

The background of the slide is a photograph of a lush green forest. Sunlight filters through the dense canopy of tall trees, creating bright highlights on the trunks and leaves. The foreground shows large, mossy rocks and fallen logs.

# Intro to Machine Learning

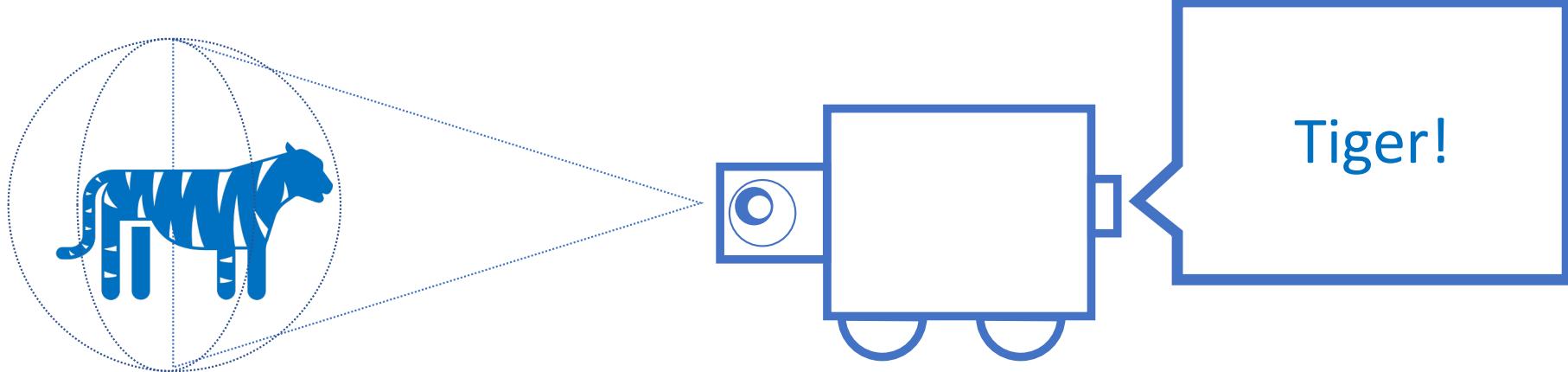
Jonny Kalambay

Slides:  
[jonnykalambay.com/ml](http://jonnykalambay.com/ml)

# What is Machine Learning

An application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed.

