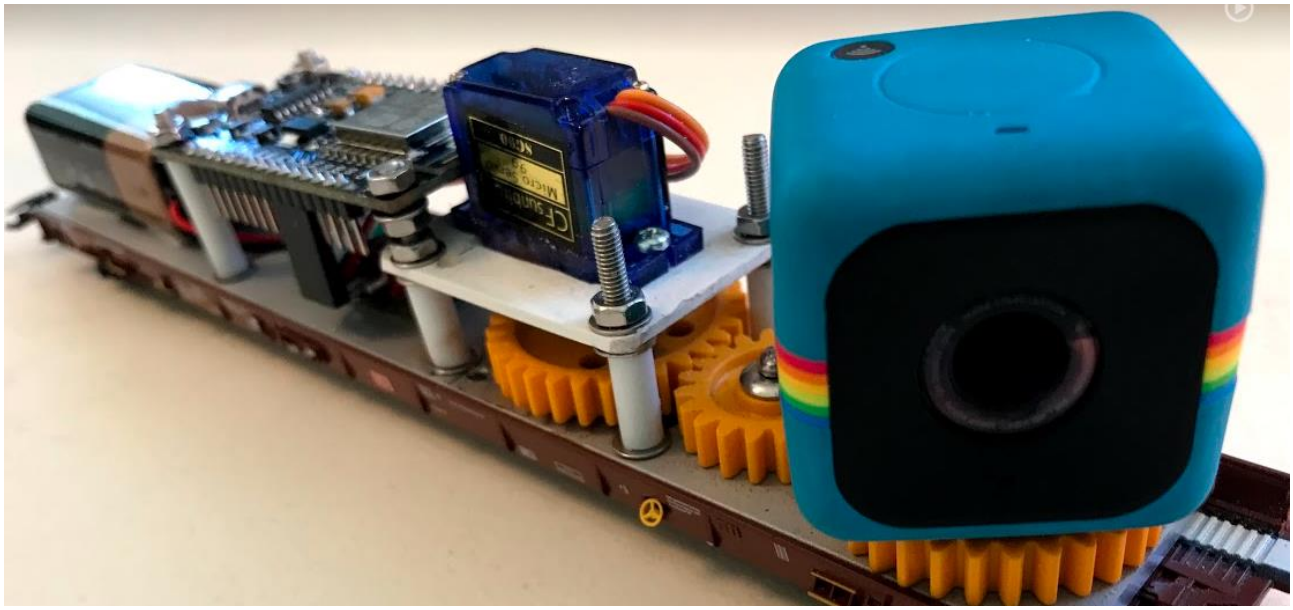
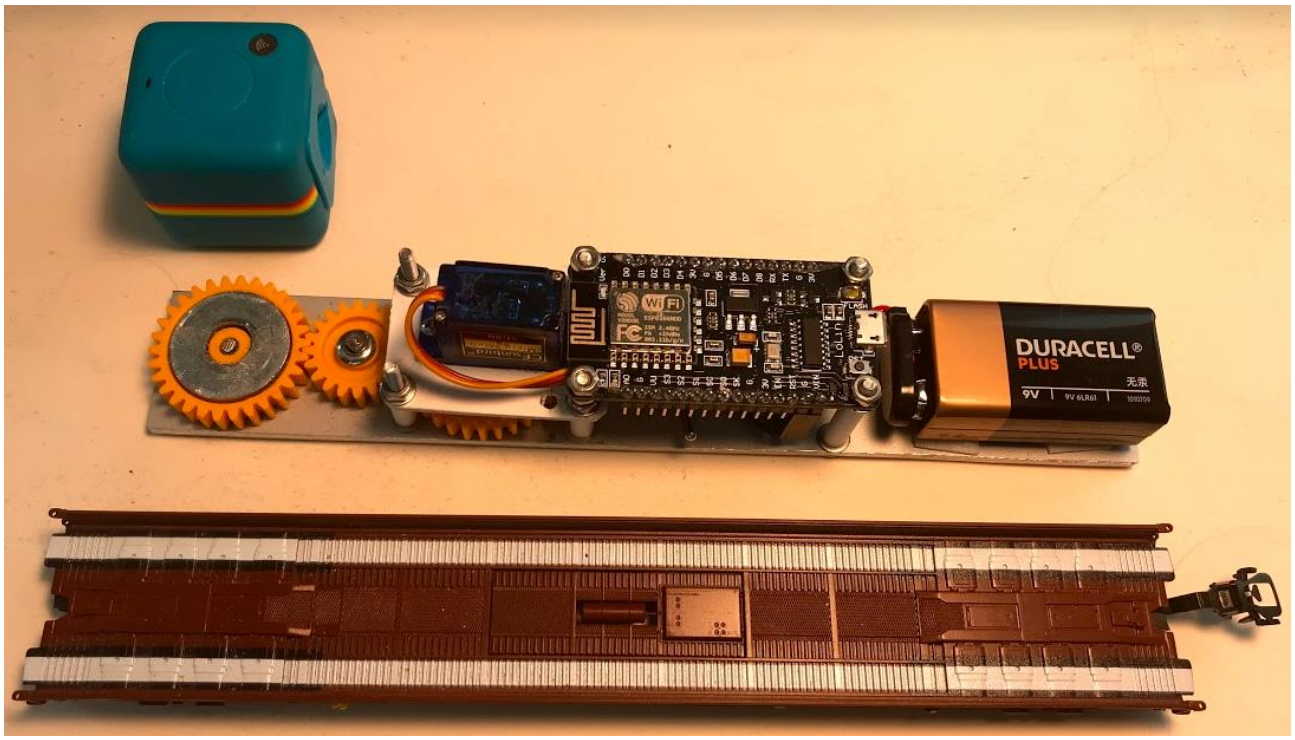


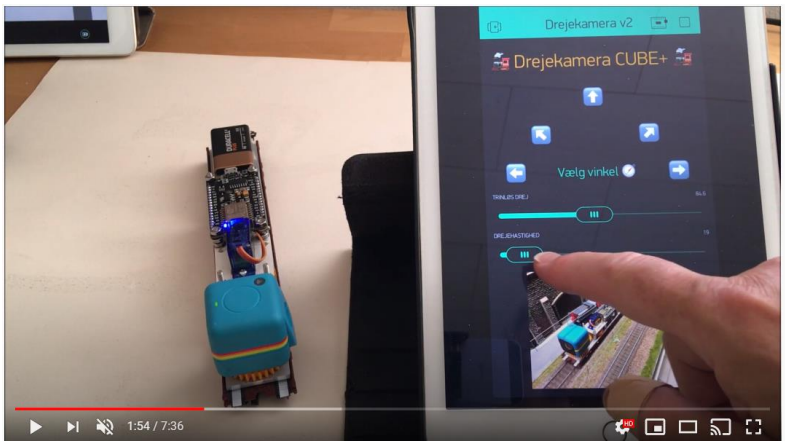
Content

1 Summary

This document contains a description of how I designed and programmed a camera wagon. The camera can pan and it is controlled by an ESP9266 Node MCU. To operate the camera, I have made an a Blynk app.



Check the YouTube video regarding this project: - click on the picture to start the video



1.1 Construction of the wagon

1.1.1 Bottom plate

Metal plate – 31 x 200 x 3 mm. The weight of the plate stabilizes the wagon when driving

Bought in Bauhaus and cut out.

The bottom plate is designed to match the wagon from Rollende Landstraße / Rolling Road

1.1.2 Gear

I have used 3 gear-wheels:

- wheel 31,5 mm
- 1 wheel 21,5 mm is used.

