

## Course 2: AI Coding for Fintech in 60 Minutes

# Courses

## AI Journey - Beginner to Expert

- ▶ Course 1: AI for Everyone in 60 Minutes
- ▶ Course 2: AI Coding for Fintech in 60 Minutes
- ▶ Course 3: Apply AI in Business in 60 Minutes
- ▶ Course 4: Machine Learning Algorithms in 60 Minutes
- ▶ Course 5: Deep Learning Algorithms in 60 Minutes

# Objective

Within 60 minutes, you will:

- ▶ Understand AI in Fintech
- ▶ Understand popular Deep Learning Frameworks
- ▶ Get hands on coding with Keras and TensorFlow

# AI Landscape in FinTech

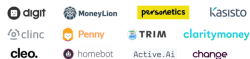


## THE AI IN FINTECH MARKET MAP

### CREDIT SCORING / DIRECT LENDING



### ASSISTANTS / PERSONAL FINANCE



### REGULATORY, COMPLIANCE, & FRAUD DETECTION



### GENERAL PURPOSE / PREDICTIVE ANALYTICS



### BUSINESS FINANCE & EXPENSE REPORTING



### QUANTITATIVE & ASSET MANAGEMENT



### INSURANCE



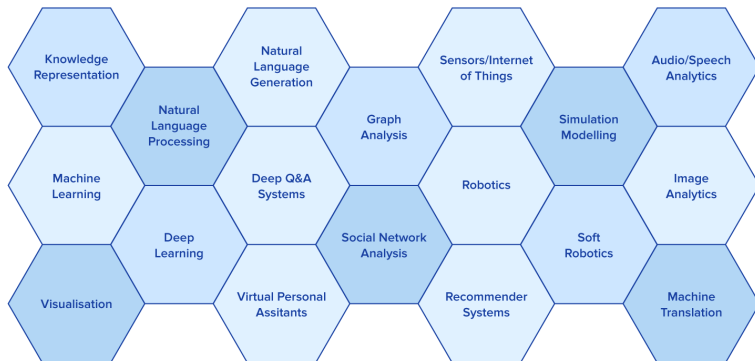
### MARKET RESEARCH / SENTIMENT ANALYSIS



### DEBT COLLECTION



# Deep Learning for Financial Services




# Deep Learning Frameworks

## Popular Deep Learning Frameworks

- ▶ TensorFlow - Google
- ▶ Keras - TensorFlow, CNTK
- ▶ Pytorch - Facebook
- ▶ MXNet - AWS
- ▶ CNTK - Microsoft

# Deep Learning Frameworks Comparison

	Languages	Tutorials and training materials	CNN modeling capability	RNN modeling capability	Architecture: easy-to-use and modular front end	Speed	Multiple GPU support	Keras compatible
Theano	Python, C++	++	++	++	+	++	+	+
TensorFlow	Python	+++	+++	++	+++	++	++	+
Torch	Lua, Python (new)	+	+++	++	++	+++	++	
Caffe	C++	+	++		+	+	+	
MXNet	R, Python, Julia, Scala	++	++	+	++	++	+++	
Neon	Python	+	++	+	+	++	+	
CNTK	C++	+	+	+++	+	++	+	

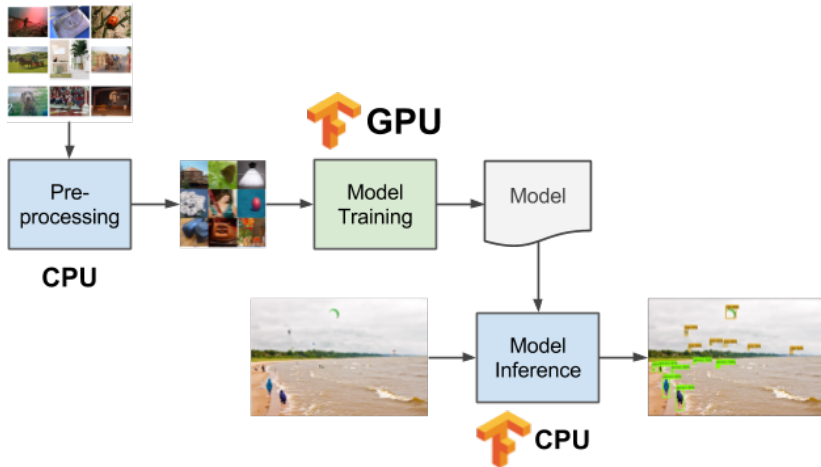
# Why TensorFlow



- ▶ Python API
- ▶ Flexible enough for research, yet built with production use in mind
- ▶ Portable on heterogeneous systems, from mobile devices to large-scale distributed machines, and on a variety of OS (Android, Windows, iOS, ...).
- ▶ TensorBoard visualization has no rival.
- ▶ Large community and supported by Google.



# TensorFlow Workflow



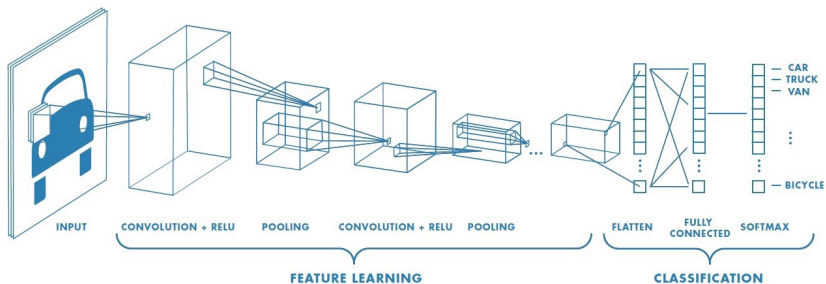
# Why Keras

- ▶ Keras is a wrapper that allows you to use either the Theano or the TensorFlow backend
- ▶ Keras has beautiful guiding principles: modularity, minimalism, extensibility, and Python-nativeness. In practice, this makes working in Keras simple and enjoyable.
- ▶ Keras has out-of-the-box implementations of common network structures. It's fast and easy to get a convolutional neural network up and running.