# What is Machine Learning



# Types of Machine Learning

Supervised Learning

Unsupervised Learning

Semi-Supervised Learning

Reinforcement-Learning

# Machine Learning Applications

Supervised

Unsupervised

Semi Supervised

Reinforcement

Virtual Assistants

Social Suggestions

Autonomous Vehicles

Product Recommendations

Face Recognition

Spam Filtering

Snapchat Filters

Chatbots

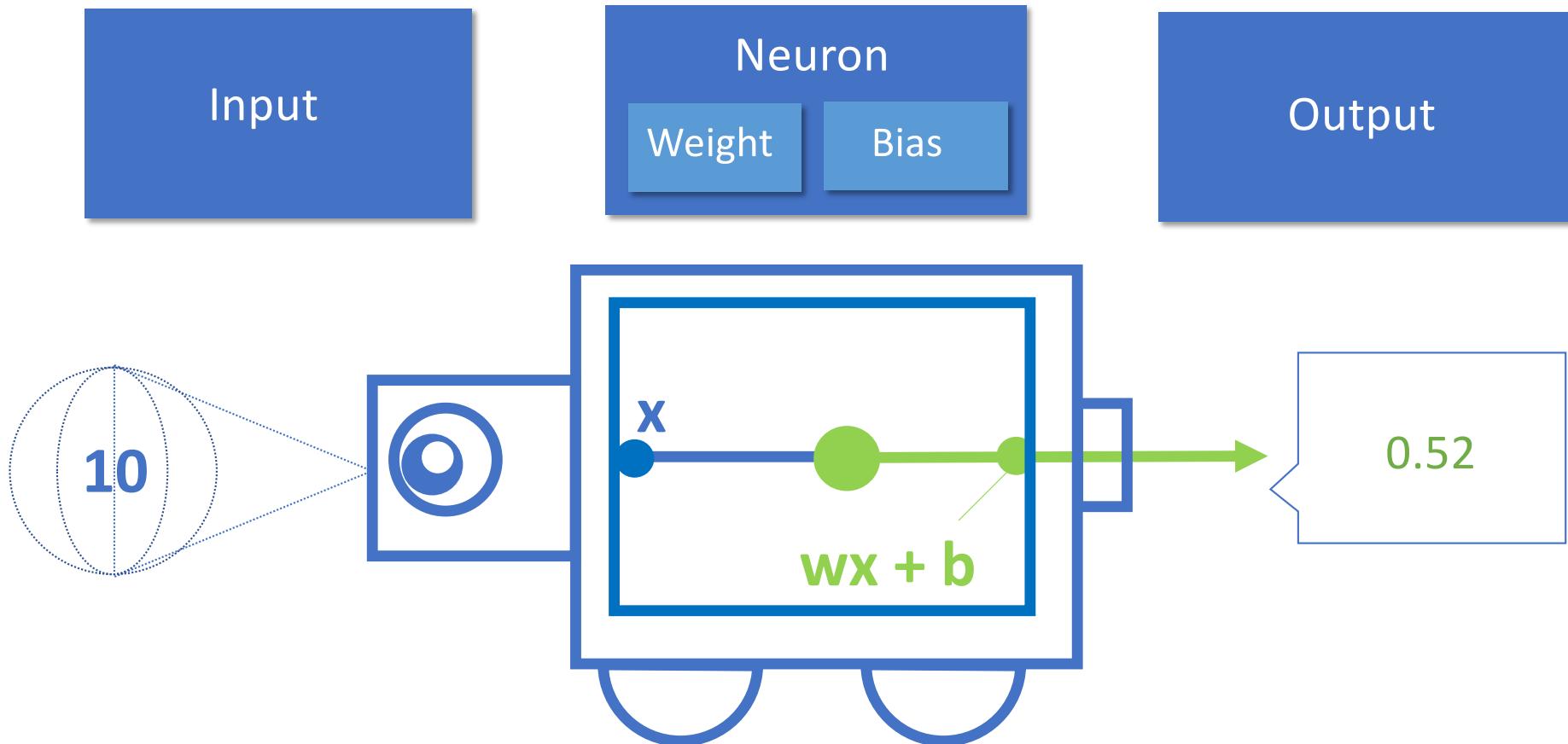
