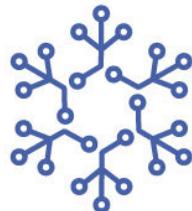


HARVARD IACS
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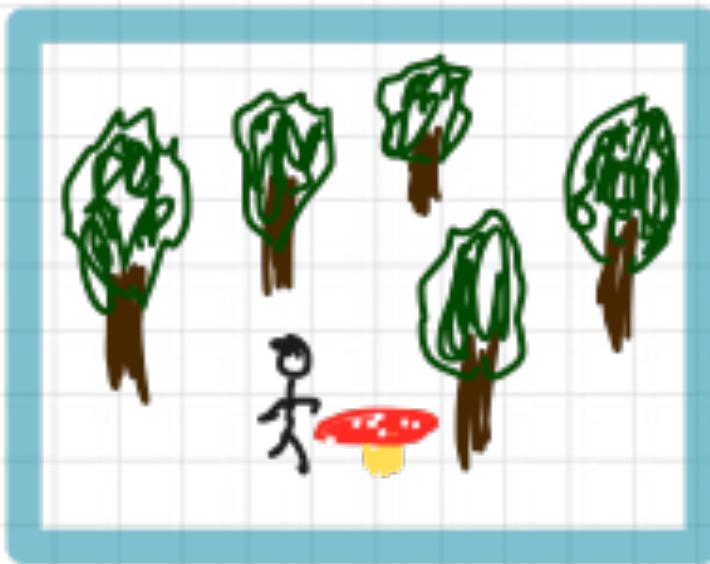
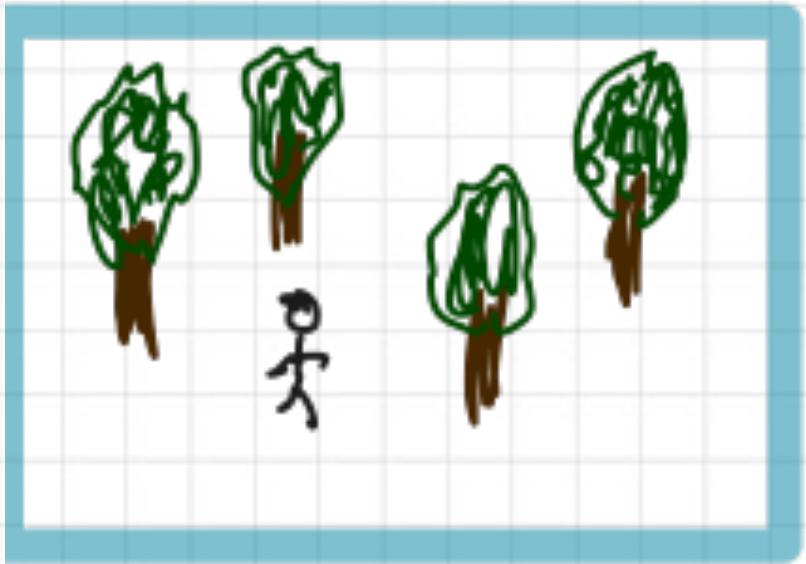
JAN 19–22 2021



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 a 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.

McKinsey Global Survey's findings on Adoption of AI show nearly a 25% year over year increase in the use of AI.

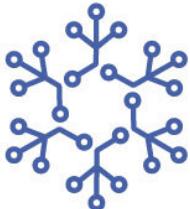
50% of companies spend between 8 and 90 days deploying a single AI model, with 18% taking longer than 90 days.

A report by IDC that surveyed 2,473 organizations and their experience with ML found that a significant portion of **attempted deployments fail**, citing **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 Pets 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

1

Find me

Breed Age Height Weight Similar

2

Find me

Breed Age Height Weight Similar

Find Similar Reset

3

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 p
Yes I am the best
in the litter :)

Type a message...

