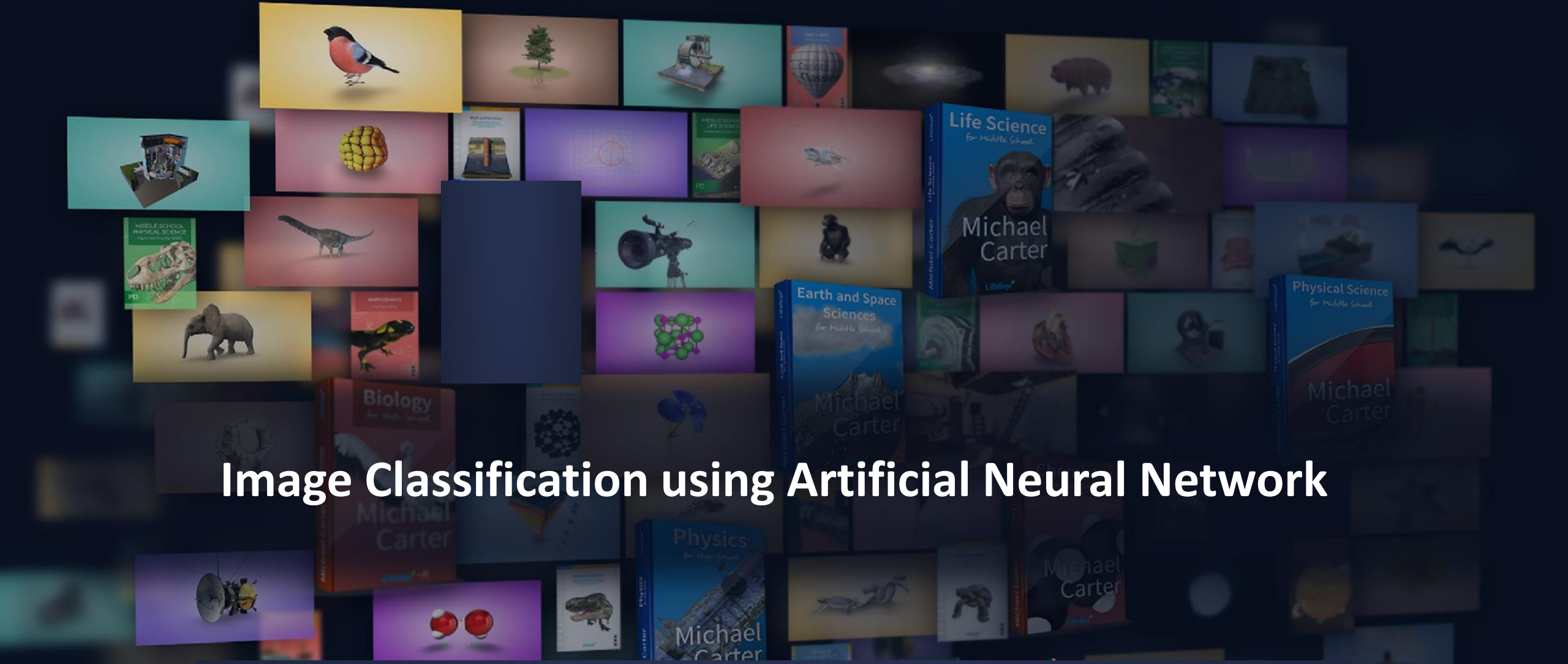


Image Classification using Artificial Neural Network

James Ng

2019-09-27

SPCA

SOCIETY FOR THE PREVENTION OF CRUELTY TO ANIMALS, SINGAPORE

FRIENDS FOR LIFE®

Connect With Us
Call us at **62875355**
24 hour hotline: **62875355 ext 9**
50 Sungei Tengah Road, S(699012)

About Us | Our Services | News & Events | Shop | Pet Care | Animal Welfare

Our Services : Animal Shelter > Surrendering An Animal

Surrendering an Animal

Our Services : Lost-and-Found Pets > Lost Animals

Lost Animals

These are the animals that were found and brought to the SPCA. The ad will remain online for 5 days (inclusive of weekends and public holidays). If you are the owner of any of these animals, please call 62875355 ext 9 as soon as possible.

Local

Animal Type: Cat
Gender: Male
Color: Tabby and White
Breed: Local
Specific features: Microchipped
Location Found: Pasir Ris Street 71
Date: 25 September 2019

X-breed

Animal Type: Dog
Gender: Male
Color: Brown and White
Breed: X-breed
Specific features: Wearing Choke Chain
Location Found: Marymount Road
Date: 25 September 2019

