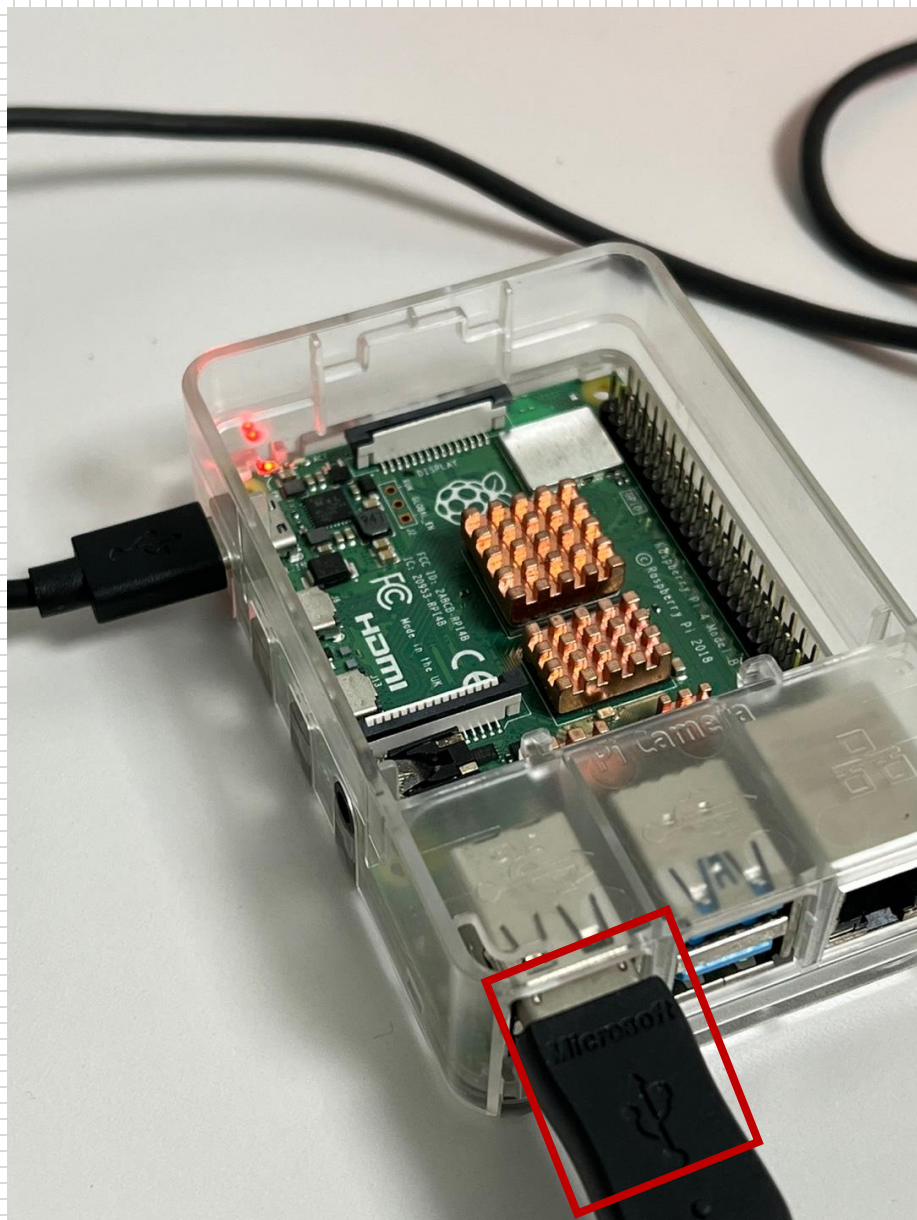


라즈베리파이 연결



웹캠 연결



1. Raspberry pi 안에 Node-Red 설치하기

<https://iotmaker.kr/iotbook-install-raspi-node-red/>

<https://reddb.tistory.com/123>

1). 최신버전으로 업데이트

```
sudo apt update
```

```
sudo apt upgrade
```

2). Node.js 설치

```
sudo curl -sL https://deb.nodesource.com/setup_16.x | sudo -E bash
```

```
apt list | grep nodejs
```

```
pi@raspberrypi:~ $ apt list | grep nodejs
WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

netdata-plugins-nodejs/stable 1.29.3-4 all
nodejs-doc/stable 12.22.12~dfsg-1~deb11u1 all
nodejs/unknown 14.20.0~deb-1nodesource1 armhf
```

```
sudo apt-get install nodejs
```

```
node -v
```

