How to Feed Your Robot

Building and Maintaining Open Machine Learning Datasets 🤖

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Supervised ML, grossly simplified

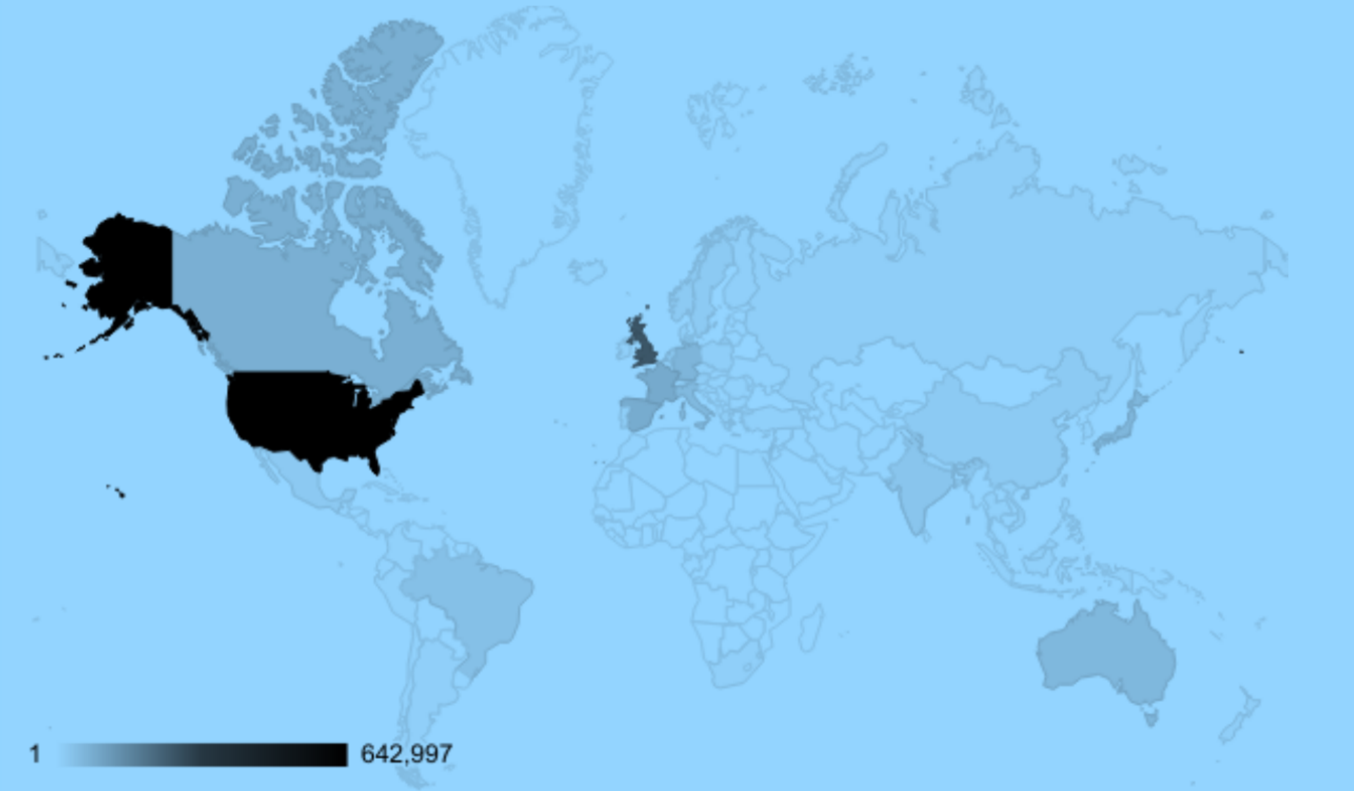
1. **Train** an algorithm with labeled data

Picture	Show **a label**
🐶	“This is a **dog**”
🐱	“This is a **cat**”
🐶	“This is a **dog**”
🐱	“This is a **cat**”
…lots of other examples…	
🐶	“This is a **dog**”

2. Use the algorithm to **classify** new pictures of dogs and cats

New **picture**	Algorithm **classifies**	
😸	“I’m 0.79 sure that is a **cat**.”	🤖
🐶	“I’m 0.87 sure that is a **dog**.”	🤖

Massive Bias Problems



60%

images in ImageNet and Open Images comes from **six countries**

Source: *No Classification without Representation: Assessing Geodiversity Issues in Open Data Sets for the Developing World by Shreya Shankar et al.*

Current Project

Interview **~20 data set builders, maintainers, and funders** to understand how we can build just and effective datasets for development and humanitarian use

- Semi-structured conversations
- Spread across industry, academic, research institutions
- No attribution unless the info was published
- Most interviewees were working on text or image datasets

Alex Ratner	*Alistair Johnson*	*Andrew McCallum*	*Brandeis Marshall*	*Celina Lee*
Courosh Mehanian	*Desmond Patton*	*Donghui Li*	*George Azzari*	*Jayme Garcia Arnal Barbedo*
Leo Anthony Celi	*Mutale Nkonde*	*Mutembesa Daniel*	*Nick Adams*	*Rashida Richardson*
Rediet Abebe	*Sebastian Ruder*	*Sue Márquez*	*Tariq Khokhar*	*Tony Hey*

Thank you to everyone who took the time to talk! Any errors are on me.

