

# Recycle.ai

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Recycling made simple

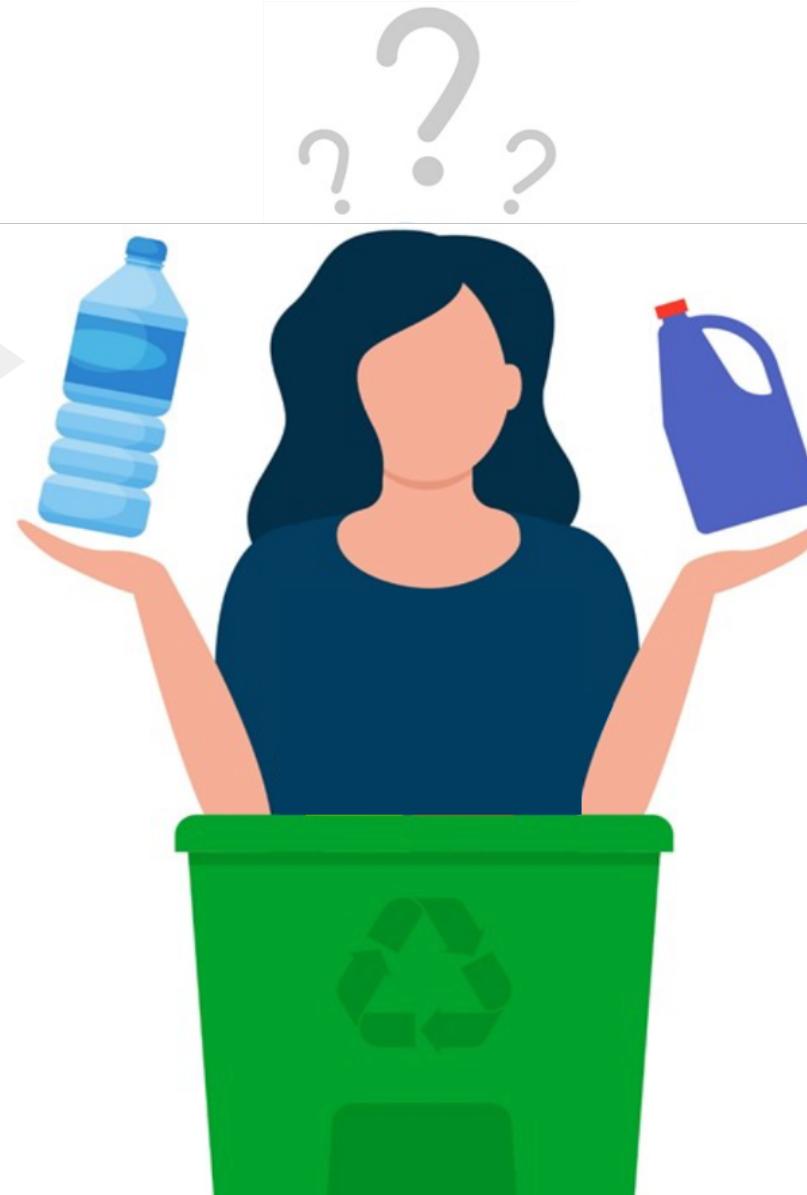
Vin Anand



# Do you know how to recycle?



Water bottle

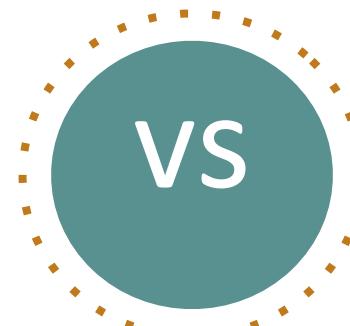


Detergent bottle

# Problem

## Berkeley<sup>1</sup>

- #1 Plastics
- #2 Plastics
- #5 Plastics



## Chicago<sup>2</sup>

- #1 Plastics
- #2 Plastics
- #3 Plastics
- #4 Plastics
- #5 Plastics
- #7 Plastics



1: [Confused about recycling in Berkeley? We answer your top 10 questions.](#)

