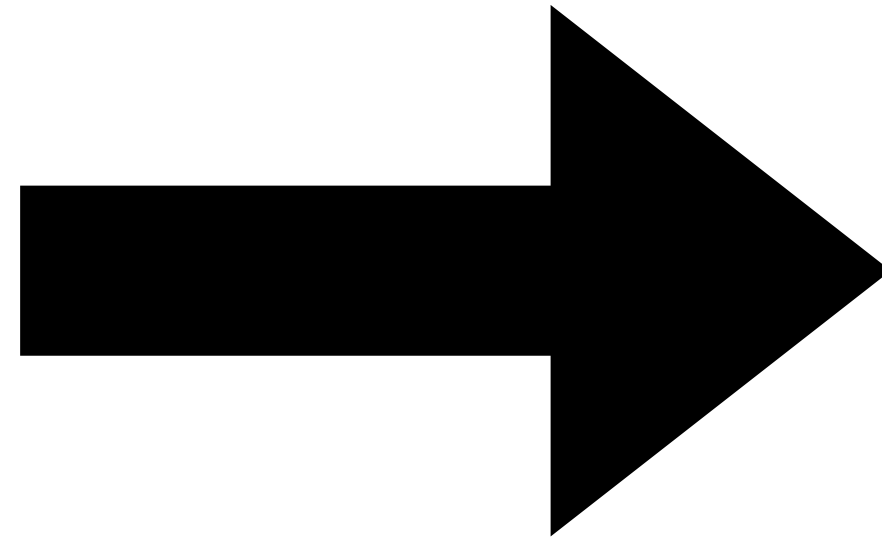


Design and review on applying the neural network to the abandoned bike report system

