Natural Language Processing

Session-1(04:00-06:00)

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Outline

- Deep learning
- Hardware
- Software
- Colab
- Environment Setup
- Cat or dog classification

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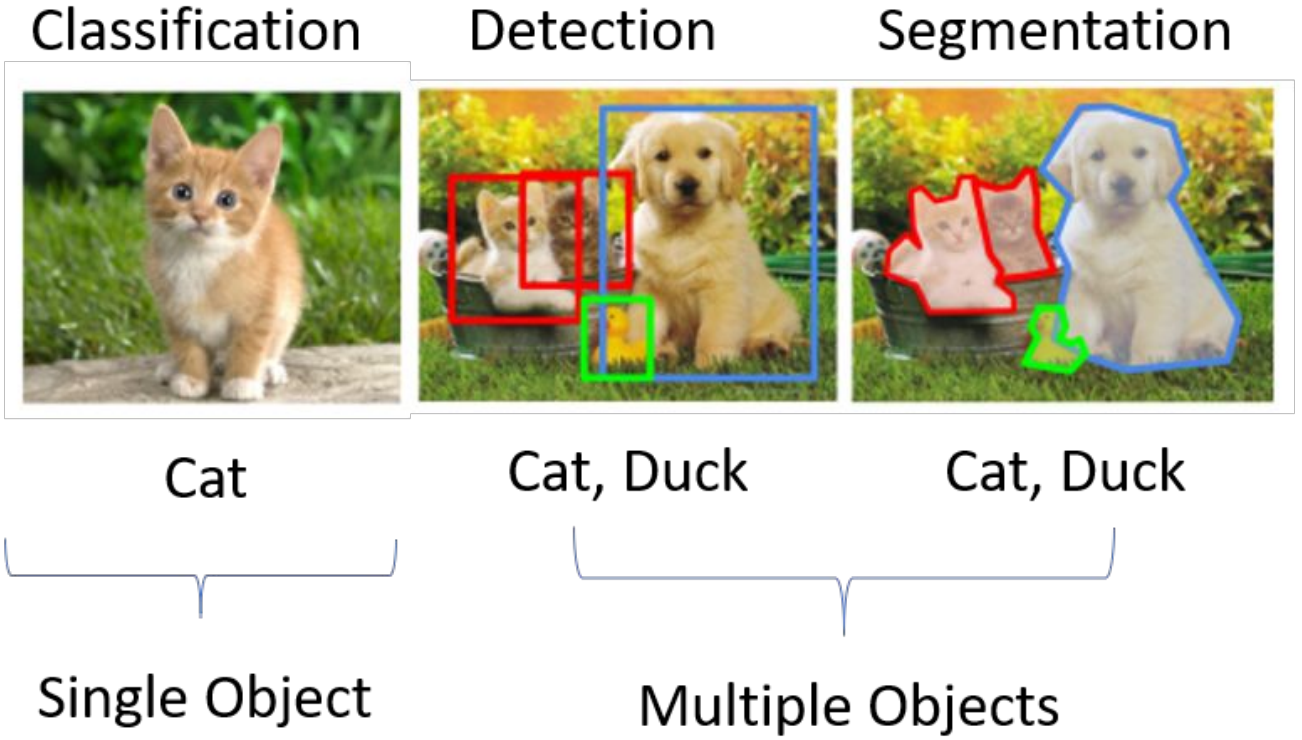
Deep learning

- Classification
- Detection
- Segmentation
- Recognition
- Generation



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How to solve ?

- Hardwere
- Software

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Hardware

- Graphics processing Unit (GPU)
- Tensor Processing Unit (TPU)
- Central processing Unit (CPU)

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Hardwere?

- Offline Service
  - Personal Computer
  - Gaming PC (Nvidia cuda capable GPU)
  -
- Cloud Service
  - Unpaid Service
    - Google colab
    - Microsoft azure
    - Kaggle notebook
  - Paid Service
    - GCP
    - AWS
    - HPC

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Software

Programming Language

- Python-3/2
- C++
- julia
- ….

Deep learning framework

- Pytorch
- Tensorflow
- Keras
- MxNet
- ….

