Appen Limited

Technology Day

29 May 2019

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Appen Tech Day - Agenda

- Welcome and introductions
- AI primer and how we support our customers
- Overview of our technology
- Break
- Figure Eight demo
- Q&A

Team introduction

Mark Brayan

CEO

Wilson Pang

CTO

Ryan Kolln

VP Corporate Development

Meeta Dash

Director Product

Appen Tech Day

Welcome and introductions

AI primer and how we support our customers

Overview of our technology

Break

Figure Eight demo

Q&A

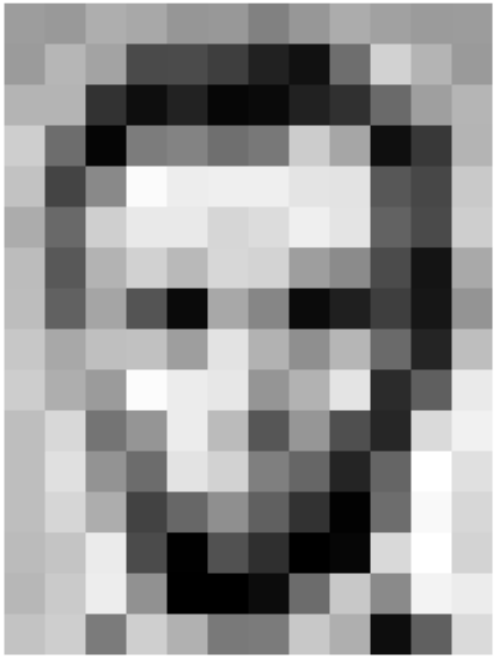
AI mimics human behaviour, typically two approaches

Humans provide the rules

Humans provide examples

We support leading AI applications by providing ‘examples’ (aka training data)

To learn, computers are ‘told’ what data represents



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155	182	163	74	75	62	33	17	110	210	180	154
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206	109	5	124	131	111	120	204	166	15	56	180
194	68	137	251	237	239	239	228	227	87	71	201
172	105	207	233	233	214	220	239	228	98	74	206
188	88	179	209	185	215	211	158	139	75	20	169
189	97	165	84	10	168	134	11	31	62	22	148
199	168	191	193	158	227	178	143	182	106	36	190
205	174	155	252	236	231	149	178	228	43	95	234
190	216	116	149	236	187	86	150	79	38	218	241
190	224	147	108	227	210	127	102	36	101	255	224
190	214	173	66	103	143	96	50	2	109	249	215
187	196	235	75	1	81	47	0	6	217	255	211
183	202	237	145	0	0	12	108	200	138	243	236
196	206	123	207	177	121	123	200	175	13	96	218

