

Recycle.ai

Recycling made simple

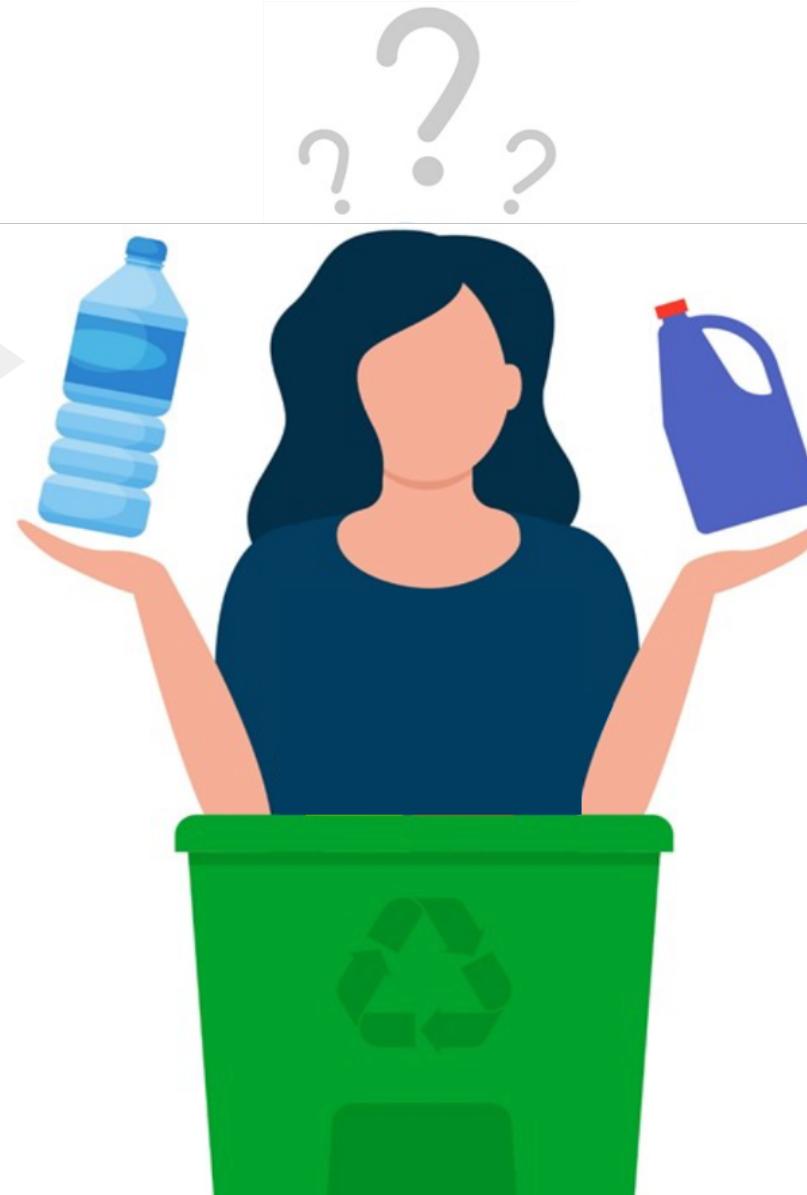
Vin Anand



Do you know how to recycle?



Water bottle

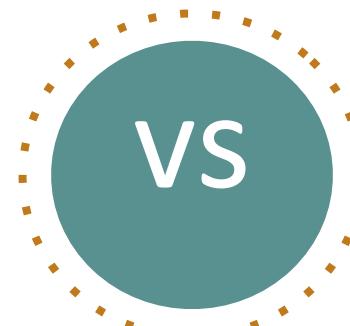


Detergent bottle

Problem

Berkeley¹

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



Chicago²

- #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?](#)

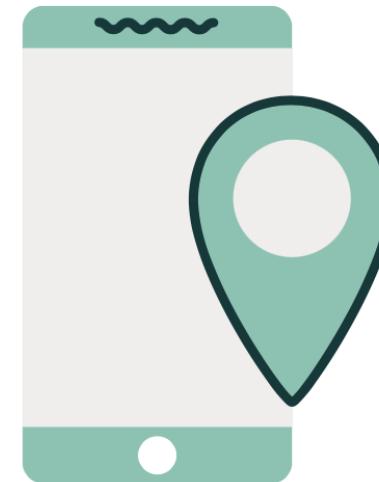
Problem



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**.