Five lessons

1. Motivations shape dataset
2. Transactional labels are always worse than you think
3. Find your place on the labeling spectrum
4. Don’t ignore shelf life
5. Think infrastructure, not research

1. Motivations shape datasets

Commercial

- I want to build a new product
- This dataset will give us a moat
- This dataset will make our algorithm more robust

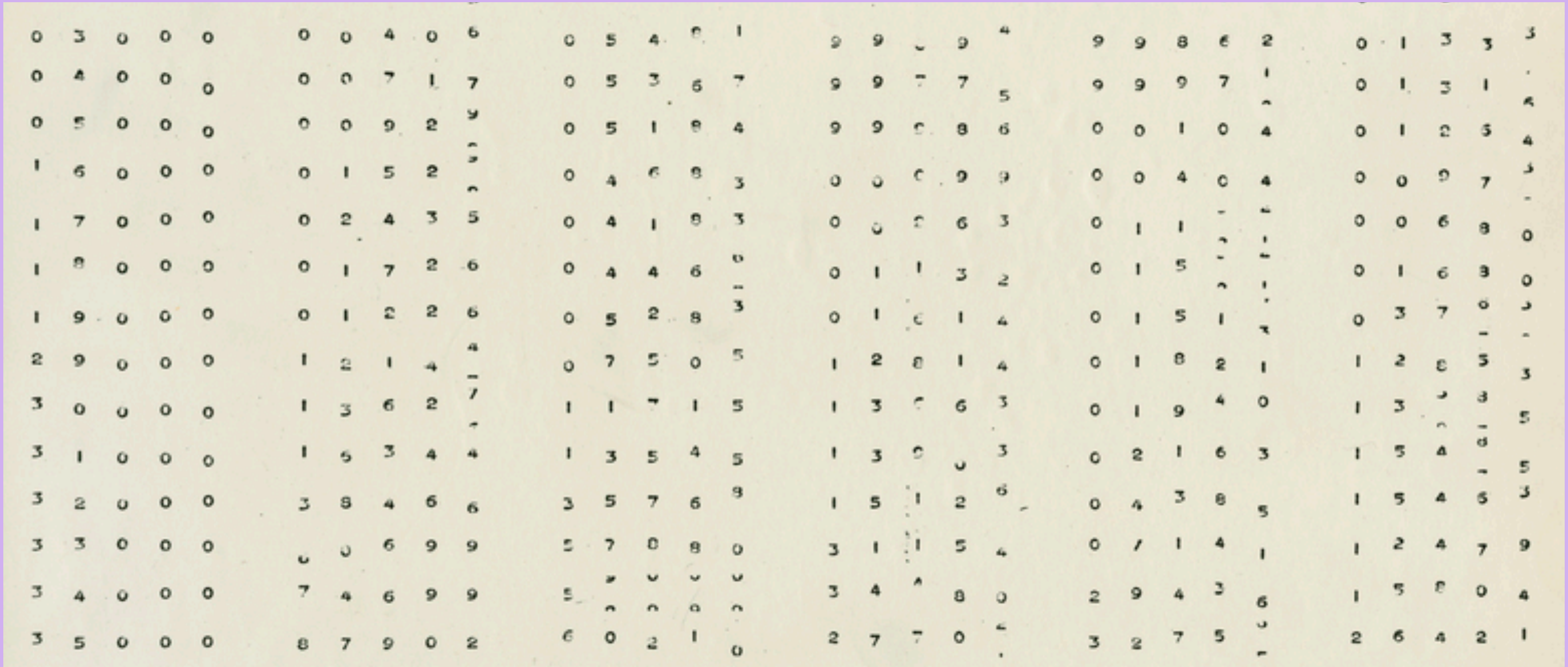
Methodological

- We need a benchmark for the field
- If we have this dataset, we can figure out this method
- I’m curious about __________.

Applied

- How do I understand these data?
- How to I automate this annoying task?