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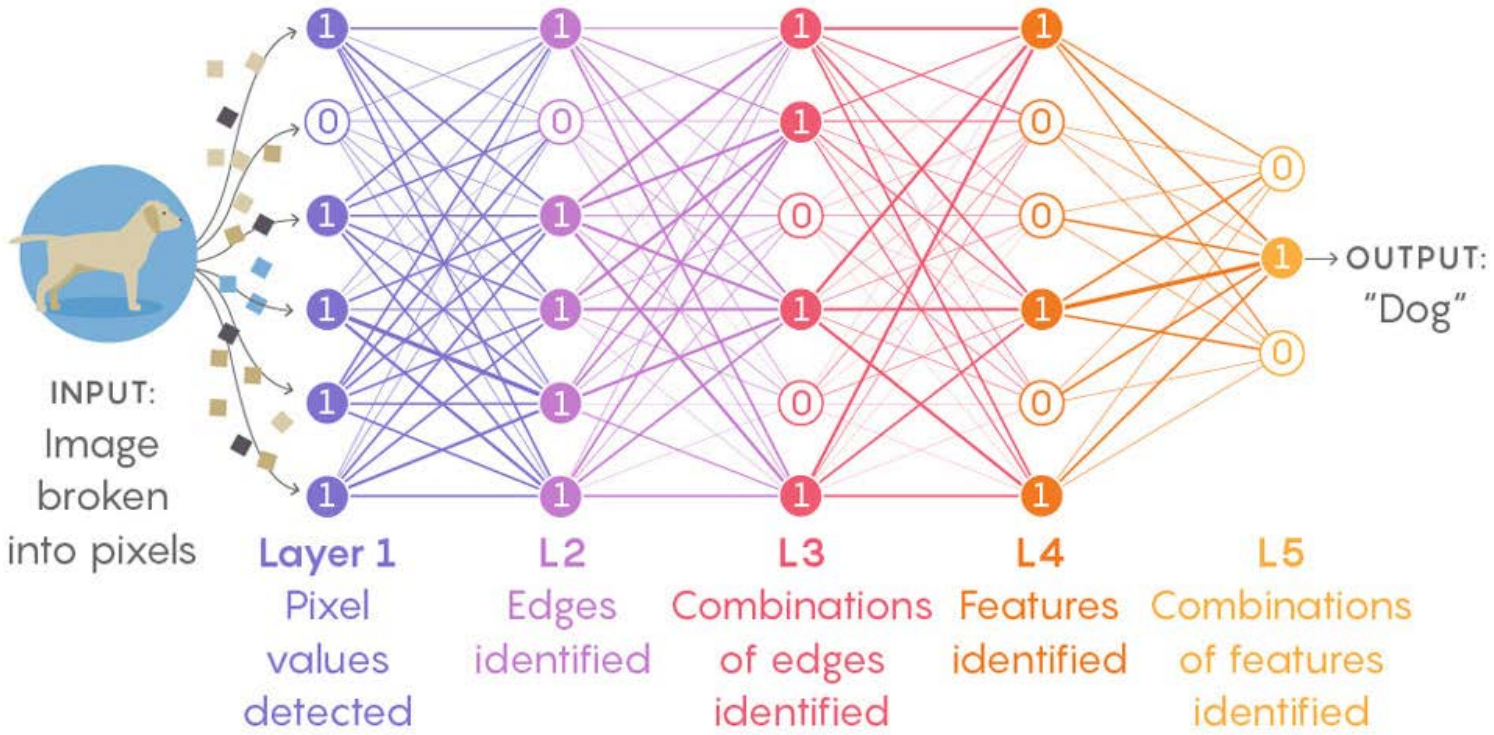
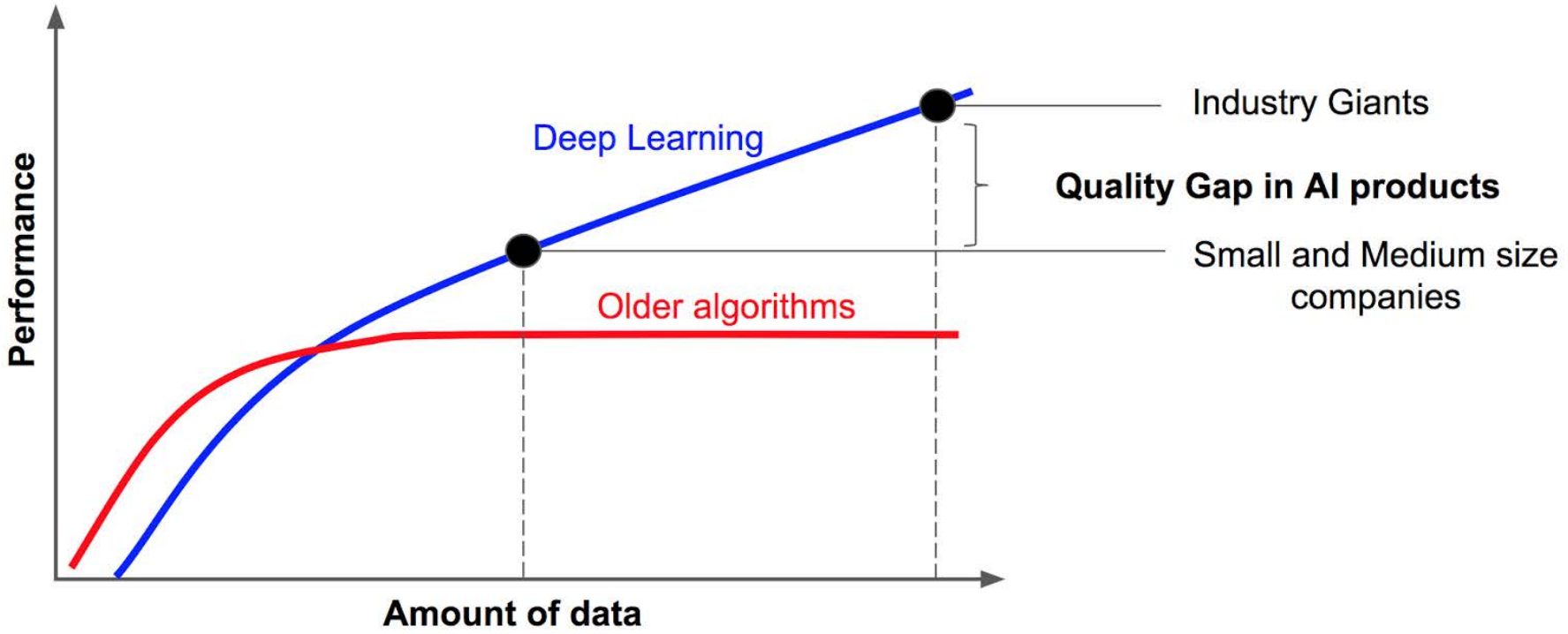
196	206	123	207	177	121	123	200	175	13	96	218

