Pow-Ying-Shoop

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Introduction

- Influence
- Thoughts
- Training

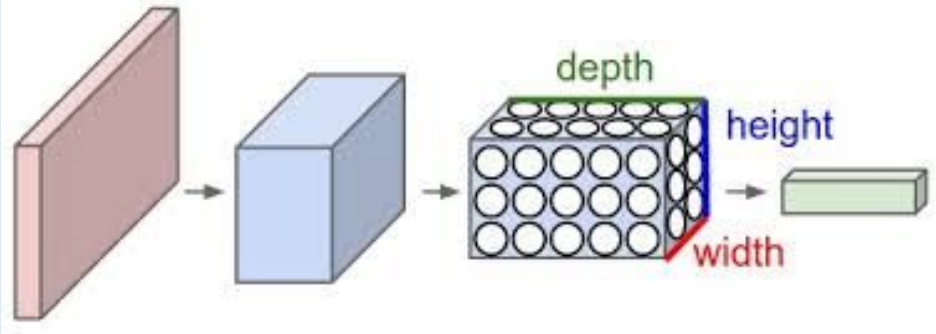
How to play

1. Take a picture of player's hand gesture
    a. Rock
    b. Paper
    c. Scissor
2. Load to the code
3. Open cmd to run the code
4. Computer will randomly select its hand
5. Match begin!

AI Technique

Convolutional Neural Network (CNN)

Essentially neural networks that use convolution in place of general matrix multiplication in at least one of their layers



