

## ***Workshop Title:***

# ***Hands On with Deep Learning and IoT***

### **OVERVIEW**

Let's get started with Deep Learning and the Internet of Things! We'll do hands-on exercises: you'll use a webcam and a neural network to recognize images, aggregate data, and run real-time IoT analytics. Our goal is to get you excited about IoT and Deep Learning, and to set you up for success with maker projects in your community after the conference.

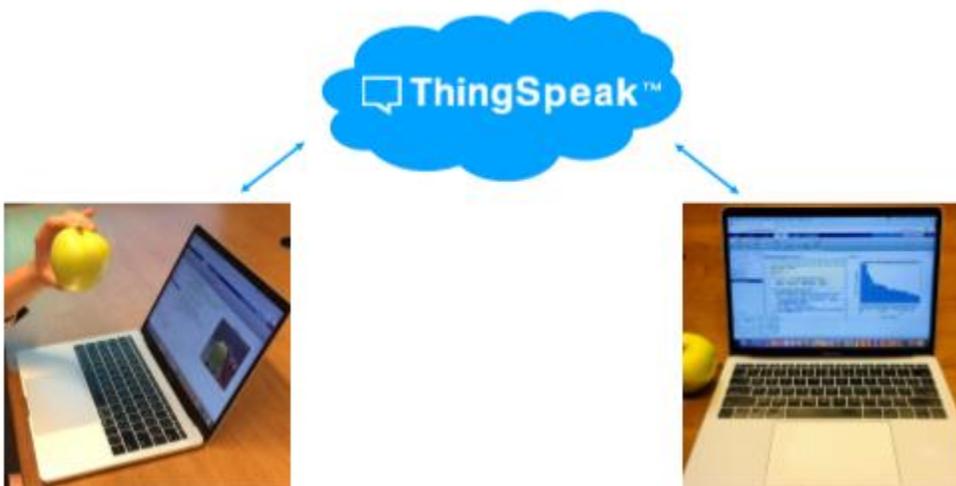
### **AUDIENCE**

In this workshop, we engage beginner and intermediate participants interested in getting started with Deep Learning and the Internet of Things (IoT). We will have project-based-learning exercises for both skill levels. Users will need a single laptop and a browser per group. We'll supply all software in the cloud we'll use during the workshop, and any other hardware required to support workshop demos.

### **INTRODUCTION**

This workshop integrates two popular application areas, and we expect it to be a great hit. Our confidence in the popularity of this workshop stems from our past experience delivering similar workshops.

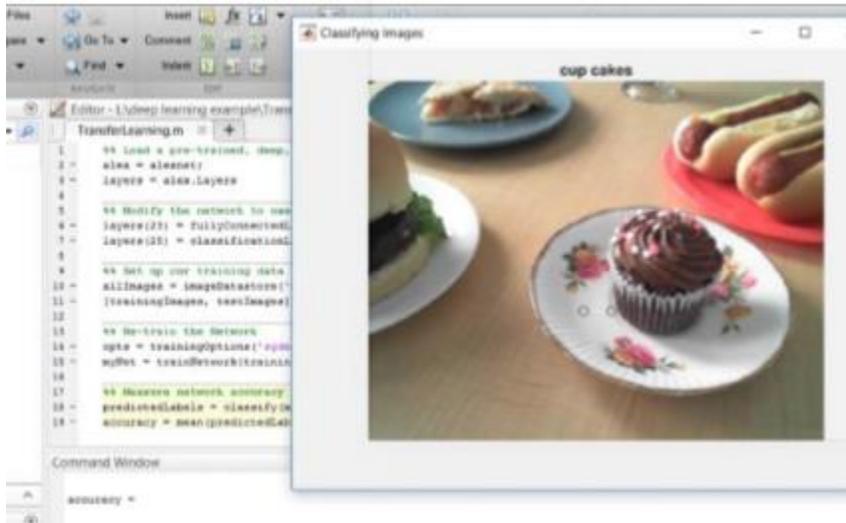
Below is an example of an example application that could be implemented with using Deep Learning for object detection and accumulating everyone's results in one room to see what objects were recognized in this room.



### **BREAKDOWN OF TIME**

Workshop participants will do up to three group exercises. Clear and precise instruction sheets will guide you through examples at beginner through intermediate level.

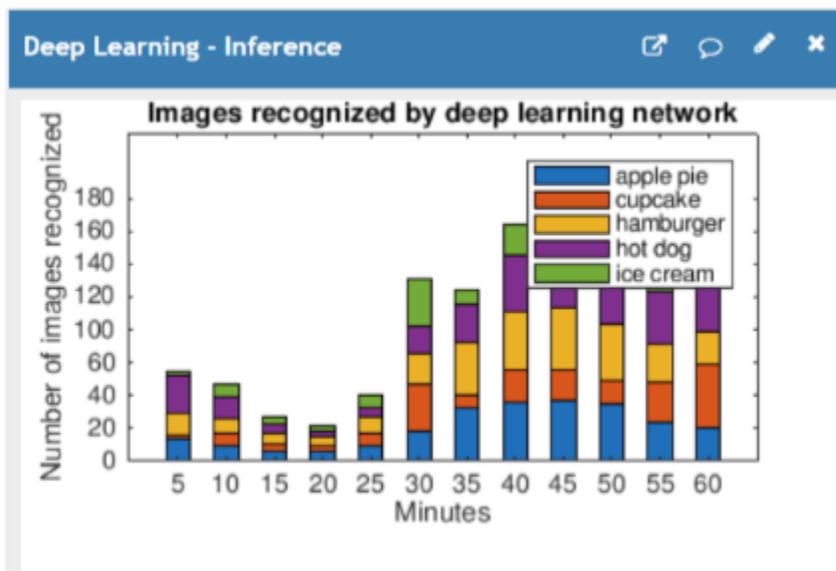
**Exercise 1.** During this first exercise, groups of participants will use a pretrained convolutional neural network to recognize objects seen through a webcam.



**Figure 1.** Deep Learning network recognizes images seen with a webcam.

**Exercise 2.** In this second exercise, we will use the live inference data from webcam images our neural network classified, and aggregate it using an Internet of Things platform. Note there is no explicit output from this exercise but we will use the data from this exercise in the third exercise.

**Exercise 3.** Finally, in this third exercise, we will visualize and analyze the data we ingest from the Internet of Things platform.



**Figure 2.** Live inference data aggregated via Internet of Things.

We will have instruction sheets for you to take home after the workshop. Inspired and brave participants will get to try their hand at what we did together, and to build up to a few advanced examples. Then we'll do three hands-on exercises.

Table of the schedule for this workshop is below.

### Summary:

The duration of this workshop is 1-hour long and the timing can be broken down as follows:

Introduction + Set Up	10 min
Deep Learning on a Webcam+Exercise	10 min
Aggregate Data using IoT+Exercise	10 min
Analyze Data from the IoT Platform+Exercise	20 min
Questions and Answers	5 min
Wrap Up	5 min

***We envision a future where the people who imagine and build technology mirror the people and societies for whom they build it.***

### **OUTCOMES/CONCLUSION**

We want to share our excitement about Deep Learning and IoT. We'd like to show a glimpse of what can be achieved when you combine approaches from different application areas. You will walk away with worksheets that will help you do experiments on your own. We sincerely hope that you will apply what you learn in this workshop, and continue to explore Deep Learning and IoT after this session.