This sequence of numbers is an image of Abraham Lincoln

Training data is used to ‘train’ AI algorithms



More training data = better performance



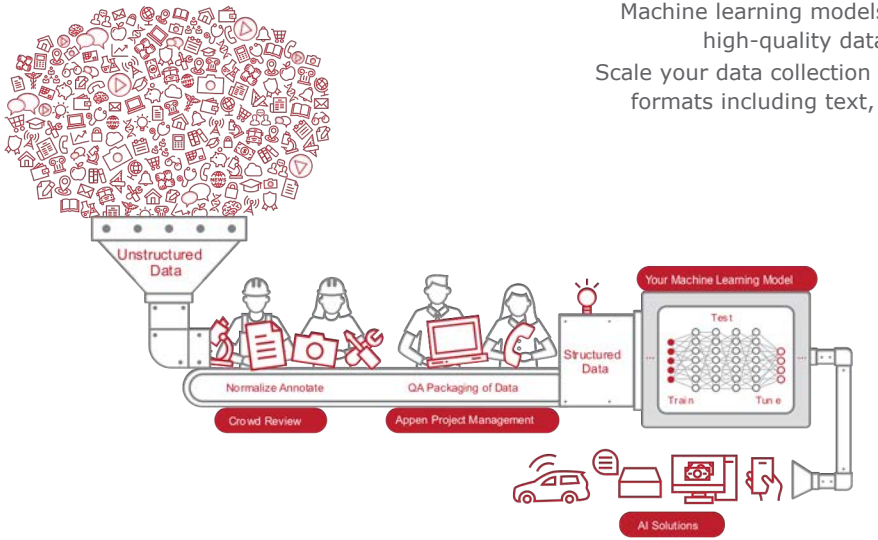
Source: Andrew Ng

Training data is the ‘product’ when it comes to AI

	Design	Code	Test	Iterate
Old approach	Start with logic (e.g., Abraham Lincoln has a beard but no moustache)	Take the logic and convert into code	Use real world examples to test	Improve the performance by adding/changing logic and corresponding code
Deep learning	Start with training data (e.g., 5000 of Honest Abe, 5000 of other people)	Deep learning network programs itself using training data	Use real world examples to test	Add more training data

Typically most important step in process

Appen provides high-quality AI training data



Data Collection

Machine learning models require large volumes of high-quality data to be trained effectively.

Scale your data collection efforts across multiple file formats including text, image, video and speech.

Data Annotation

Annotated data enables richer and more valuable machine learning-based products.

Appen's curated crowd allows you to get the high-quality data you need to develop better products for your customers.

We focus on three main data types

Relevance

- Enhance on-site search, categorization, personalization and more
- Use cases include search, social media and eCommerce

Speech & Natural Language

- Data for speech recognition, speech synthesis and natural language understanding
- Used for personal assistants, chatbots and in-vehicle speech systems

Image & Video

- Data collection and annotation for computer vision
- Use cases include driverless vehicles, surveillance, medical image diagnosis, etc.