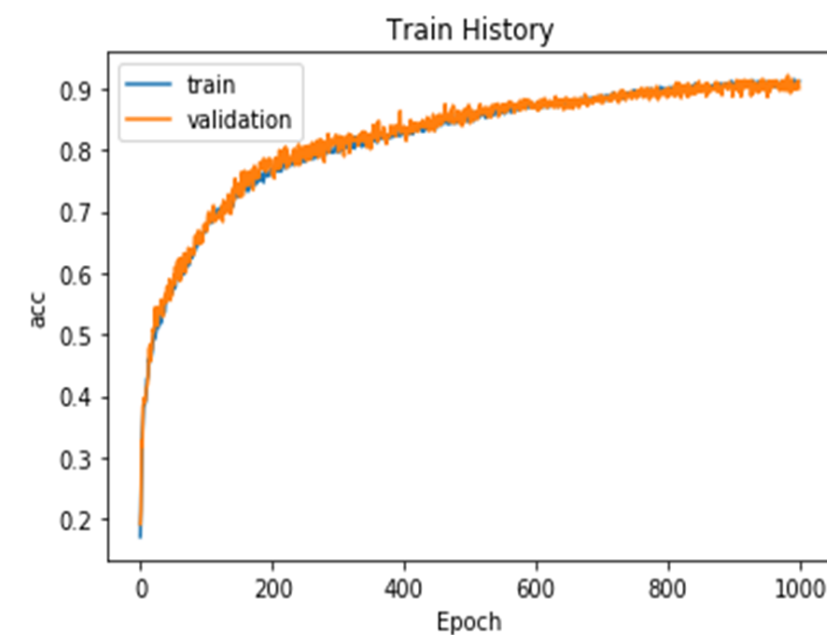


Motivation

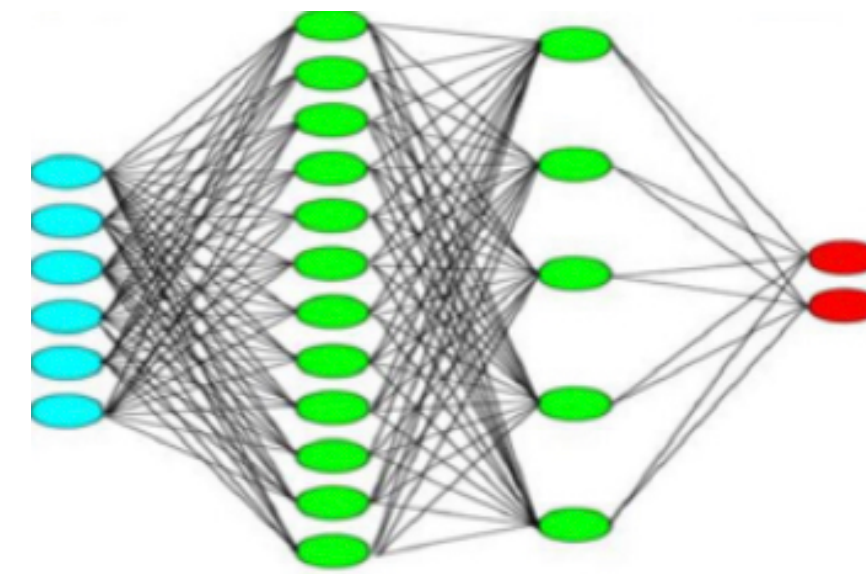


Purposes

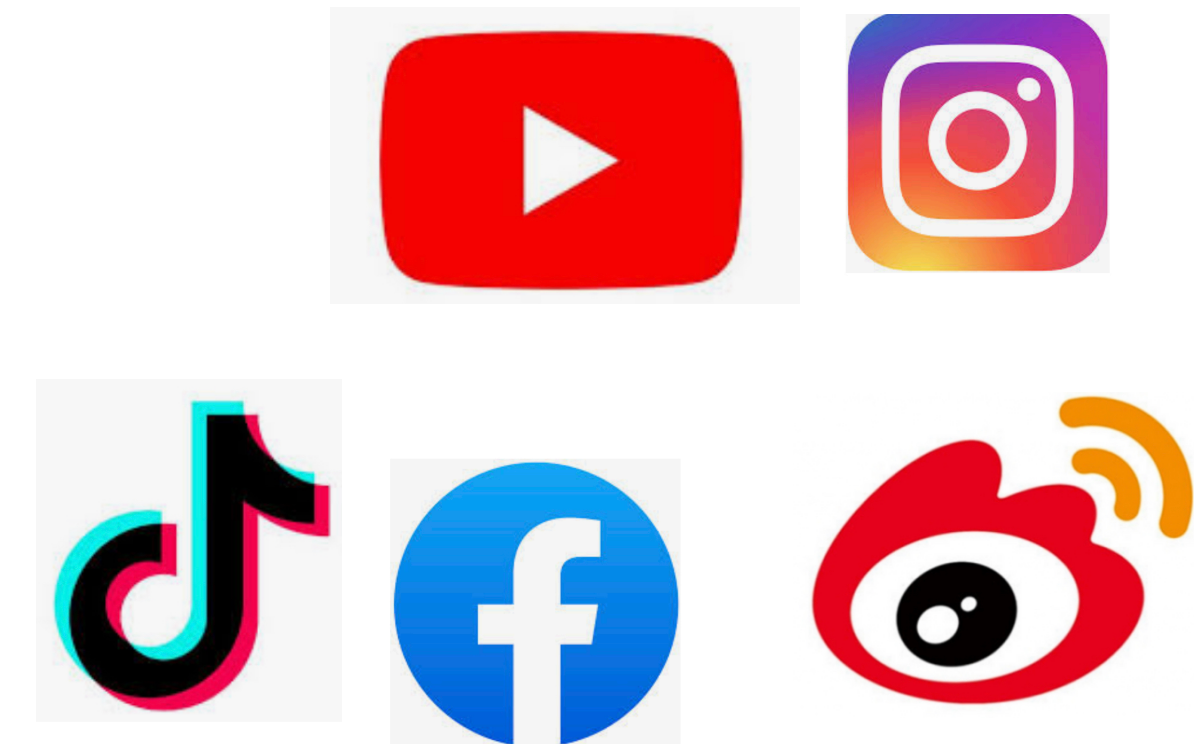
Develop AI application and evaluate validity




Find the optimal amount of hidden layers and neurons



Apply the model to analyze 5 platforms




AI Chatbot



BikeR Reborn
Bicycle Repair Service
2021年10月16日 上午 4:43

Get Started



HI

Welcome to BikeR's project menu, I am Cyclone, your digital assistant.

Start Recycling
Project info
My Stats

Start Recycling

Aa

Please upload a photo of the bike/bikes you wish to report.

user ID:Frances
contact:0916300487

Upload Photos
Change Name
Change Phone Number

Upload Photos

Please upload a photo of the bike/bikes you wish to report.






photo received, identifying...



GO JOB!

Aa

Please upload the closest doorplate image or input bike's location in text



Got it ! Cyclone will use AI to recognize the door plate, please hold...

I have recognized some text fragments:
262,Washington,St.,
then try to combine....


262 Washington St,
Dedham, MA 02026, USA

If address is correct, please click button. Or you could re-upload one more time. Or you could input the address in text! Or you could add some detail about the location

Aa

address_correct

Thanks ! Cyclone will use AI to review your report, please hold...



GOOD JOB!

Great, you will receive 10 points by this report !