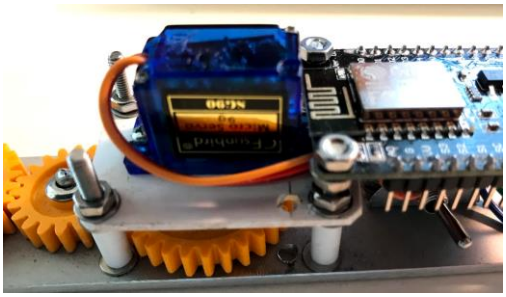
Bought at Conrad.de: https://www.conrad.de/de/search.html?search=237663

Shafts 4 mm – bought at bauhaus

Glue a metal disc onto the gear-wheel to carry the camera - check that it is magnetic

1.1.3 Servomotor

https://www.elextra.dk/details/H34768/servomotor-mikro-3-72vdc-120ms-60-9g



The servo is mounted on a 31 x 44 x 2 mm plastic plate

The screws are 3 mm - from the Bauhaus. The bushings are plastic tubes.

1.1.4 ESP8266 – Node MCU

https://www.conrad.de/de/p/joy-it-entwickler-platine-node-mcu-esp8266-wifi-1613301.html

1.1.5 Power supply

I have used a 9V battery - Here you might consider a different solution so you don't have to change the battery.

A toggle switch to disconnect battery power is also necessary.

1.1.6 Camera

Polaroid Cube+ - wifi.

Unfortunately, it does not appear to be available anymore

Polaroid Cube+ 1440p Mini Lifestyle Action Camera with Wi-Fi & Image Stabilization (Black)

by Polaroid

420 ratings | 143 answered questions

Available from these sellers.

Color: Black

1 option from $251.88 | 4 options from $70.00 | 2 options from $119.02

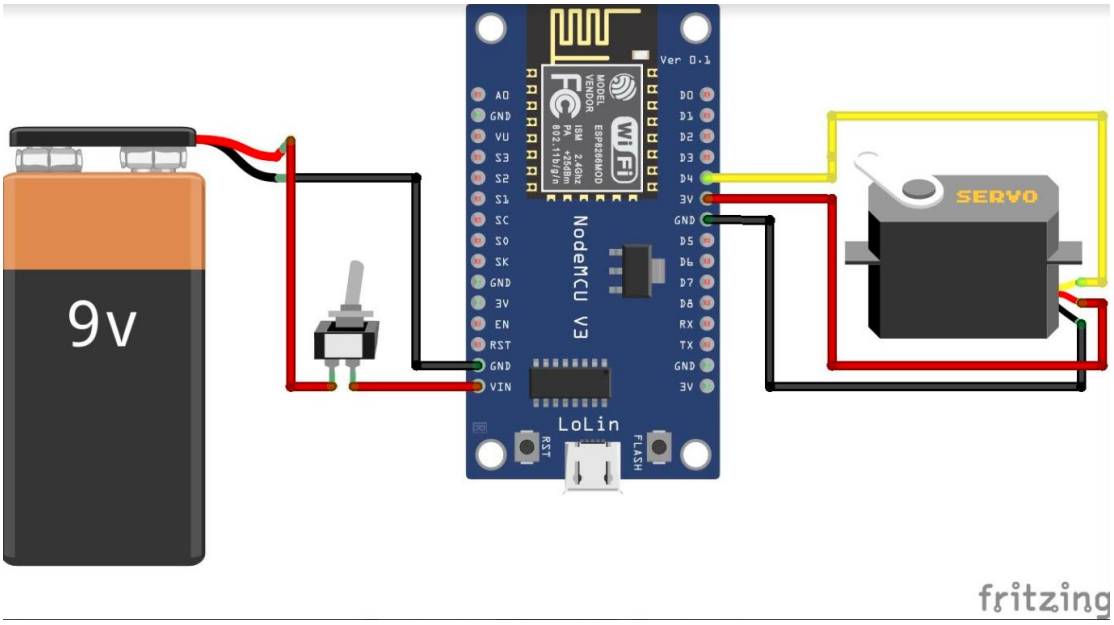
- World's Funnest, Cutest Lifestyle Action Camera in Light & Tiny Cubic Package
- NEW! Wi-Fi + FREE App; Shoot, View, Save, Print & Share with Your Mobile Device
- 8MP still images; Selectable 1440p / 1080p / 720p Video Rate; Full Image & Video Stabilization
- Built-In Rechargeable Battery for up to 107 Minutes of Continuous Recording Per Charge
- 124° Wide-Angle Lens; Magnetic/Clip Mounting Options; Includes MicroSD Card & Polaroid Bumper Case

There is a newer model of this item:

Polaroid Cube+ Live Streaming 1440p Mini Lifestyle Action Camera with Wi-Fi & Image Stabilization (Black)

Currently unavailable.

1.1.7 Connect Node CMU with servo and battery



The servo with its three wires is connected in this way:

- Yellow – signal – D4
- Red – 3v
- Black – Ground

The battery is connected to GND and VIN

1.2 BLYNK – app

Here there are two options:

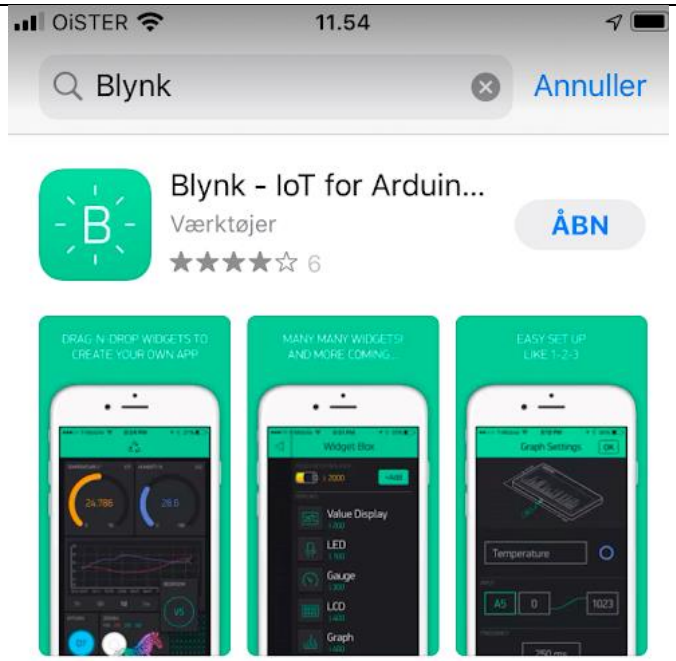
- Import a copy of my Blynk app
- Make your own Blynk-app from scratch

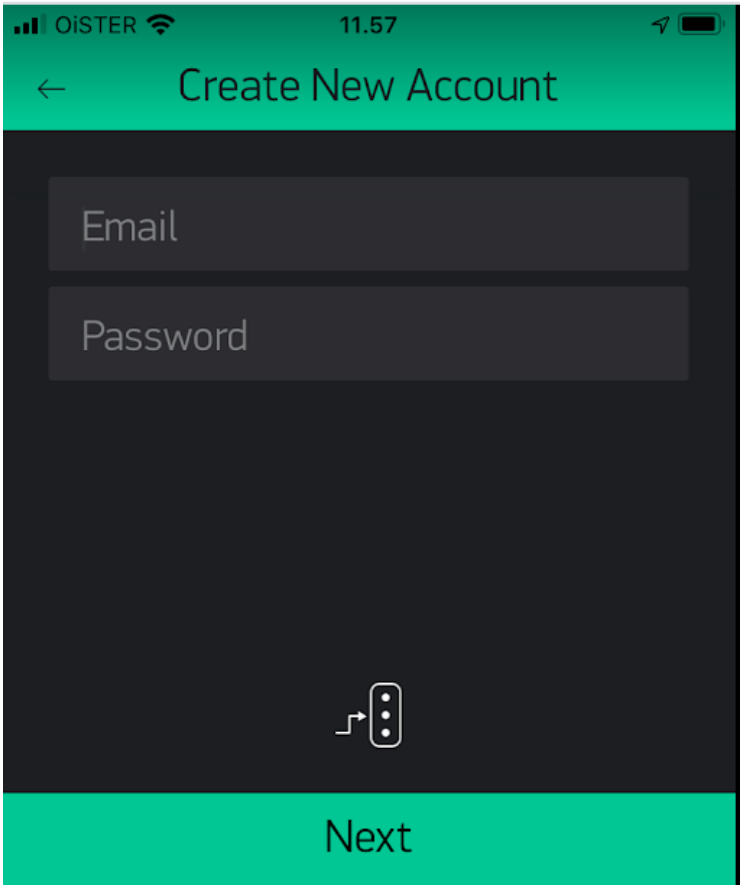
These two options are described in the next two chapters.

