# GROUP 8 - BECOME STRONGER

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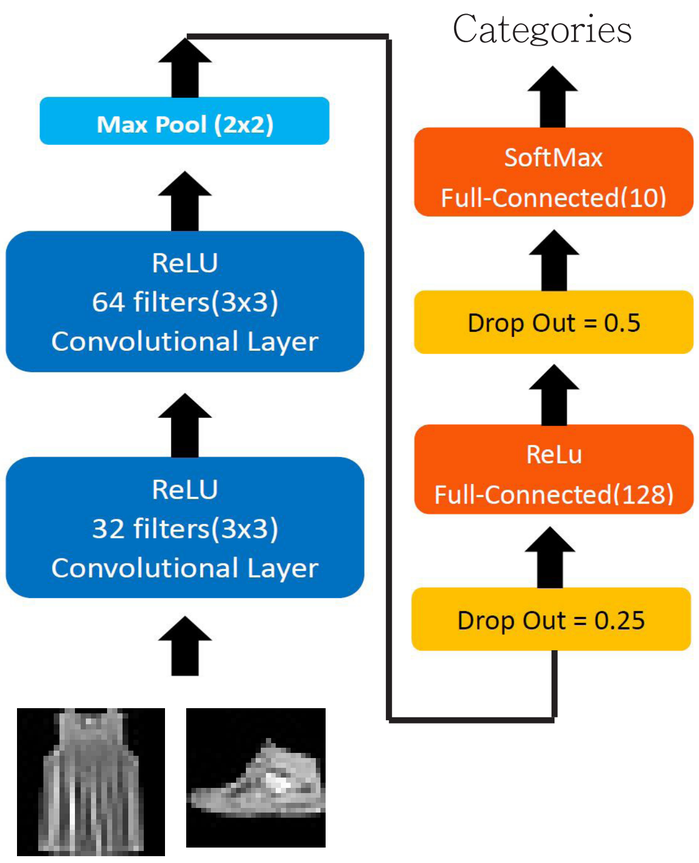
## Task 1 : Small Data Supervised Learning

### Model Structure




input images

### Training Details:

Categories : 10
Loss Function:Cross-Entropy
Optimizer : Adam
Learning Rate: 0.001
Training time: less than 1 hour

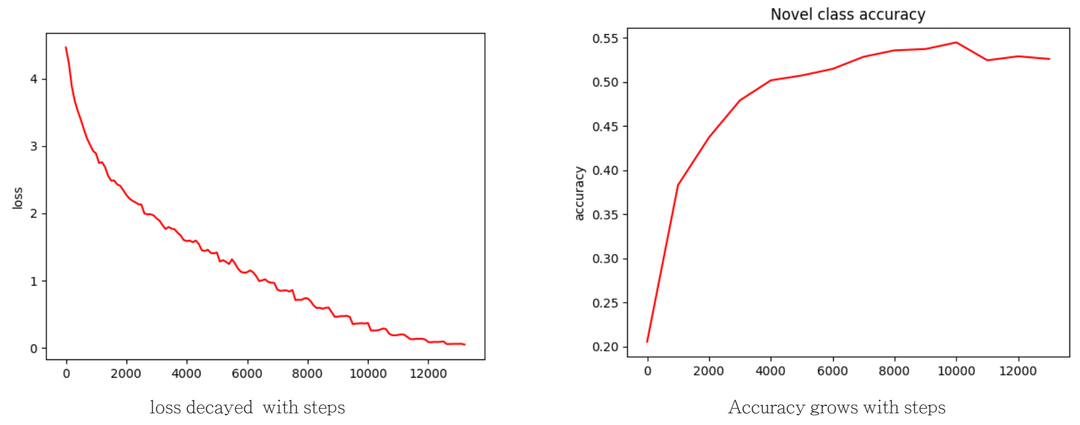
### Training Tricks:

1. Not too Deep
2. Add Drop-out Layers

==> Avoid Overfitting !

Accuracy on testing data: 0.8626

### Learning Curve:

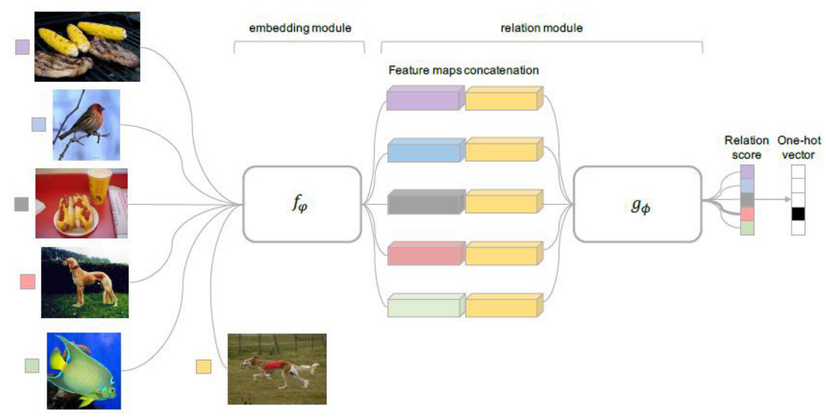



| | One-shot | Five-shot | Ten-shot |
|---|---|---|---|
| Accuracy (on testing set) | 32.8% | 55.75% | 58.05% |

## Task 2 : Few-shot Learning

### Method 2: Relation Network

(Learning to compare: Relation Network for few-shot learning 2018)