User ID: Frances
Contact Number:
0916300487
Location: 262 Washington St, Dedham, MA 02026, USA(detail:-)

Confirm Upload
To Menu

Confirm Upload

Aa

AI Report Evaluation



Name: ○先生

Phone Number: 0935xxx610

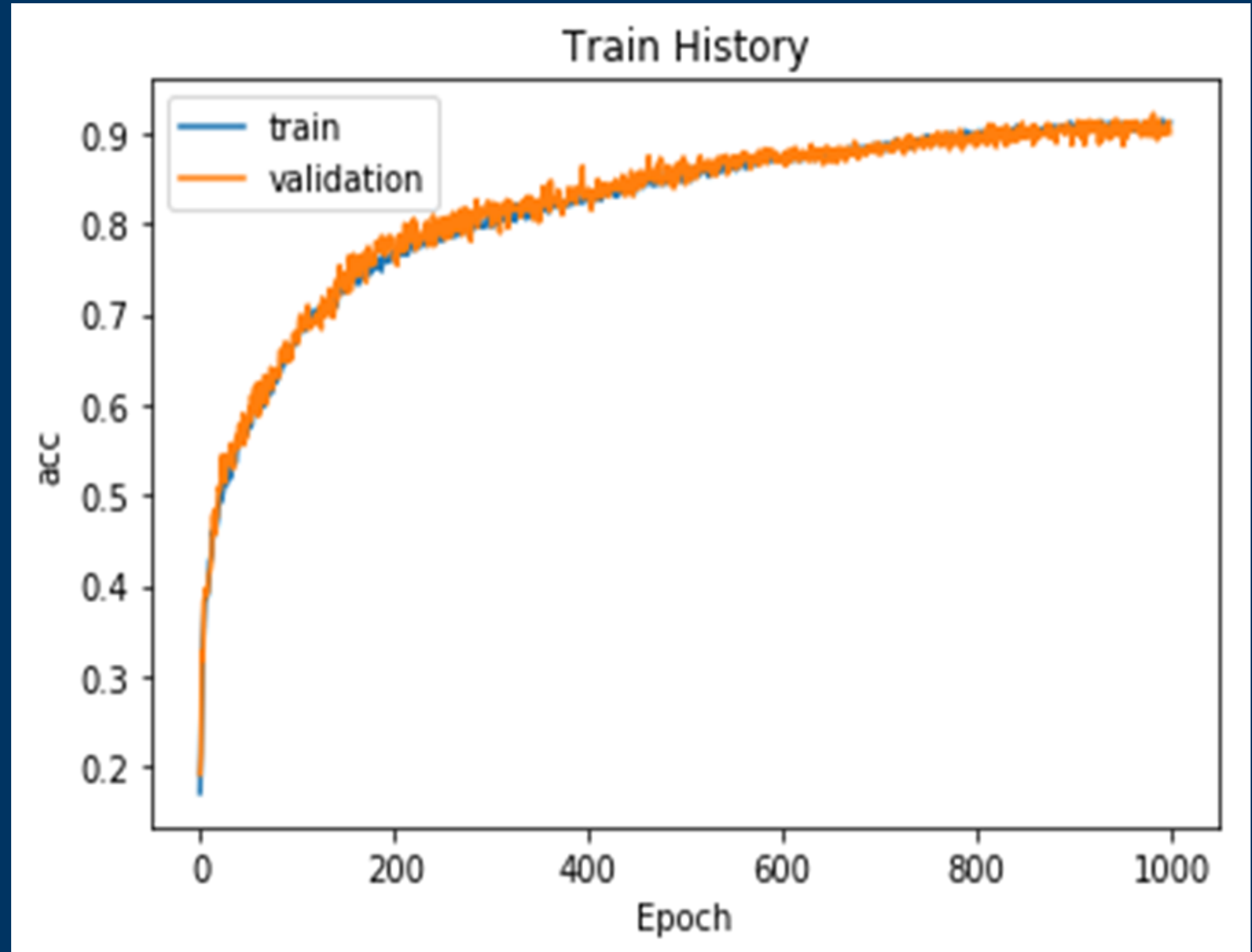
Probability of Abandoned Bicycle: 9.5

Is Address Appropriate: Yes

Past Number of Reports: 5

Reports in Last 10 Minutes: 0

New User: Yes



AI Brocken Bicycle Recognition

The screenshot shows the Google Cloud Vision API interface with a mountain bike image. The recognition results are as follows:

| Label | Confidence |
|---------------------------------|------------|
| Mountain Bike | 96% |
| Bicycle Stem | 95% |
| Bicycles-Equipment And Supplies | 95% |
| Hybrid Bicycle | 94% |
| Bicycle Seatpost | 91% |
| Bicycle Saddle | 91% |
| Groupset | 90% |
| Sports Equipment | 90% |

The screenshot shows the Google Cloud Vision API interface with a stationary exercise bike image. The recognition results are as follows:

| Label | Confidence |
|--------------------|------------|
| Exercise Equipment | 94% |
| Indoor Cycling | 93% |
| Stationary Bicycle | 90% |
| Exercise Machine | 89% |
| Product | 88% |
| Exercise | 64% |
| Sports Equipment | 59% |
| Vehicle | 54% |
| Wheel | 53% |