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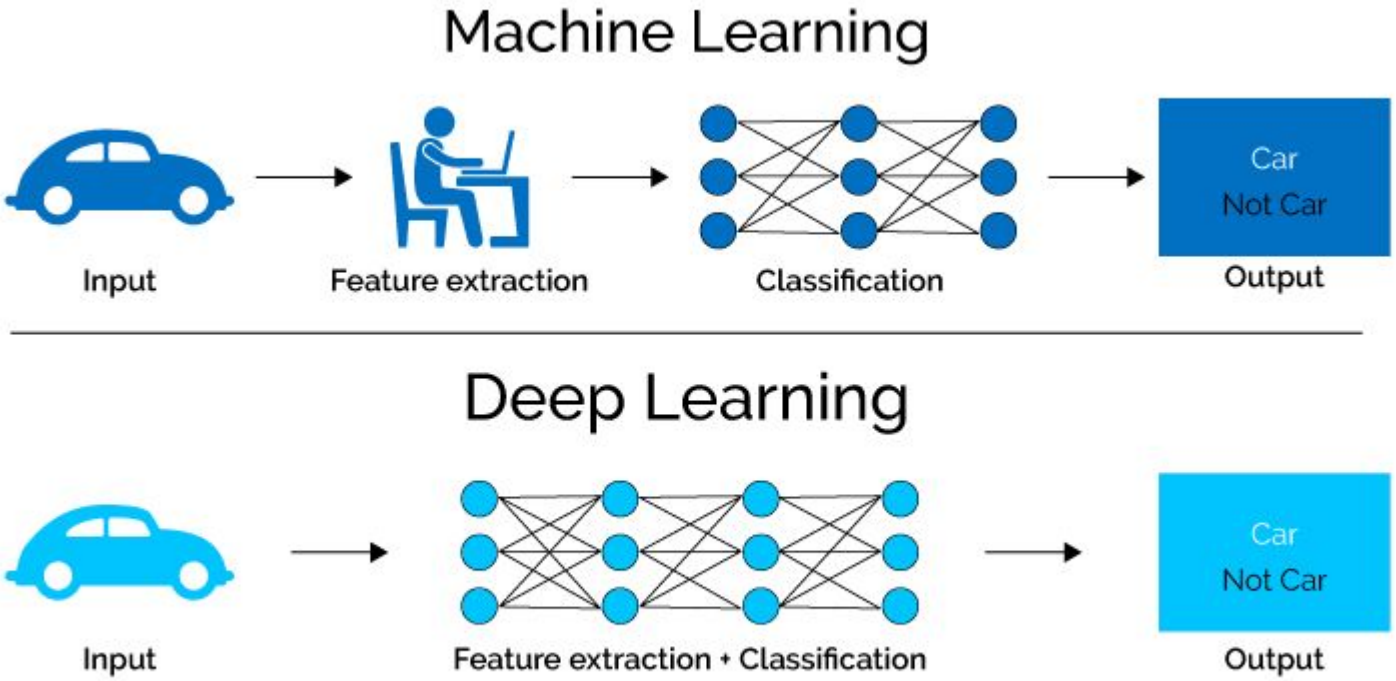
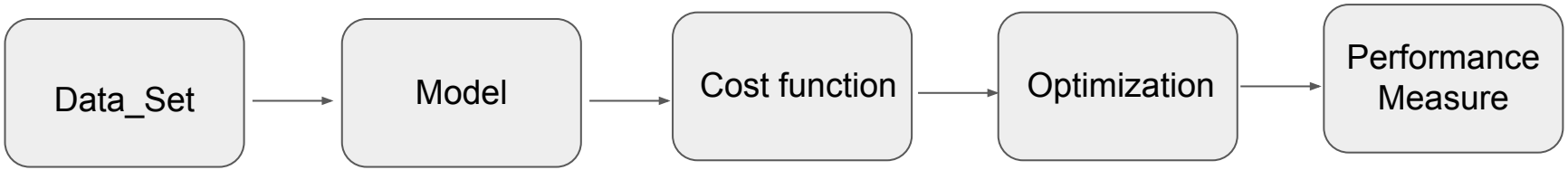
ML Vs DL