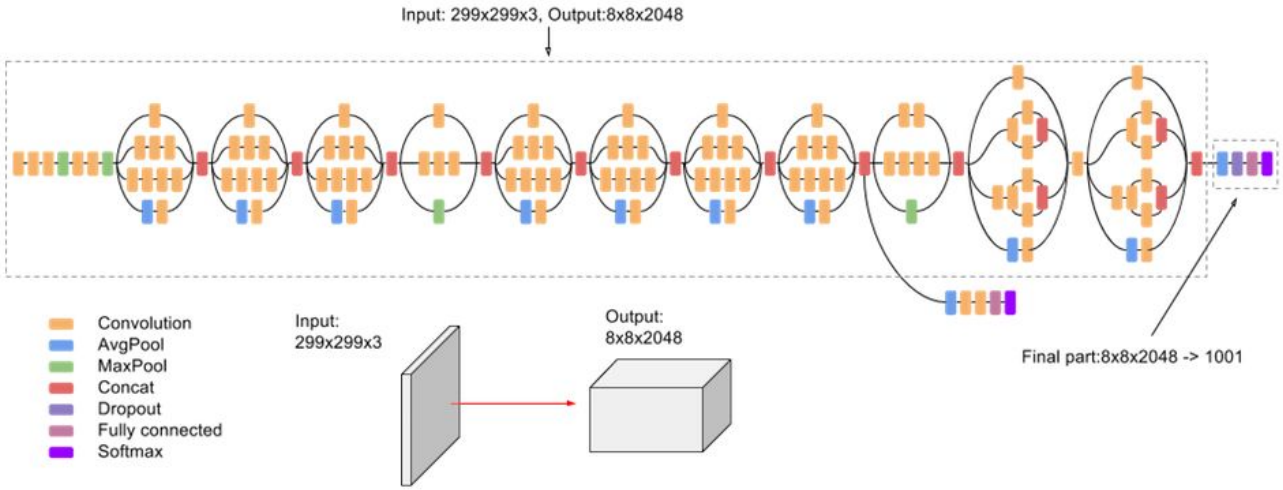
How to install

- 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

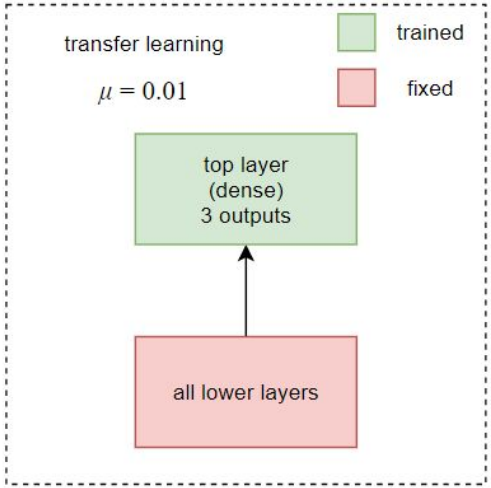
TRAIN

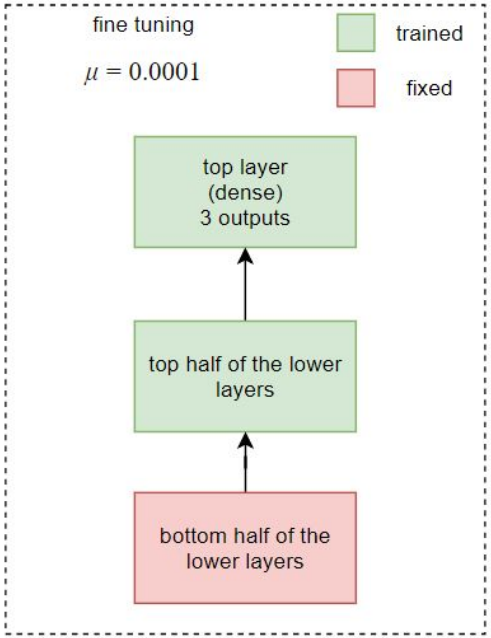
1. Resize images to 299*299 (standard size)
2. Split data to Train and Test
    a. Pre-trained model Inception-V3 50 layers
    b. Train on Dataset ImageNet
    c. Remove last layer (1,000 class)
    d. insert last 2 layers (256 classes and 3 classes)
    e. Fixe lower layers
    f. Train only new layer, not affect trained weight
    g. Train until accuracy not improve
    h. Learning rate u default 0.01
    i. Train half lower layer, top layer still fixed
        i. Minimize u to 0.0001

Inception-V3 architecture



Transfer learning and fine tuning





Training images

TEST

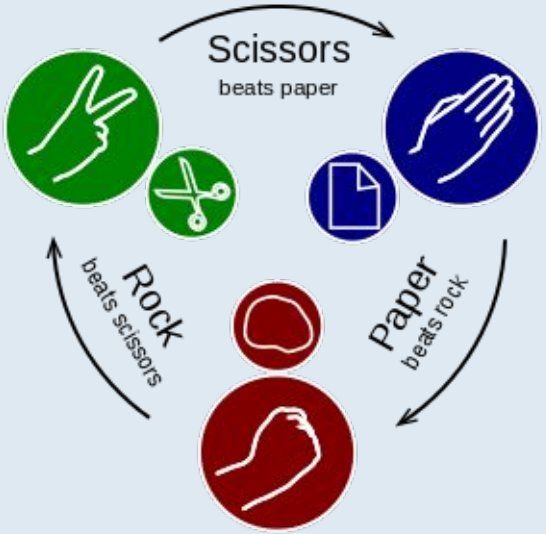
1. Test on unseen images
2. Load trained model
3. Image processing → resize resolution equal to train, pixel 0-1
4. Result as probability → select class with highest probability
5. Return answer

Evaluation Result

Classify as **Rock**

Classify as **Paper**

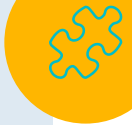
Classify as **Scissor**




```python
com1=np.random.randint(0,3)
#0paper
#1rock
#2scissor
if com1 == 0 and max_prob == 0:
    print('Com1 is paper you are paper Draw!')
elif com1 == 0 and max_prob == 1:
    print('Com1 is paper you are rock You Lose!')
elif com1 == 0 and max_prob == 2:
    print('Com1 is paper you are scissor You Win!')

elif com1 == 1 and max_prob == 0:
    print('Com1 is rock you are paper You Win!')
elif com1 == 1 and max_prob == 1:
    print('Com1 is rock you are rock Darw!')
elif com1 == 1 and max_prob == 2:
    print('Com1 is rock you are scissor You Lose!')

elif com1 == 2 and max_prob == 0:
    print('Com1 is scissor you are paper You Lose!')
elif com1 == 2 and max_prob == 1:
    print('Com1 is scissor you are rock You Win!')
elif com1 == 2 and max_prob == 2:
    print('Com1 is scissor you are scissor Draw!')

```

Future Development

1. Real-time video capture
2. Record score
3. Record past iterations
4. Probability player predictions
5. Analytic trend movement




Thank You