The screenshot shows the Google Cloud Vision API interface with a red tricycle image. The recognition results are as follows:

| Label | Confidence |
|---------------|------------|
| Land Vehicle | 100% |
| Vehicle | 99% |
| Bicycle Wheel | 97% |
| Tricycle | 93% |
| Red | 90% |
| Bicycle Part | 85% |
| Riding Toy | 85% |
| Transport | 84% |
| Bicycle | 82% |

The screenshot shows the Google Cloud Vision API interface with a red scooter image. The recognition results are as follows:

| Label | Confidence |
|------------------------|------------|
| Land Vehicle | 100% |
| Vehicle | 99% |
| Motorcycle | 96% |
| Car | 94% |
| Scooter | 93% |
| Red | 92% |
| Motor Vehicle | 90% |
| Motorcycle Accessories | 88% |

- Vision
- Dashboard
- Datasets**
- Models

| | |
|---------------|-----|
| All images | 587 |
| Labeled | 587 |
| Unlabeled | 0 |
| Filter labels | ⋮ |

Filter images

broken(1) broken(1) normal(1) normal(1) broken(1) normal(1) broken(1) broken(1)

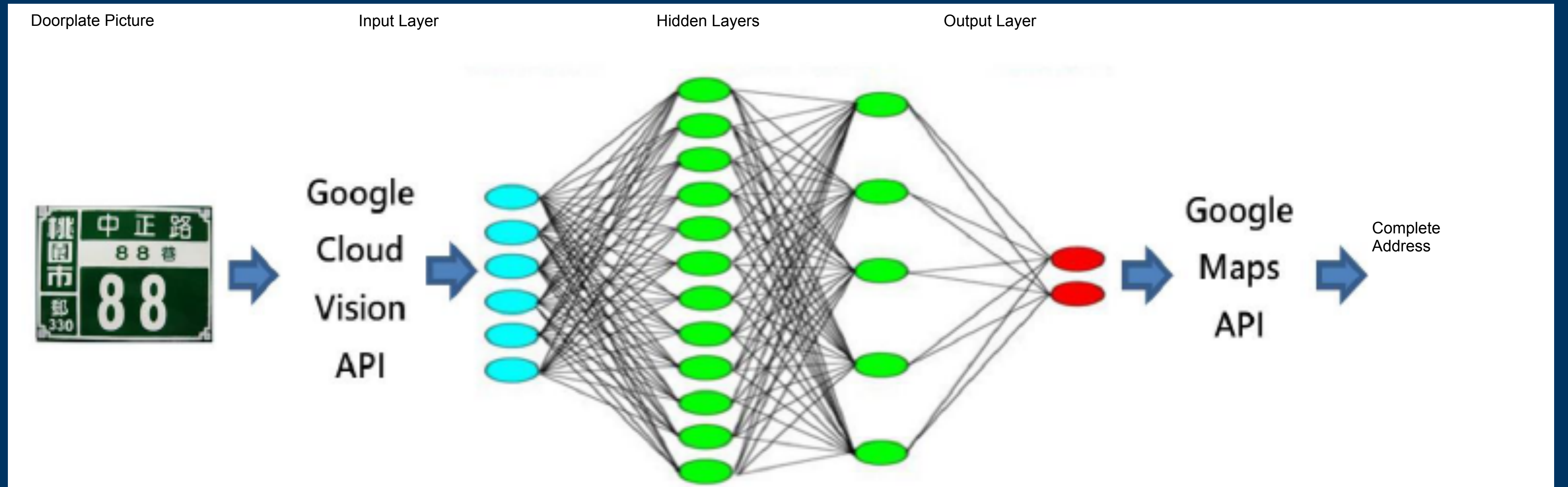
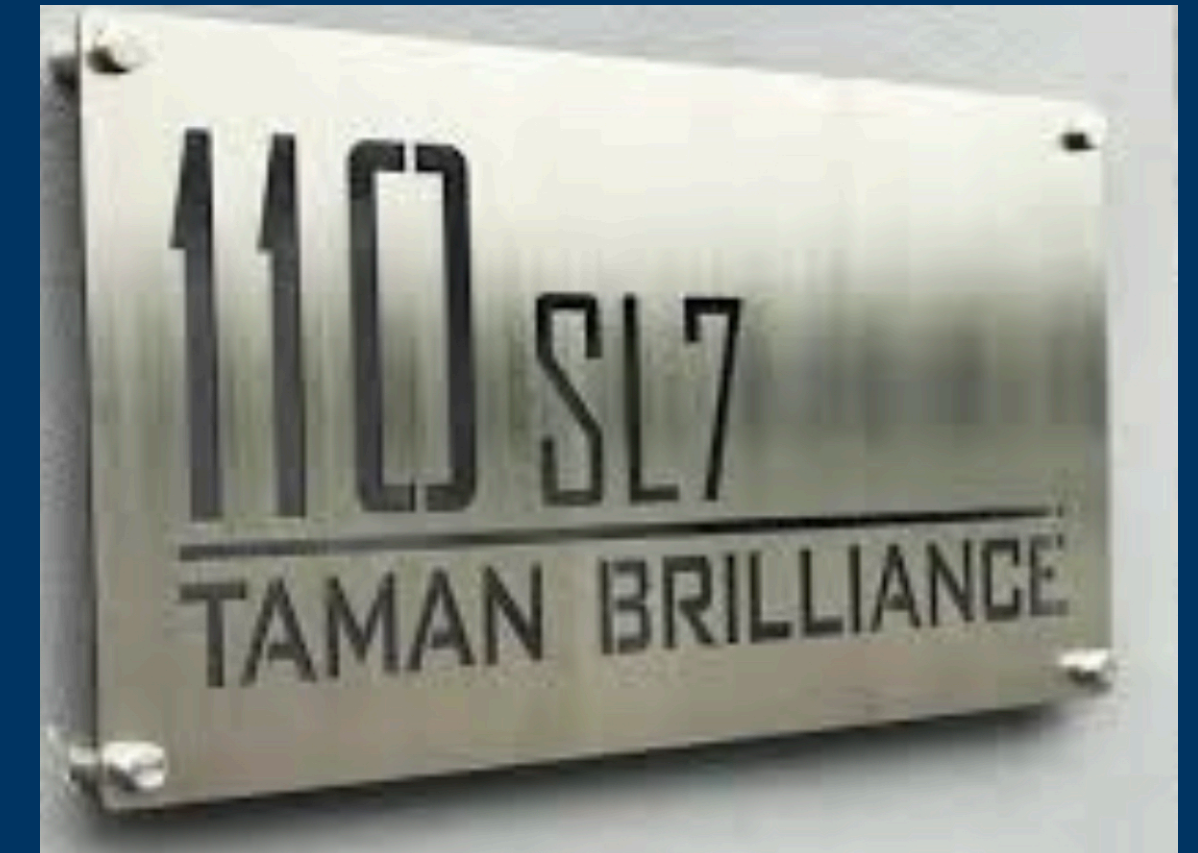
broken(1) normal(1)

