Austin Pets Alive (APA) - Project Outline

AI-5

Deep Learning, Development, and Operations (MLOps)

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Outline

- Project Scope
- Project Workflow
- Process Flow
- Data
- Models

Problem Definition

Austin Pets Alive (APA) is an association of pet owners for pet owners. APA dog data is roughly ~17k dog records. Close to 40k if you include cats. For those ~40k animals there looks to be ~140k photos. For those photos, what I can provide is a list of publicly accessible URLs such as this (https://www.shelterluv.com/sites/default/files/animal_pics/464/2018/07/11/21/20180711213702.png) so a part of the project would be some data wrangling to go grab and persist the photos somewhere. Adopt-a-pet is also maybe a platform that could potentially take the work and move it to production.

The goal will be to build a reusable application, design, and framework that can be used in any animal welfare nonprofits to connect future pet owners with pets. The outcome of the project will be to build a full featured application for the APA.

Proposed Solution

For the scope of the course we will focus on creating a user friendly tool that helps connect future dog owners with dogs available for adoption. The core problem we are trying to solve is to help future dog owners find a dog who is a good fit for their lifestyle and family environment. Some of the features that this tool can have are:

- Help the user search for dogs based on certain features such as size and color.
- Find similar dogs by uploading a picture of a dog the user is interested
- Connect the dog with the user by allowing the user to chat with a persona of the dog. The user can ask this virtual dog any question about it, its breed characteristics, or any general questions about puppies and dogs.
- As an adoption center, when new images are available for dogs. An function to upload images of the dog:
  - Remove background from the picture
  - Add a preset background color
  - Enhance the image if the resolution of uploaded picture is not good

Project Scope

Proof Of Concept (POC)

- Data Wrangle the images
- Verify images
- Experiment on some baseline models
- Verify new unseen images that are predicted by the model(s)
- Visualize model activations to analyse what the model is seeing

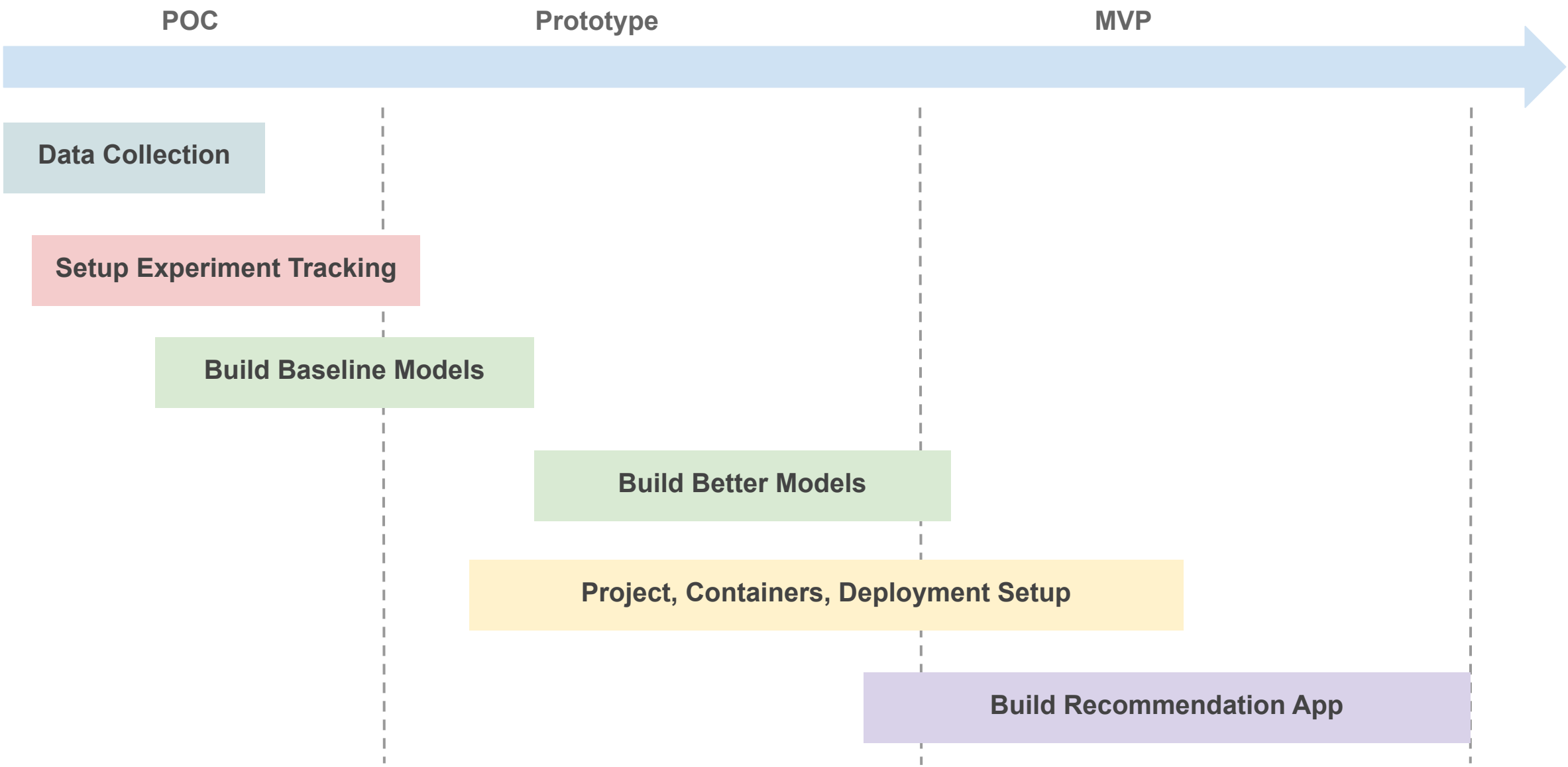
Prototype

- Create a mockup of screens to see how the app could look like
- Deploy one model to Fast API to service model predictions as an API