Marketing Analysis

Fraud Detection

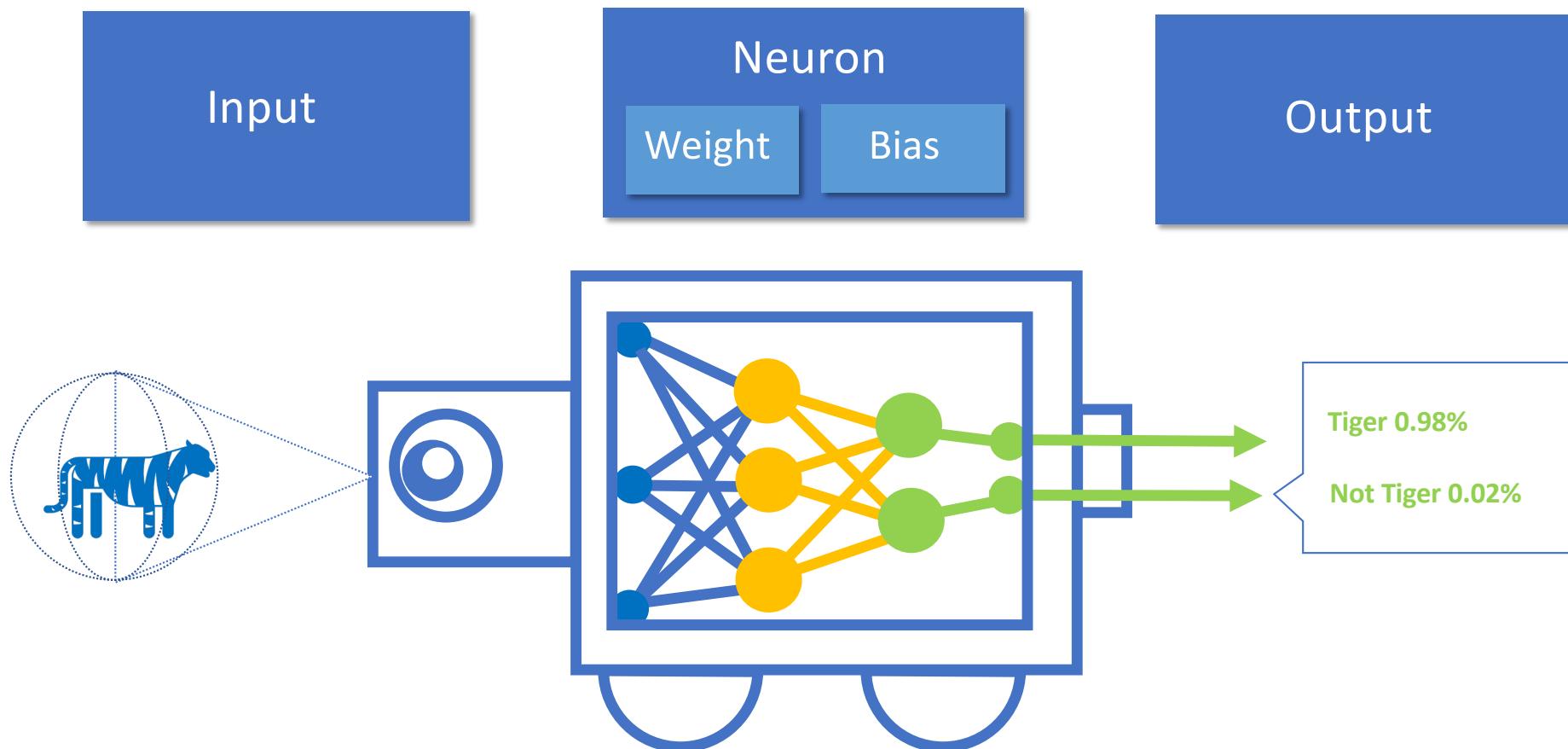
Website Classification

Game AI

# The Neural Network



# The Model



# Training

## Prediction

Data



Model



Predictions