broken(1) normal(1) broken(1) normal(1) broken(1) normal(1) normal(1) broken(1)

normal(1) normal(1) broken(1) broken(1) normal(1) normal(1) normal(1) broken(1)

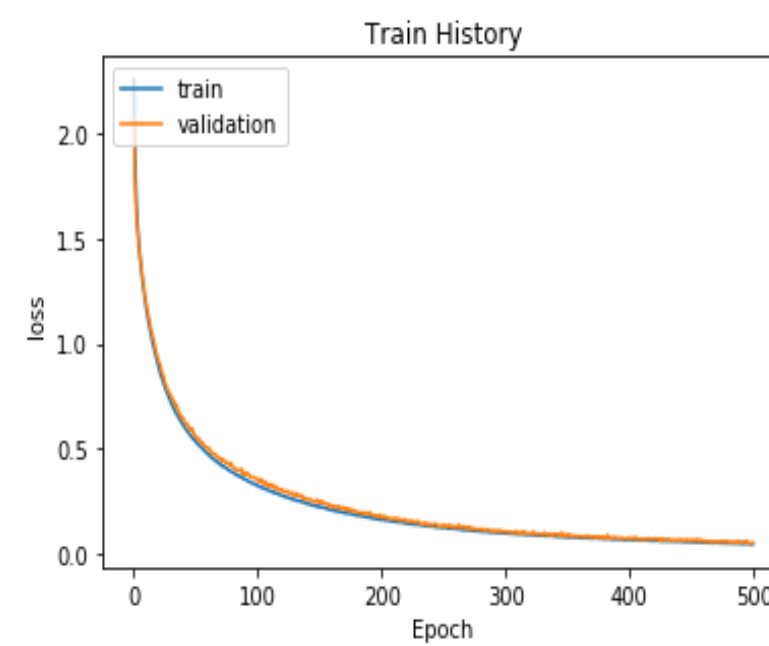
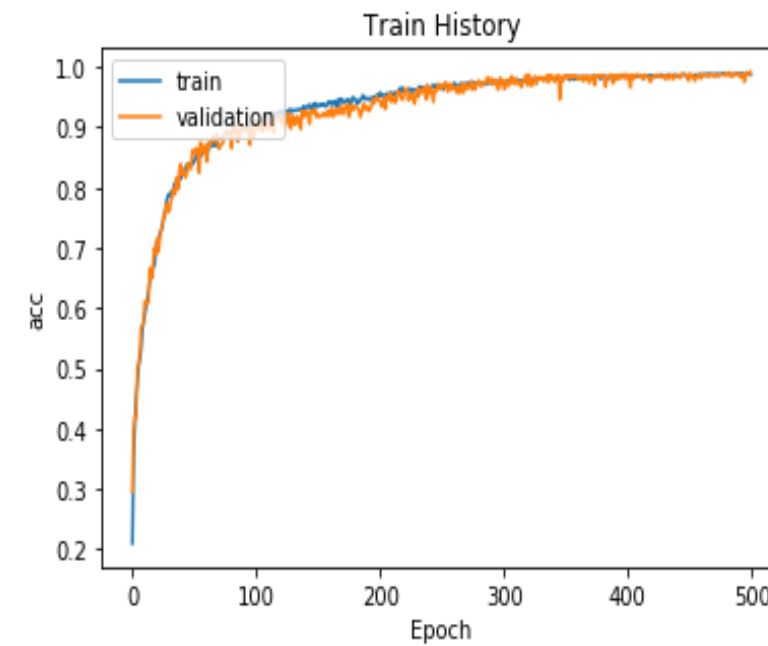
| | |
|-------------------------------|-----|
| broken | 256 |
| normal | 331 |
| ADD NEW LABEL | |