3). Node-red 설치

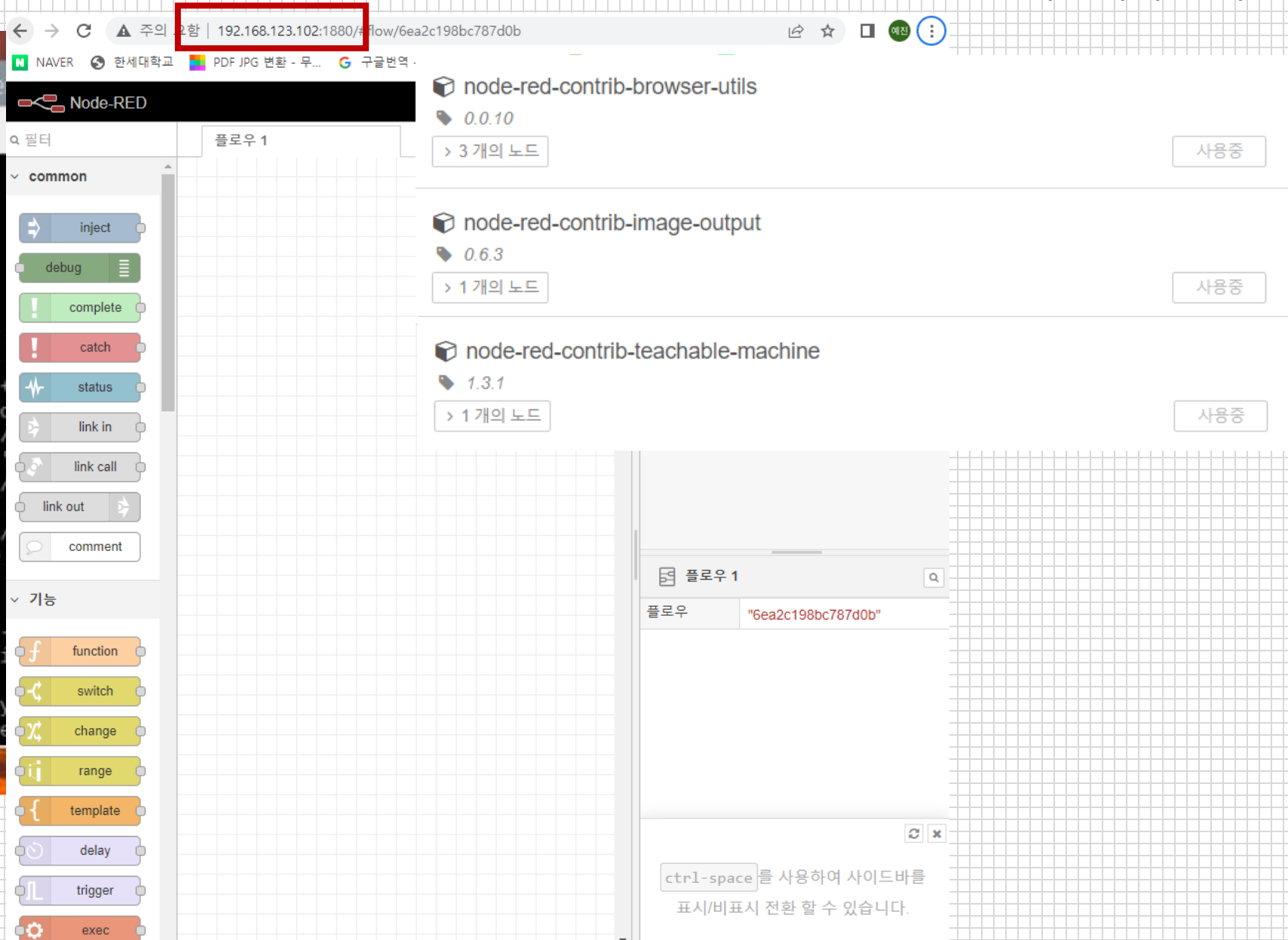
```
bash <(curl -sL https://raw.githubusercontent.com/node-red/linux-installers/master/deb/update-nodejs-and-nodered)
```

```
node-red-start
```