## Loss Calculation

Predictions



Ground Truth



Loss Function



Loss

## Optimization

Loss



Model



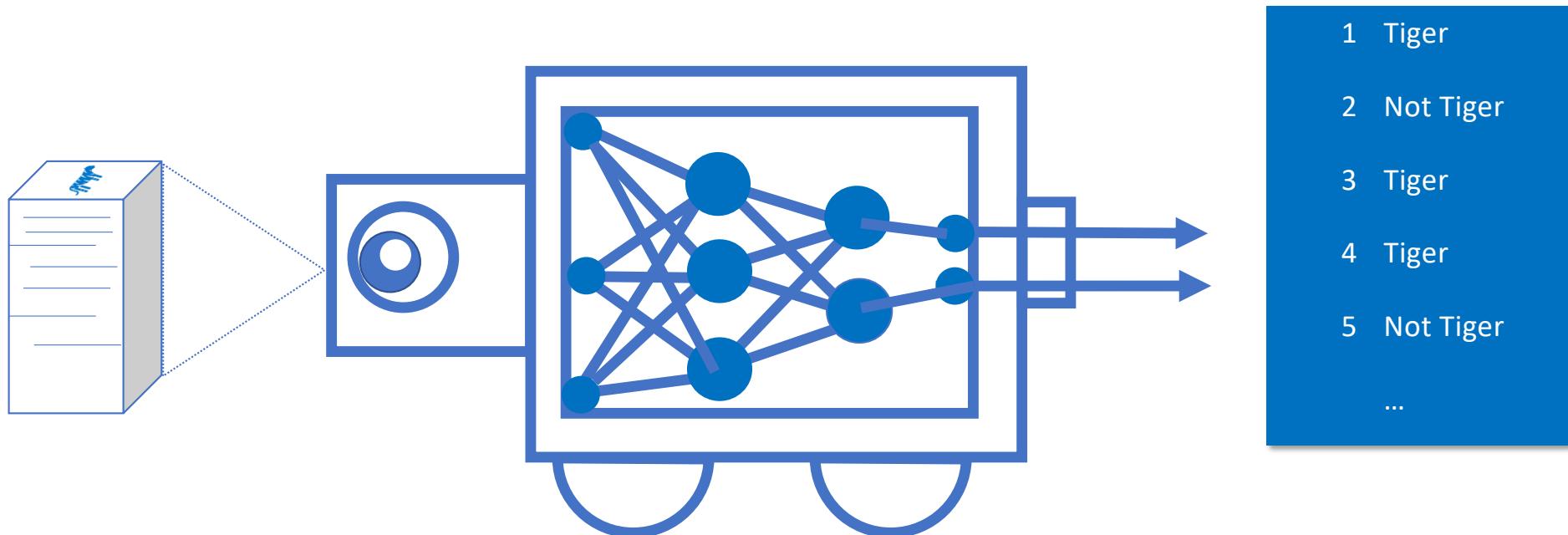
Optimizer



Adjusted Model

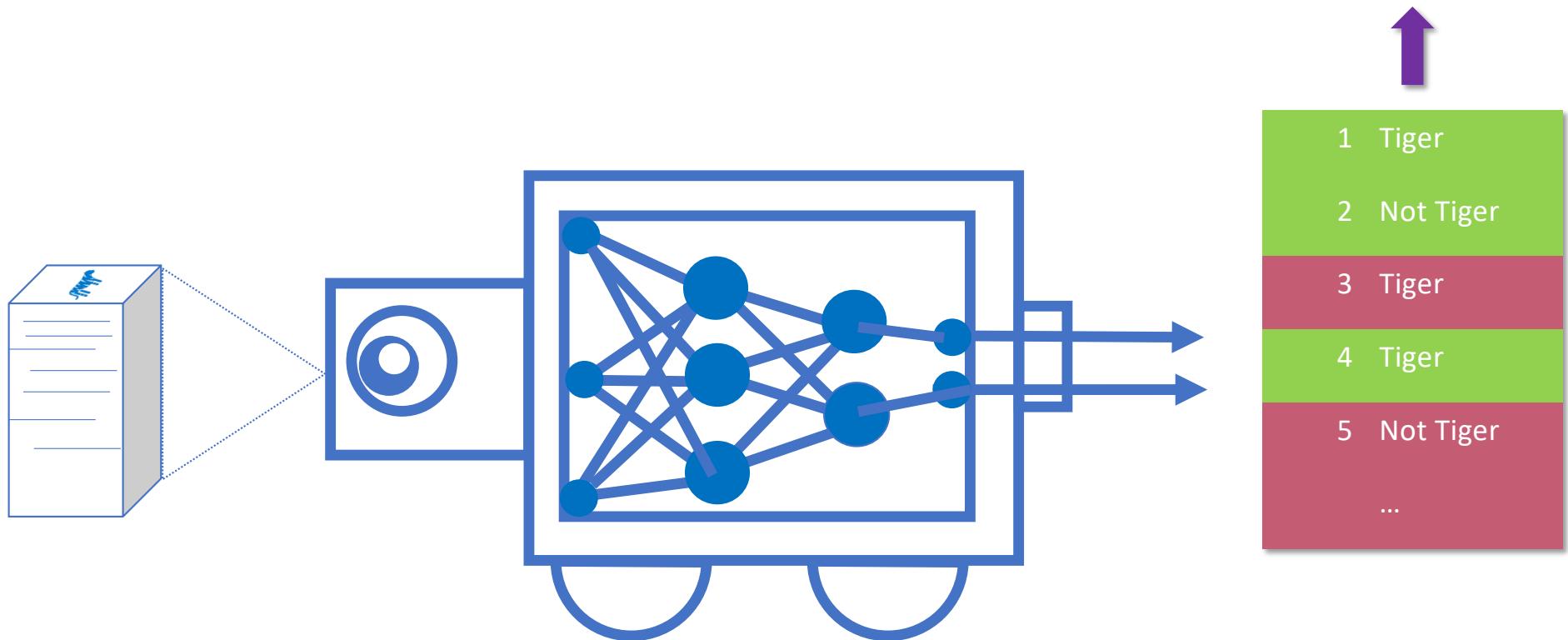