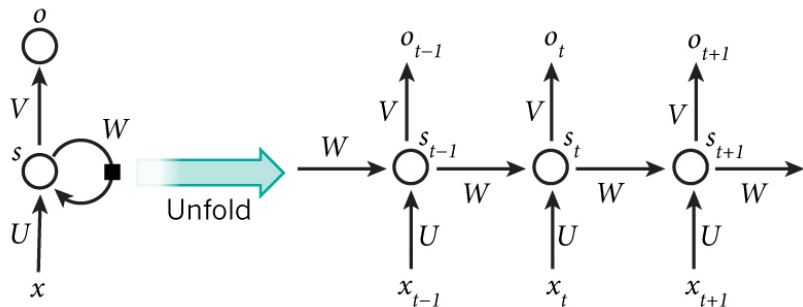
# Neural Network Types

Type	Variants	Network structure	Applications
BP	RBF GRNN	Input layer Output layer Hidden layer	Data fitting Pattern recognition Classification
CNN	LeNet, AlexNet VggNet	Input layer Convolution layer Pooling layer Full connected layer	Image processing Speech signal Natural Language Processing
RNN	LSTM	Input layer Hidden layer Output layer	Time series analysis Emotion analysis Natural Language Processing
GAN	DCGAN	Discrimination model Generation model	Image generation Video generation

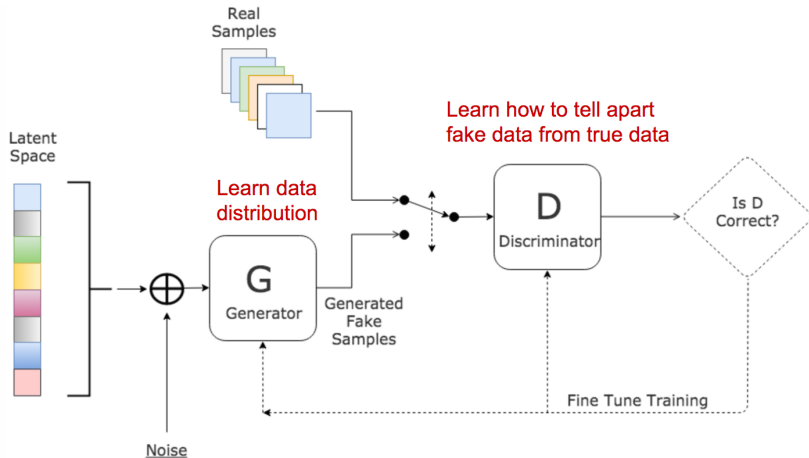
# CNN - Convolutional Neural Network



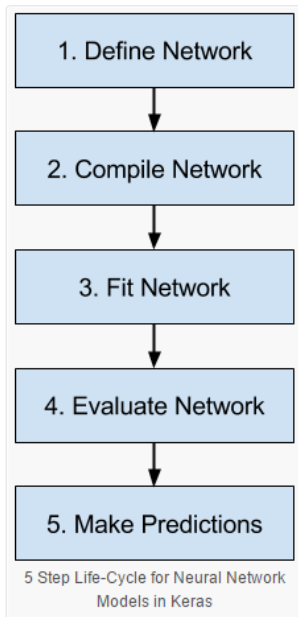
# RNN - Recurrent Neural Network



# GAN - Generative Adversarial Network



# Keras Workflow



# Keras Example

```
1  from keras.models import Sequential
2  from keras.layers import Dense, Activation
3
4  # Simple feed-forward architecture
5  model = Sequential()
6  model.add(Dense(output_dim=64, input_dim=100))
7  model.add(Activation("relu"))
8  model.add(Dense(output_dim=10))
9  model.add(Activation("softmax"))
10
11 # Optimize with SGD
12 model.compile(loss='categorical_crossentropy',
13               optimizer='sgd', metrics=['accuracy'])
14
15 # Fit model in batches
16 model.fit(X_train, Y_train, nb_epoch=5, batch_size
17           =32)
18
19 # Evaluate model
20 loss_and_metrics = model.evaluate(X_test, Y_test,
21                                   batch_size=32)
```



# Google Colab Notebooks

Google Colab Notebooks is a Google research project created to help disseminate machine learning education and research. It's a Jupyter notebook environment that requires no setup to use and runs entirely in the cloud.

- ▶ Tutorial: ML & DL
- ▶ Coding: Generating Handwritten Digits with DCGAN

Q & A

Thank You!

# Appendix

- ▶ Google Colab Notebooks  
<https://colab.research.google.com/>
- ▶ Summary of concepts in Deep Learning  
[https://github.com/ppant/deeplearning.ai-notes/blob/master/Summary\\_of\\_Deep\\_Learning\\_Concepts.ipynb](https://github.com/ppant/deeplearning.ai-notes/blob/master/Summary_of_Deep_Learning_Concepts.ipynb)
- ▶ Deep Learning Frameworks 2019 (Video)  
<https://youtu.be/SJld00s4vB8>
- ▶ Keras Explained (Video)  
[https://youtu.be/j\\_pJmXJwMLA](https://youtu.be/j_pJmXJwMLA)