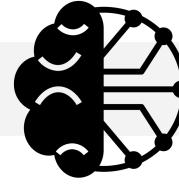
Approach



Data



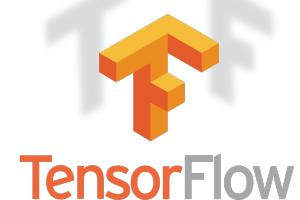
Advisors



Model



App

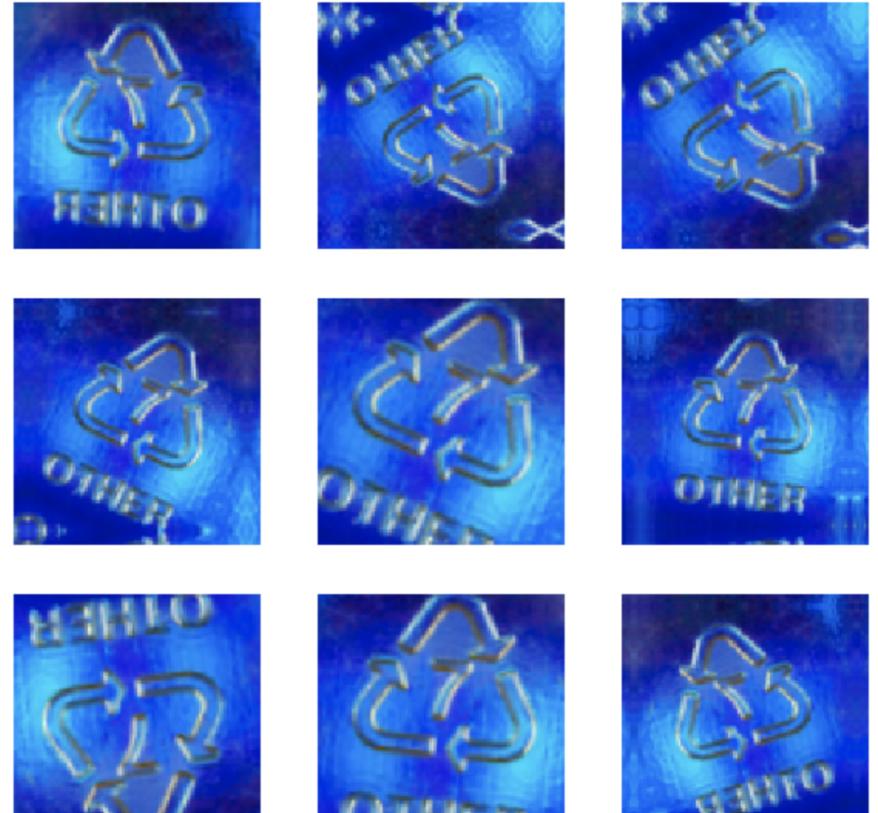


TensorFlow



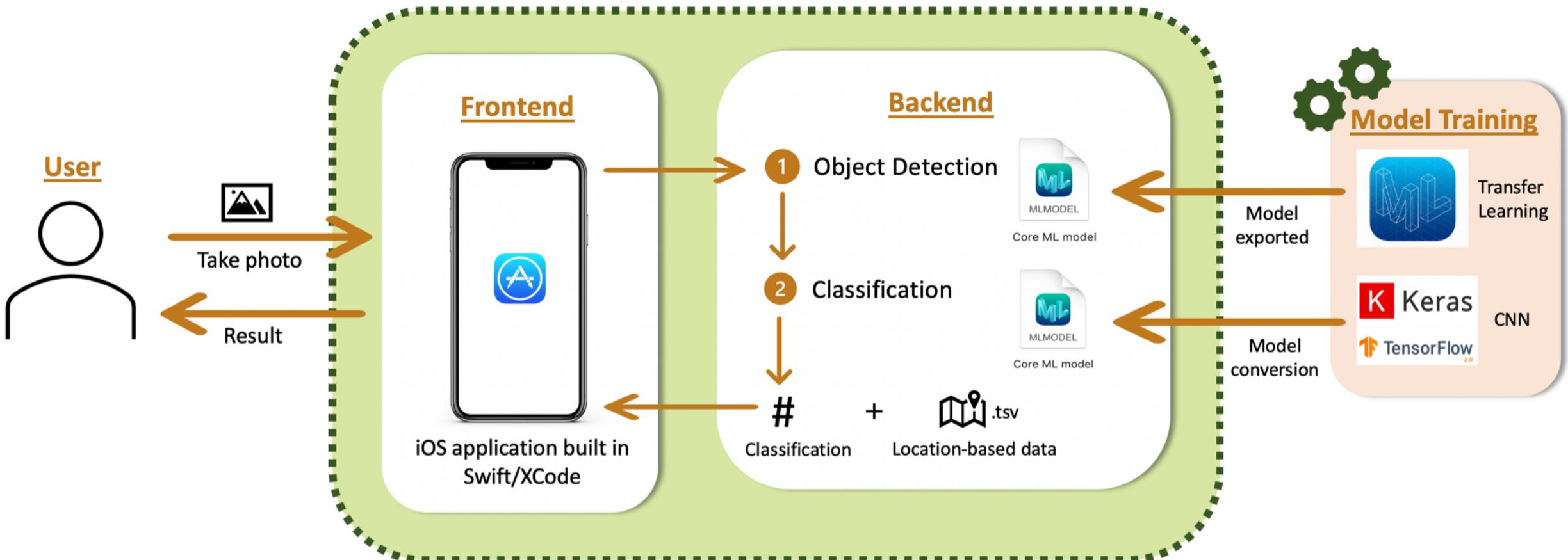
Data collection

- **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%)

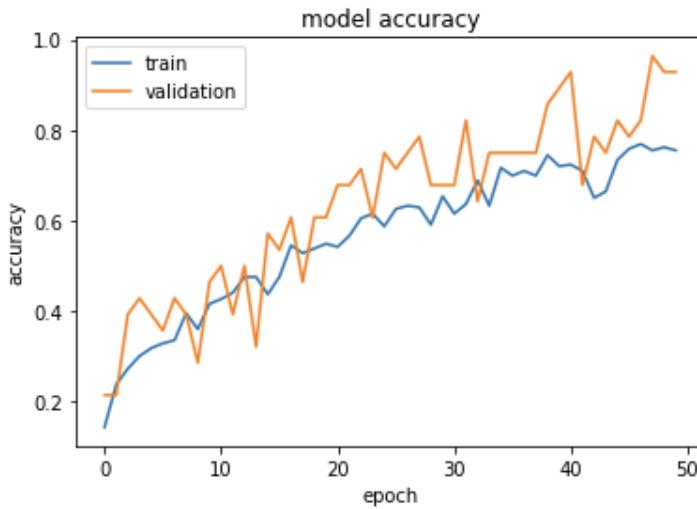