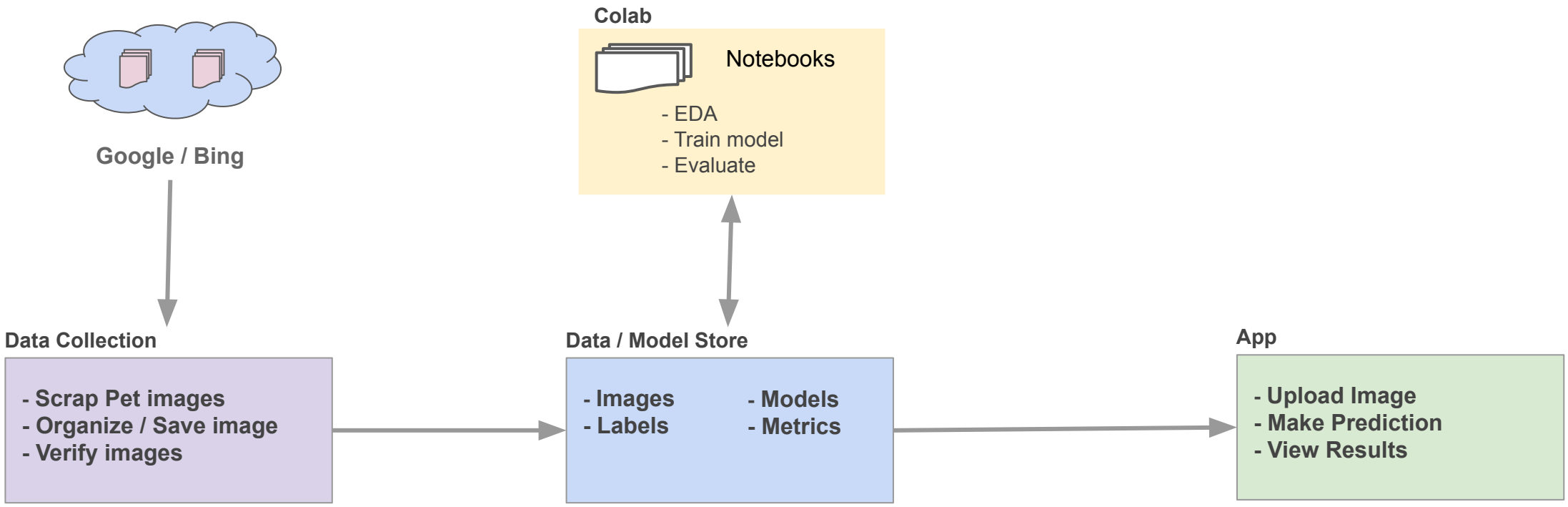
Minimum Viable Product (MVP)

- Create App to recommend photos to pet owners
- API Server for uploading images and predicting using best model

Project Workflow



Process Flow



Data

Provided by APA

dogs.csv - one row for every dog taken into custody since 1/1/2017.

Field	Description
AnimalID	public facing unique id
AnimalInternal-ID	internal unique id - USE THIS to link to the other tables (dogs_photos.csv and dogs_website_memos.csv)
AnimalName	Name of dog
AnimalType	always "Dog"
AnimalSex	Male, Female or Unknown
AnimalCurrentWeightPounds	decimal weight in pounds. NOTE: data quality of this field is mediocre at best. Staff are good about recording at least one weight around the time of intake but not as diligent about recording a weight prior to outcome.
AnimalDOB	DOB formatted as YYYYMMDD
AnimalBreed	concatenation of primary and secondary breed fields delimited by " /".
AnimalColor	concatenation of primary and secondary colors fields delimited by " /".
AnimalPattern	animal pattern NOTE: not often populated for dogs. More often used for cats

Data

dogs_photos.csv - one row for every photo uploaded to a dogs profile.

Field	Description
AnimalInternal-ID	internal unique id for dog. USE THIS to link to dogs.csv
PhotoUrl	URL to photo

dogs_website_memos.csv - one row for every website bio

Field	Description
AnimalInternal-ID	internal unique id for dog. USE THIS to link to dogs.csv
MemoText	contains public bio text that displays for each animal on their adoption page.

Dataset link:

https://drive.google.com/drive/folders/1LCYLVkwZSHfkKvJUXs3EtHWRjUSUWZGy?usp=sharing

Models

Proposed modeling techniques to consider

Computer Vision:

- Image classification with transfer learning
- Feature extractor
- Embeddings for search
- Background removal using segmentation
- Image resolution enhancement using GANs

Language:

- Question-answering task using any transformer-based model
- Dialog/ Conversational task using any transformer based model (e.g: GPT2 doublehead model)