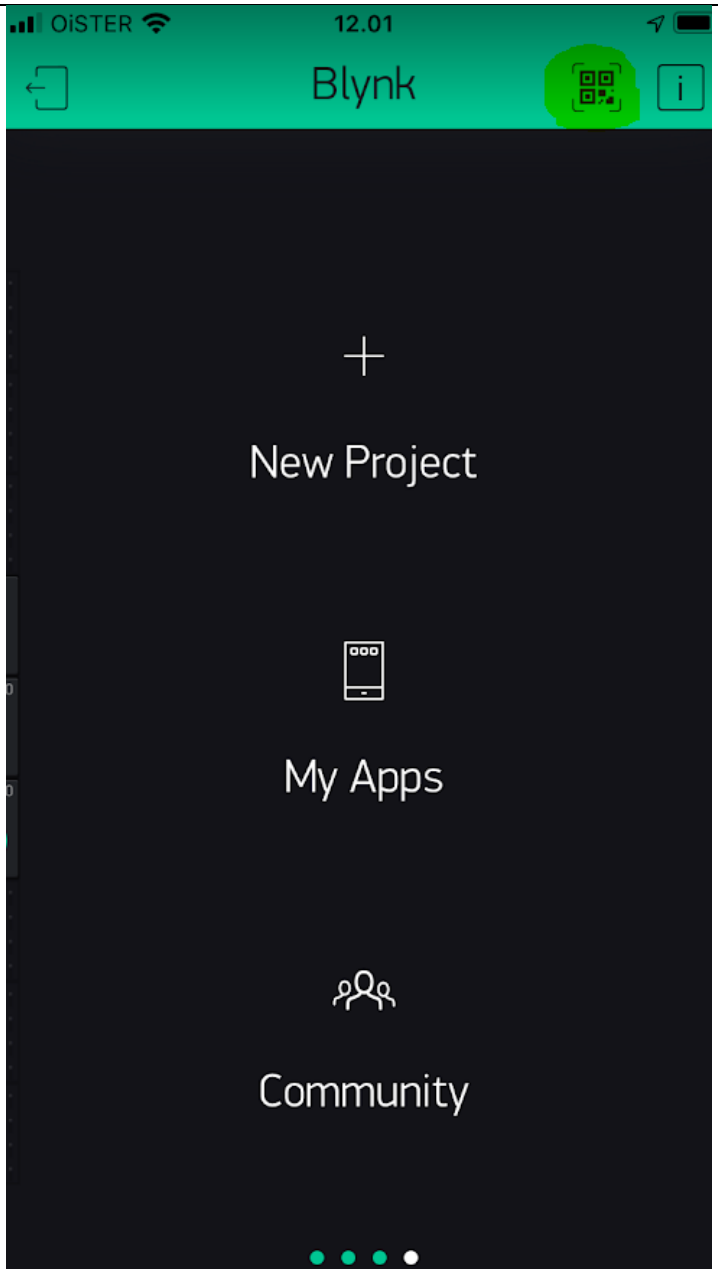
1.2.1 Import a copy of my Blynk app.

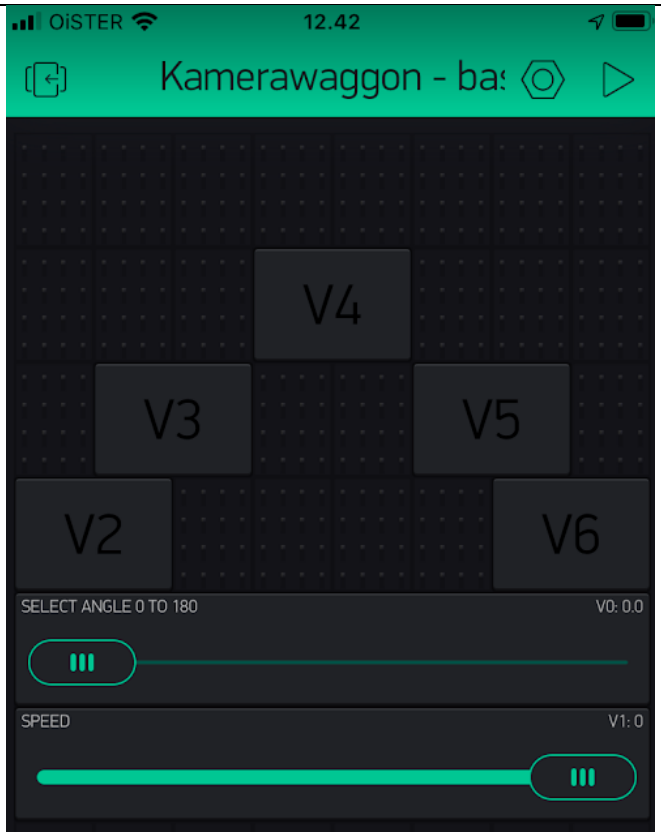
Follow the guide below step 1 to 5 to import a full functional copy of my app.

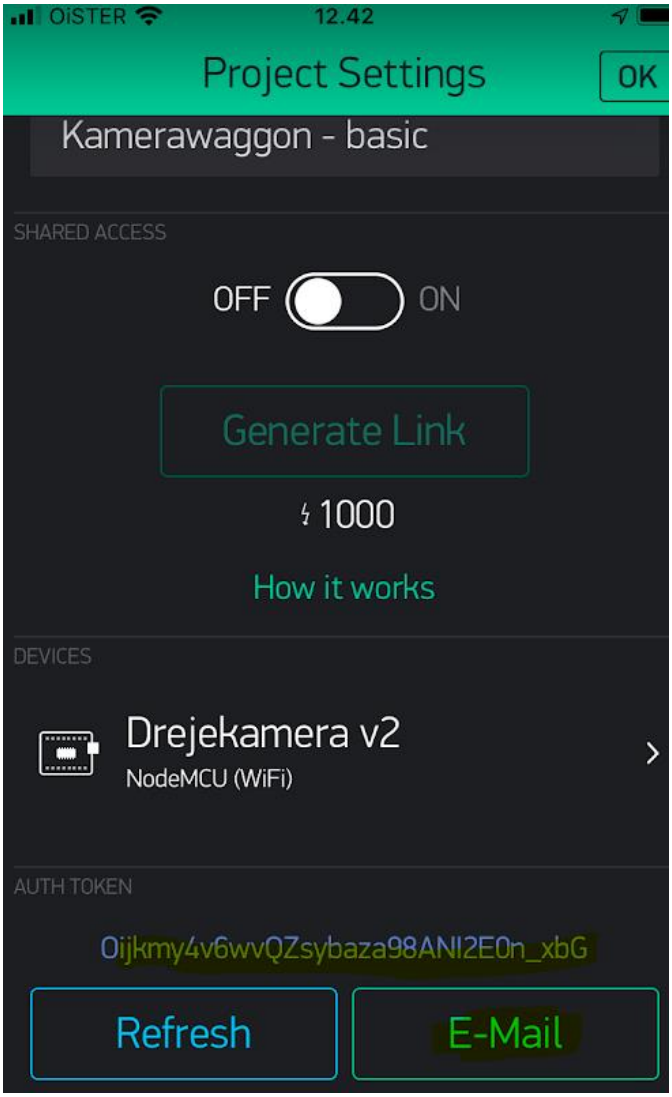
When you have imported my Blynk app – you can make all the changes to it that you want.