AI Doorplate Recognition



Analysis of Hidden Layers and Neurons

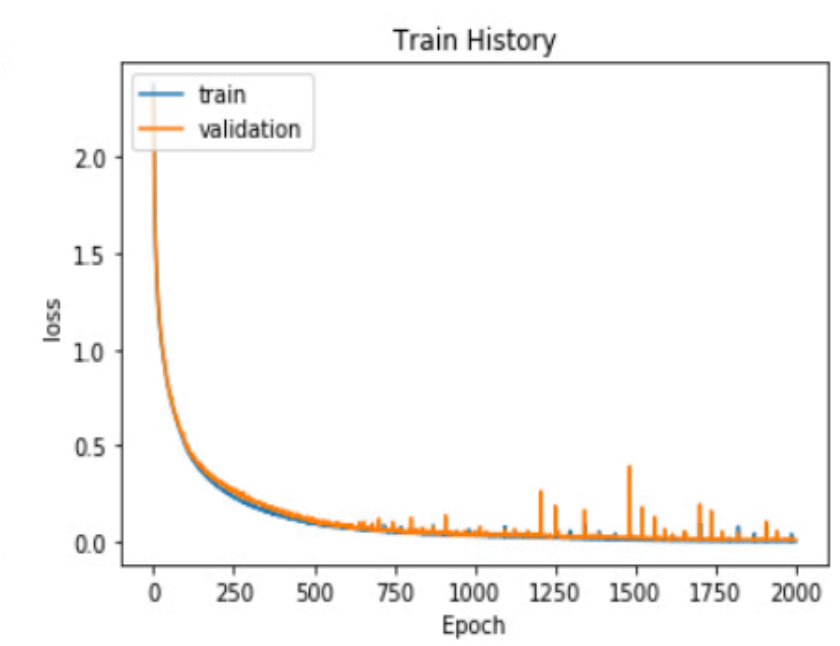
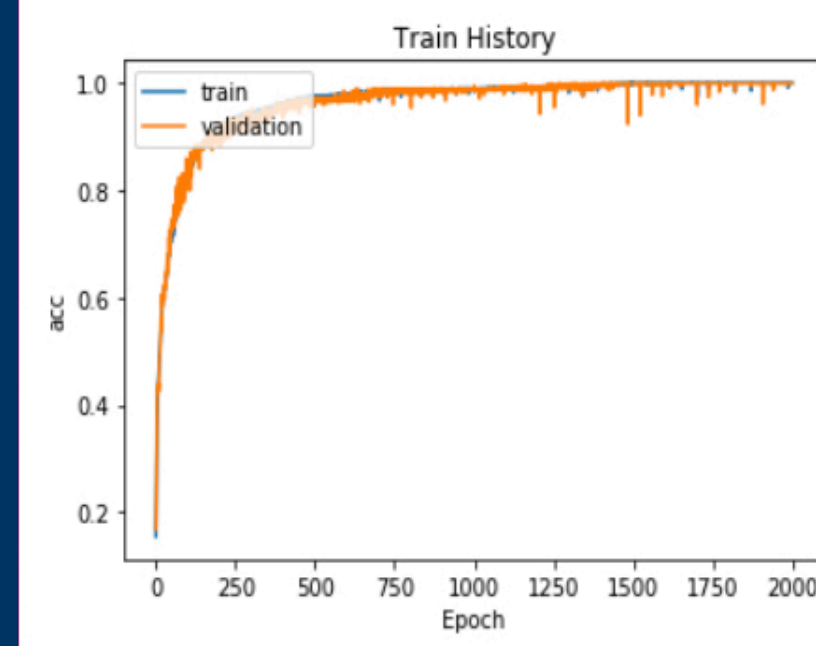
Experiment 5