Ref-https://semiengineering.com/deep-learning-spreads/

Deep Learning Problem Design

Problem - Cat vs dog Object classification



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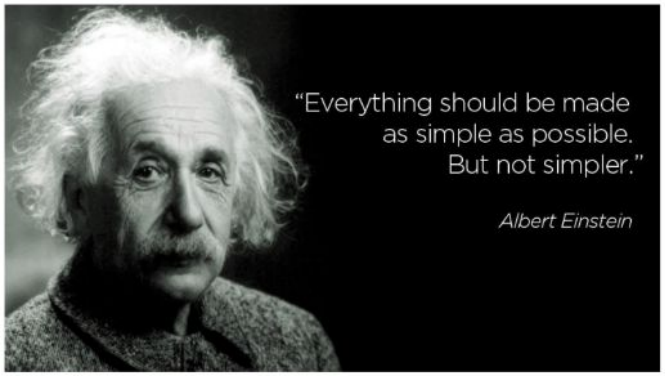

Input Image:

TensorFlow Model:

Neural Network

Output:

5

(with 87% confidence)

1

```python
# import tensorflow and keras (tf.keras not "vanilla" Keras)
import tensorflow as tf
from tensorflow import keras
```

2

```python
# get data
(train_images, train_labels), (test_images, test_labels) = \
keras.datasets.mnist.load_data()
```

3

```python
# setup model
model = keras.Sequential([
    keras.layers.Flatten(input_shape=(28, 28)),
    keras.layers.Dense(128, activation=tf.nn.relu),
    keras.layers.Dense(10, activation=tf.nn.softmax)
])

model.compile(optimizer=tf.train.AdamOptimizer(),
              loss='sparse_categorical_crossentropy',
              metrics=['accuracy'])
```

4

```python
# train model
model.fit(train_images, train_labels, epochs=5)
```

5

```python
# evaluate
test_loss, test_acc = model.evaluate(test_images, test_labels)
print('test accuracy:', test_acc)
```

6

```python
# make predictions
predictions = model.predict(test_images)
```

Ref: MIT Lex Fridmen.

Datasets

- Training samples
- Validation samples
- Testing samples

} Training samples

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DL Terminology

- Iteration
- Epoch
- Bach Size

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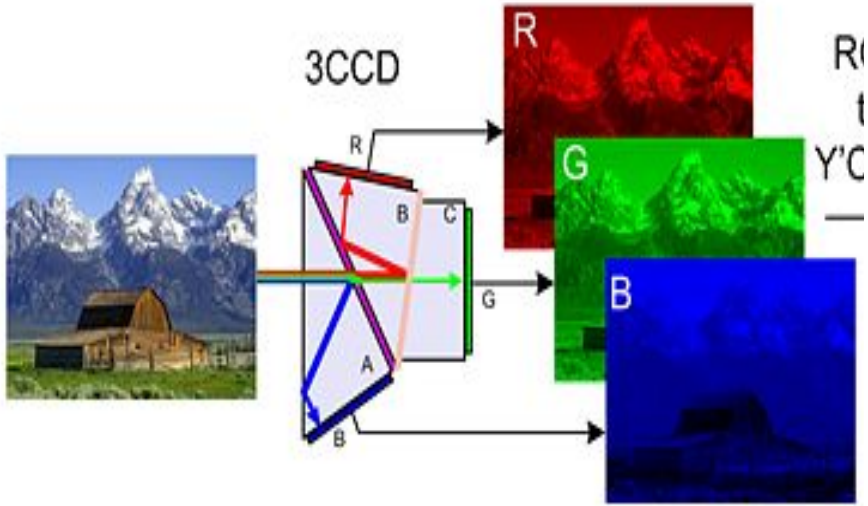
Color image



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		14	125	233	201	98	159
253	144	120	251	41	147	204
67	100	32	241	23	165	30
209	118	124	27	59	201	79
210	236	105	169	19	218	156
35	178	199	197	4	14	218
115	104	34	111	19	196	
32	69	231	203	74		

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Thank You ….