Step No	Description	Clip
1	Install Blynk – app on mobile	 Install the App – it is free.

Step No	Description	Clip
2	Create an account	

Step No	Description	Clip
3	Import project	 Press the QR-Code – button – and scan this code

Step No	Description	Clip
4	Check the project. The project 'Kamerawaggon – basic' should now have been imported. This is the basic project with functionality to operate the servo. You kann change it – add extra texts – buttons and pictures. To do that you must buy more' Energy' – I have bought for 59 dk – it is 7-8 Euro. You can start with this basic app – and see how it works.	
5	Get the Blynk Token	To get the Blynk-token – press this button

Step No	Description	Clip
		  Now you can see your Token – it is NOT the same as shown on the picture above. Presse the E-mail-button – and your token will be email'ed to you.

1.2.2 Make your own Blynk-app from scratch

Follow the guide below if you want to make your own Blynk app – and not a copy of my app. See previous chapter.

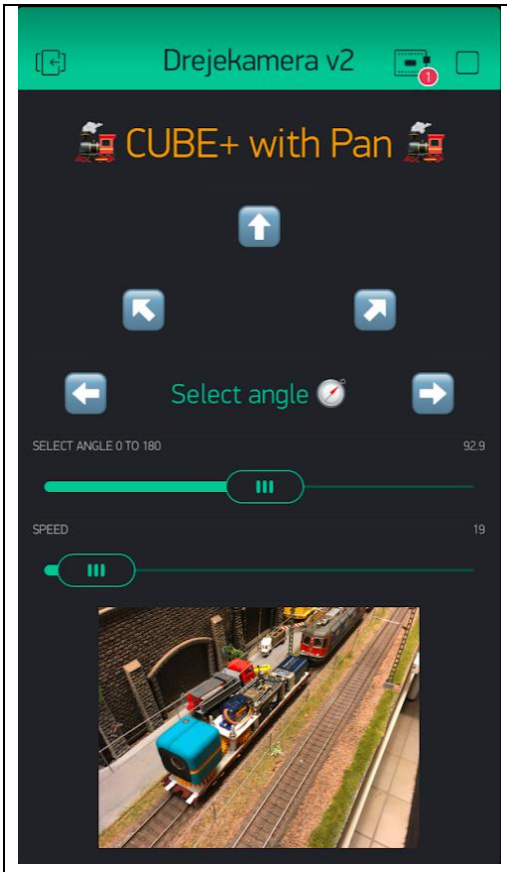
There are many videos on YouTube describing how to work with Blynk.

Take a look at this video: https://www.youtube.com/watch?v=EYrEjC3QEew&t=8s

Install the Blynk app on your Mobile or iPad and follow the instructions in the video above.

Make sure to get the authorization code – you shall use it later.

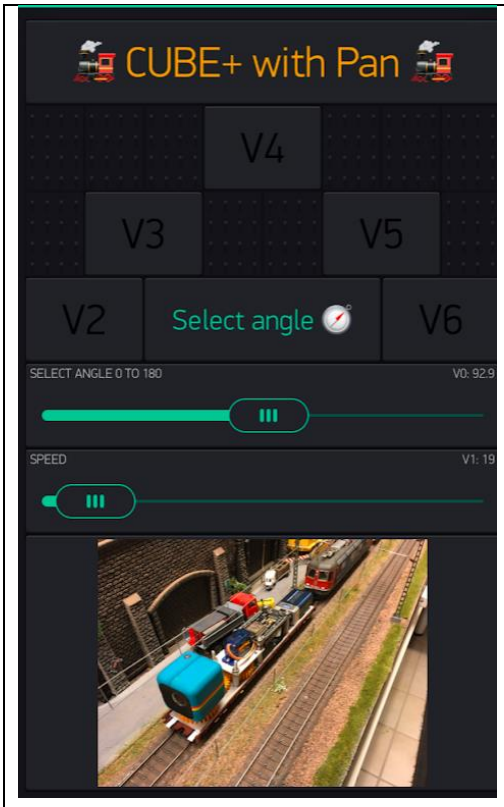
Below a description of the Blynk app to control the Servo:



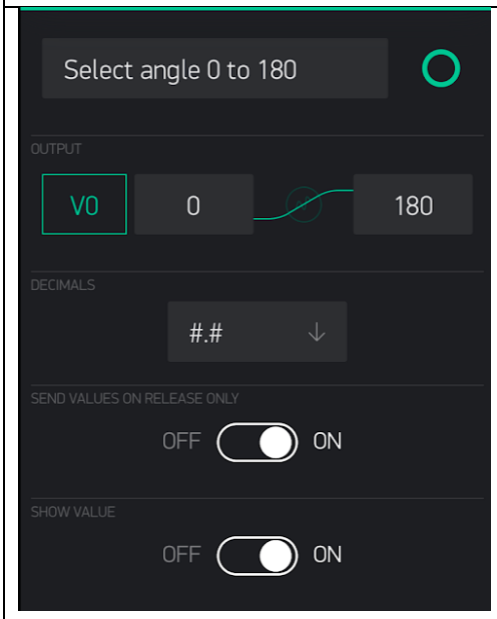
This is the finished application.

There are 5 buttons with arrows and 2 horizontal sliders.

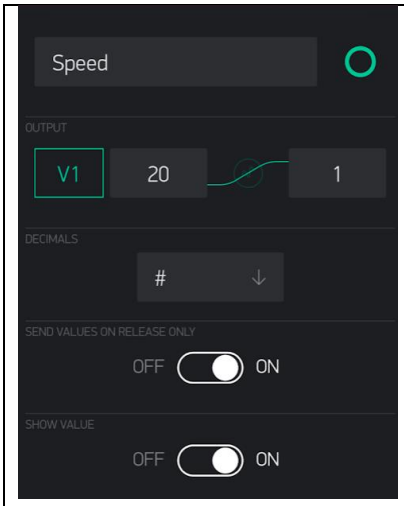
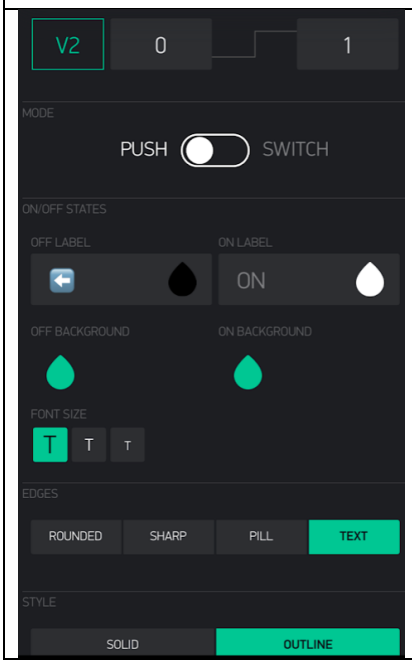
The other elements are just texts and pictures - you can compose them as you like.

<table>
<tr>
<td> 
</td>
<td>This is Design view.

Each of the sliders and the angle-buttons have a virtual pin.

• V0 – select angle slider
• V1 – speed slider
• V2 – 0 degree
• V3 – 45 degree
• V4 – 90 degree
• V5 – 135 degree
• V6 – 180 degree</td>
</tr>
<tr>
<td> 
</td>
<td>Detail for: The Select angle slider.

