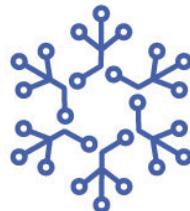


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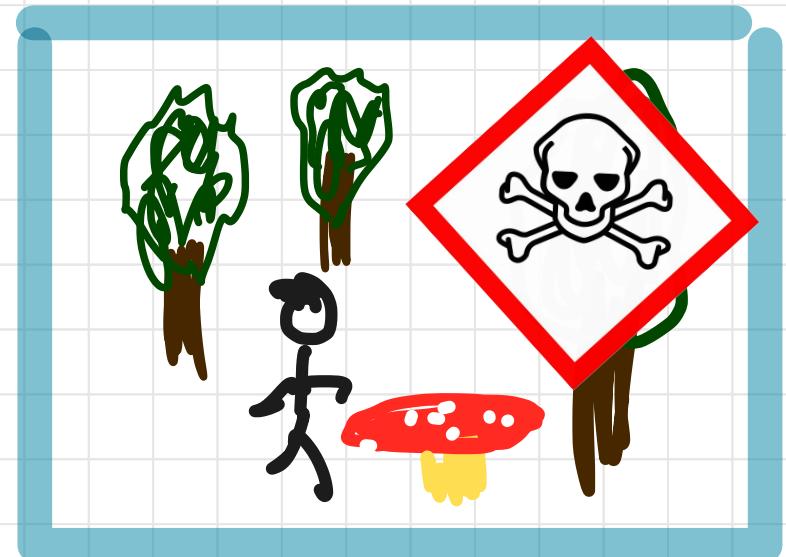
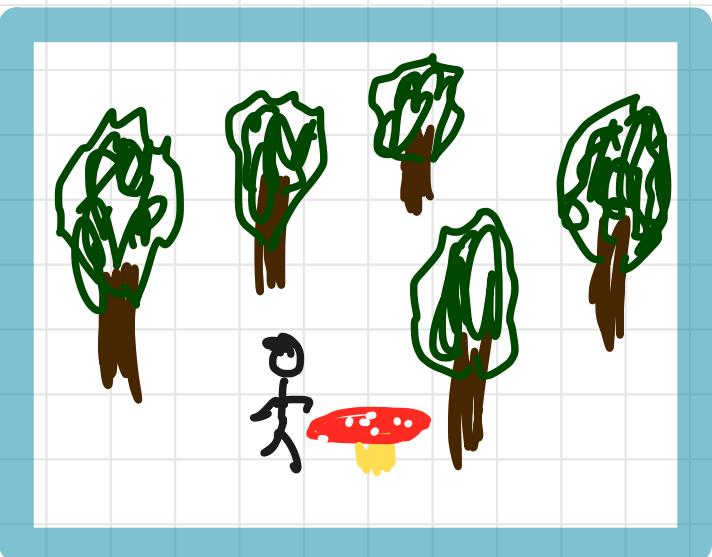
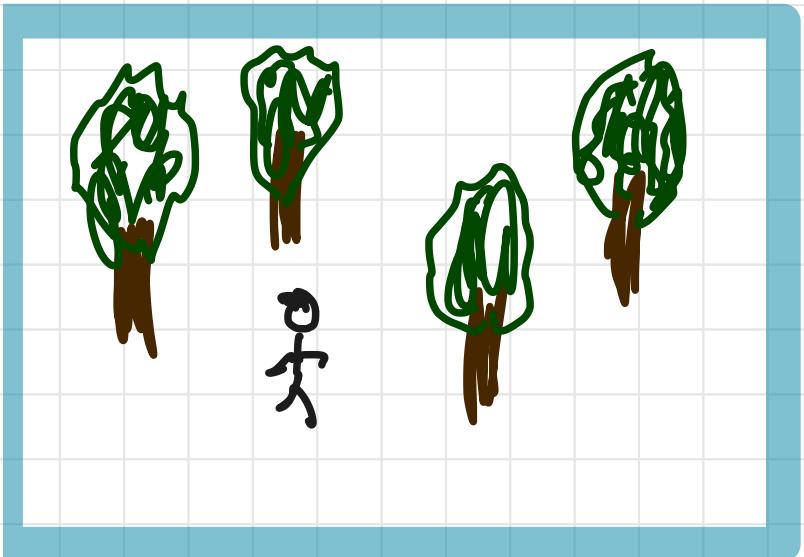
JAN 19–22 2021