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 chat bot 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 :)

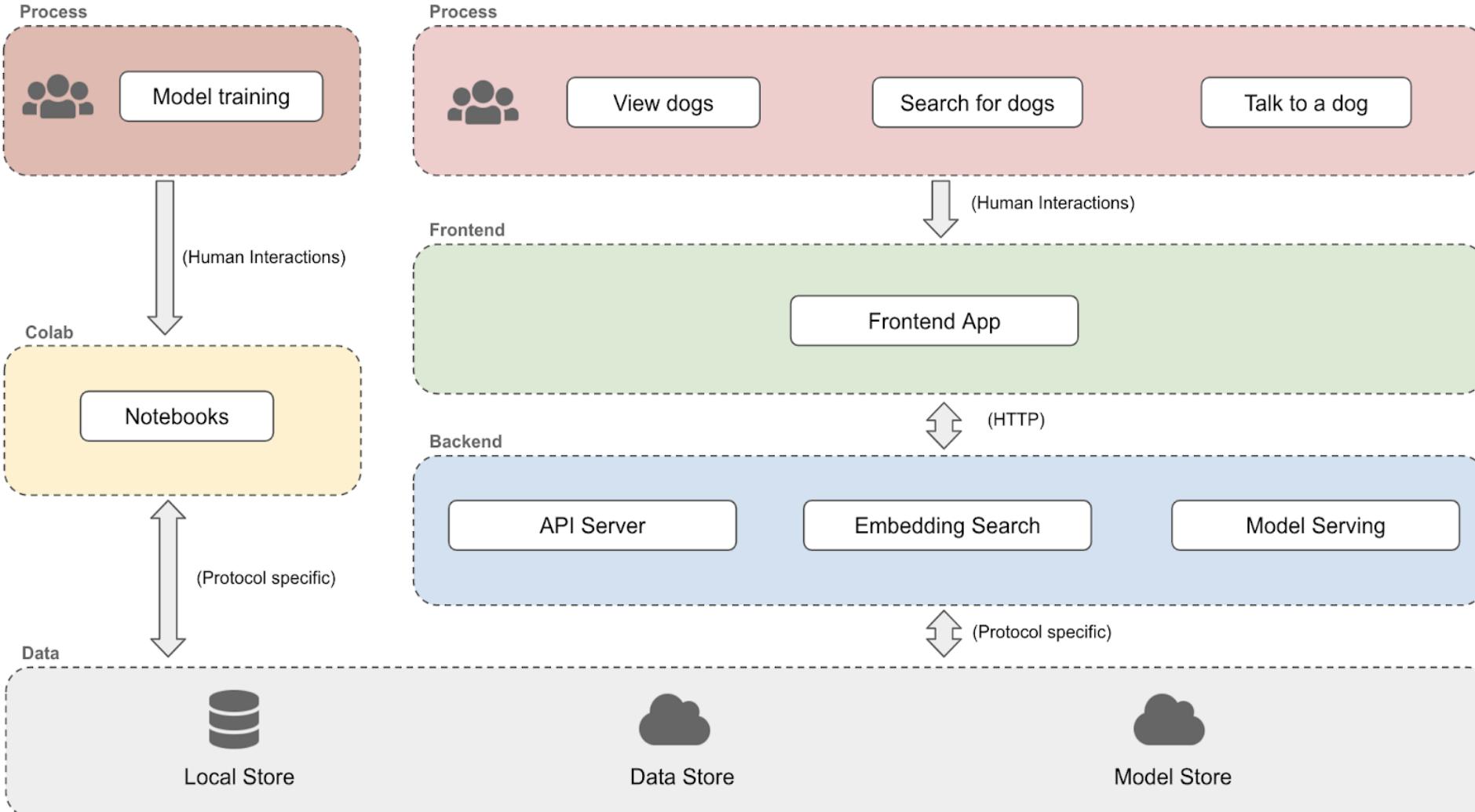
Type a message...