The values are 0 to 180</td>
</tr>
</table>

	Detail for: The select speed slider NB: the values goes from 20 to 0 The speed is implemented as an delay in milliseconds between each change of degree. Example – go from 45 to 90 degree. We loop from 45 to 90 – that is 45 steps. In each step we have a delay – if the value of the is small – for example 5 – then the speed is fast. If the delay is high – for example 18 – then the speed is slow
	Detail for: This is button 0 degree – V2. The other 4 buttons are identical – of course another pin (v3 – v4 – v5 – v6) and another label

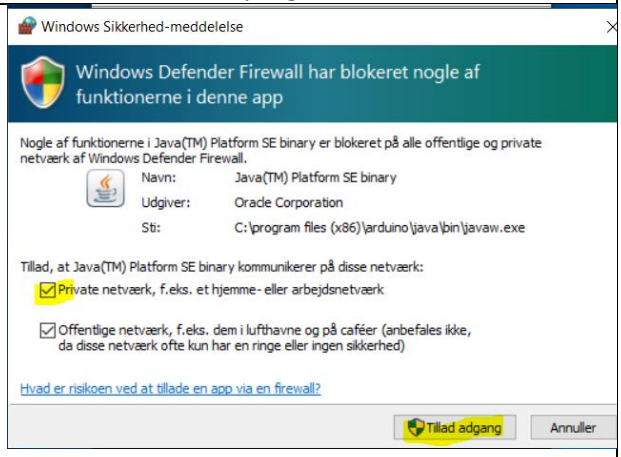
1.3 Coding the Node MCU – ESP8266

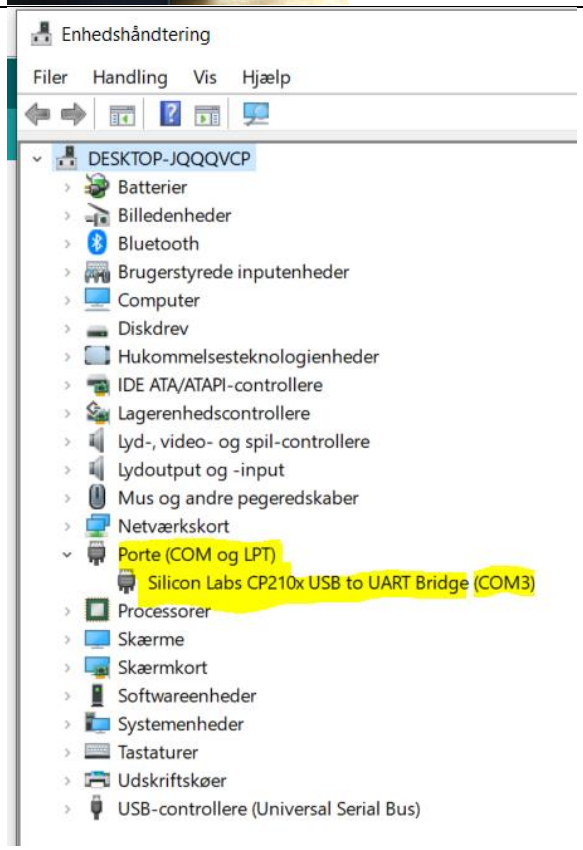
Coding of the Node MCU is done in the Arduino environment. First you must configure the Arduino IDE – and the compile the code and send it to the ESp8266.

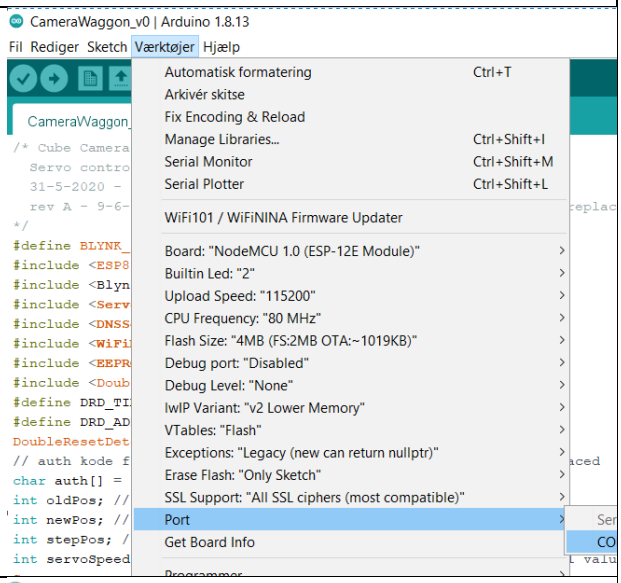
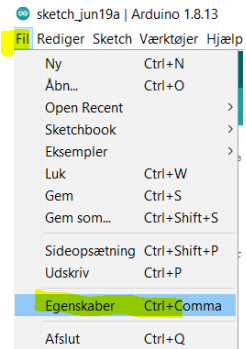
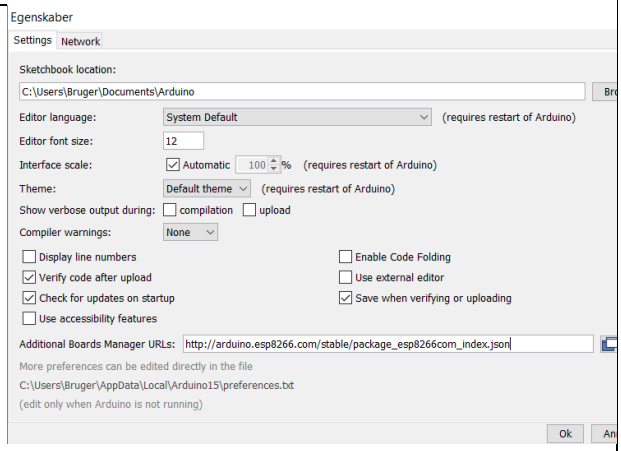
If you are new in Arduino coding you might want to have a look on this video:

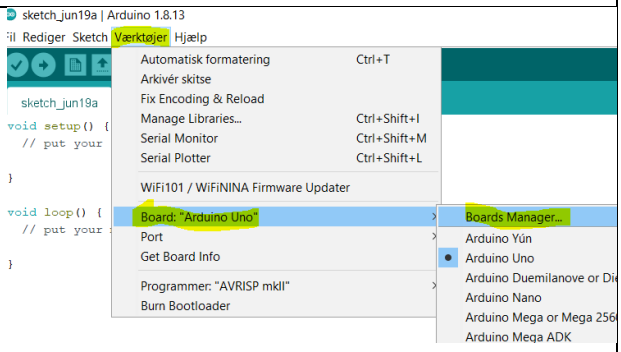
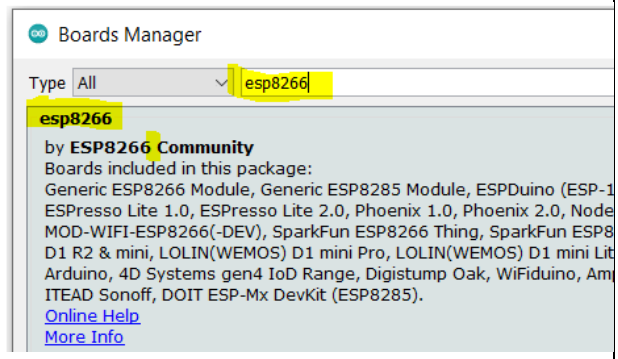
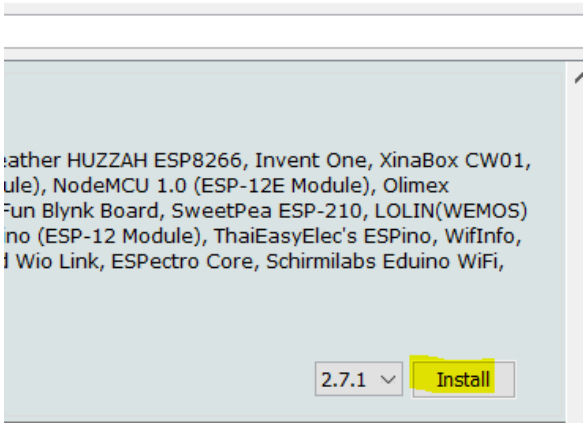
https://www.youtube.com/watch?v=p06NNRq5NTU&t=331s