2: [What can I recycle?](#)

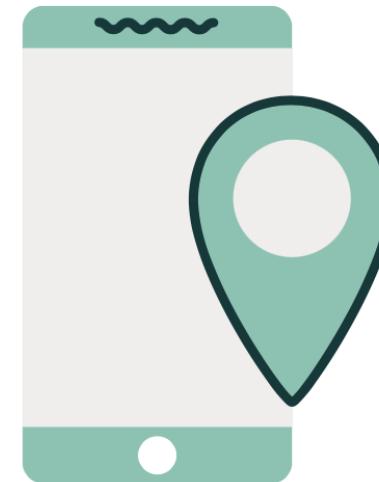
# Problem



More than **90% of plastics generated in the U.S. each year winds up in landfills or incinerators**, according to the Environmental Protection Agency. Only about 9% is recycled.

# Solution

An easy-to use **mobile** application that employs the power of **machine learning models** to provide real-time, accurate disposal recommendations **anytime and anywhere**.



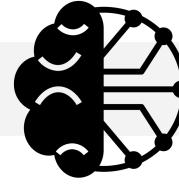
# Approach



Data



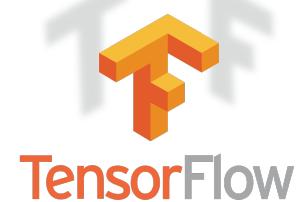
Advisors



Model



App

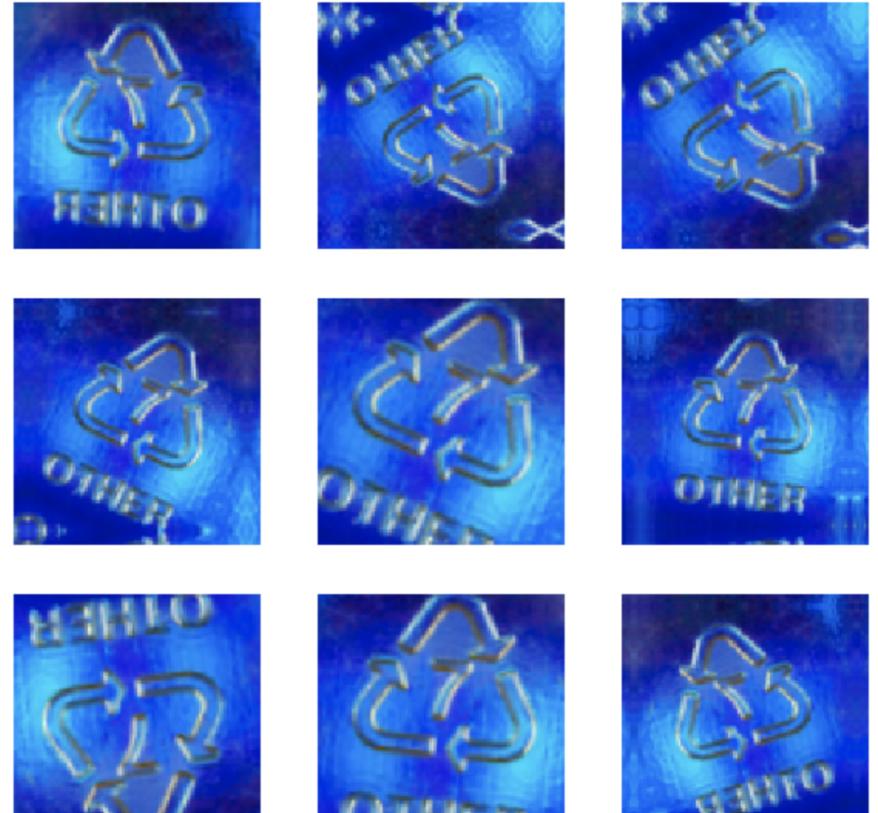


TensorFlow



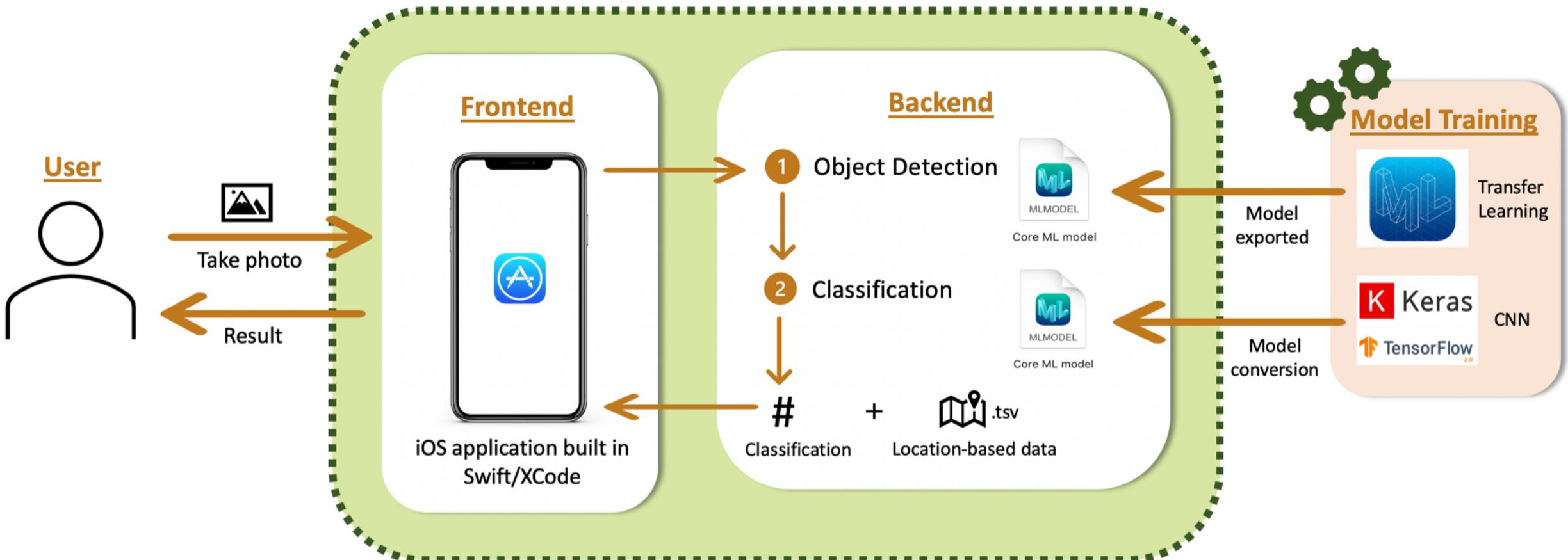
# Data collection

- **City data**
  - 80+ cities
- **Data collection:** manually & web-scraped
- **Data augmentation:**
  - horizontal and vertical flip
  - random rotation of 10 degrees
  - random zoom (up to 20%)

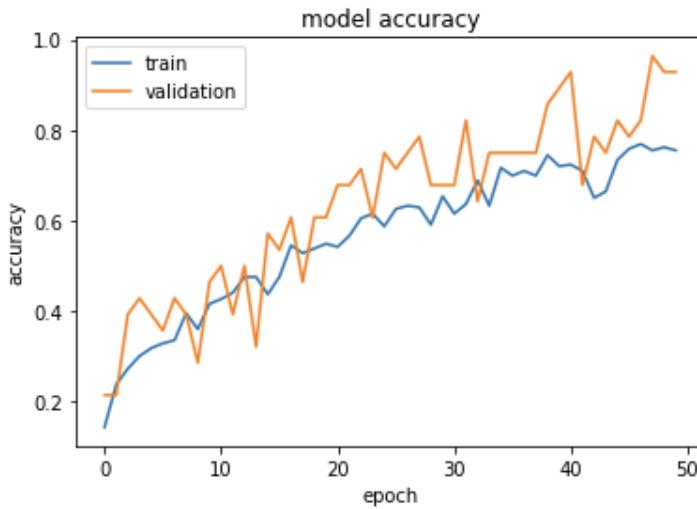


Example of the data augmentation process on one training image.

