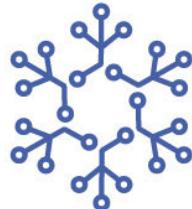


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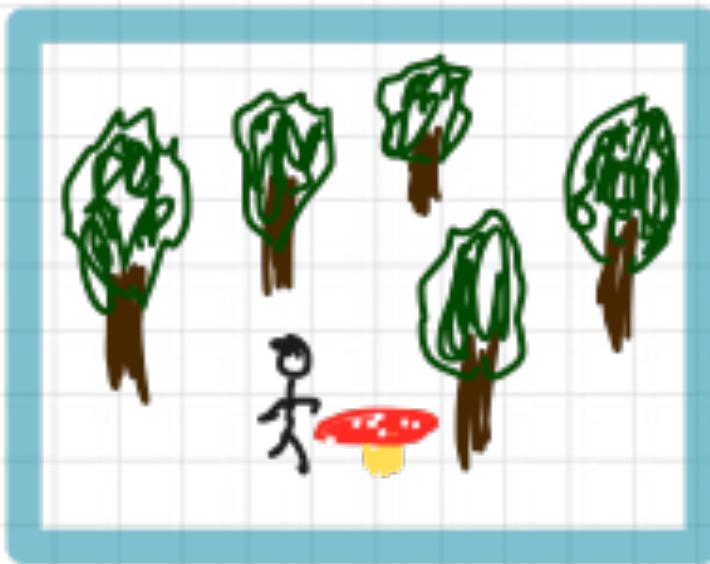
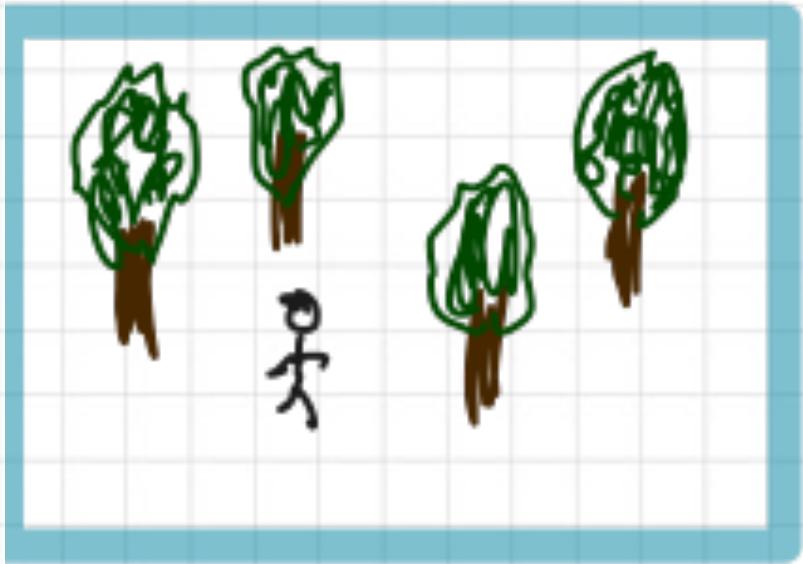
JAN 19–22 2021



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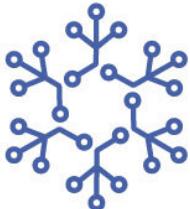
50% of companies spend between 8 and 90 days deploying a single AI model, with 18% taking longer than 90 days.

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>).

HARVARD IACS
COMPUTEFEST

JAN 19–22 2021



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 is on a page titled "Woof Woof". At the top, there is a search bar labeled "Find me" with dropdown menus for Breed, Age, Height, Weight, and a "Similar" button. Below the search bar is a grid of 12 dog photos arranged in three rows of four. A red arrow points from the "Find me" search bar down to the first row of photos.
- Step 2:** The user has selected several dogs from the grid. Four specific photos are highlighted with yellow boxes: the first photo in the first row, the second photo in the second row, the third photo in the second row, and the fourth photo in the third row. Below the grid, there are two buttons: "Find Similar" and "Reset".
- Step 3:** The user has selected a dog from the grid in Step 2. The interface now displays a personalized chatbot for that dog. On the left, there is a grid of 8 dog photos. The first photo in the first row is highlighted with a yellow box. A red arrow points from this highlighted photo to a chatbot window on the right. The chatbot window has a blue header with the name "Zella". It contains a conversation history with the following messages:
 - Woof! I am Zella
 - How can I help you?
 - How old are you?
 - I am 8 weeks old
 - Are you a good p
 - Yes I am the best in the litter :)
 At the bottom of the chatbot window is a text input field with the placeholder "Type a message..." and a red "X" button at the bottom right.