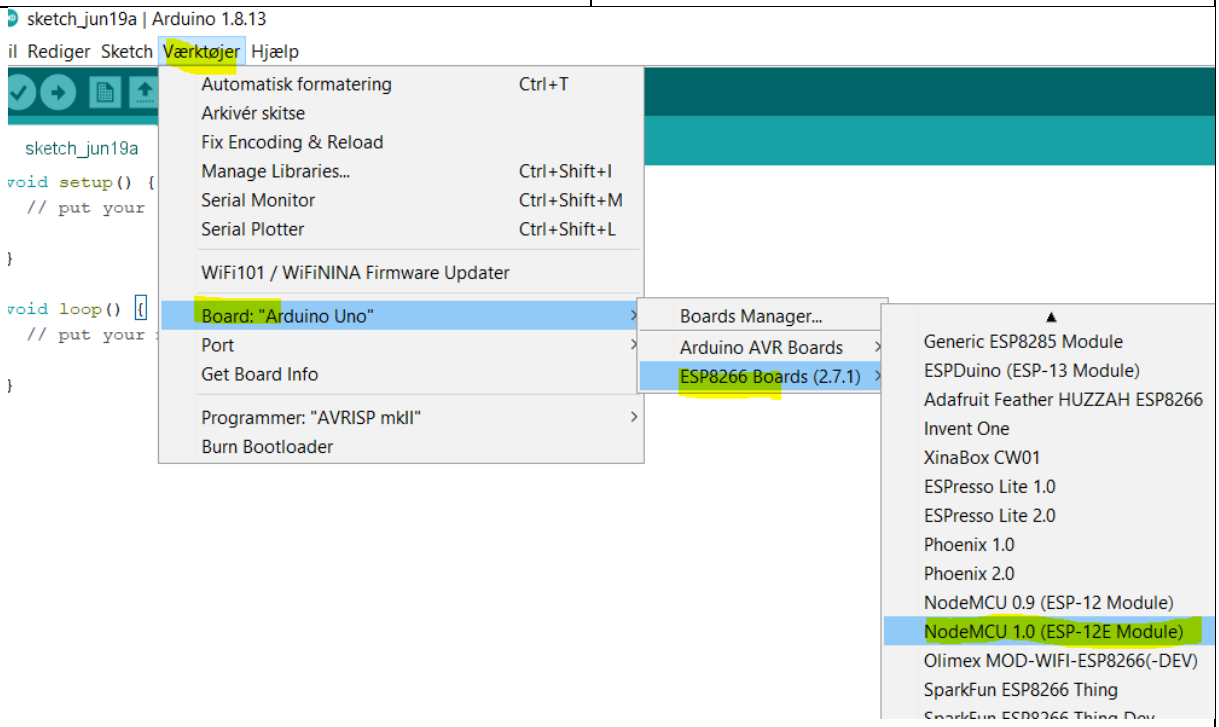
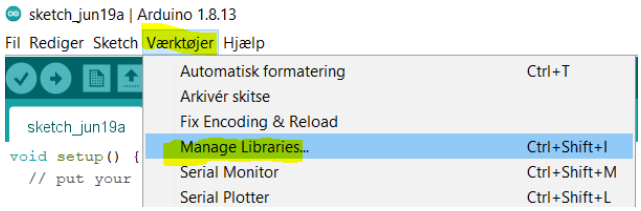
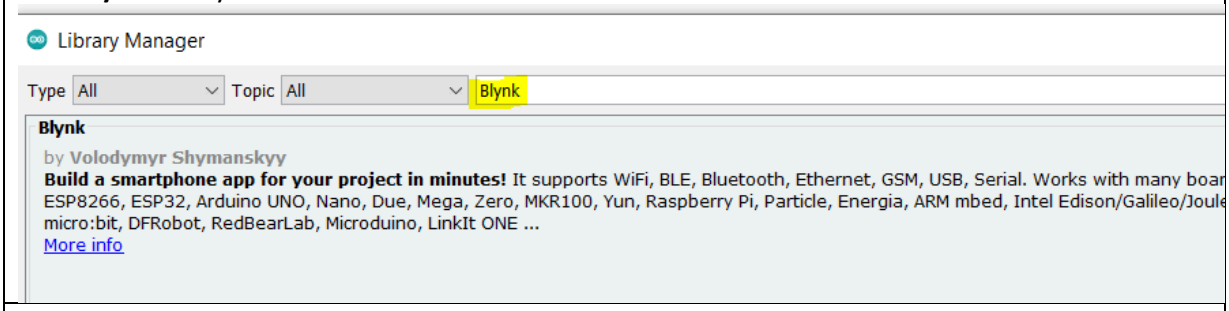
Follow the guide below to code the Node MCU – step 1 to 14.

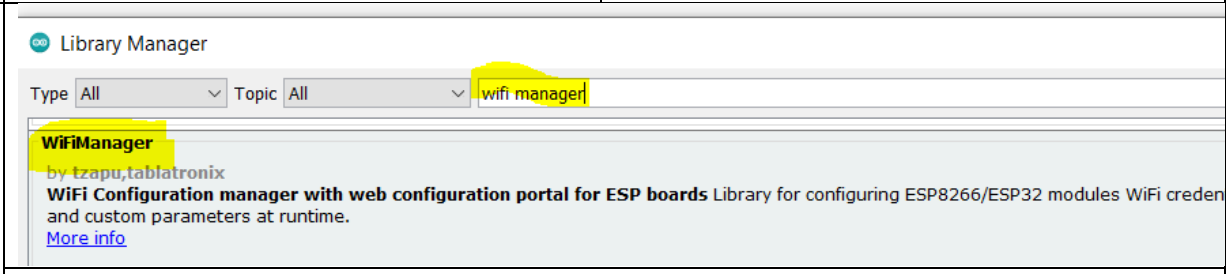
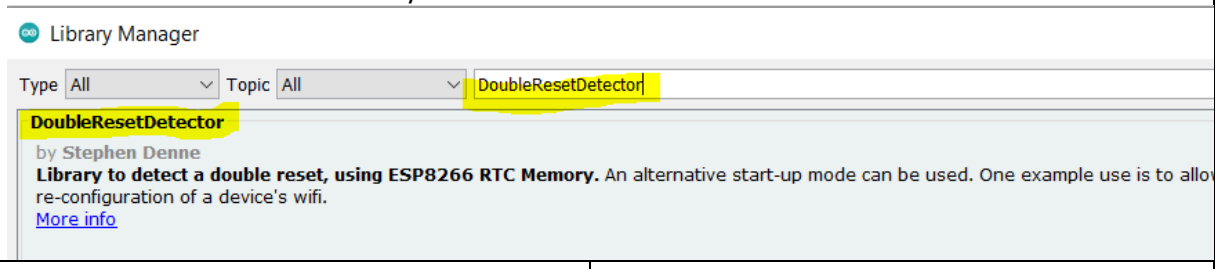
Step No	Description	Clip
1	Install Arduino https://www.arduino.cc/en/Main/Software	 Install the program  I have installed this program also
2	Start Arduino IDE form the desktop Icon	