2. node-red-start 후

팔레트에서 설치

```
pi@raspberrypi:~$ node-red
31 Aug 17:16:01 - [info]
Welcome to Node-RED
=====
31 Aug 17:16:01 - [info] Node-RED version:
31 Aug 17:16:01 - [info] Node.js version:
31 Aug 17:16:01 - [info] Linux 5.15.32-v7l
31 Aug 17:16:01 - [info] Loading palette no
31 Aug 17:16:03 - [info] Settings file :
31 Aug 17:16:03 - [info] Context store :
31 Aug 17:16:03 - [info] User directory :
31 Aug 17:16:03 - [warn] Projects disabled
31 Aug 17:16:03 - [info] Flows file :
31 Aug 17:16:03 - [info] Creating new flow
31 Aug 17:16:03 - [warn]
-----
Your flow credentials file is encrypted us
If the system-generated key is lost for any
file will not be recoverable, you will have
```

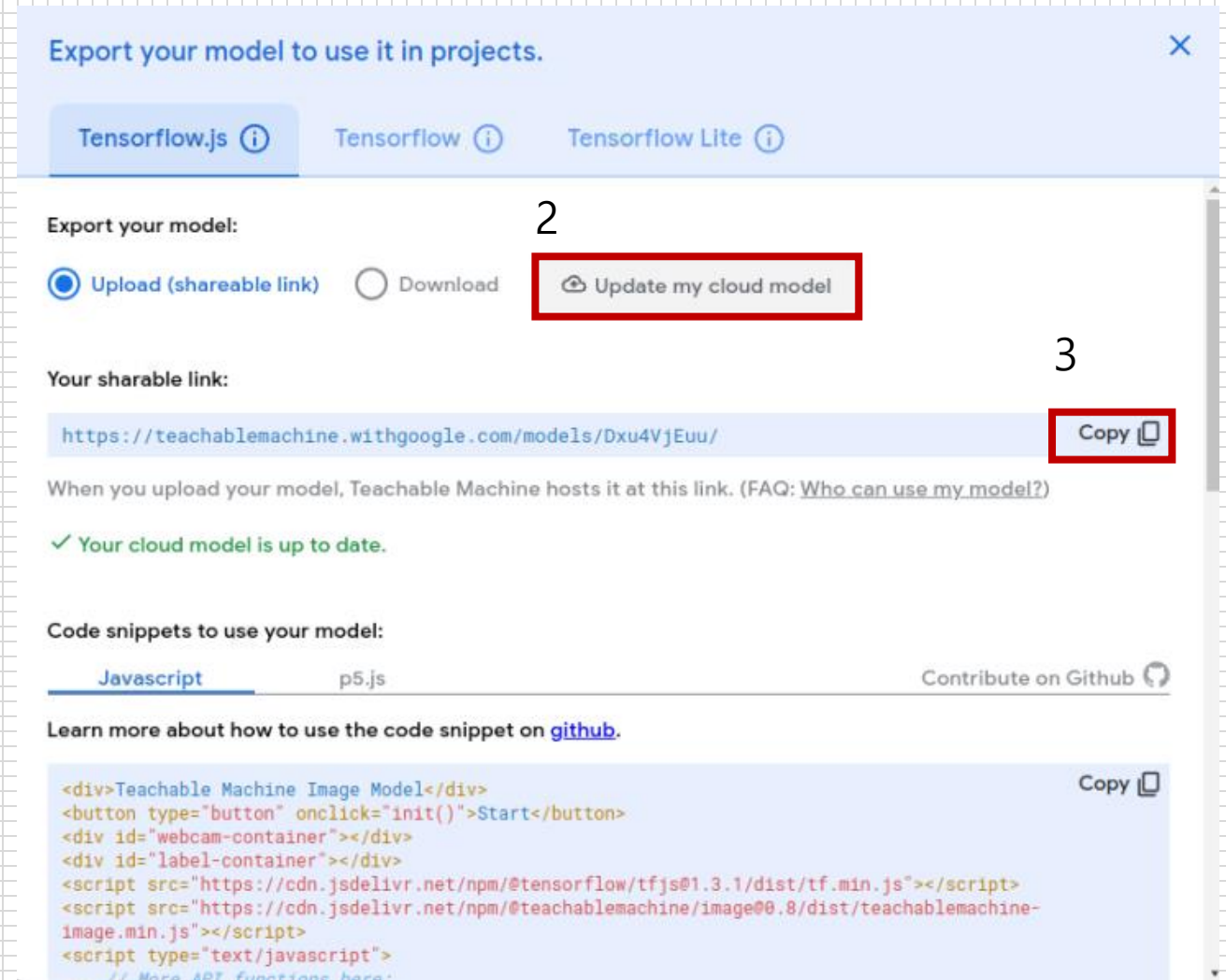
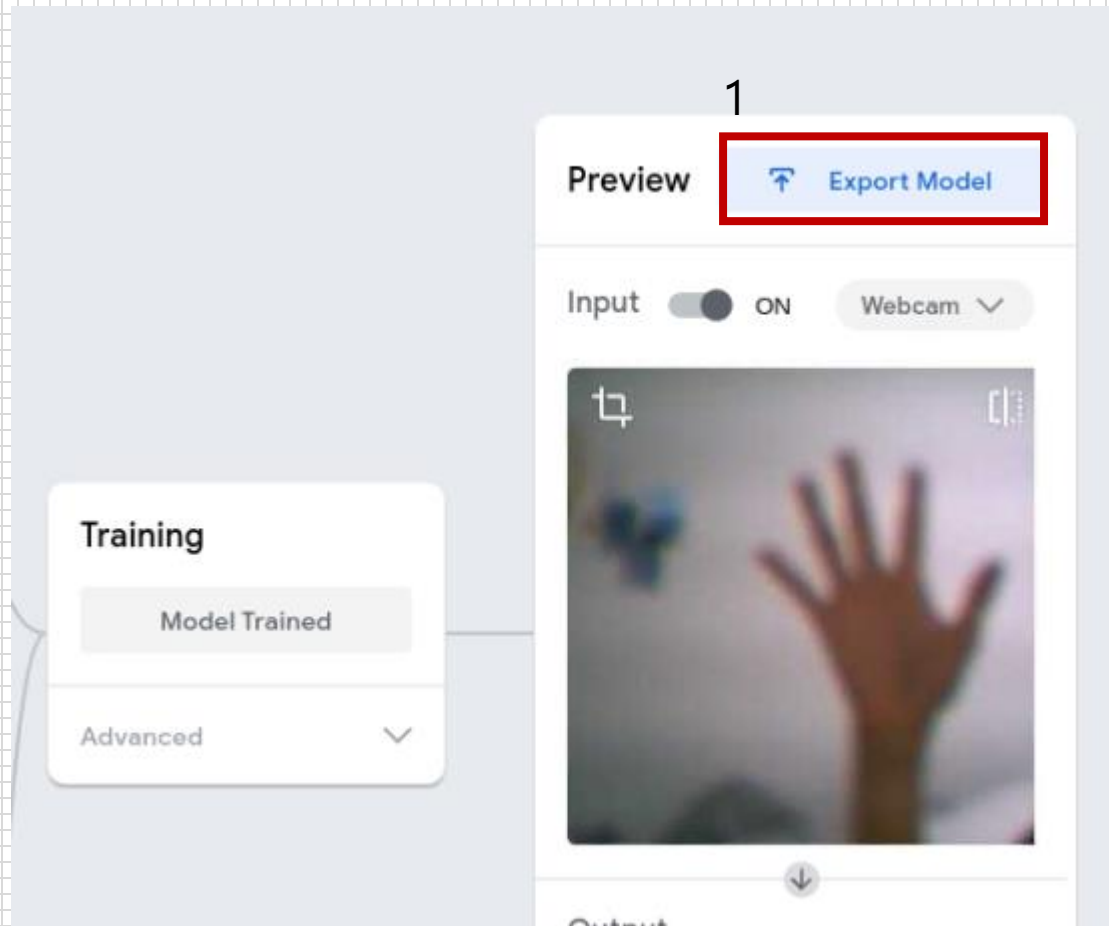