# Welcome and Introduction

Pavlos Protopapas

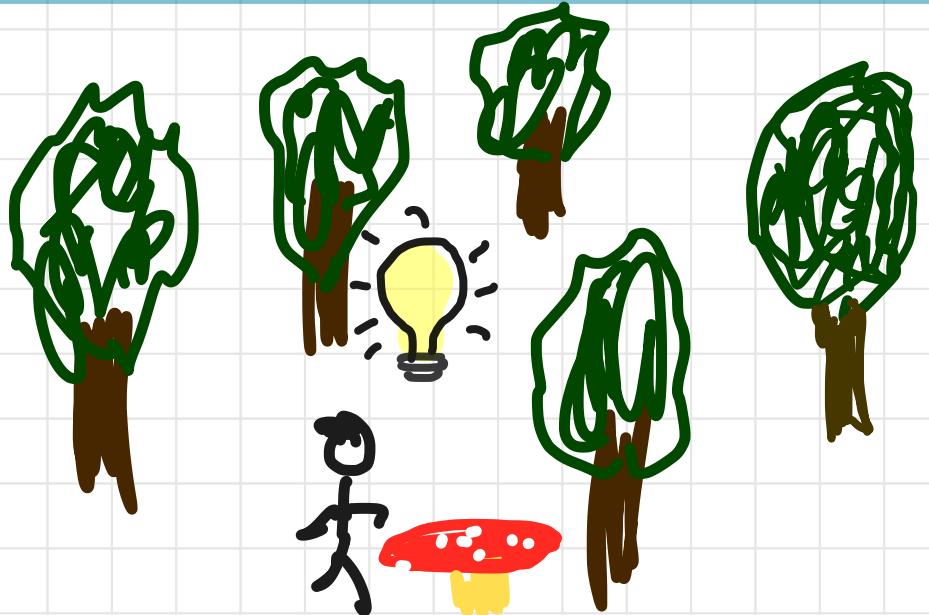
# MOTIVATION



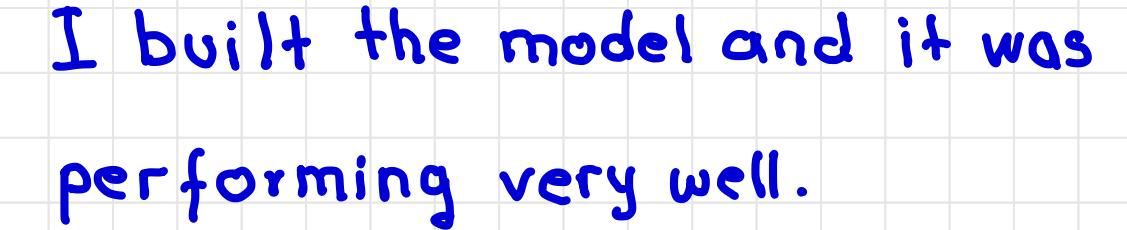
I was walking in  
the forest...

When I saw a  
mushroom!

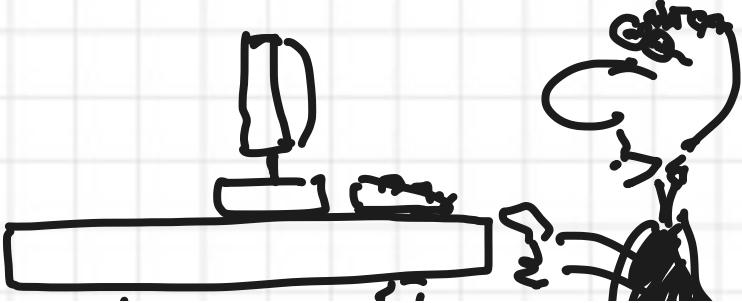
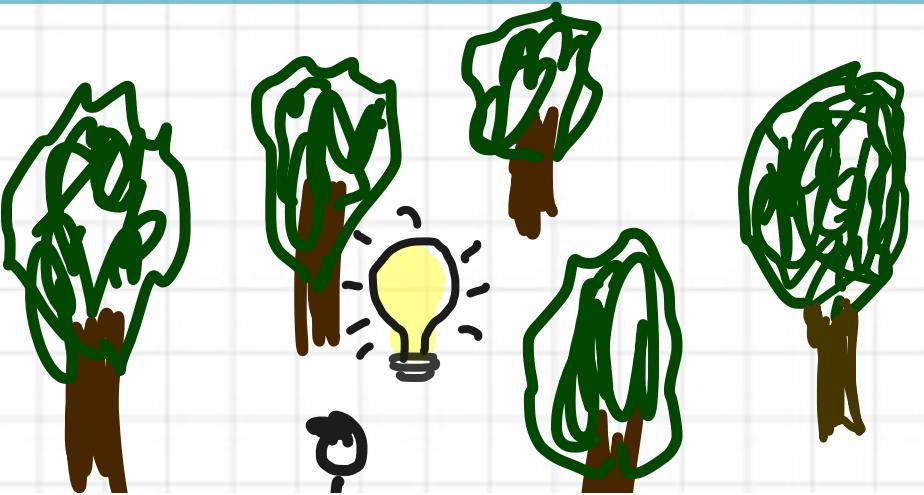
But I was not sure  
if it was poisonous?



