

Computer Vision Module

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Objectives

- This module aims to show how to train a Convolutional Neural Net (CNN) for image classification/labeling

Technical Introduction

- Training CNNs is computationally intensive and would take forever on a regular laptop. Instead, neural nets are trained using machines with powerful graphic processing units or GPUs.
- We (the Visual Politics Group (VPG) at the UW) have a created machine (instance) with GPUs in Amazon Web Services (AWS) aka --the cloud.
- For this module we first connect to this instance and then run a script in a jupyter notebook
- Getting setup to do this requires several preliminary steps however.

Dependencies to Install (ideally BEFORE coming to class)

- You will need to run some Bash commands.
- Mac computers come with a Bash terminal (look for "Terminal").
- [Windows users] If you have RStudio, you may already have a Bash shell installed. Open RStudio and go to `Tools > Shell`. A terminal will open. Type `pwd`. If you get your current directory you have bash.
- If `pwd` returns an error, you need to install a bash shell. Download [Git](#) for Windows. After installing it, search for Git Bash on your computer and open it.

Instructions

- Now you are ready to connect to the AWS instance
- First, you need to create a connection between the 8157 port on your machine and the 8888 port on the instance. You do this using the address below EXCEPT THAT YOU MUST EDIT the IP address (in red) using the information we provide. This is because a new IP address is created each time the VPG instance is started and we don't want it on all of the time:

```
ssh -L 8157:127.0.0.1:8888 visitor@ec2-54-211-167-108.compute-1.amazonaws.com
```

- And here is the password!

IvtR45Sw\$1Akk

- IMPORTANT: You need to leave the bash terminal window open. If you close it you will lose your connection to the server
- OK, now we need to open the jupyter notebook (preferably using a Chrome browser).

[On a Mac]

<https://127.0.0.1:8157>

[On a Windows machine]

<https://ec2-54-211-167-108.compute-1.amazonaws.com:8888/>

- If you get a warning that the site is not secure, Click **ADVANCED** and then "Proceed"
- The jupyter notebook will then ask for a password:

vpg1234

- Finally, look for the correct notebook and open it:

PROJECTS/cambridge_elements/notebooks/00-training-binary-classifier-559-module.ipynb

- You're good to go!