Animal Shelter
7,000 to 9,000
animals each year

NParks CIN Biodiversity Watch

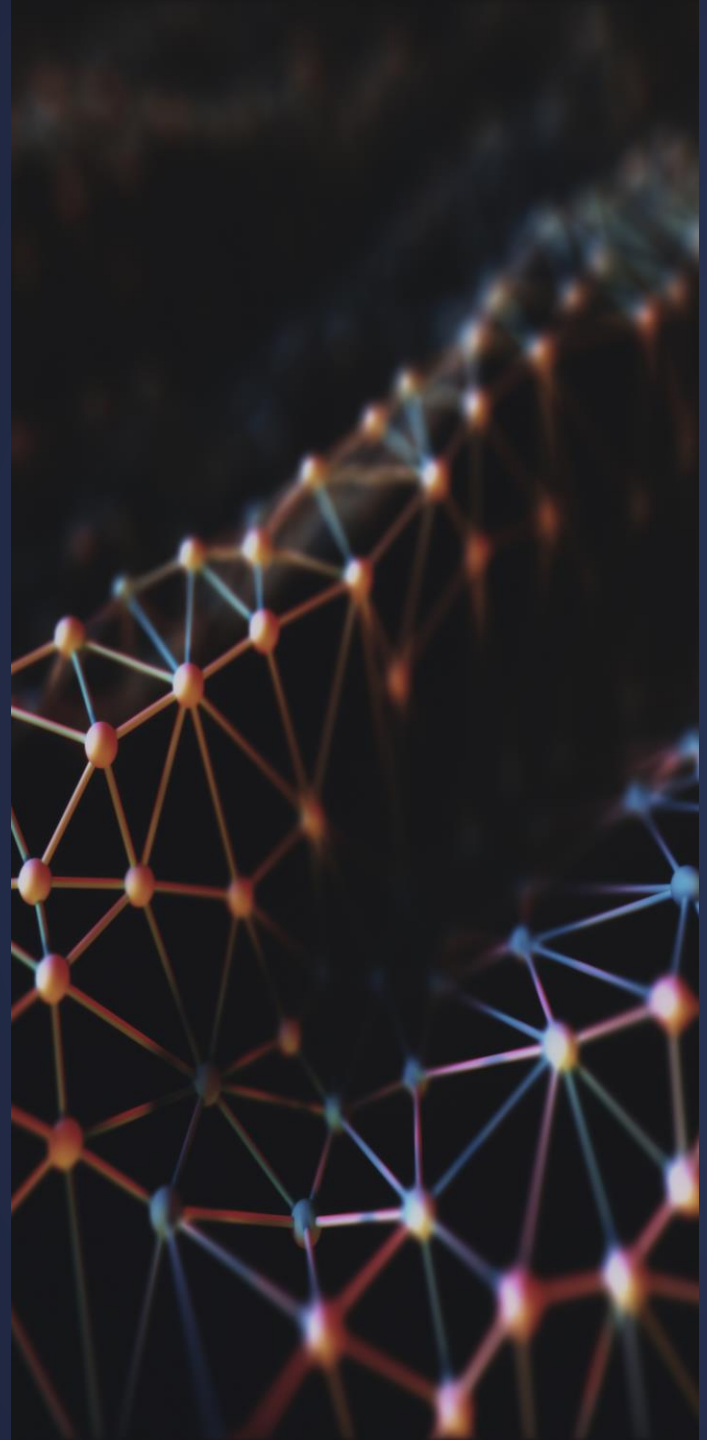
Garden Bird Watch

1 – 10 November 2019

Do you love bird watching, or have you always wanted to get involved in citizen science? Join us for the NParks Garden Bird Watch organised as part of the NParks Community in Nature (CIN) Biodiversity Watch series and help us to learn more about our birds!

For one morning between 1 and 10 November, volunteers will carry out a bird survey at a designated site. The data collected will give us information about the current distribution of birds in Singapore and contribute towards better park management and conservation measures.

Visit www.nparks.gov.sg/birdwatch for more information



Project Goal

Identification of pet breeds

Society for the Prevention of Cruelty to Animals (SPCA)

Identification of bird species

National Parks Board (NParks)

Approach

Image classification

Simple neural network model

Convolutional Neural Network model

Transfer Learning using VGG16

Tools

python

Keras

TensorFlow

NumPy + Pandas

matplotlib

OpenCV

scikit learn

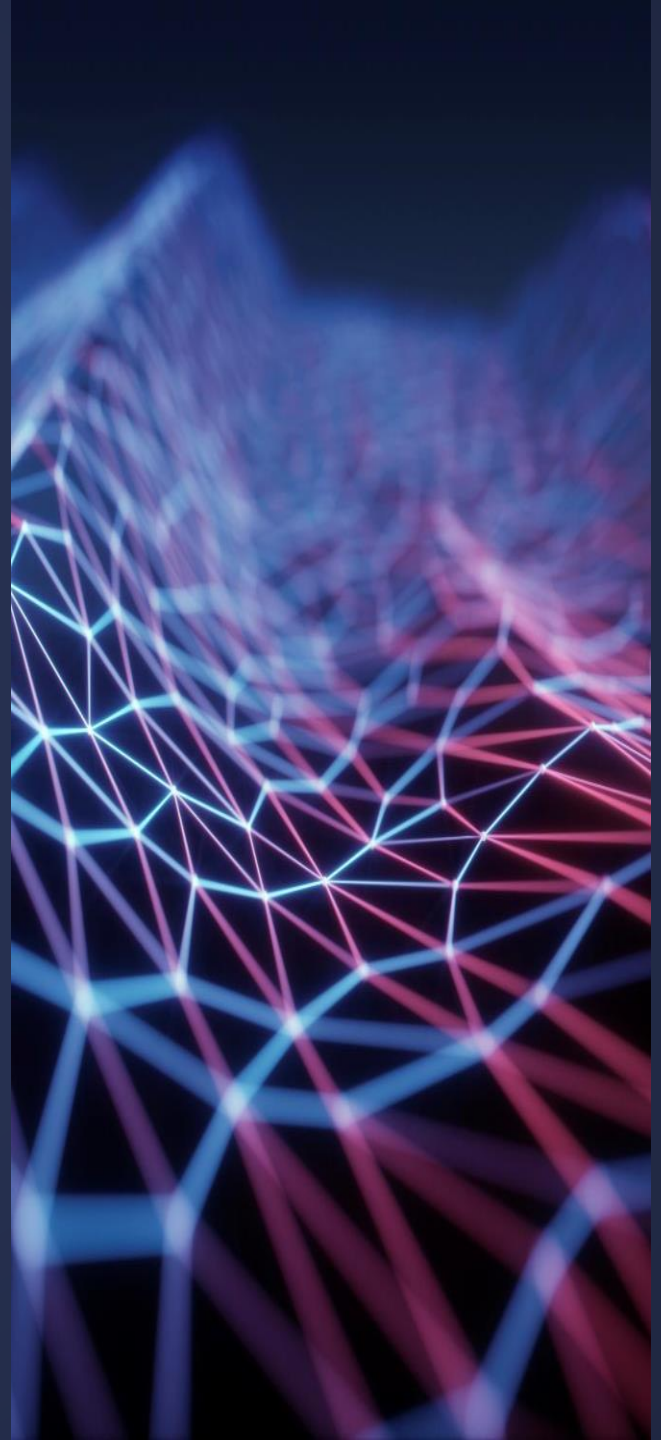
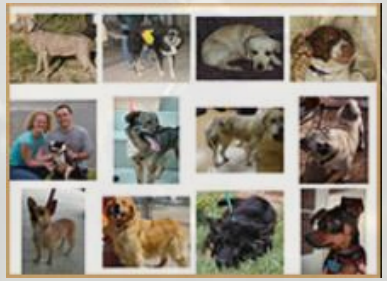