Then I had the idea of  
building a computer vision  
program that could classify  
mushrooms.



I built the model and it was  
performing very well.



## AND THEN IT WAS FORGOTTEN

Then I had the idea of building a computer vision program that could classify mushrooms.

I built the model and it was performing very well.

Mckinsey Global Survey's findings on Adoption of AI shows nearly 25% year over year increase in the use of AI.

50% of companies spend between 8 and 90 days deploying a single AI model, with 18% taking longer than 90 days.

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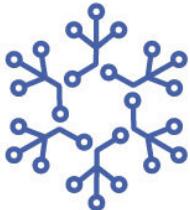
50% of companies spend between 8 and 90 days deploying a single AI model, with 18% taking longer than 90 days.

A report by IDC that surveyed 2,473 organizations and their experience with ML found that a significant portion of **attempted deployments fail**, quoting **lack of expertise**, as one of the key factors [1]

[1] (<https://arxiv.org/pdf/2011.09926.pdf>).

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Harvard IACS Computefest 2021, will be a hands-on workshop on how to build applications using deep learning models and deploying them in production.

# PROBLEM STATEMENT

Create a user friendly tool that helps future dog owners find a dog who is a good fit for their lifestyle and family environment.

There are two stages:

A. Select based on certain features such as size color or an uploaded photo of a dog.

B. Allow the user to chat with a persona of the dog.

# PROJECT WORKFLOW

Explore data: Data provided by Austin Pet Alive .

- Identify the type of data
- Preprocessing

Build models:

- Computer vision: find similar looking dogs
- Language models: Build question + answer model

Deploy:

- Deploy the app in Aws.
- Create deployment scripts and provisioning AWS instances

The image illustrates a user interface flow for finding and interacting with dogs, divided into three main steps:

- Step 1:** The user starts by using a "Find me" search bar at the top to filter dog photos. The search bar includes dropdowns for Breed, Age, Height, Weight, and a "Similar" button. A red arrow points from this step to the first grid of dog photos below.
- Step 2:** The user selects one or more dogs from the grid. In this example, four dogs are selected, indicated by yellow boxes around their respective photo thumbnails. A red arrow points from Step 1 to this selection process.
- Step 3:** The user selects a specific dog from the grid, which then opens a personalized chatbot interface. The chatbot window shows a conversation with "Zella", a puppy. The messages are as follows:
  - Zella: Woof! I am Zella
  - User: How can I help you?
  - Zella: How old are you?
  - Zella: I am 8 weeks old
  - User: Are you a good p
  - Zella: Yes I am the best in the litter :)
 A red arrow points from the selected dog in Step 2 to the chatbot window in Step 3.

1. User can find dogs using “Find me” filters
2. Select one or more dogs to find dogs similar to the selected ones
3. Select a dog to chat with. This opens up a personalized chatbot for the selected dog

Find me

Breed ▼

Age ▼

Height ▼

Weight ▼

Similar 



## Home Page:

Default page when app starts up

Top “n” dogs shown by default

Image card displays name and image of dog

Image cards are selectable (multiple)

“Find Similar” button shows up when one or more image cards are selected

## “Find me” Search/Filter:

The search/filter section will stay on each page

Allows filter by:

- Breed
- Age (range)
- Height (range)
- Weight (range)
- Similar - an image upload to find dogs similar to the dog in the uploaded picture