Hidden Layer: 1
Neurons Per Layer: 200
Neural Structure: 7x200x11
Total Neurons: 218
Computational Weight: 3811

Result:
Accuracy: 99.4%
Average Score Error: 0.05 point

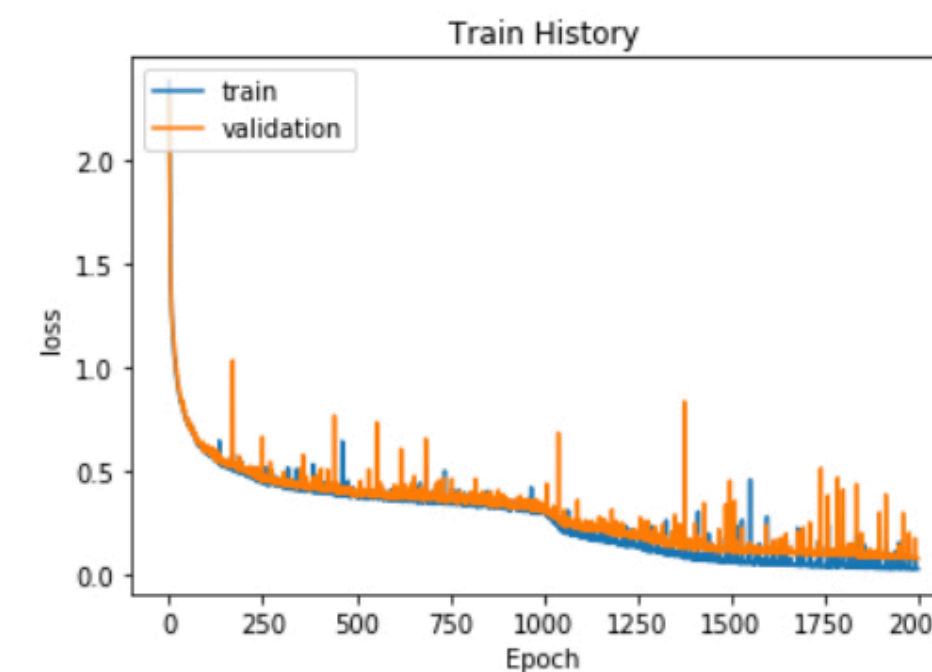
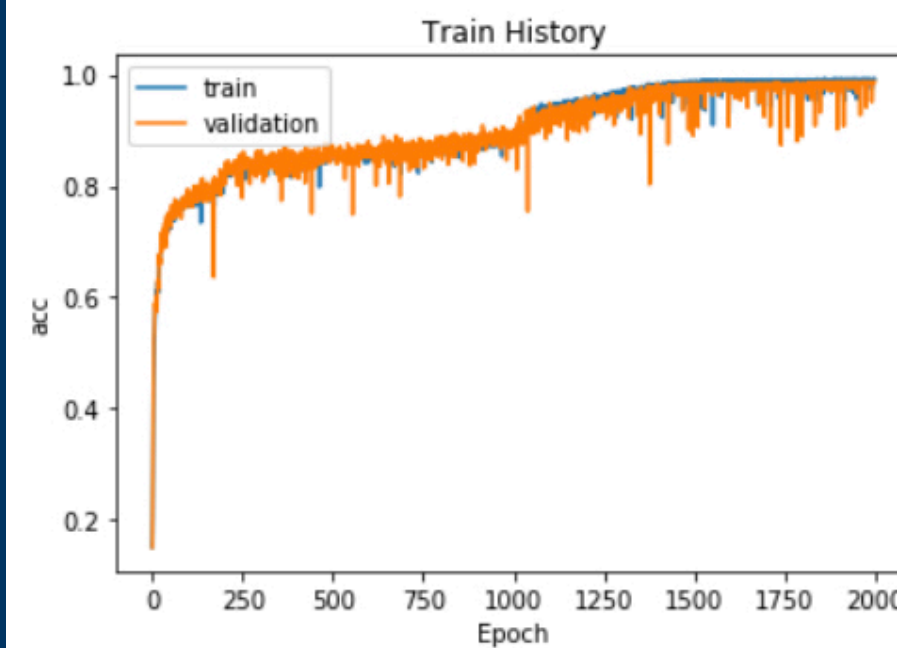
Experiment 11