# Training

## Step 1: Prediction



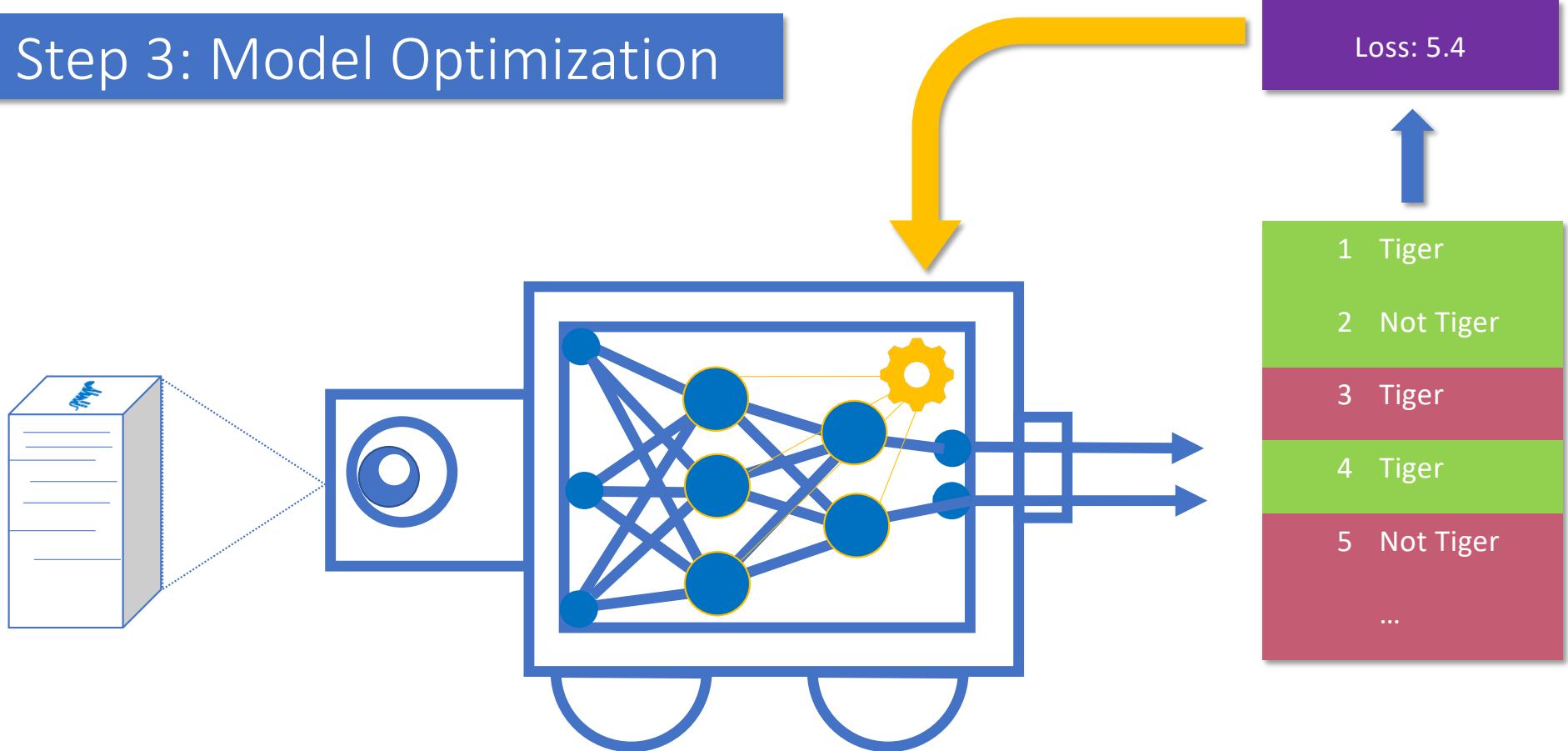
# Training

## Step 2: Loss Calculation

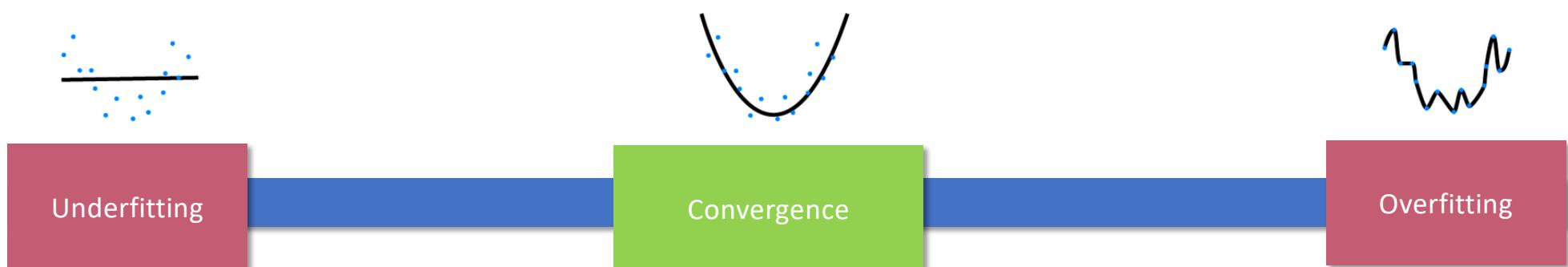
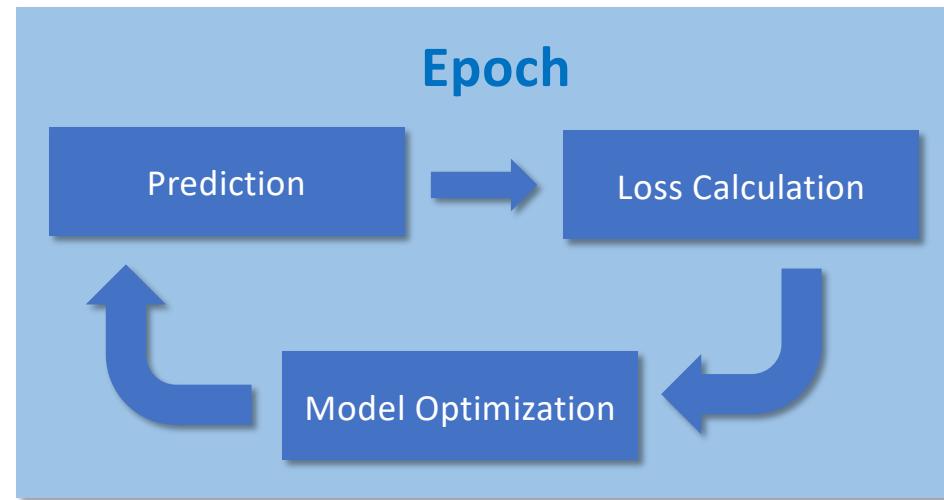