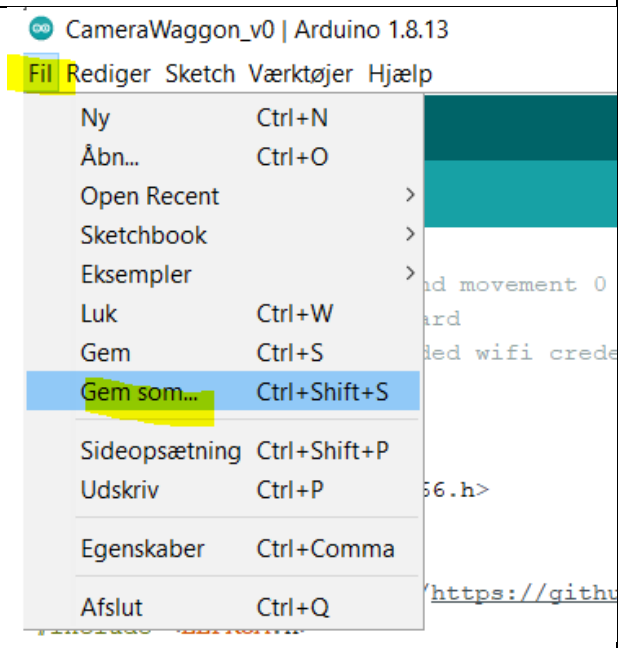
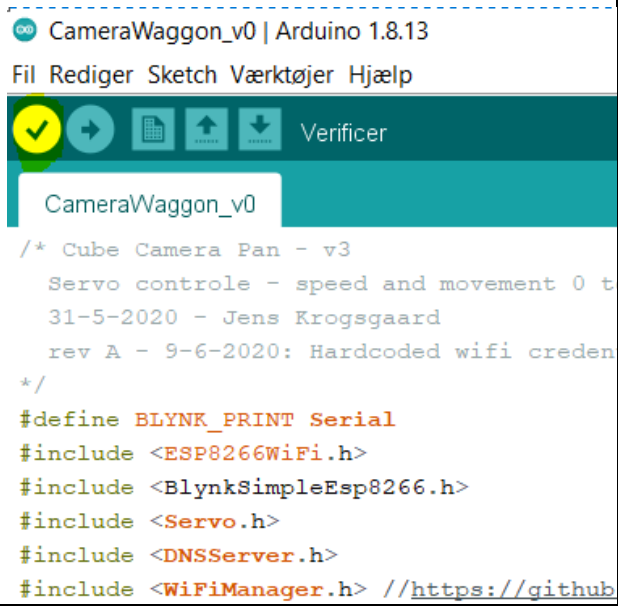
Step No	Description	Clip
3	Connect the ESP8266 to the PC with USB-cable	
4	Check com-port Open device manger – and check the com-port number. In this Example is et COM3	 Now choose this port in Arduino:

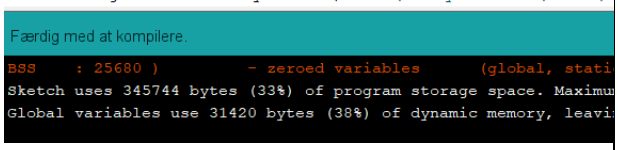
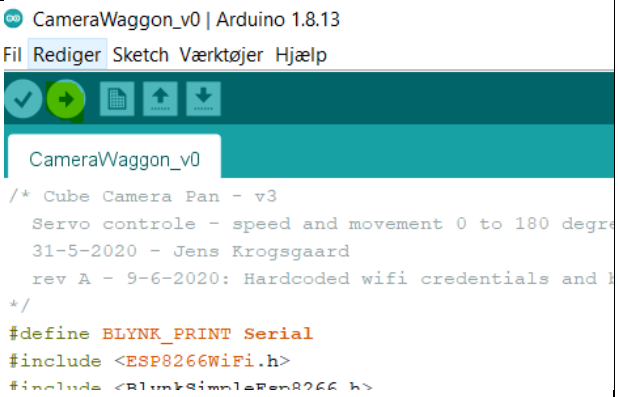
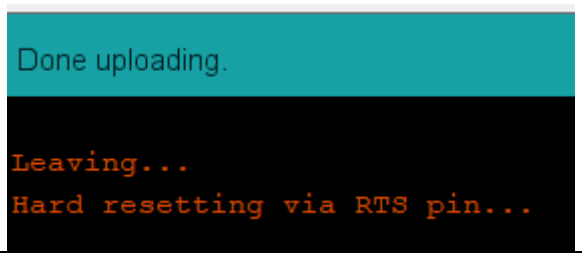
Step No	Description	Clip
		
5	Open Arduino IDE	
6	Install ESP8266 – board Choose File -> Properties – 	 Copy the URL for the line below to the "Additional boards Manager URL"
	http://arduino.esp8266.com/stable/package_esp8266com_index.json	

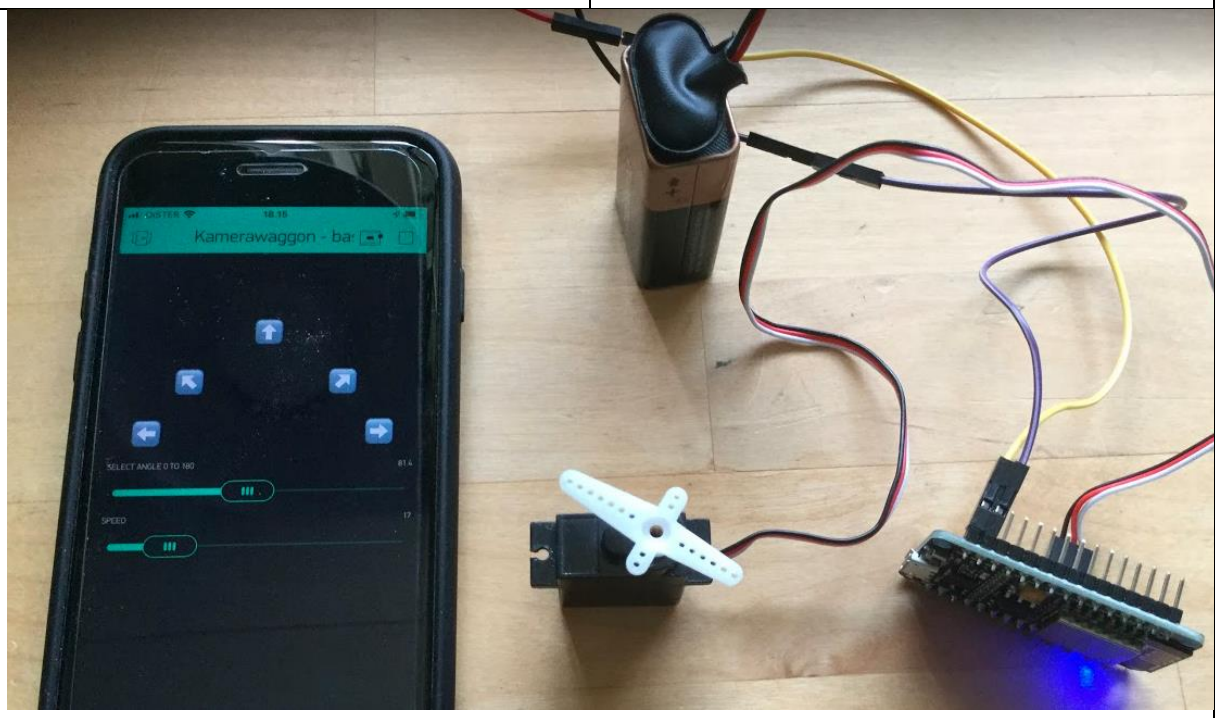
Step No	Description	Clip
7		 In the Board manager- search for esp8266 – now you should see esp8266 – as below   Now – hit the Install button
8	Choose the NodeMCU 1.0 board – as shown below	

Step No	Description	Clip
	
9	Add extra Libraries Go to this menu  Now you must add 3 Library's – choose the last version – and install them The 3 library's is listed below:	
	Find **Blynk** library – and install it 	
	Find **WiFimanager** library – and install it:	

Step No	Description	Clip
		
	Find **DoubleResetDetector** library – and install it 	
10	Remove existing code – and paste in the code	When you start Arduino – there are some line with codes – remove these lines  Now copy and paste in the code-lines rom GitHub. (see row below) Save the projects

Step No	Description	Clip
		 Choose a destination and name for the project
11	Copy in the Blynk-Token	In the Blynk installation – step 3 – you emailed the Blynk token. Now find this token and paste it into the code: That is – replace the yellow-marked text in the code above with your Blynk token. When you have done it save the project.
12	Compile the project	Press the Check/compile button 

