



## **Pao Ying Shoop**

Presented By

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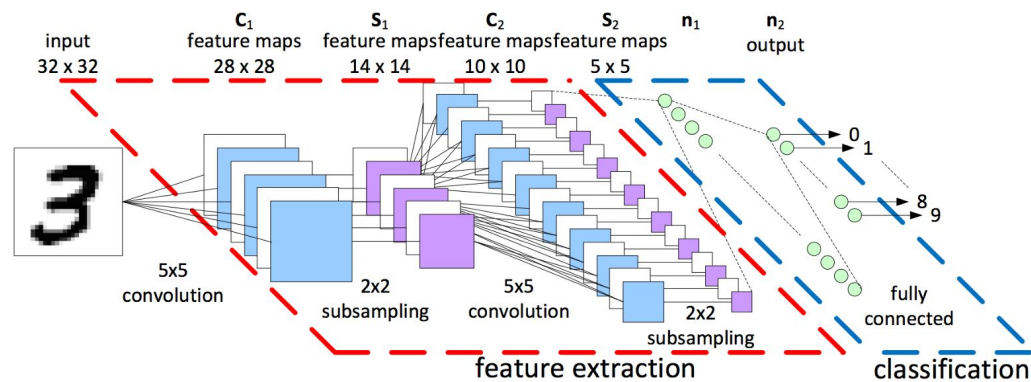
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EGCI 461 Artificial Intelligence  
Asst.Prof.Dr. Tanasanee Phienthrakul

- Introduction

We got our main influence from the game rock,paper,scissors.We thought of creating a simple command line where we use the picture we took of our hand to play with the computer by feeding it into the command line and see who wins the turn.For training the system we took at least 1000+ pictures of the 3 gestures and then we use the system to train these picture with all angle possible for example upside down,tilt 90 degree,tilt 180 degree et to generate more training sample.

- AI technique

The main technique used to design this project is convolutional neural network.Convolutional Neural Network is a class of profound neural system that is utilized for Computer Vision or examining visual symbolism.The Convolutional Layer makes utilization of an arrangement of learnable channels.A channel is utilized to identify the nearness of particular highlights or examples in the original picture.



The process of building a convolutional neural network consist of the following four step:

- Convolution
- Pooling
- Weights
- Full connection
  1. Convolutional layers apply a convolution activity to the information, passing the outcome to the next layer.
  2. Convolutional systems may incorporate nearby or worldwide pooling layers, which join the yields of neuron groups at one layer into a solitary neuron in the prior layer.
  3. Fully connected layers connect every neuron in one layer to every neuron in another layer. It is in principle the same as the traditional multi-layer perceptron neural network

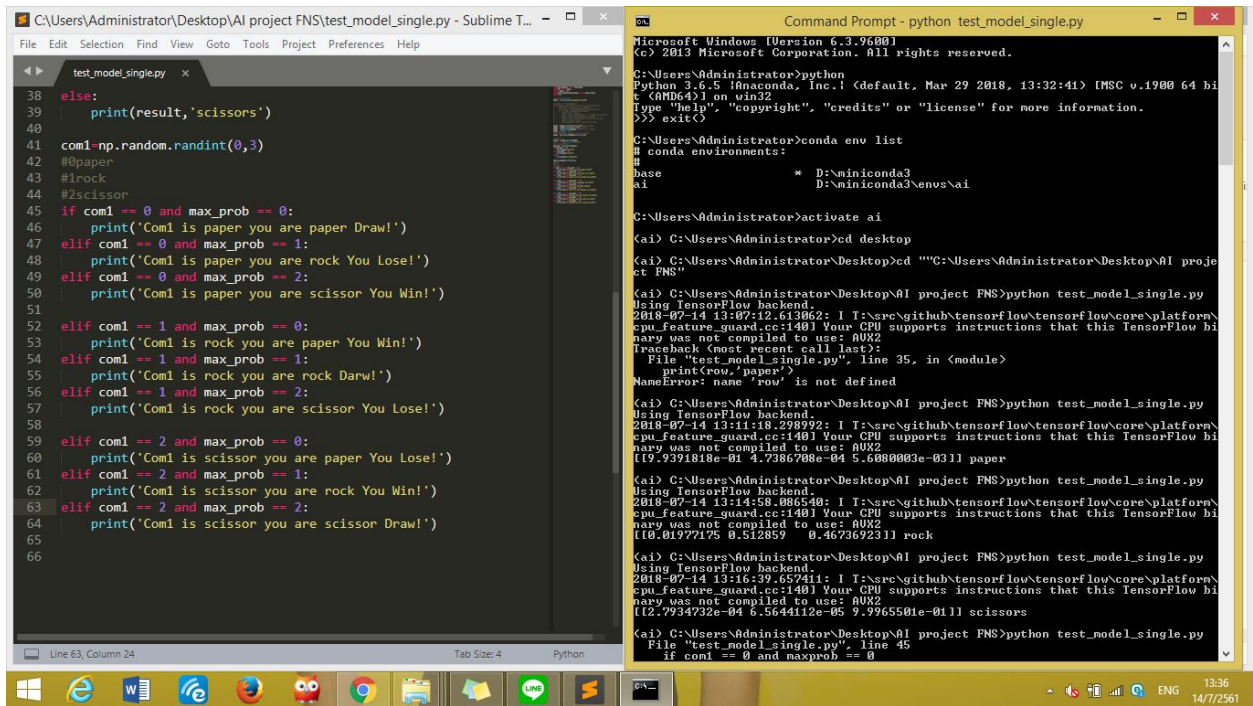
4. CNNs share weights in convolutional layers, which means that the same filter is used for each receptive field in the layer; this reduces memory footprint and improves performance.