# Training

## Step 3: Model Optimization

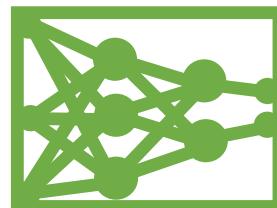


# Training Steps

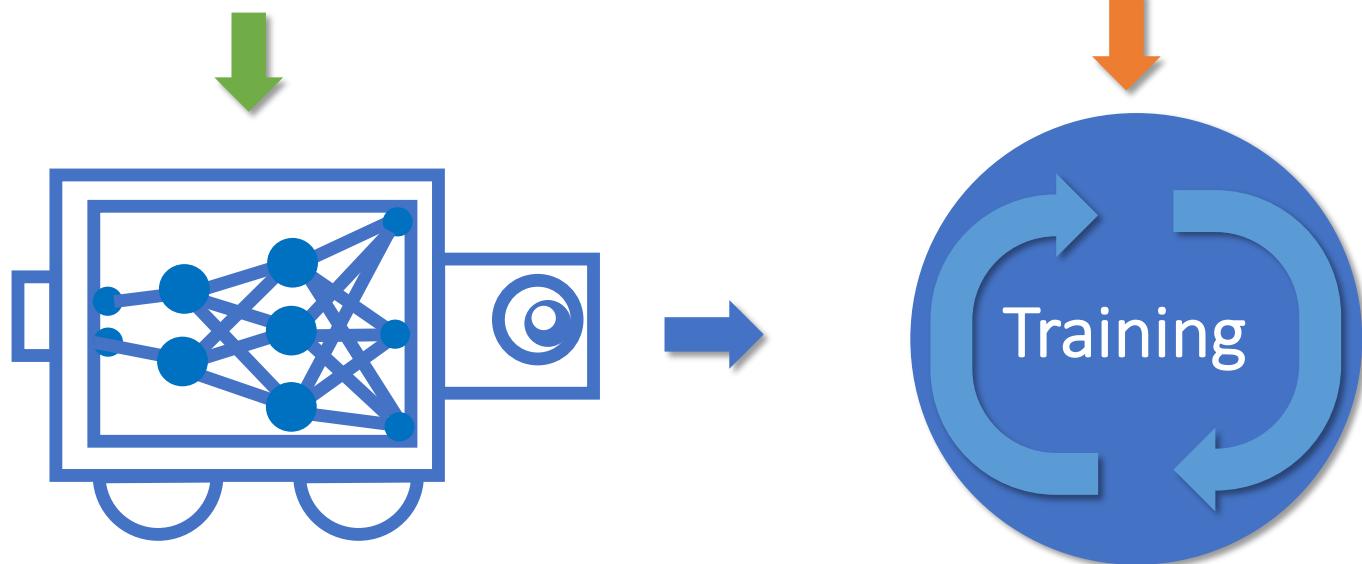


# Transfer Learning

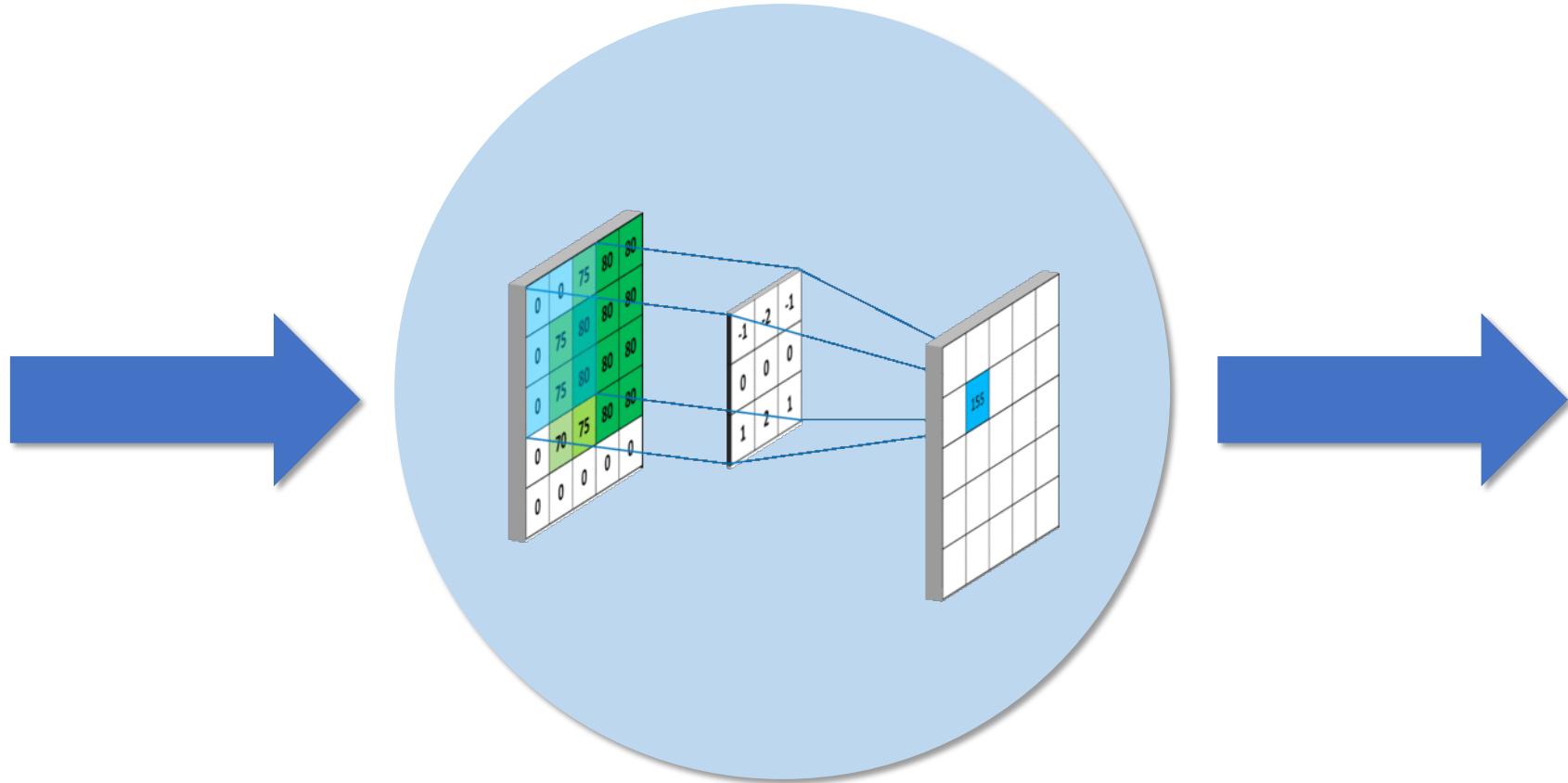
Pre-Trained  
Weights



Smaller  
Dataset

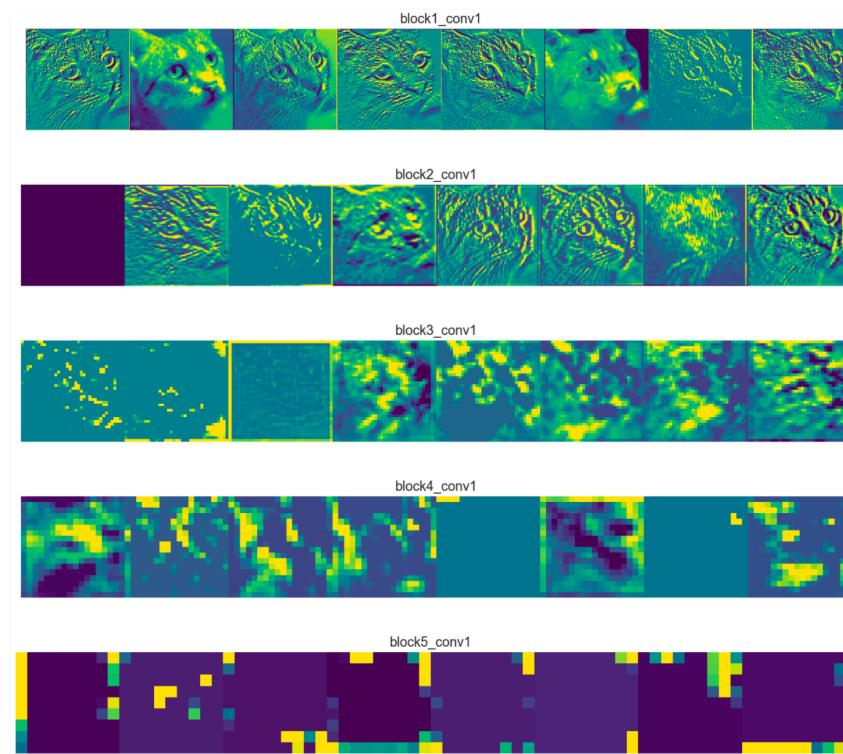


# Convolutional Neural Networks



<https://mlnotebook.github.io/post/CNN1/>

# Feature Extraction



<https://towardsdatascience.com/applied-deep-learning-part-4-convolutional-neural-networks-584bc134c1e2>

# Beyond Image Classification



Multi-Label



Object Detection



Image Segmentation

# Examples

## Linear Regression

[https://colab.research.google.com/drive/1VfGo\\_L89BERZ4d6opbDiDaYlu86O3WRW](https://colab.research.google.com/drive/1VfGo_L89BERZ4d6opbDiDaYlu86O3WRW)

## Image Classification

<https://colab.research.google.com/github/lmoroney/mlday-tokyo/blob/master/Lab5-Using-Convolutions-With-Complex-Images.ipynb>

# Where to Learn More

## Online Courses

- **Fast AI** - <https://www.fast.ai/>
- **Stanford** - Machine Learning - <https://www.coursera.org/learn/machine-learning>
- **Udacity** - <https://www.udacity.com/>

## Books

- **Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems** - Aurélien Géron
- **Deep Learning** - [Ian Goodfellow](#), [Yoshua Bengio](#), [Aaron Courville](#), and [Francis Bach](#)

## Other Resources

- **Kaggle Competitions** - <https://www.kaggle.com/>
- **Learn Data Science Meetup** - <https://www.meetup.com/LearnDataScience/>

# Thank You Questions?

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