Step No	Description	Clip
		If everything is OK- in the bottom of the screen you will now see this message:  This is Danish – in English it must be Finish compiling.. If there are errors they will belistet and you must correct them.
13	Send the code to the ESP8266	 If everything is OK – you will see this message in the bottom of the screen 
14	Test – test – test	

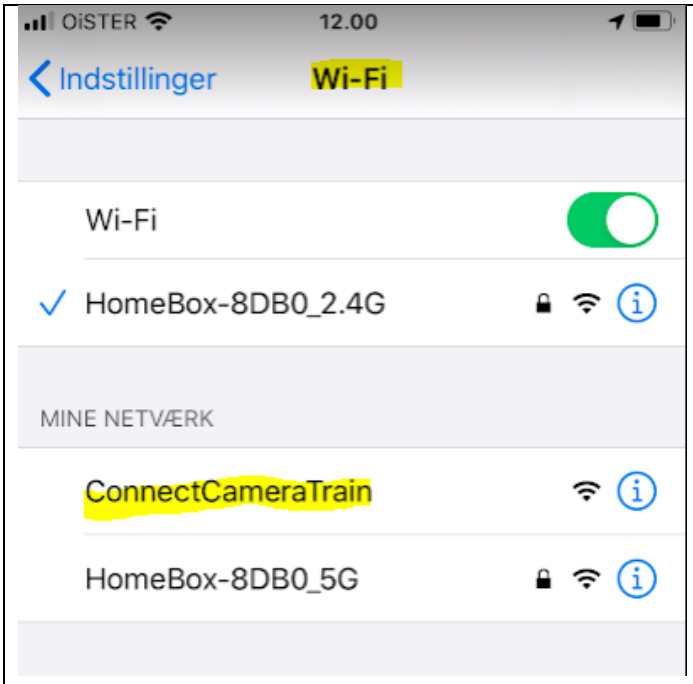
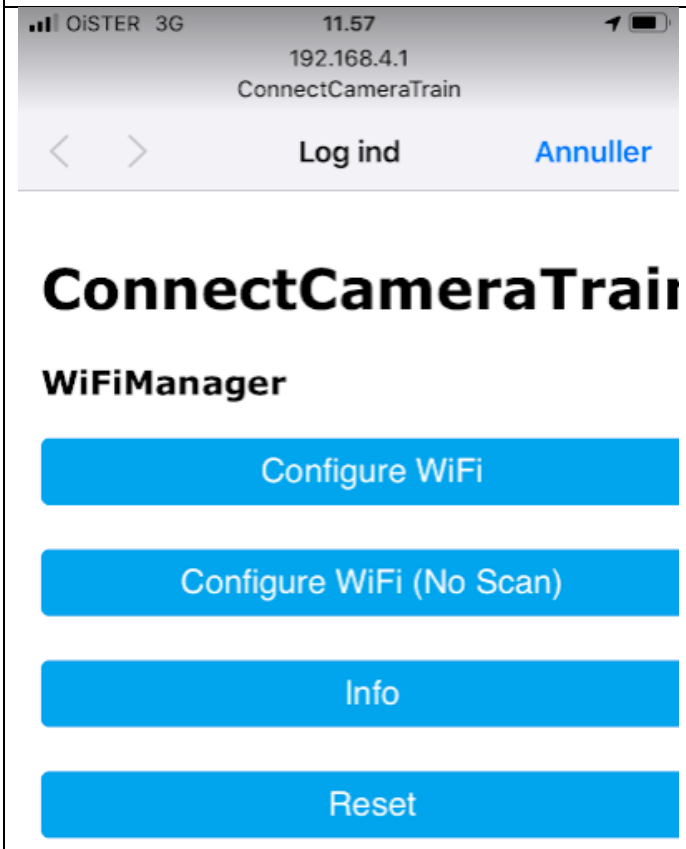
Step No	Description	Clip
	 If there problems connecting the Blynk app to the ESP8266 then take a look at the rest of this chapter.	

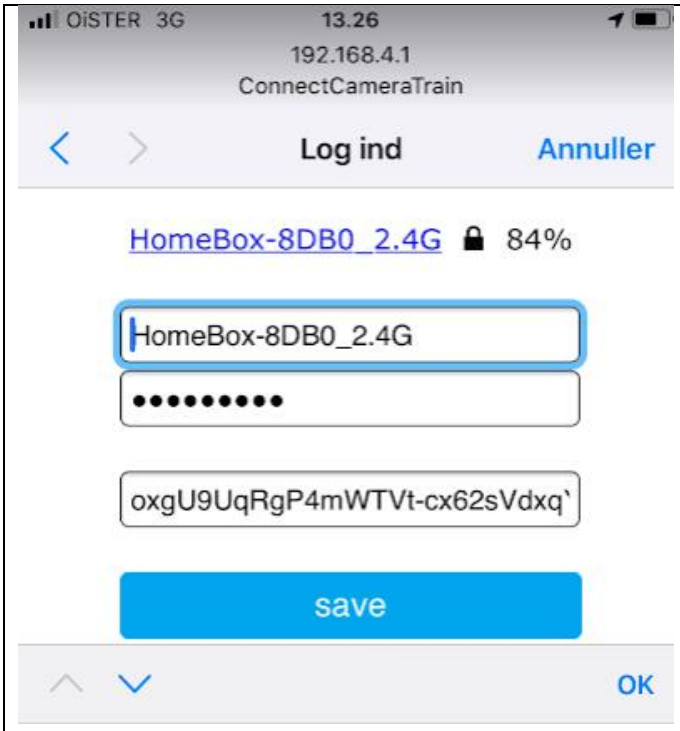
Follow this procedure to connect the Camera Train to your wifi-network – if it not connected automatically:

1 – Find your Blynk token – from mail or in the Blynk app. Copy this token to the clipboard

2 – Turn on the camera-train with the switch button.

3 – On your Mobile/Ipad or PC – find the hotspot ‘ConnectCameraTrain – and choose this hotspot. See Examples below

	Choose the hotspot ConnectCamaraTrain
	Choose the first button – 'Configure WiFi
	Choose your WiFI network and type in the password. The next field is for the Blynk Token (see previous chapter). Paste in this token here.

<table>
<tr>
<td> 
</td>
<td>Click Save.</td>
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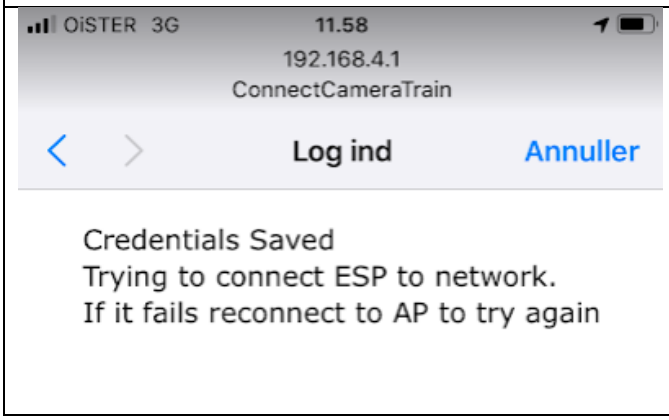
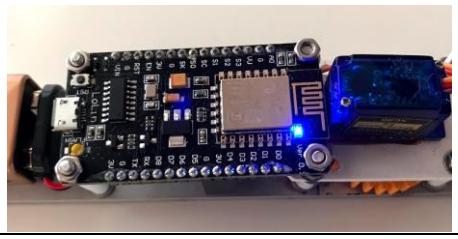
<td> 
</td>
<td>If everything is Ok – you should now see this massage (picture to the left) And there must be a blue-light on the ESP8266 – as shown below.
  </td>
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