# Architecture

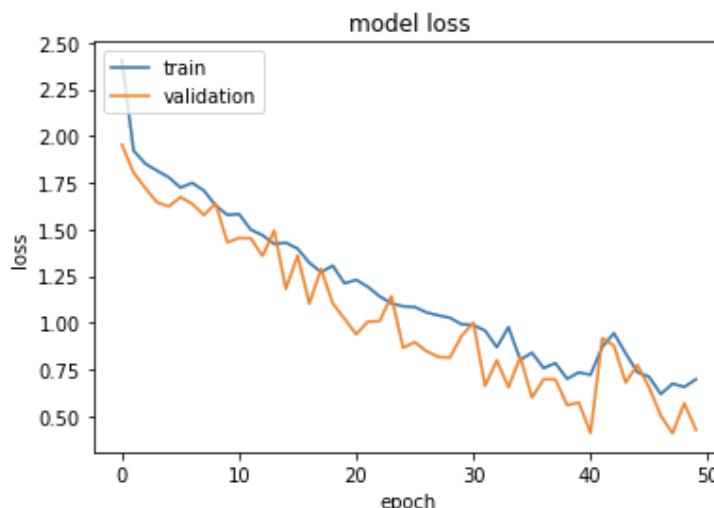


# Classification model - Keras CNN



## Final Model Accuracy:

- Training = 86%
- Validation = 93%



## Final Model Loss:

- Training = 0.6
- Validation = 0.4

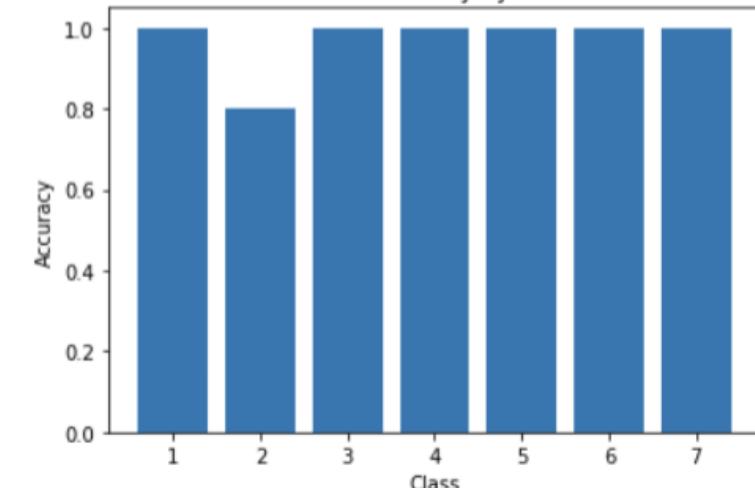
## Performance by Class:

		Predicted Class						
		1	2	3	4	5	6	7
True Class	1	6	0	0	0	0	0	0
	2	1	8	0	0	0	1	0
3	0	0	3	0	0	0	0	0
4	0	0	0	1	0	0	0	0
5	0	0	0	0	4	0	0	0
6	0	0	0	0	0	2	0	0
7	0	0	0	0	0	0	2	0