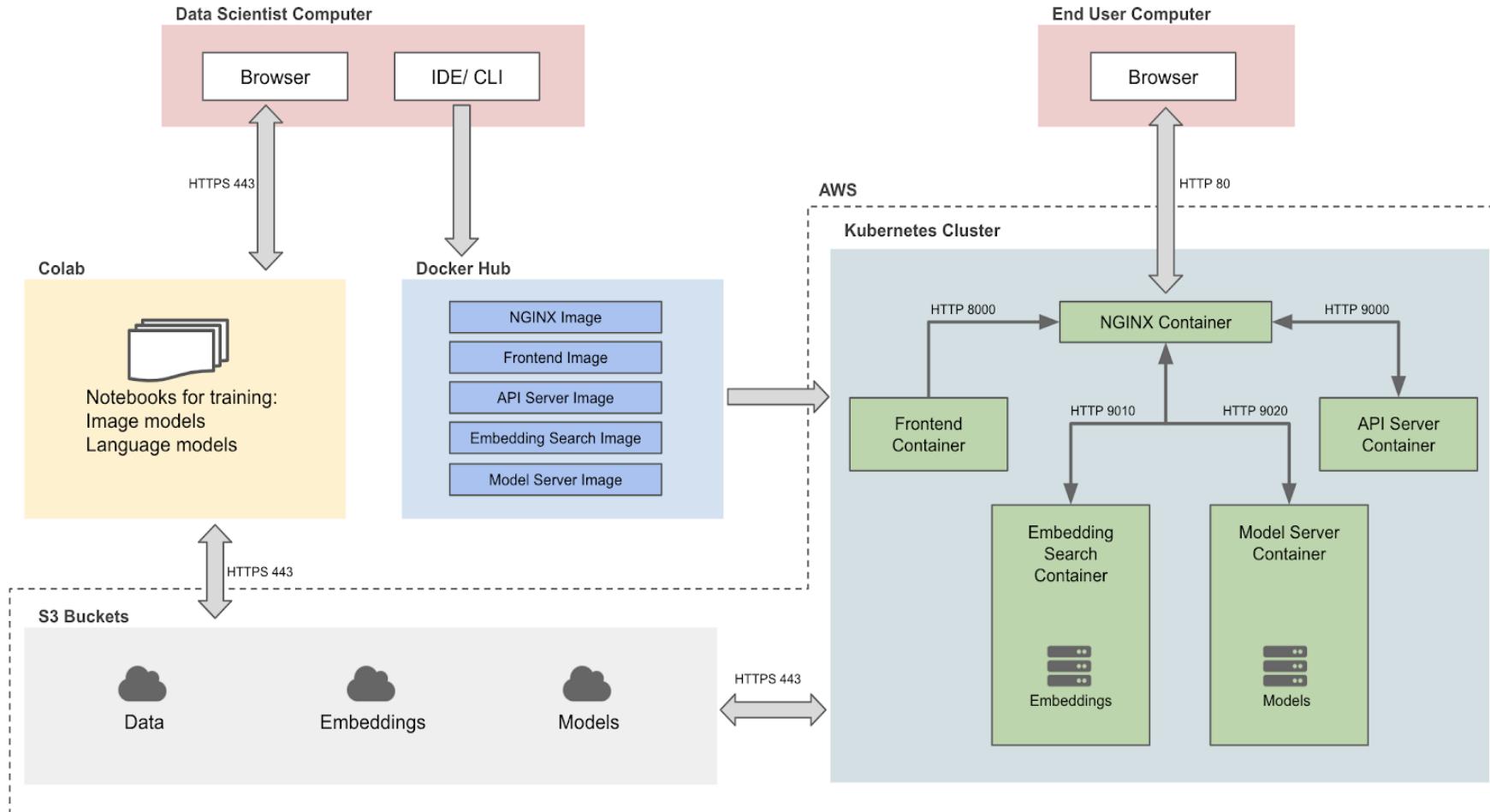
Select a dog to chat with it:

- 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

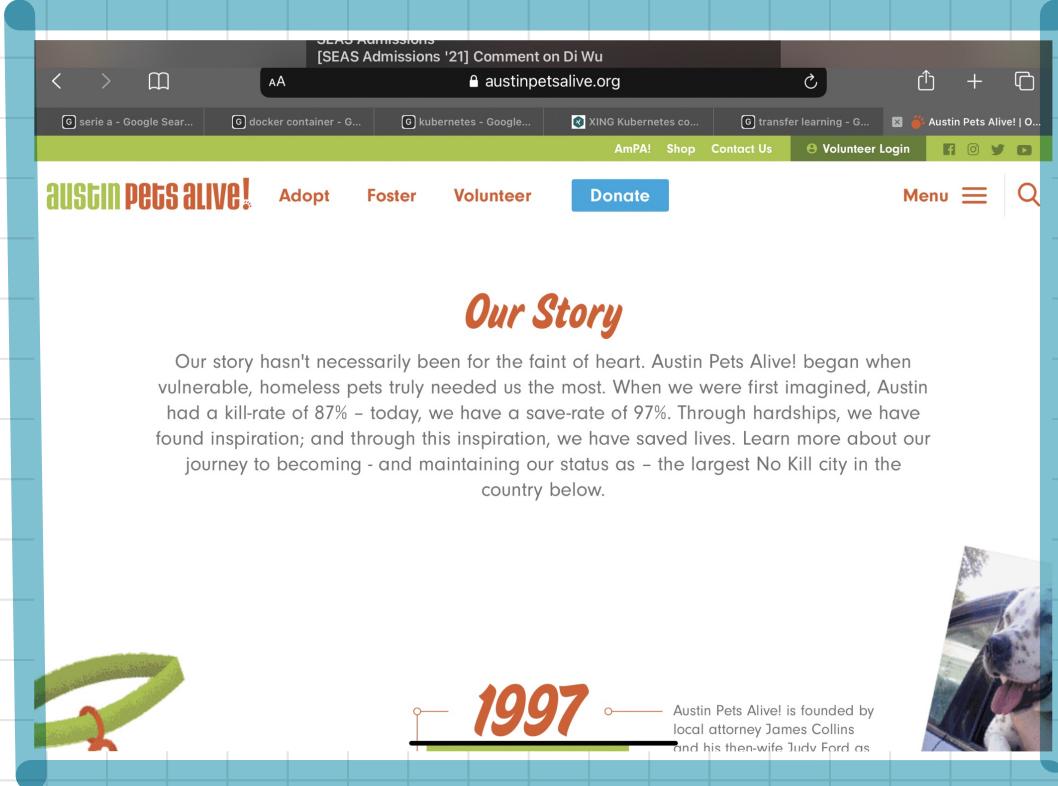


Technical Architecture

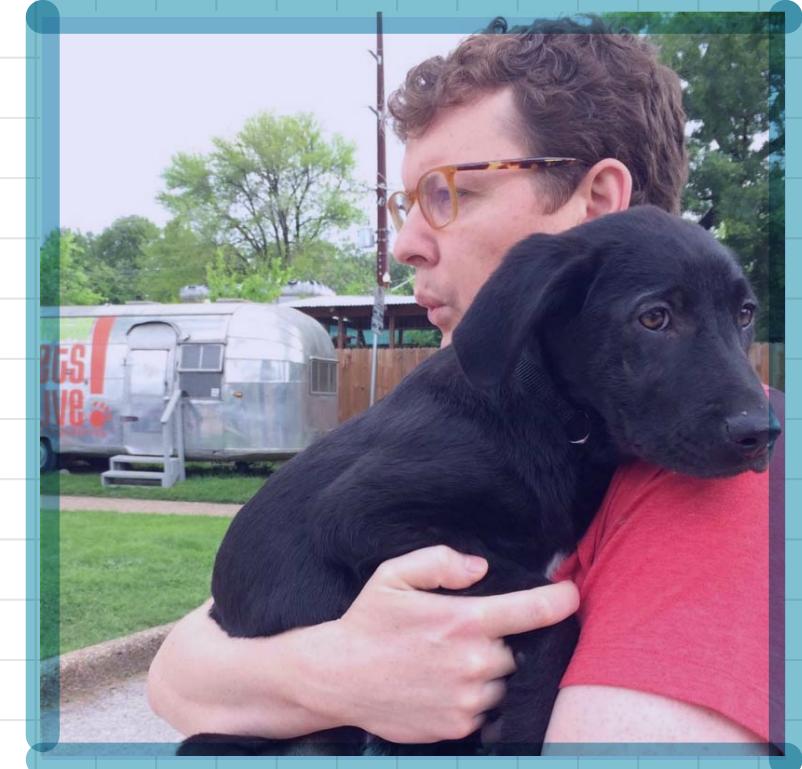


DATA

AUSTIN PETS ALIVE



Steve Porter

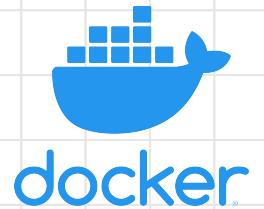
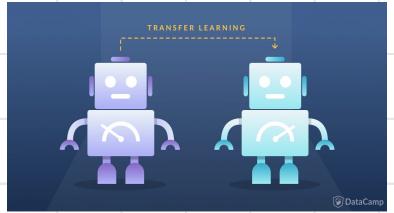


Provide the data and guidance

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 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

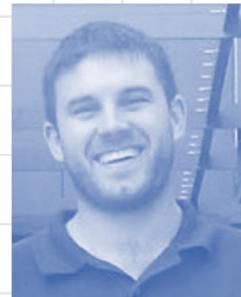


Chris Tanner

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

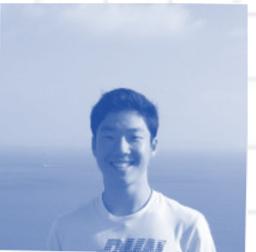


Rashmi Banthia

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>