3. 티처블 접속 후 이미지 등록 -> Training하기

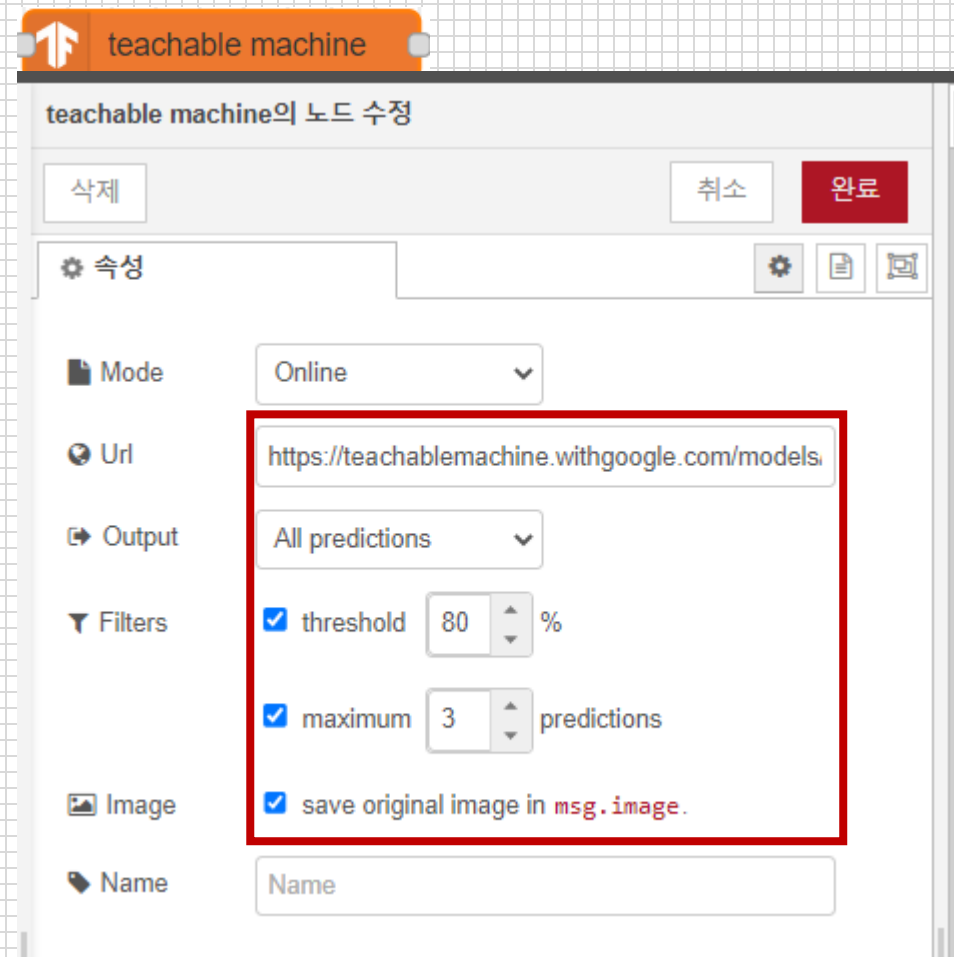
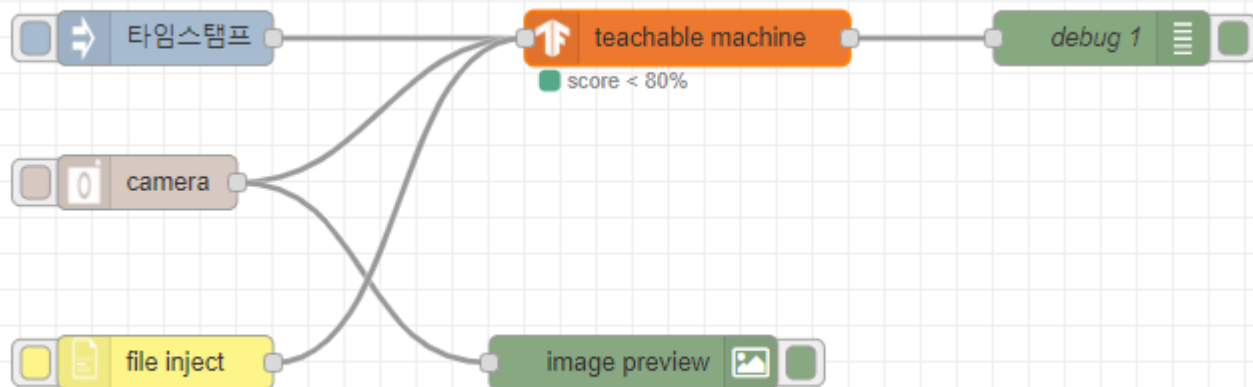
chablemachine.withgoogle.com/train/image