Example of the data augmentation process on one training image.

Architecture

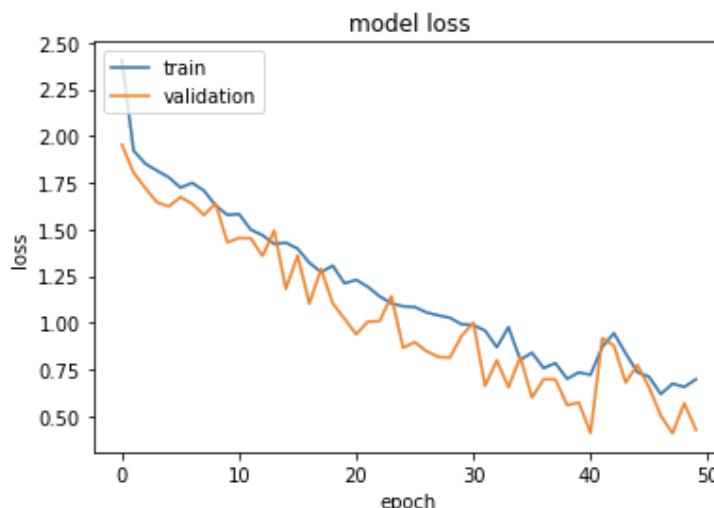


Classification model - Keras CNN



Final Model Accuracy:

- Training = 86%
- Validation = 93%



Final Model Loss:

- Training = 0.6
- Validation = 0.4

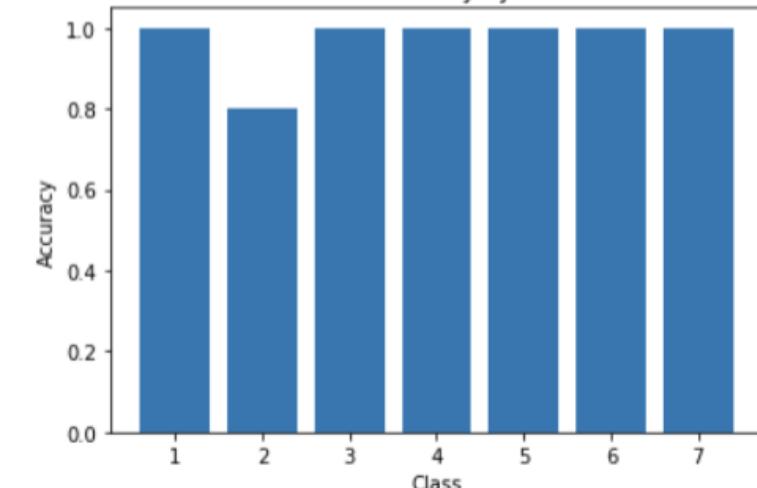
Performance by Class:

		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

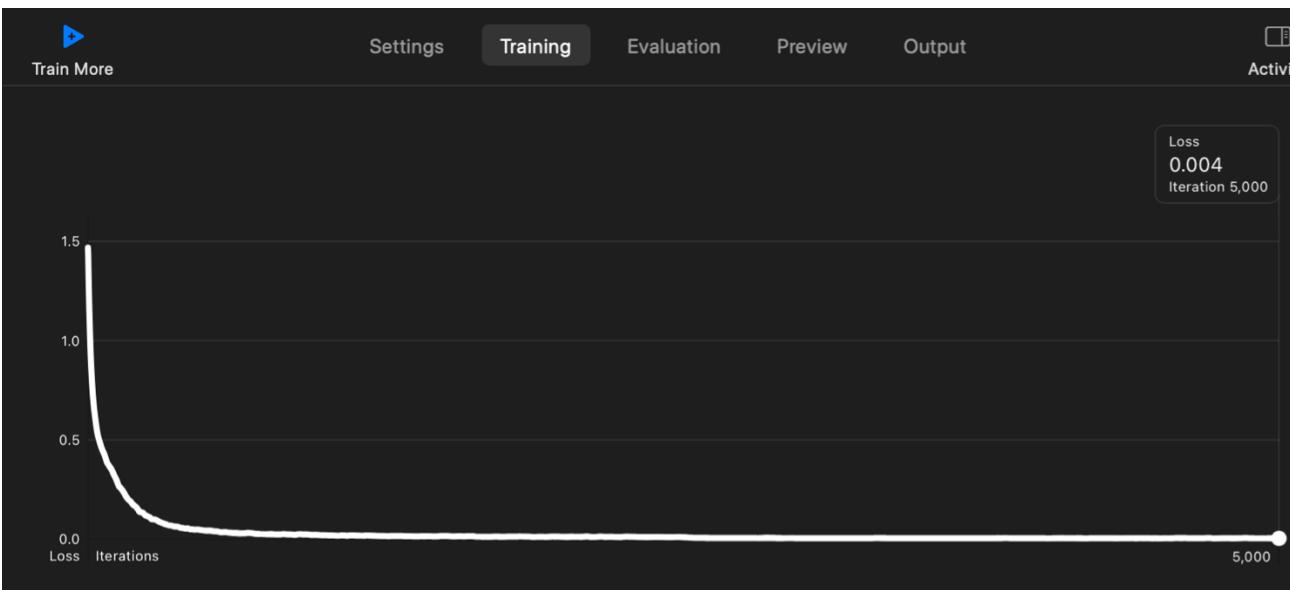


Model Accuracy by Class



Object detection model

- Object detection pipeline