Image classification – simple neural network

2400
training images

600
testing images

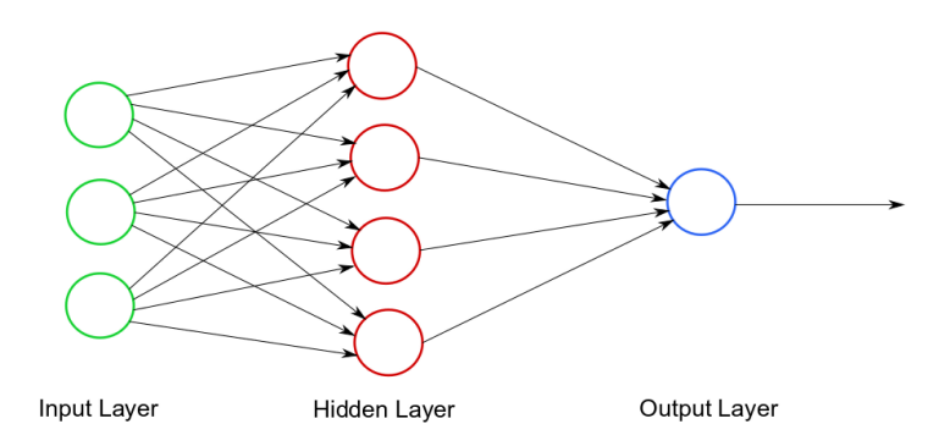
Dataset:
[pyimagesearch]