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 :)

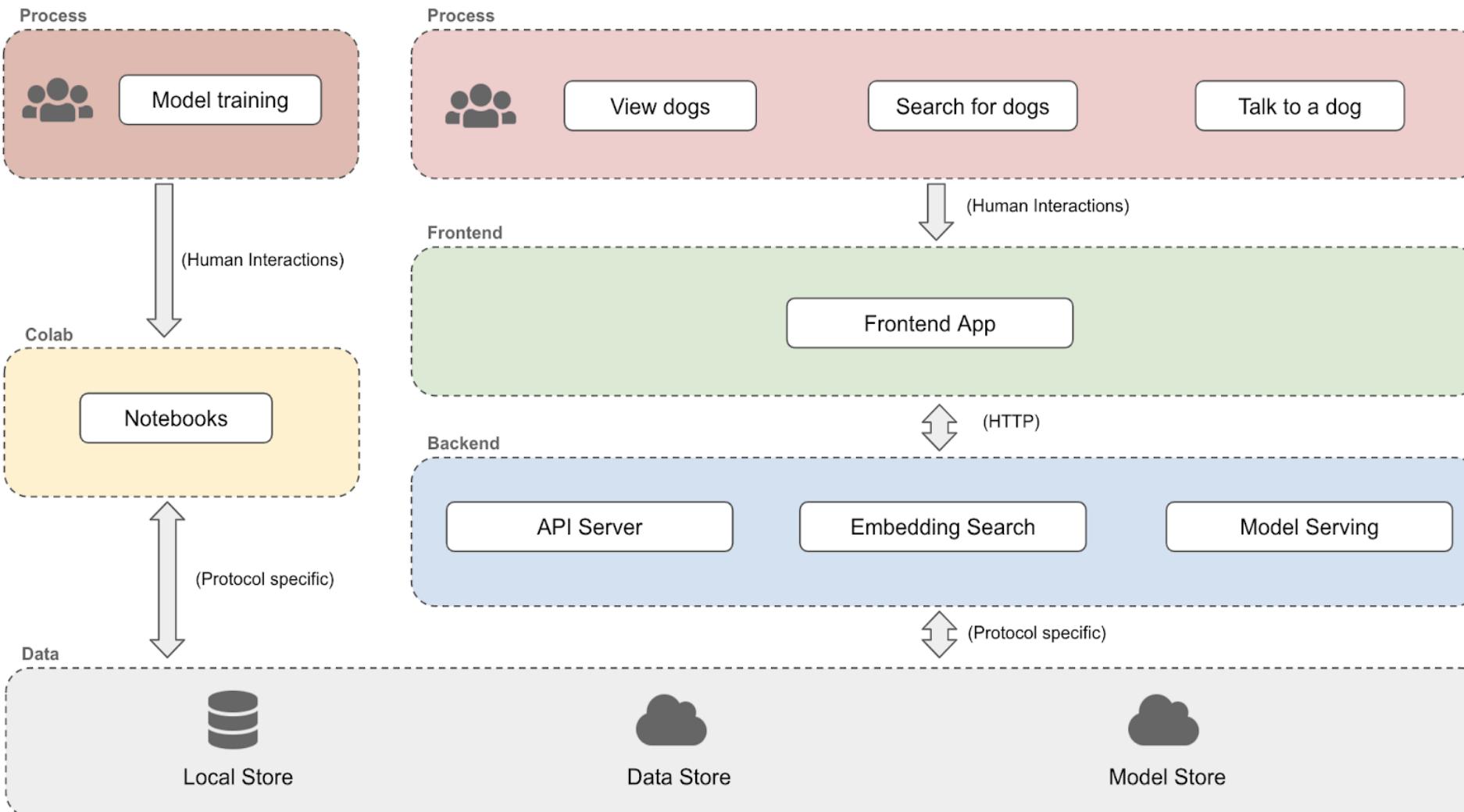
Type a message...