The filter will get applied on change of any of the filter elements and refresh the image grid

Find me

Breed ▾

Age ▾

Height ▾

Weight ▾

Similar 

Find Similar

Reset

## Select dogs to find more similar dogs:

- Click on image grid cards to select one or more dogs
- Click on “Find Similar” button to find dogs similar to the ones selected

Find me

Breed ▾

Age ▾

Height ▾

Weight ▾

Similar 



- All selected dogs + top “n” similar dogs are displayed in the image grid



Find me —

Breed ▼ Age ▼ Height ▼ Weight ▼ Similar 



Zella

Woof! I am Zella

How can I help you?

How old are you?

I am 8 weeks old

Are you a good pup?

Yes I am the best  
in the litter :)

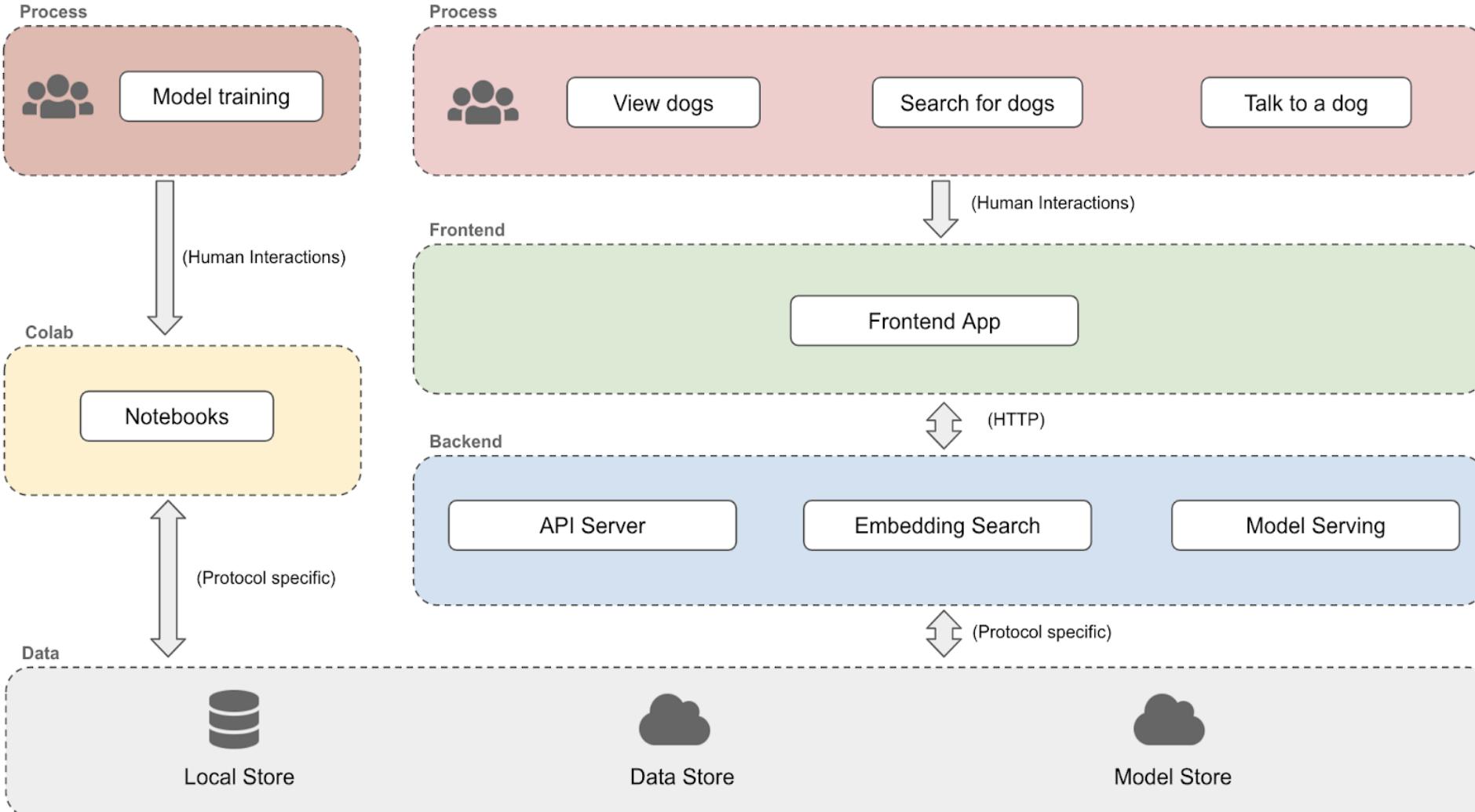
Type a message...