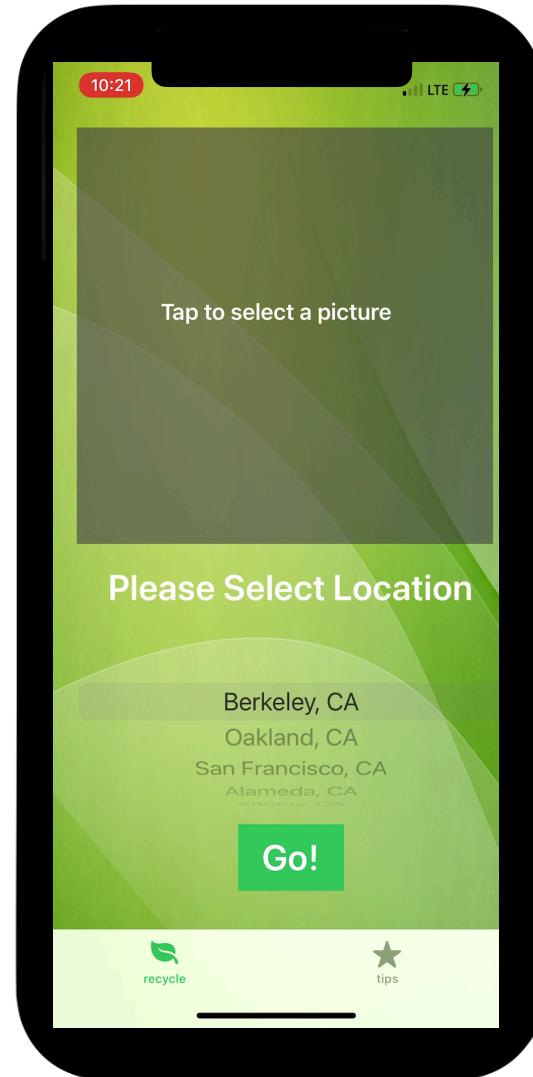


Final model accuracy:

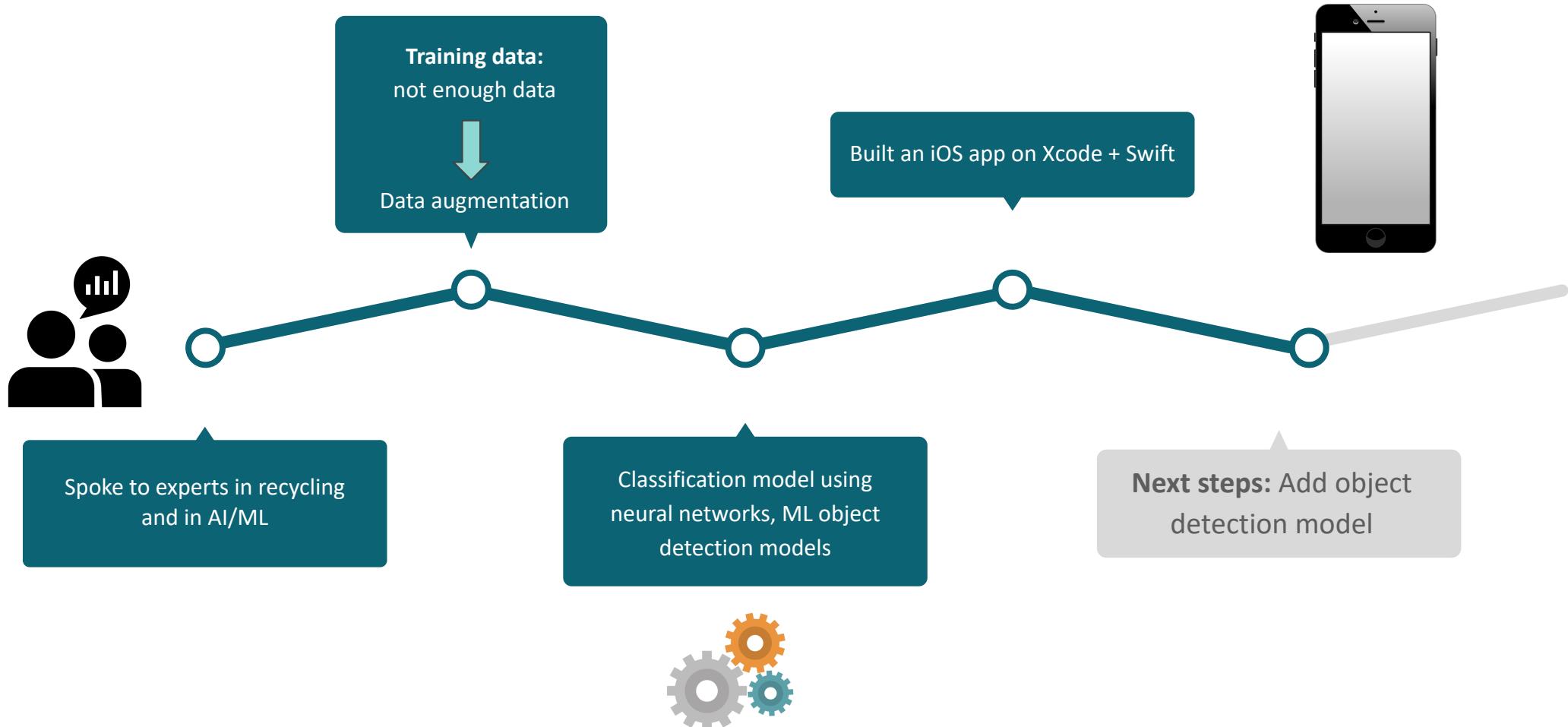
- Training = 100%
- Validation = 94%

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