- How to install

- Install Miniconda Python distribution
  - Python 3.x 64 bit
- Install Python package
  - Install numpy - matrix calculation
  - Install scipy - math function
  - Install pillow - image processing
- Install Tensorflow - library for CNN
- Install Keras - high level API for Tensorflow

- How to use

- Resize images to 299\*299 (standard size)
- Split data to Train and Test
  - Train
    - Pre-trained model Inception-V3 50 layers
    - Train on Dataset ImageNet - 14,000,000 images and 1,000 classes
    - Remove last (top) layer (1,000 class) → insert last 2 layers (256 classes and 3 classes)
    - 1 Epoch = all images 1 round
    - Fixed lower layers → train only new layer, not affect trained weight
    - Train until accuracy not improve
    - Learning rate u default 0.01 (less quicker, more not stable)
    - Let half of lower layer to be trained, top layer still fixed
    - Minimize u to 0.0001 because not change half lower layer too much
  - Test on unseen images
    - Load trained model
    - Image processing → resize resolution equal to train, pixel 0-1 (before 0-255)
    - Result probability → select class with highest probability
    - Return answer (paper or rock or scissor)



```
C:\Users\Administrator\Desktop\AI project FNS\test_model_single.py - Sublime T...
File Edit Selection Find View Goto Tools Project Preferences Help

test_model_single.py x
38 else:
39     print(result, 'scissors')
40
41 com1=np.random.randint(0,3)
42 #0=paper
43 #1=rock
44 #2=scissor
45 if com1 == 0 and max_prob == 0:
46     print('Com1 is paper you are paper Draw!')
47 elif com1 == 0 and max_prob == 1:
48     print('Com1 is paper you are rock You Lose!')
49 elif com1 == 0 and max_prob == 2:
50     print('Com1 is paper you are scissor You Win!')
51
52 elif com1 == 1 and max_prob == 0:
53     print('Com1 is rock you are paper You Win!')
54 elif com1 == 1 and max_prob == 1:
55     print('Com1 is rock you are rock Darw!')
56 elif com1 == 1 and max_prob == 2:
57     print('Com1 is rock you are scissor You Lose!')
58
59 elif com1 == 2 and max_prob == 0:
60     print('Com1 is scissor you are paper You Lose!')
61 elif com1 == 2 and max_prob == 1:
62     print('Com1 is scissor you are rock You Win!')
63 elif com1 == 2 and max_prob == 2:
64     print('Com1 is scissor you are scissor Draw!')
65
66

Line 63, Column 24 Tab Size: 4 Python

Command Prompt - python test_model_single.py
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>python
Python 3.6.5 |Anaconda, Inc.| (default, Mar 29 2018, 13:32:41) [MSC v.1900 64 bi
t (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> exit()

C:\Users\Administrator>conda env list
# conda environments:
#
base                    * D:\miniconda3
ai                      D:\miniconda3\envs\ai

C:\Users\Administrator>activate ai
(ai) C:\Users\Administrator>cd desktop
(ai) C:\Users\Administrator\Desktop>cd ""C:\Users\Administrator\Desktop\AI proje
ct FNS"
(ai) C:\Users\Administrator\Desktop\AI project FNS>python test_model_single.py
Using TensorFlow backend.
2018-07-14 13:07:12.613062: I T:\src\github\tensorflow\tensorflow\core\platform\
cpu_feature_guard.cc:140] Your CPU supports instructions that this TensorFlow bi
nary was not compiled to use: AVX2
[[2.7934732e-04 6.5644112e-05 9.9965501e-01]] scissors
Traceback (most recent call last):
  File "test_model_single.py", line 35, in <module>
    print(row, 'paper')
NameError: name 'row' is not defined

(ai) C:\Users\Administrator\Desktop\AI project FNS>python test_model_single.py
Using TensorFlow backend.
2018-07-14 13:11:18.298992: I T:\src\github\tensorflow\tensorflow\core\platform\
cpu_feature_guard.cc:140] Your CPU supports instructions that this TensorFlow bi
nary was not compiled to use: AVX2
[[19.9391818e-01 4.7386708e-04 5.6080003e-03]] paper

(ai) C:\Users\Administrator\Desktop\AI project FNS>python test_model_single.py
Using TensorFlow backend.
2018-07-14 13:14:58.086540: I T:\src\github\tensorflow\tensorflow\core\platform\
cpu_feature_guard.cc:140] Your CPU supports instructions that this TensorFlow bi
nary was not compiled to use: AVX2
[[0.01977175 0.512859 0.46736923]] rock

(ai) C:\Users\Administrator\Desktop\AI project FNS>python test_model_single.py
Using TensorFlow backend.
2018-07-14 13:16:39.657414: I T:\src\github\tensorflow\tensorflow\core\platform\
cpu_feature_guard.cc:140] Your CPU supports instructions that this TensorFlow bi
nary was not compiled to use: AVX2
[[2.7934732e-04 6.5644112e-05 9.9965501e-01]] scissors

(ai) C:\Users\Administrator\Desktop\AI project FNS>python test_model_single.py
File "test_model_single.py", line 45
    if com1 == 0 and maxprob == 0
```