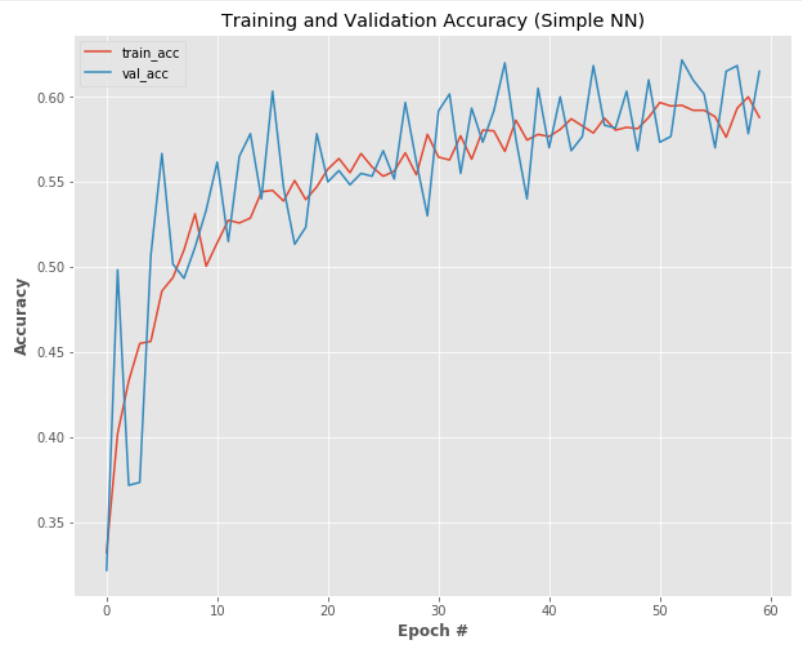


3 classes

- Cat
- Dog
- Panda

Simple neural network





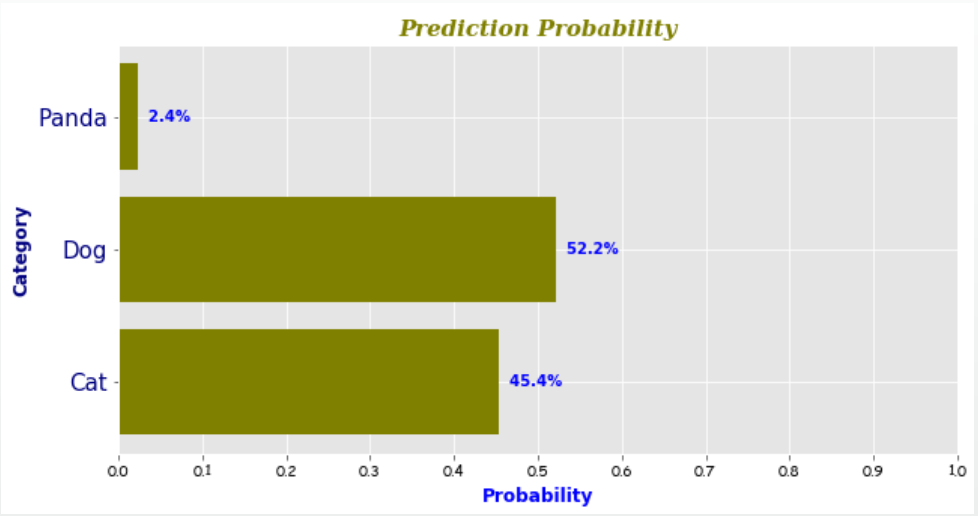
Training time = 4 minutes

Accuracy = 61%

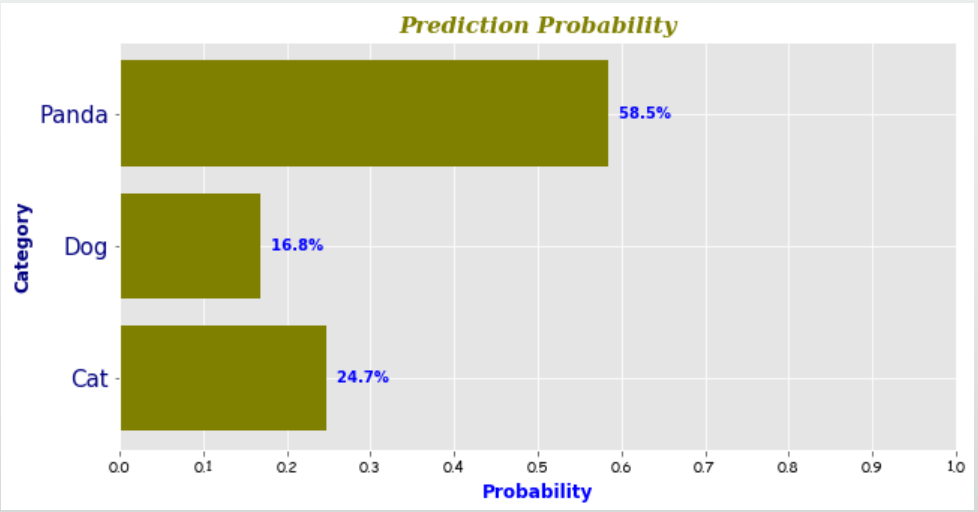
Classification results

Classification results

Dog 52.2%



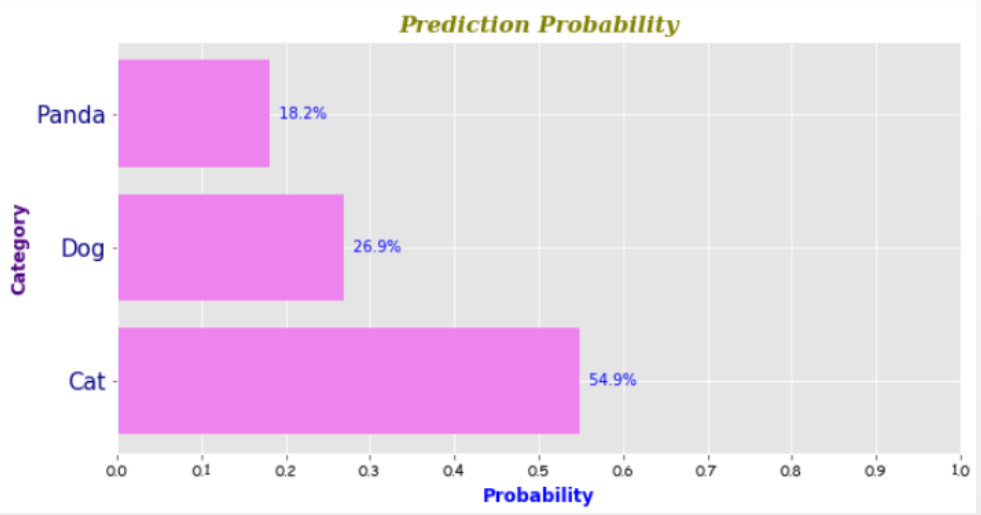