The screenshot displays the Teachable Machine web interface. At the top, the browser address bar shows the URL `teachablemachine.withgoogle.com/train/image`, which is highlighted with a red box and labeled with a '1'. Below the header, the 'Teachable Machine' logo is visible. The main workspace contains two class cards. The first card, labeled with a '3', has a class name 'v' in a red box. It shows '6 Image Samples' and includes 'Webcam' and 'Upload' buttons, both of which are also highlighted with red boxes and labeled with a '2'. The second card shows the class name 'five' and '7 Image Samples'. To the right of these cards is the 'Training' panel, labeled with a '4', which features a 'Train Model' button highlighted with a red box. Further right is the 'Preview' panel, which contains an 'Export Model' button and a message: 'You must train a model on the left before you can preview it here.' At the bottom of the workspace, there is a dashed box with the text 'Add a class'. The bottom right corner of the interface shows a language dropdown set to 'English' and a version string 'release-2-4-5 - 2.4.5#18d7c1'.

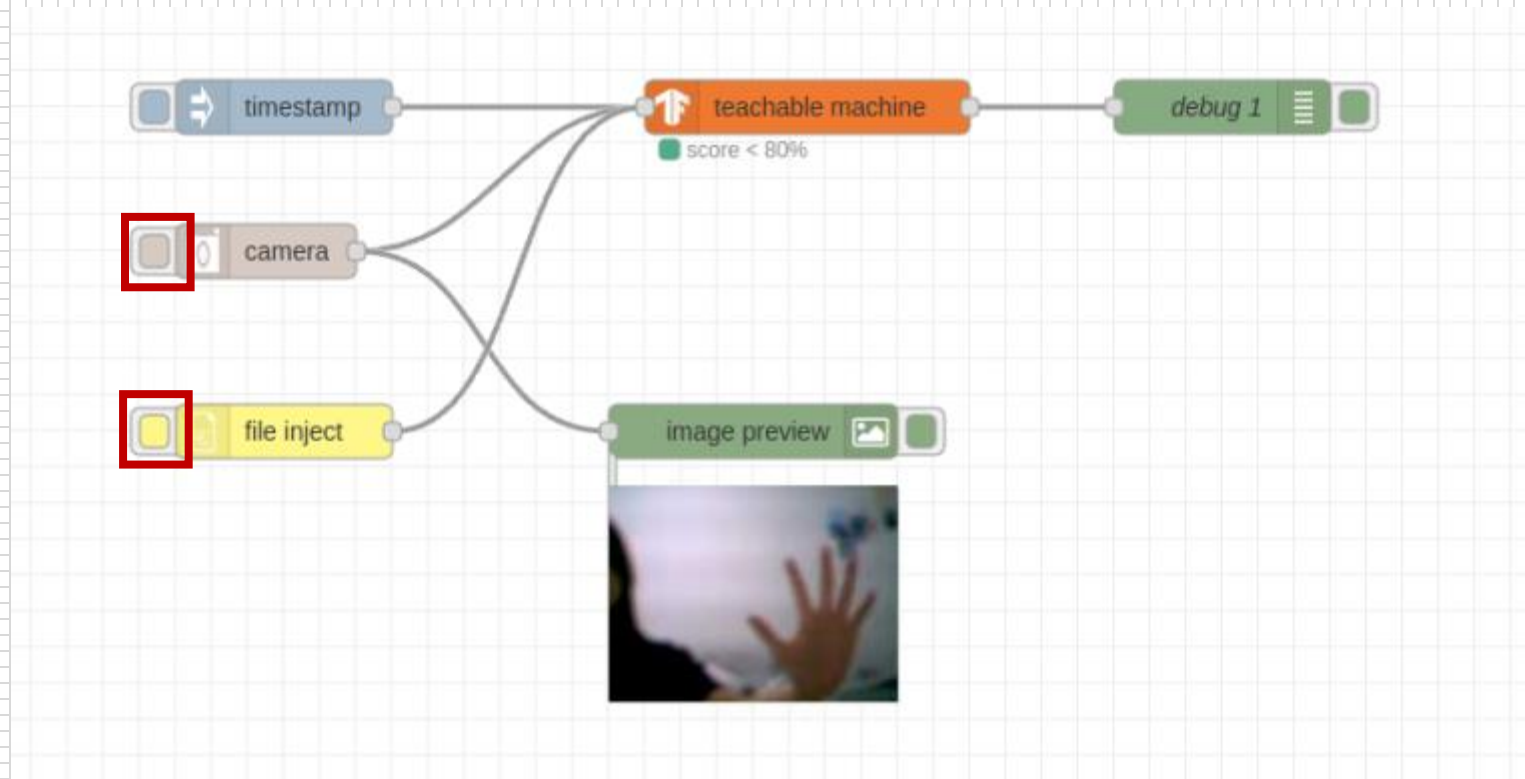
4. 트레이닝 후 'Export Model' 후 클라우드 모델 업데이트 -> URL 복사