- Evaluation Result



```
Command Prompt
2018-07-14 13:33:06.703640: I T:\src\github\tensorflow\tensorflow\core\platform\
cpu_feature_guard.cc:140] Your CPU supports instructions that this TensorFlow bi
nary was not compiled to use: AVX2
[[2.7934732e-04 6.5644112e-05 9.9965501e-01]] scissors
Traceback (most recent call last):
  File "test_model_single.py", line 41, in <module>
    com1=np.random.randint(0,3)
NameError: name 'numpy' is not defined

(ai) C:\Users\Administrator\Desktop\AI project FNS>python test_model_single.py
Using TensorFlow backend.
2018-07-14 13:34:19.564402: I T:\src\github\tensorflow\tensorflow\core\platform\
cpu_feature_guard.cc:140] Your CPU supports instructions that this TensorFlow bi
nary was not compiled to use: AVX2
[[2.7934732e-04 6.5644112e-05 9.9965501e-01]] scissors
Traceback (most recent call last):
  File "test_model_single.py", line 59, in <module>
    elif com1 == 2 and maxprob == 0:
NameError: name 'maxprob' is not defined

(ai) C:\Users\Administrator\Desktop\AI project FNS>python test_model_single.py
Using TensorFlow backend.
2018-07-14 13:36:09.686642: I T:\src\github\tensorflow\tensorflow\core\platform\
cpu_feature_guard.cc:140] Your CPU supports instructions that this TensorFlow bi
nary was not compiled to use: AVX2
[[2.7934732e-04 6.5644112e-05 9.9965501e-01]] scissors
Com1 is scissor you are scissor Draw!

(ai) C:\Users\Administrator\Desktop\AI project FNS>python test_model_single.py
Using TensorFlow backend.
2018-07-14 13:37:24.489660: I T:\src\github\tensorflow\tensorflow\core\platform\
cpu_feature_guard.cc:140] Your CPU supports instructions that this TensorFlow bi
nary was not compiled to use: AVX2
[[2.7934732e-04 6.5644112e-05 9.9965501e-01]] scissors
Com1 is rock you are scissor You Lose!

(ai) C:\Users\Administrator\Desktop\AI project FNS>
```

- Future Development
  - Real-time video capture. A built-in webcam on the computer screen can be implemented to automatically analyse hand movement and recognize gesture.
  - Record score. A scoring system can be kept in place to analyse results from Player 1 and Player 2, to keep track on winning streaks.
  - Record past iterations. A history of analysed hands can be recorded and kept for future references. For the convenience of the user him/herself.
  - Probability player predictions. If it is the same player, a player profile can track player's previous play styles. To see how high or low low is the possibility of a person drawing out a specific hand gesture.