Panda 58.5%



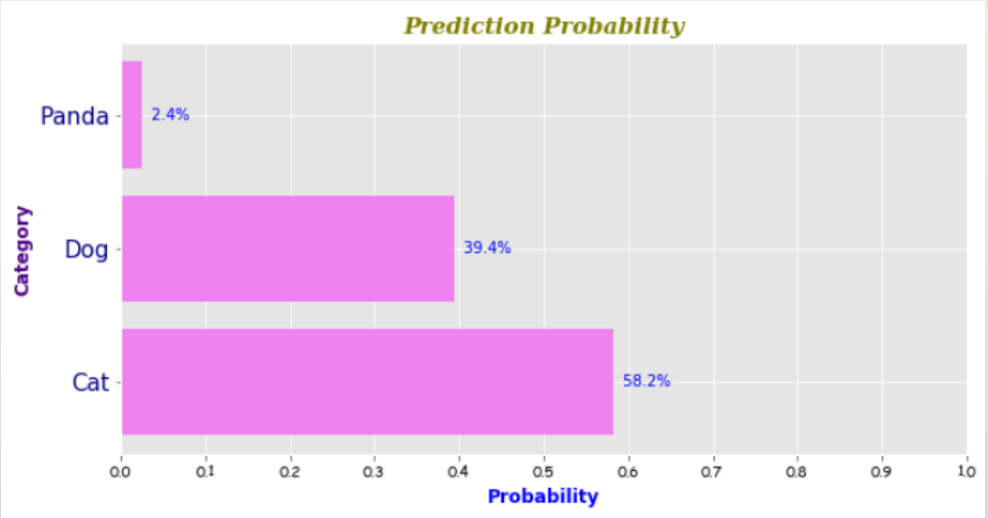
Classification results

Classification results

Cat 54.9%



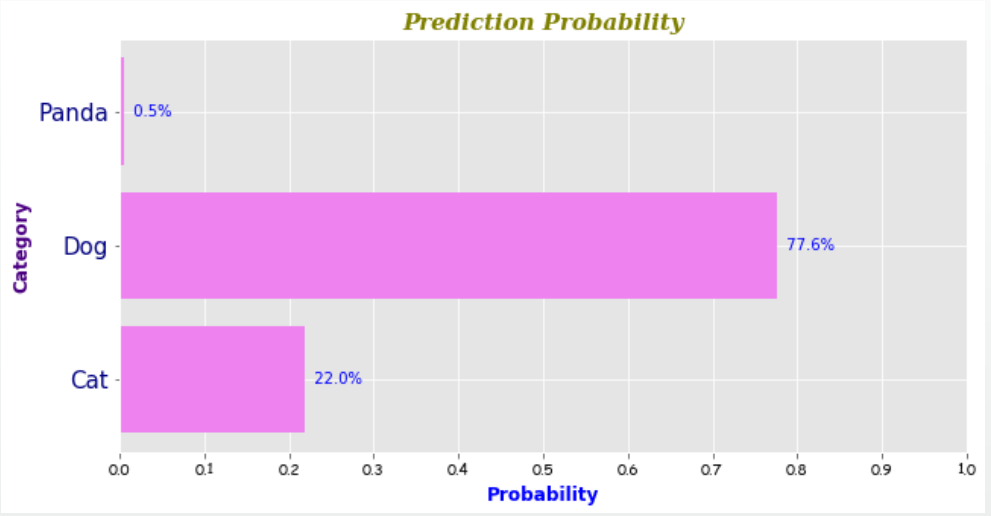
Cat 58.2%



Classification results

Classification results

Dog 77.6%



Dog 55.2%

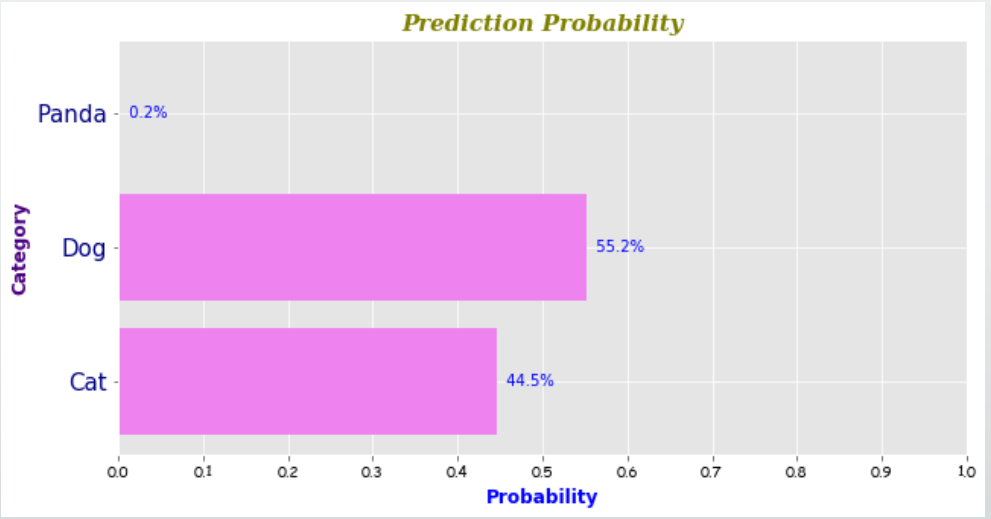
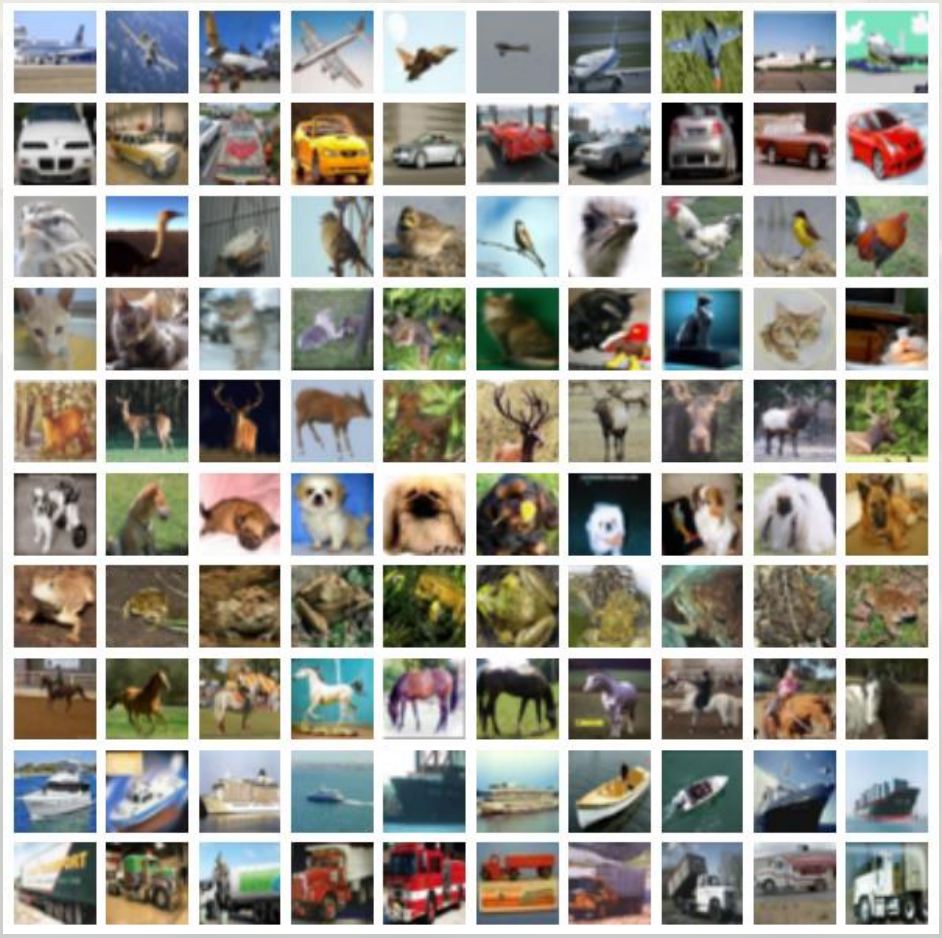