5. node-red 접속 후 아래와 같이 생성



6. 카메라, 파일 클릭하여 작동 확인



6. 카메라, 파일 클릭하여 작동 확인

Node-RED interface showing a workflow for testing a camera and file click functionality.

The workflow consists of the following nodes:

- inject** (blue)
- debug** (green)
- complete** (green)
- catch** (red)
- status** (blue)
- link in** (grey)
- link call** (grey)
- link out** (grey)
- comment** (white)
- function** (orange)
- switch** (yellow)

The workflow is configured as follows:

- inject** node connects to **timestamp** (blue) and **camera** (brown).
- timestamp** node connects to **teachable machine** (orange).
- camera** node connects to **teachable machine** (orange) and **image preview** (green).
- file inject** (yellow) node connects to **teachable machine** (orange).
- teachable machine** node (labeled 95% - v) connects to **debug 1** (green).
- image preview** node displays a video feed of a hand.

The **debug 1** node output shows the following data:

```
26/09/2022, 16:34:51 node: debug 1
msg.payload : array[0]
[ empty ]

26/09/2022, 16:43:07 node: debug 1
msg.payload : array[0]
[ empty ]

26/09/2022, 16:45:23 node: debug 1
msg.payload : array[0]
[ empty ]

26/09/2022, 16:47:01 node: debug 1
msg.payload : array[1]
▼ array[1]
▼ 0: object
  class: "v"
  score: 0.9006930589675903

26/09/2022, 16:48:01 node: debug 1
msg.payload : array[1]
► [ object ]

26/09/2022, 16:48:20 node: debug 1
msg.payload : array[1]
► [ object ]
```


오류 사항

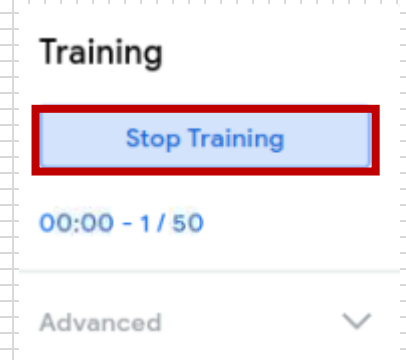
<https://reddb.tistory.com/123>

<https://minikupa-dev.tistory.com/87>

<https://www.npmjs.com/package/node-red-contrib-browser-utils>

오류 - 1 : 티처블머신에서 트레이닝 10분 넘게 지연되며 1/50에서 넘어가지 않음.

해결 방안 : Training 버튼에 커서를 올려 stop Training 누른 후 학습이 완료 됨.
라즈베리파이가 딜레이가 있어 지연된 것으로 생각함.



->재연 화면

오류 - 2 : 카메라 버튼 클릭 안 됨

해결 방안 : 터미널에서 node.js 제거 후 최신버전으로 재설치 / 초기에는 14버전

1. `sudo apt-get remove nodejs`
2. `sudo curl -sL https://deb.nodesource.com/setup_16.x | sudo -E bash`
3. `node-red -v`로 버전 확인
4. <http://127.0.0.1:1880> 으로 접속

```
pi@raspberrypi:~ $ node-red -v
19 Sep 20:06:59 - [info]

Welcome to Node-RED
=====

19 Sep 20:06:59 - [info] Node-RED version: v3.0.2
19 Sep 20:06:59 - [info] Node.js version: v16.17.0
19 Sep 20:06:59 - [info] Linux 5.15.61-v7l+ arm LE
19 Sep 20:07:01 - [info] Loading palette nodes
```