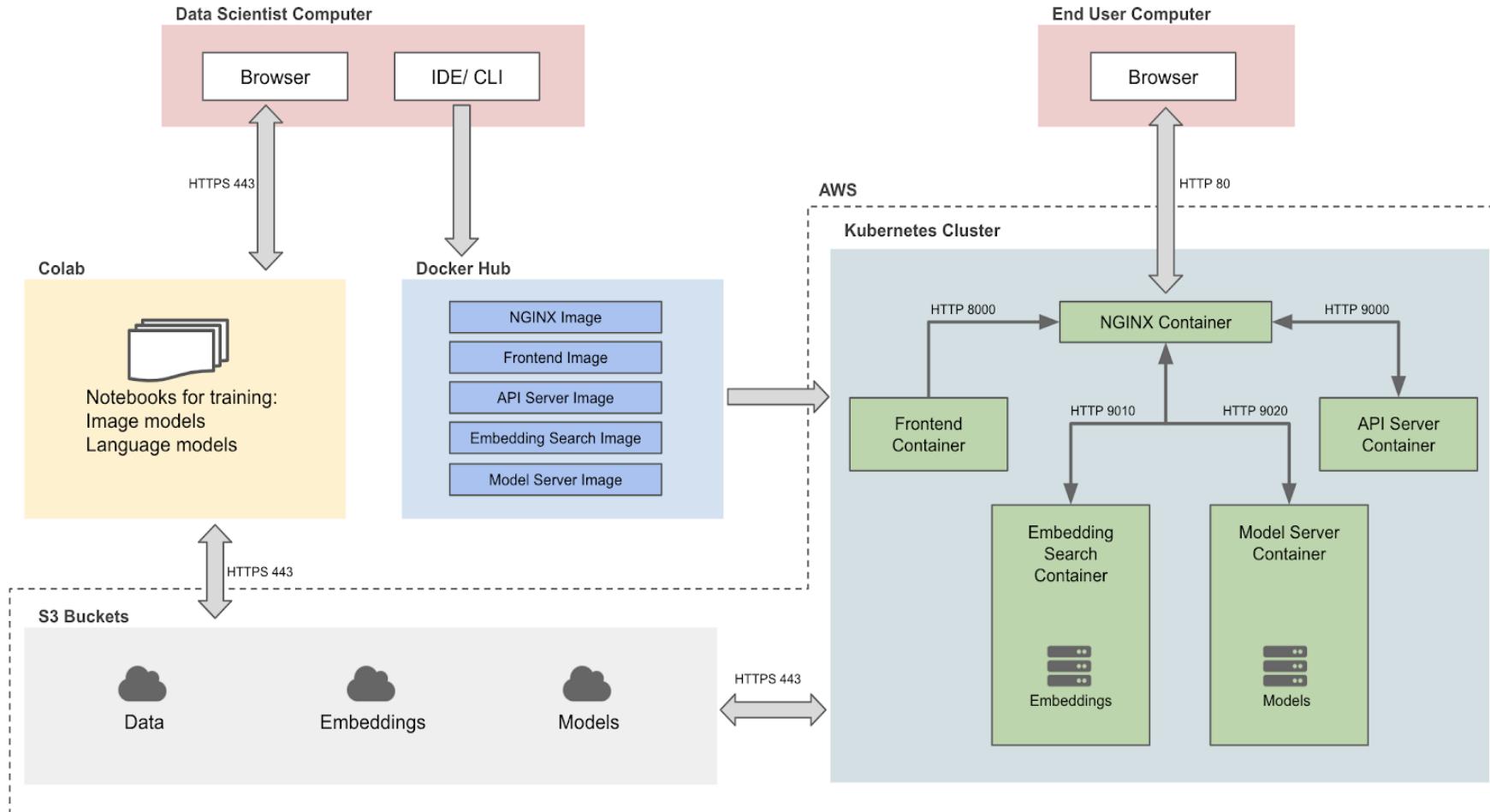
## Select a dog to chat with it:

- Image cards in the image grid display a “chat” icon for each dog
- Click on “chat” icon to open up a chat popup
- The chatbot active will be specific to the dog selected
- Dog chat bot can answer basic question about itself + other general questions about the breed + some general question about dogs

# Solution Architecture

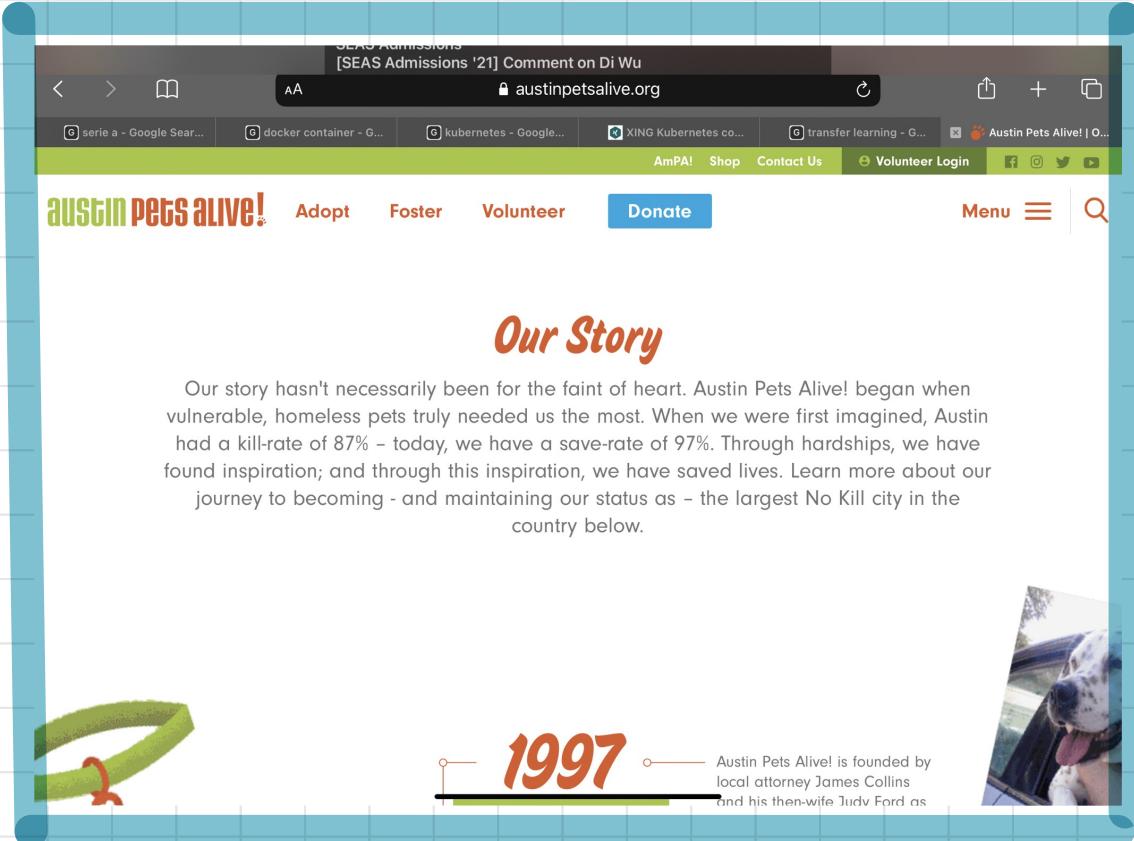


# Technical Architecture

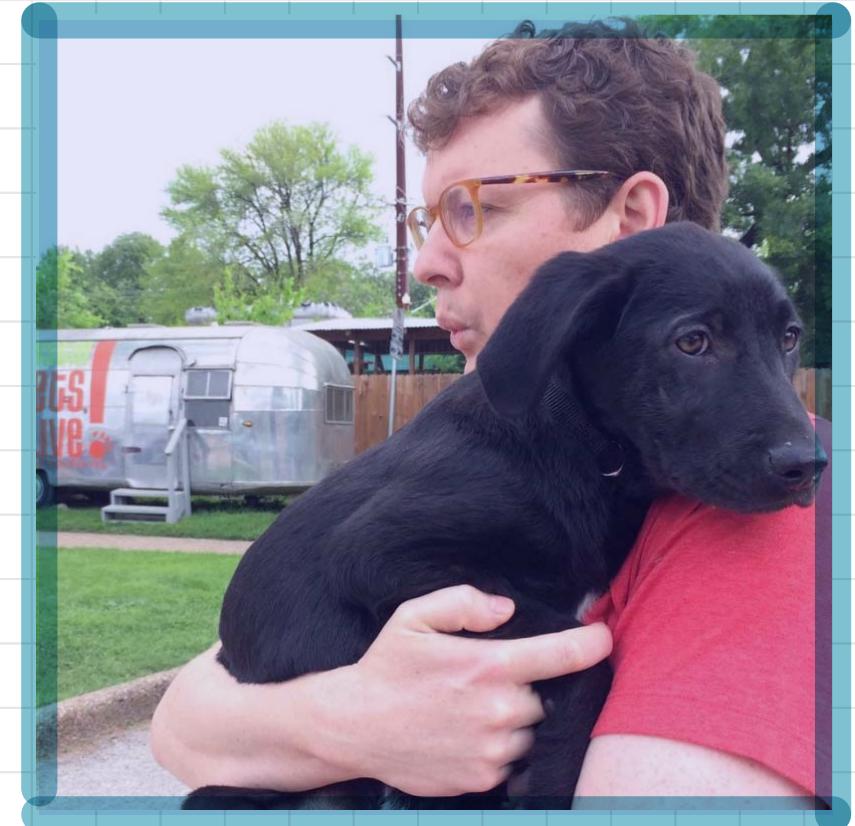


# DATA

# AUSTIN PET ALIVE



# Steve Porter

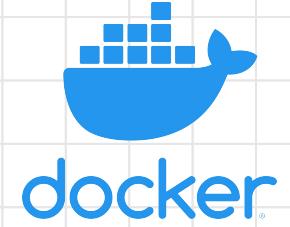
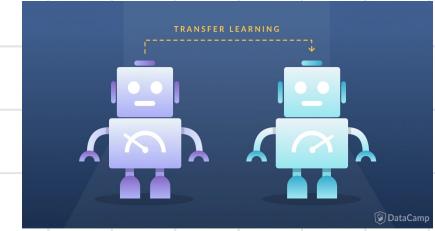


Provide the data and guidance

THANK YOU

## TAKE-AWAYS

- Learn about transfer learning as it is applied to computer vision and language models.
- Learn how to containerize your applications using Docker.
- Learn how to deploy your applications on cloud computing using Kubernetes.



# EXTRA TAKE-AWAYS

- Scaffold for your application
- High quality starter code
- Network

# DAY BY DAY

## DAY 1:

Workshop will be on transfer learning for computer vision.

- Transfer learning
- Image Classification
- Network distillation



Pavlos Protopapas



Marios Mattheakis