Image classification – convolutional neural network

50,000
training images

10,000
testing images

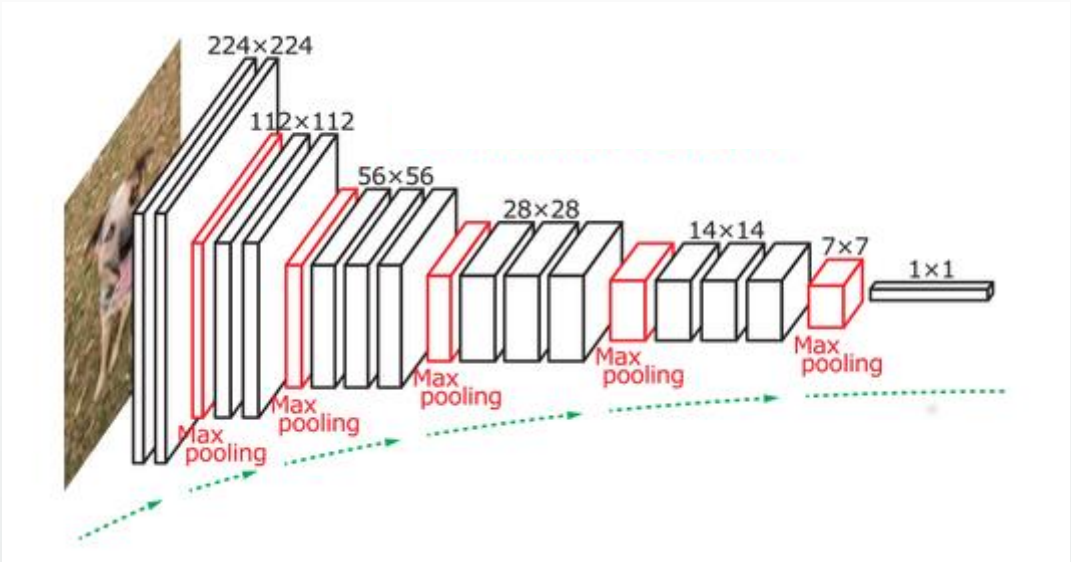
Dataset:
CIFAR-10

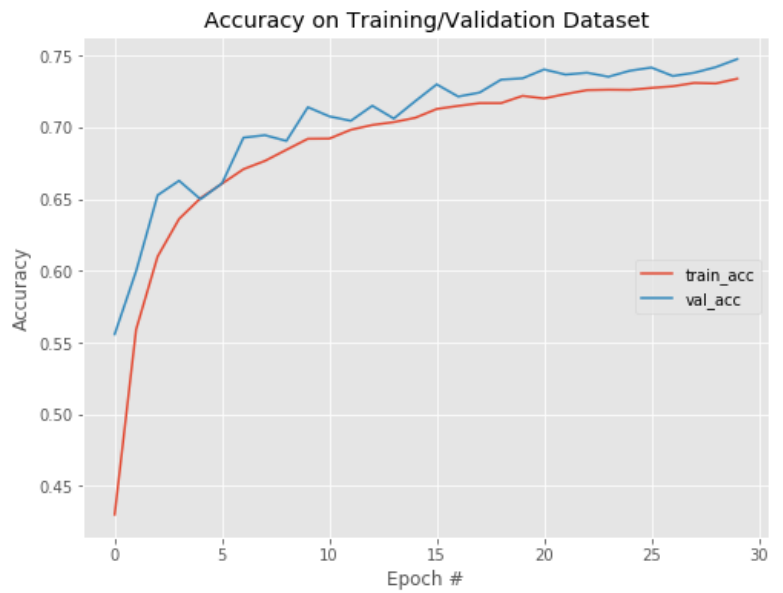


10 classes

- Airplane
- Car
- Bird
- Cat
- Deer
- Dog
- Frog
- Horse
- Ship
- Truck

Convolutional neural network



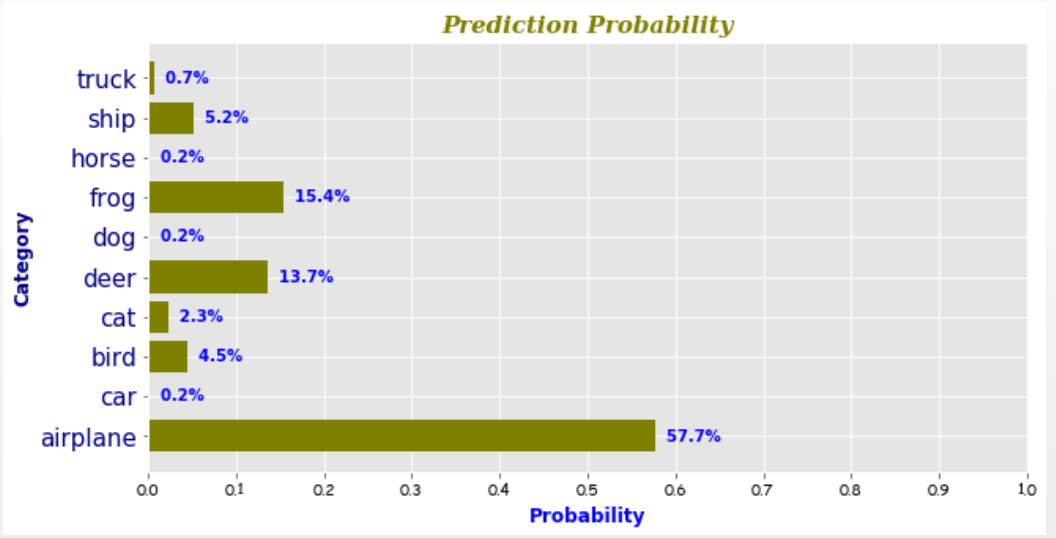


Training time = 4 hours

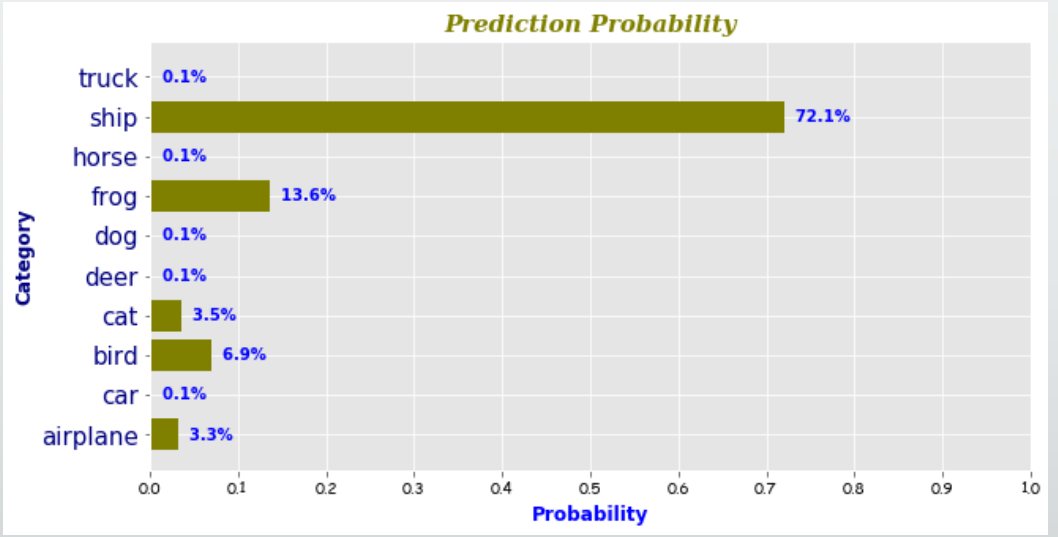
Accuracy = 75%

Classification results

Airplane 57.7%

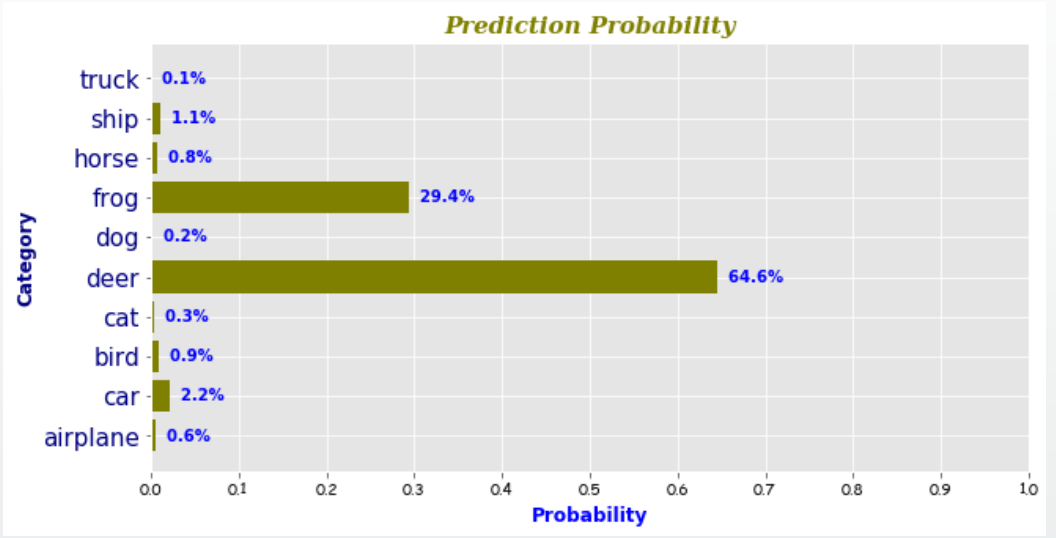


Ship 72.1%

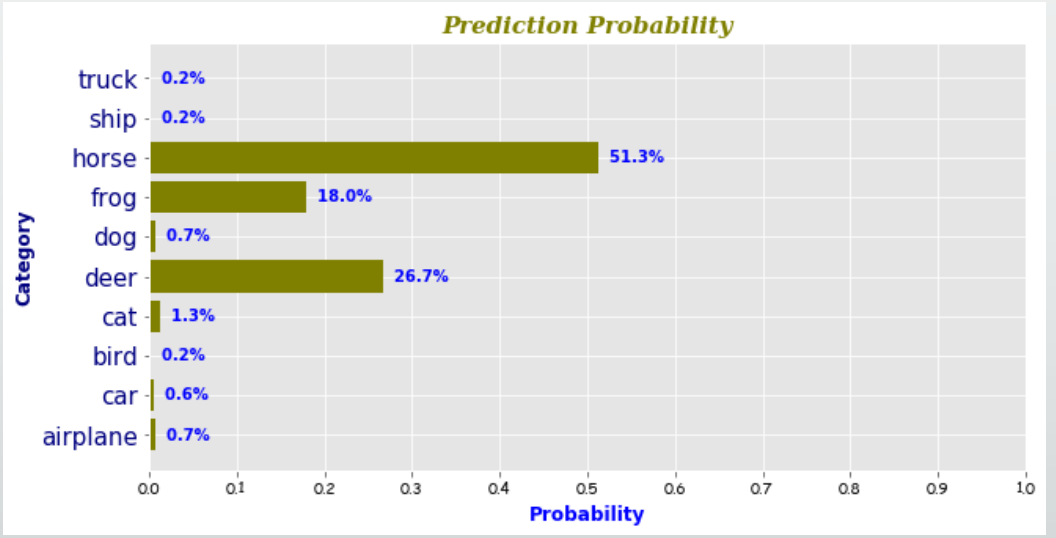


Classification results

Deer 64.6%

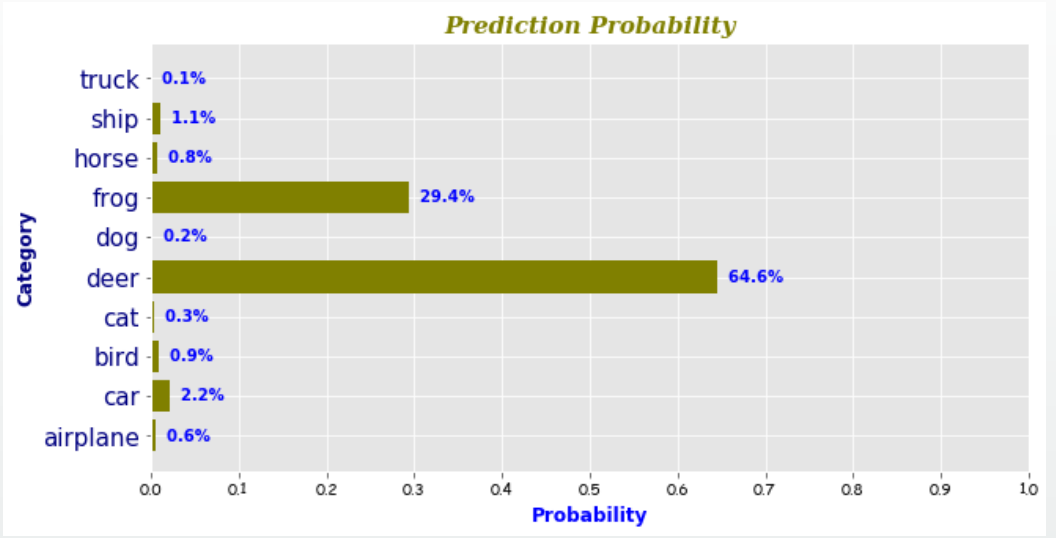


Horse 51.3%



Classification results

Deer 64.6%



Horse 51.3%

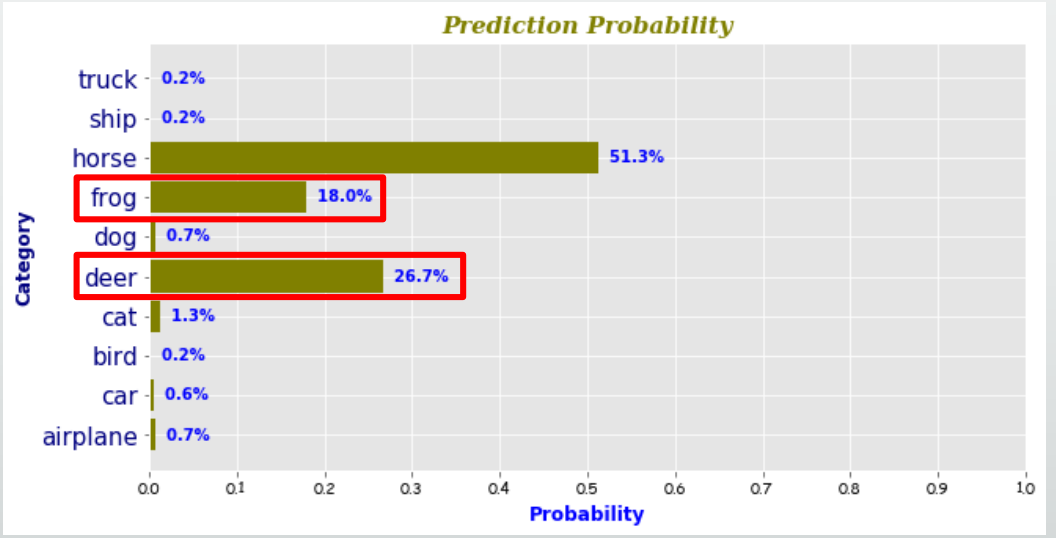


Image classification – transfer learning

1,200,000
training images

150,000
testing images

Pre-trained model:
VGG16
University of Oxford

1000 classes

Animal

fish
bird
mammal
invertebrate

Plant

tree
flower
vegetable

Activity

sport

Material

fabric

Instrumentation

utensil
appliance
tool
musical instrument

Scene

room
geological formation

Food

beverage

Classification results




Classification results

Basset 79.6%

Beagle 56.5%