2. Transactional labels are worse than you think



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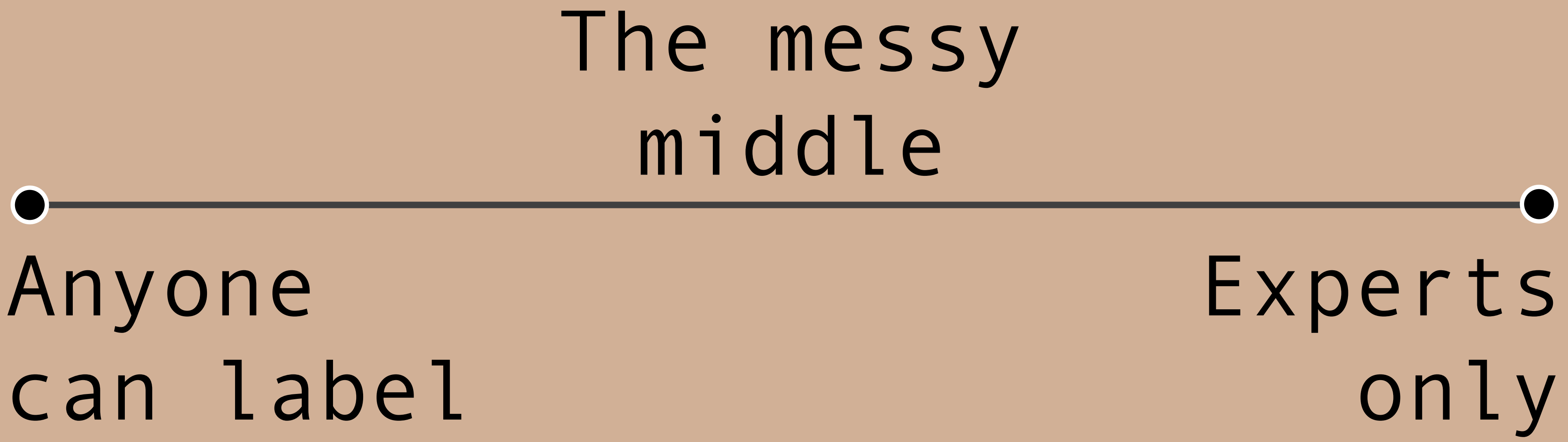
3. Find your place on the labeling spectrum



The messy middle

Anyone can label

Experts only

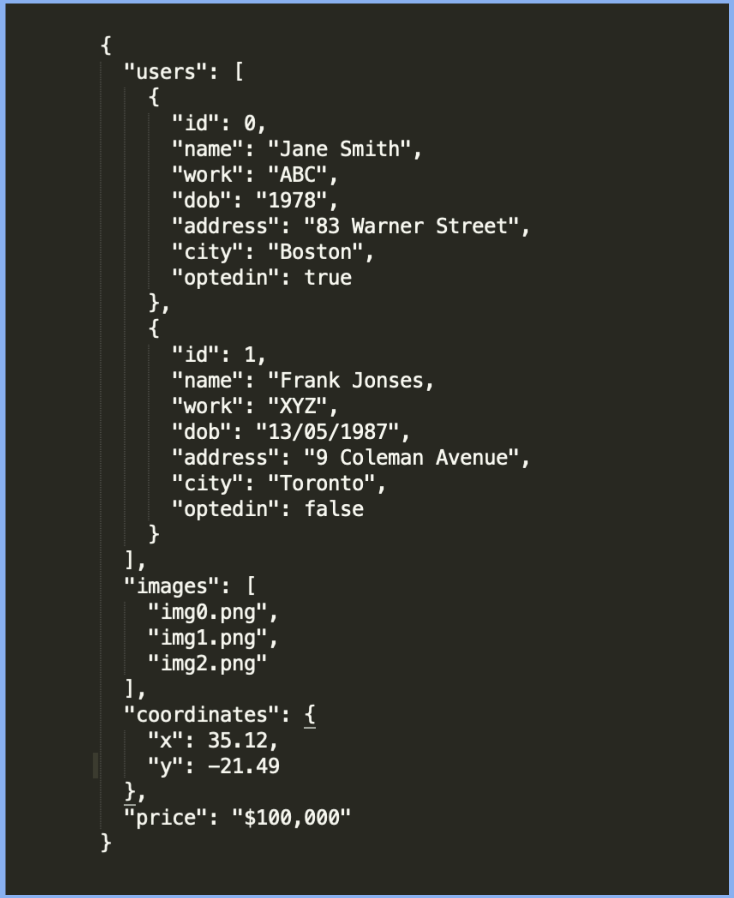
3. Find your place on the labeling spectrum

Strategies for the **messy middle**

- Incentives, not just financial
- New tools to make tasks easier
- Change the classification problem

4. Don’t ignore shelf life

Use Buy:
2020-02-28



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5. Think infrastructure, not research

- Ubiquitous, not bespoke
- For a community, not a team
- A separate budget, not a budget line
- Measure and reward contributions

Background Reading:
https://www.are.na/evan-tachovsky/in-training

Thank you! Get in touch

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