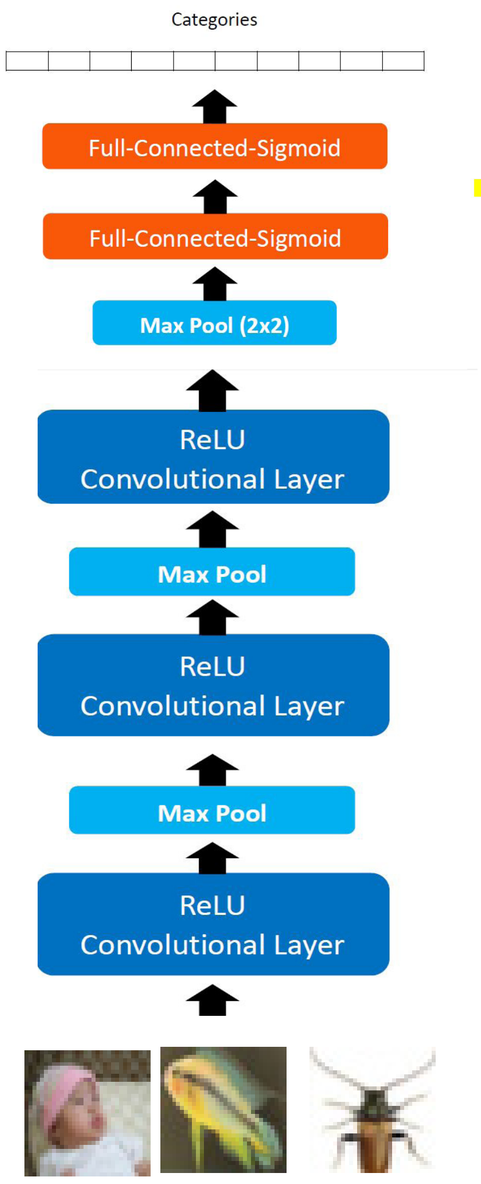



Learning to compare images according to their "similarity" !

=> unsupervised

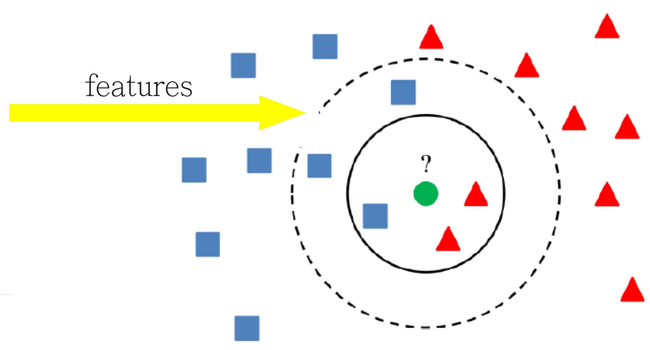
### Method1: CNN+KNN

#### Model Structure






80 base class



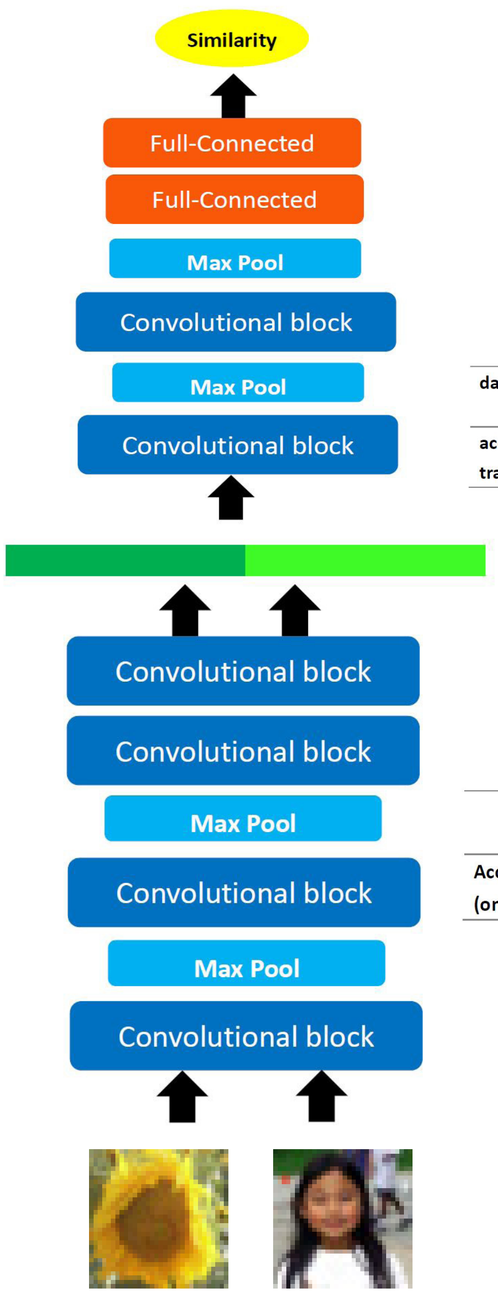

#### Training Strategy:

Using simple CNN to supervised learning on based class, and use the extracted features to implement KNN prediction.

#### Training Tricks:

1.Extract features from 1st fc layer
2.Add Sigmoid function on 1st fc layer
=> 1. & 2. leads to 4% promotion Acc on novel class
3.Not too deep
4.Special neighbor selecting trick
5.Add new loss function, in order to make the extracted features from same class share more similarity.

### Model Structure






#### Training Tricks:

1.Strategy is very important !
2.Add Batch normalization
3. Bigger but not Deeper
4. Train with more images in one step
5. Data Augmentation => Flip but don't rotate

#### Data augmentation

| data augmentation | None | rotatate & flip | flip only |
|---|---|---|---|
| accuracy of same training steps | 41.2% | 38.6% | 42.5% |

#### Training Results

| | One-shot | Five-shot | Ten-shot |
|---|---|---|---|
| Accuracy (on testing set) | 30% | 48.9% | 50.9% |

### Comparison between two:

1.Method 1 's accuracy is a little bit higher
2.Both models needs to be fat instead of deep
3.Method 1 takes shoter time to train