English foxhound 48.4%

Walker hound 51.4%

Classification results





Classification results

Egyptian cat 77.3%

Persian cat 94.9%

Siamese cat 99.9%

Tabby cat 68.4%

Tiger cat 36.2%

Classification results












Classification results

Ptarmigan 99.9%

Quail 99.6%

Black grouse 99.9%

Bulbul 99.9%

Chickadee 99.9%

Coucal 99.9%

Goldfinch 99.9%

Hornbill 99.9%

Indigo bunting 99.9%

Jay 99.9%

Magpie 99.9%

Partridge 81.6%

Next Steps

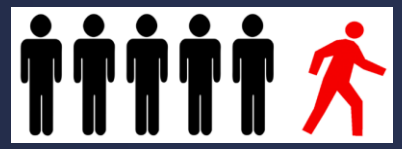
To train the model on common birds and animals found in Singapore

“The model is as intelligent as you train it to be”

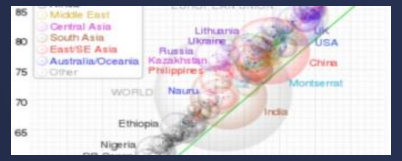
Metis Projects

- Computer Vision (CV) image classification using artificial neural network

- Natural Language Processing (NLP) to analyse product reviews by online shoppers



- Classification analysis on Telco customer churn



- Regression analysis to predict life expectancy on a country level

- Exploratory Data Analysis on NYC MTA turnstile data

James Ng

Data Science · Project Management · MSc

Thank You

Metis Projects

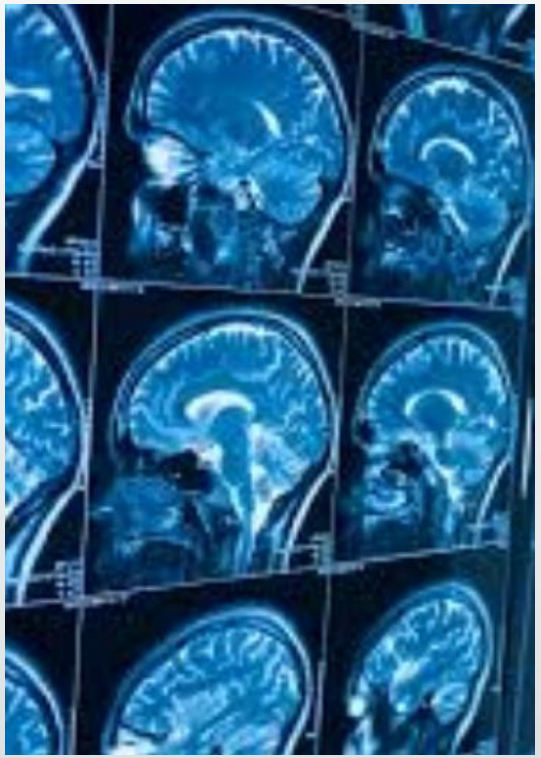
- Computer Vision (CV) image classification using artificial neural network