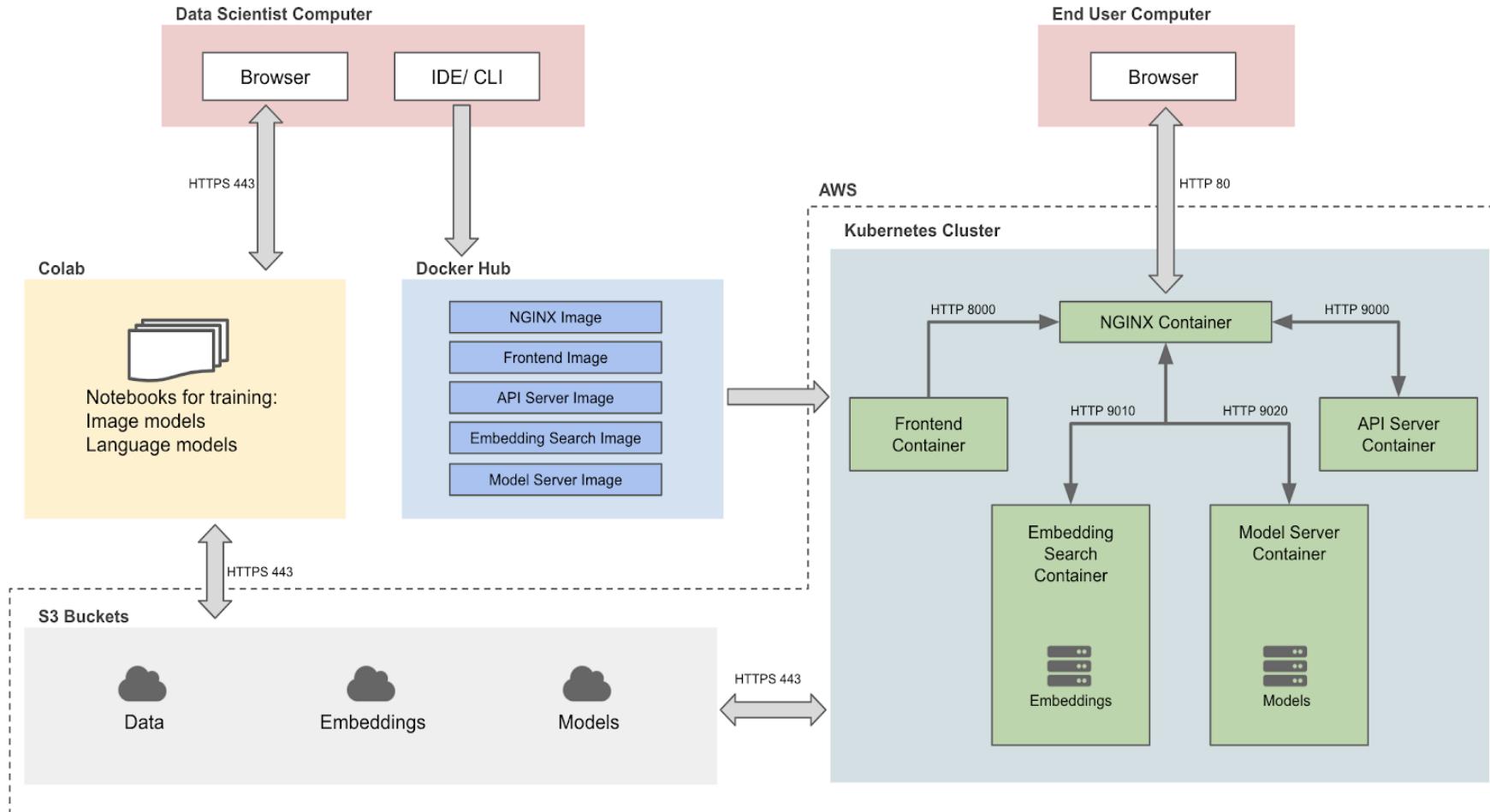
Select a dog to chat with it:

- 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



THANK YOU

Provide the data and guidance

TAKE-AWAYS

- Learn about transfer learning as it is applied to computer vision and language models.
- Learn how to containerize your applications using Dockers.
- 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

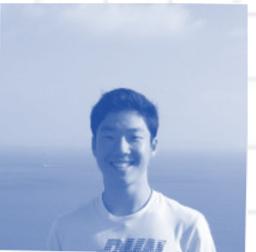


Rashmi Banthia

Day 1:



Hayden Joy



Henry Jin



Cathy Chute

Day 2:



Rohit Beri



Zhao Lyu



Eduardo Peynetti

Day 3:



Connor Capitolo



Mehul Raje



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>