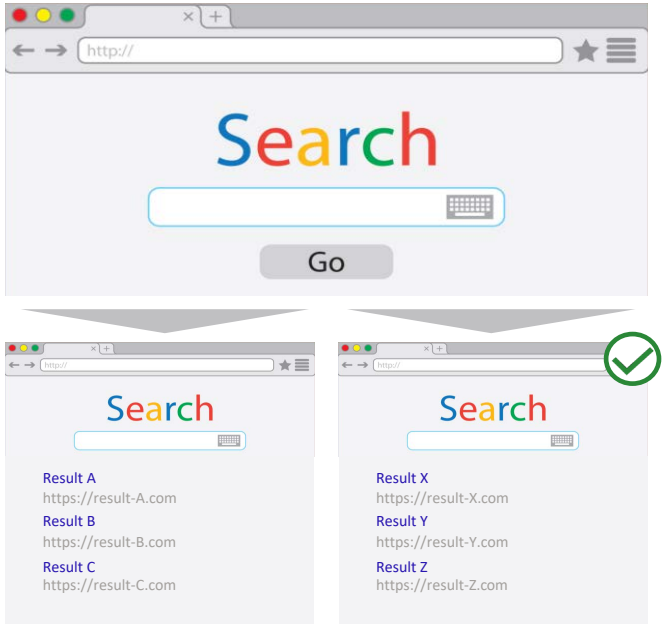
Relevance: judgements to support search and social media

Relevance

Speech & Natural Language

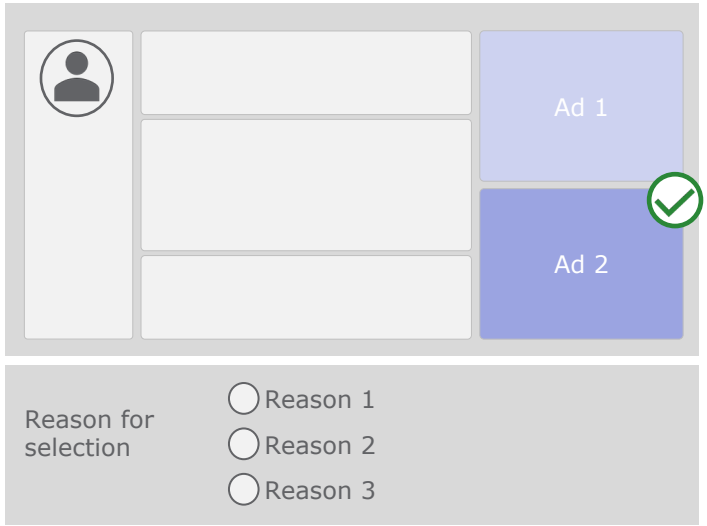
Image and Video

Search evaluation



- Crowd workers select result that is most 'correct' to them
- Used to test and tune search algorithms

Ad evaluation



- Crowd workers select ad that is most 'relevant' to them
- Used to test and tune ad delivery algorithms

Speech and Language: data collection & annotation

Relevance

Speech & Natural Language

Image and Video

Speech collection

- Speech recognition systems required a wide array of languages, dialects, accents and acoustic settings
- We procure a crowd that meets the accent, demographic and language requirements
- Our crowd reads from a script into our mobile voice recorder

Sentiment analysis

What sentiment is expressed towards the political party? (required)

- ○ Positive
- ○ Neutral (no sentiment)
- ○ Negative

- Sentiment models are used to infer meaning from text
- Our crowd workers read the news article and provide views on the sentiment of the article

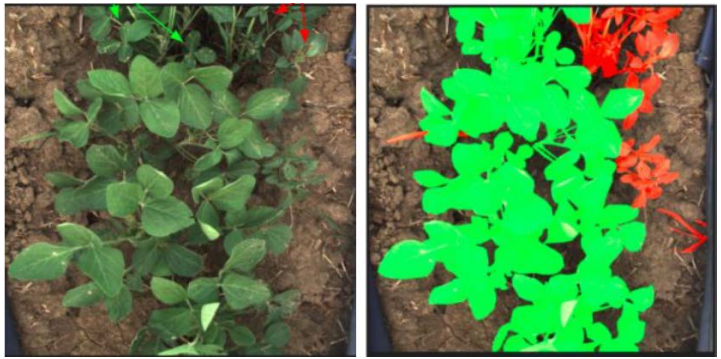
Image and Video: annotation for computer vision