- Natural Language Processing (NLP) to analyse product reviews by online shoppers
- Classification analysis on Telco customer churn
- Regression analysis to predict life expectancy on a country level
- Exploratory Data Analysis on NYC MTA turnstile data

www.linkedin.com/in/jnyh/

James Ng
2019-09-27

- Coastal surveillance to identify floating objects, e.g. log, shark, illegal immigrant

- Anomaly detection in medical scans

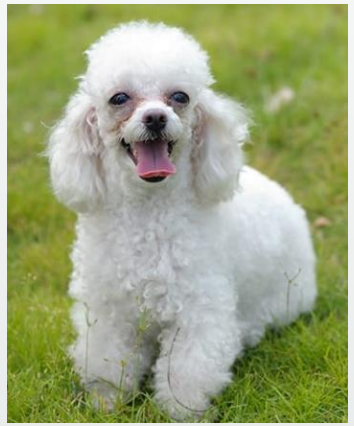


- Autonomous vehicle to identify surrounding objects

Breed identification

Miniature poodle 60.3%

Standard poodle 87.8%



Toy poodle 68.7%

Breed identification

Cheetah 99.3%

Cougar 77.8%

Jaguar 60.5%

Leopard 98.5%

Lynx 99.9%

Snow Leopard 92.4%

Breed identification

Guinea pig 99.9%

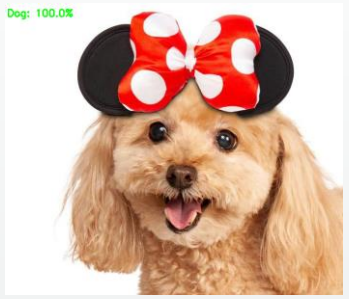
Guinea pig 99.5%

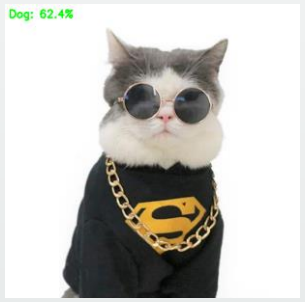
Guinea pig 72.6%

Guinea pig 99.9%

Pig 25.8%

Challenging images for classification





Classification results

Pickup truck 97.2%

Garbage truck 99.6%

Tow truck 76.4%

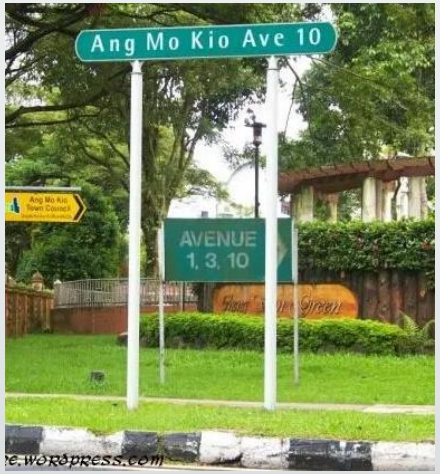
Fire truck 99.1%

Trailer truck 76.3%

Classification results

Street sign 97.3%

Traffic light 97.3%



Street sign 98.5%

Traffic light 99.9%