True Class

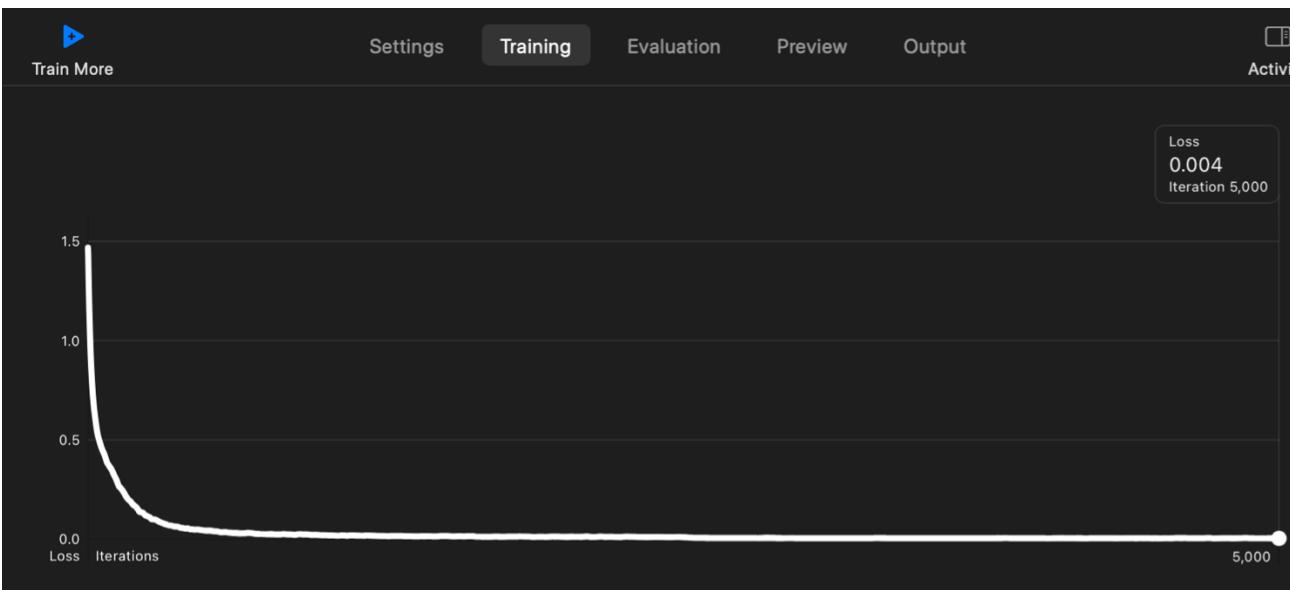


## Model Accuracy by Class



# Object detection model

- Object detection pipeline

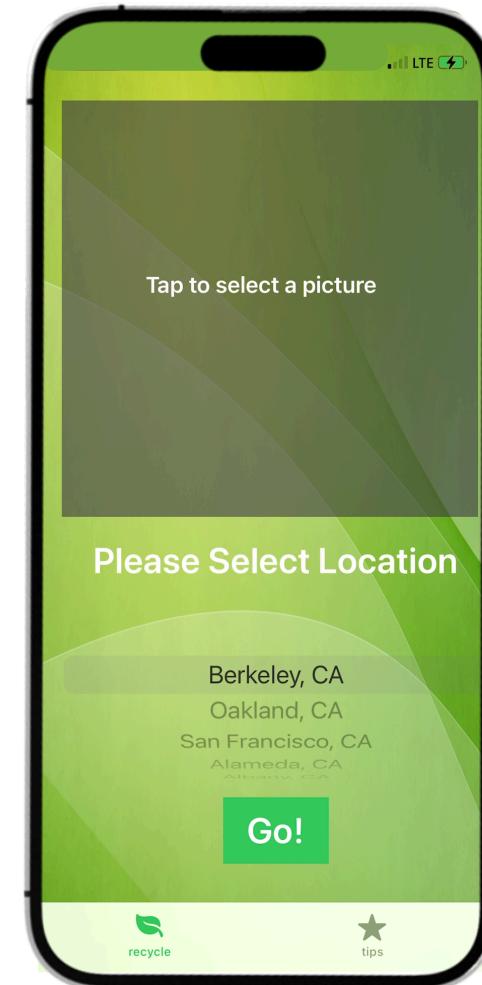


**Final model accuracy:**

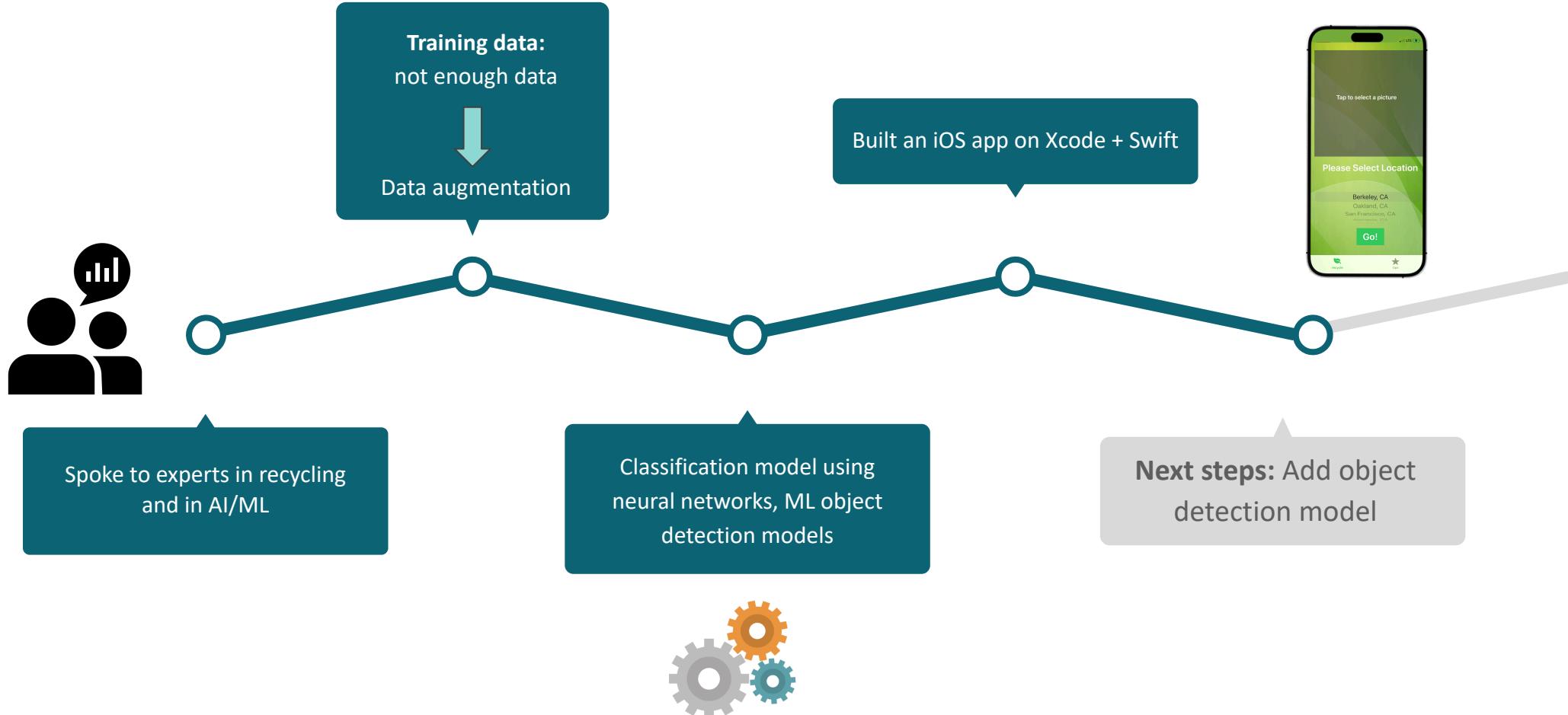
- Training = 100%
- Validation = 94%

# Recycle.ai on iOS

- 1** Upload or take a picture
- 2** Choose your location
- 3** Press Go! to see if product is recyclable



# Product journey



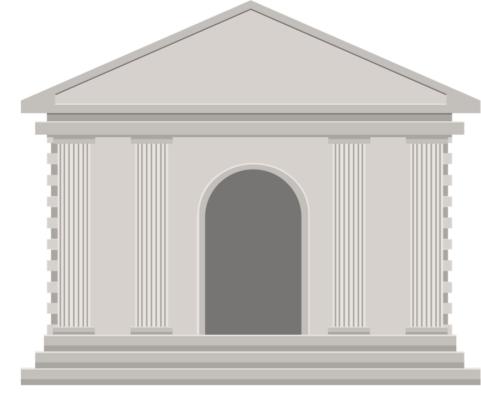
# What is the future of Recycle.ai?



**Smarter shopping**



**User incentives**



**Informing policymakers**