Hidden Layer: 2
Neurons Per Layer: 20
Neural Structure: 7x20x20x11
Total Neurons: 58
Computational Weight: 811

Result:
Accuracy: 99.99%
Average Score Error: 0.004 point

Experiment 16



Hidden Layer: 3
Neurons Per Layer: 20
Neural Structure: 7x20x20x20x11
Total Neurons: 78
Computational Weight: 1231

Result:
Accuracy: 99.1%
Average Score Error: 0.04 point

| Experiment Number | # of Hidden Layer | Neurons per Layer | Total Neurons | Computational Weight | Accuracy | Average Score Error |
|-------------------|-------------------|-------------------|---------------|----------------------|----------|---------------------|
| 1 | 0 | 0 | 18 | 88 | 46.27% | 1.4655 |
| 2 | 1 | 10 | 28 | 201 | 84.91% | 0.5067 |
| 3 | 1 | 50 | 68 | 961 | 95% | 0.2196 |
| 4 | 1 | 100 | 118 | 1911 | 97.45% | 0.1268 |
| 5 | 1 | 200 | 218 | 3811 | 99.18% | 0.0532 |
| 6 | 1 | 400 | 418 | 7611 | 99.27% | 0.0292 |
| 7 | 1 | 800 | 818 | 15211 | 99.73% | 0.0212 |
| 8 | 1 | 3200 | 3218 | 60811 | 99.82% | 0.0195 |
| 9 | 2 | 5 | 28 | 136 | 72.09% | 0.7782 |
| 10 | 2 | 10 | 38 | 311 | 88.27% | 0.3839 |
| 11 | 2 | 20 | 58 | 811 | 99.91% | 0.0106 |
| 12 | 2 | 40 | 98 | 2411 | 99.91% | 0.0091 |
| 13 | 2 | 80 | 178 | 8011 | 99.91% | 0.0146 |
| 14 | 2 | 160 | 338 | 28811 | 99.91% | 0.0113 |
| 15 | 2 | 320 | 658 | 108811 | 99.91% | 0.0147 |

Result of Hidden layer = 0, 1 and 2

| Experiment Number | # of Hidden Layer | Neurons per Layer | Total Neurons | Computational Weight | Accuracy | Average Score Error |
|-------------------|-------------------|-------------------|---------------|----------------------|----------|---------------------|
| 16 | 3 | 10 | 48 | 421 | 99.36% | 0.0268 |
| 17 | 3 | 20 | 78 | 1231 | 99.73% | 0.0117 |
| 18 | 3 | 40 | 138 | 4051 | 99.91% | 0.0042 |
| 19 | 3 | 80 | 258 | 14491 | 100% | 0.0005 |
| 20 | 4 | 20 | 98 | 1651 | 99% | 0.02767 |
| 21 | 4 | 40 | 178 | 5691 | 99.91% | 0.0094 |
| 22 | 4 | 80 | 338 | 20971 | 99.64% | 0.0561 |
| 23 | 5 | 10 | 68 | 641 | 97.73% | 0.1012 |
| 24 | 5 | 20 | 118 | 2071 | 96.09% | 0.1967 |
| 25 | 5 | 40 | 218 | 7331 | 98.36% | 0.0713 |
| 26 | 5 | 80 | 418 | 27451 | 100% | 0.00006 |
| 27 | 5 | 160 | 818 | 106091 | 99.91% | 0.0025 |

Result of Hidden layer = 3, 4 and 5

Validation of Cyclone Conjecture on 5 popular social media websites

| Category | Input | | | | | | | Output | |
|-----------|----------------|-------------|---------------------------|----------------|----------------|---------------------------|------------------------|------------|-----------|
| Instagram | # of Followers | Total Posts | Avg Likes in Last 5 Posts | Face(0-1) | # Video (0-10) | # Posts in Past 7 Days | | # of Likes | 8 Neurons |
| Facebook | Photo (0-1) | Face(0-1) | Video (0-1) | Location (0-1) | Link (0-1) | Avg Likes in Past 5 Posts | # Posts in Past 7 Days | # of Likes | 7 Neurons |
| Youtube | Subscribers | View | View-1 | View-2 | View-3 | View-4 | View-5 | # of Views | 7 Neurons |
| Tik Tok | Followers | View | View-1 | View-2 | View-3 | View-4 | View-5 | # of Views | 7 Neurons |
| Weibo | Followers | # of Posts | Photos (0-9) | Video (0-1) | Face(0-1) | Likes -1 | Likes -2 | # of Likes | 7 Neurons |

Conclusions

- **Number of hidden layers: 2 to 4 layers.**
- **Number of neurons in each layer:
1-10 times the average between number of input
and output neurons.**