## DAY 2:

Workshop will be on transfer learning for language models.

- Language models
- Attention, Self attention
- Transformers
- Bert



Chris Tanner

## DAY 3:

Workshop will be on moving code from notebook to self contained environments

- Code optimization
- Containers
- Microservices/APIs



David Sondak

## DAY 4:

Workshop will be on deploying containers to the AWS cloud environment.

- Kubernetes
- Amazon Web Services



Pavlos Protopapas

## Organizers

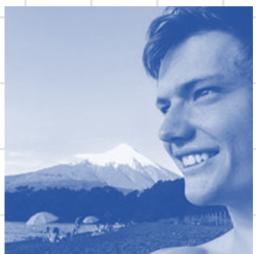


Shivas Jayaram



Rashmi Banthia

## Day 1:



Hyeden Joy



Henry Jin



Cathy Chute

## Day 2:



Rohit Beri



Zhao Lyu



Eduardo Peynetti

## Day 3:



Connor Capitolo



Mehul Smriti



Simon Warchol

# GitHub, Discussion Forum and Workspace

- All notebooks, links to colab, lecture notes are:
  - <https://github.com/Harvard-IACS/2021-ComputeFest>
- Forum:
  - <https://compute fest forum.seas.harvard.edu>
- Zoom:
  - Check your email for zoom ids and passwords
- Breakout Rooms:
  - <https://app.sophya.world/s/ComputeFest/cafe>
  - <https://app.sophya.world/s/ComputeFest/join/ZV8Ouz8p/tf office>
  - <https://app.sophya.world/s/ComputeFest/join/CA0B2gpv/instructor office>