Relevance

Speech & Natural Language

Image and Video

Pixel annotation

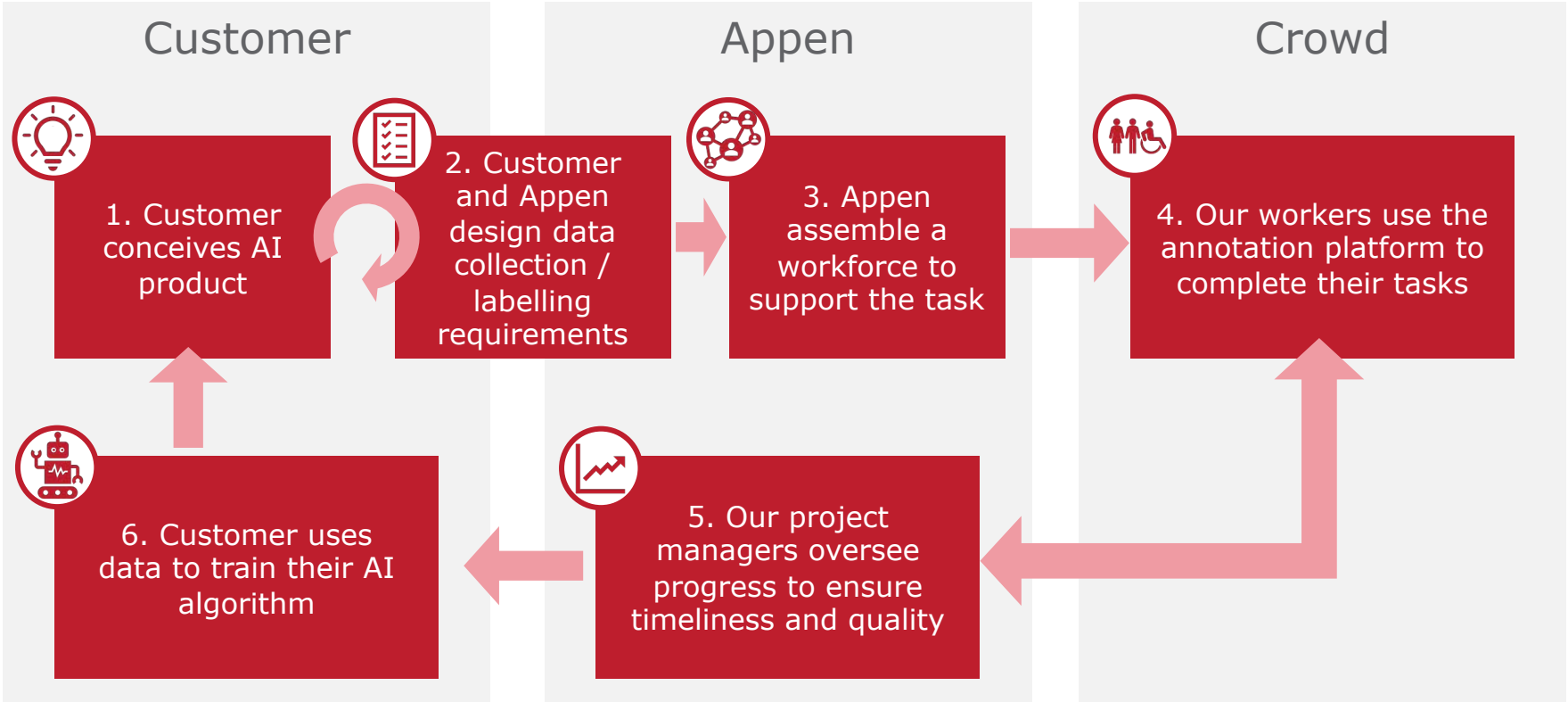


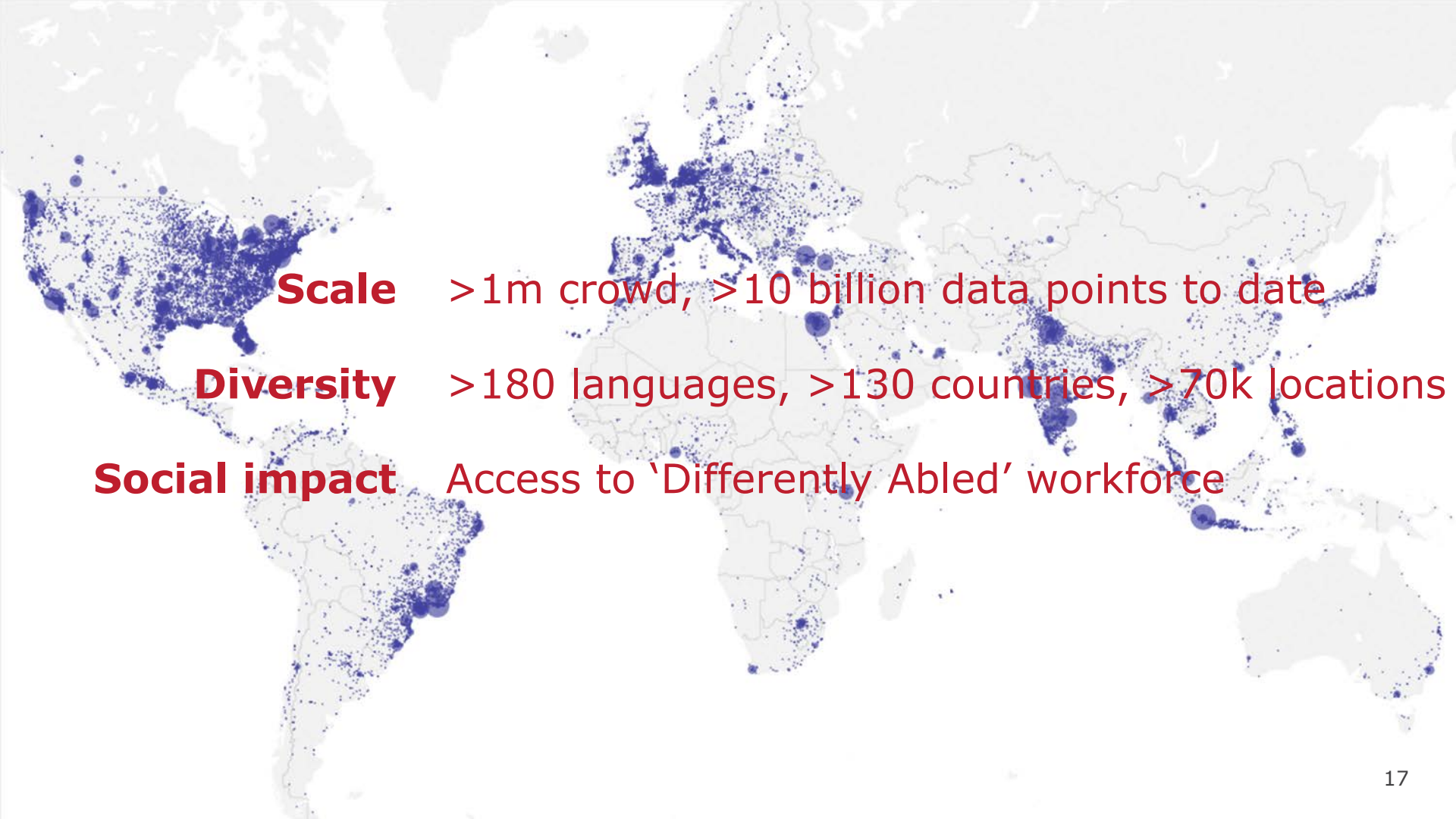
- AI is used to identified weeds to enable more targeted use of pesticide
- Training data required to label weeds (red) vs. crops (green)
- Through more efficient use of pesticide, 90% reduction in herbicide and 50% reduction in seed costs

Bounding boxes

- Customer uses AI to identify items that our out of stock and inform store operations
- Training data is required to identify empty shelves, and to differentiate out of stock vs. low stock

Typical steps in data collection and labelling





Scale >1m crowd, >10 billion data points to date

Diversity >180 languages, >130 countries, >70k locations

Social impact Access to ‘Differently Abled’ workforce

Leading technology to enable our crowd and customers

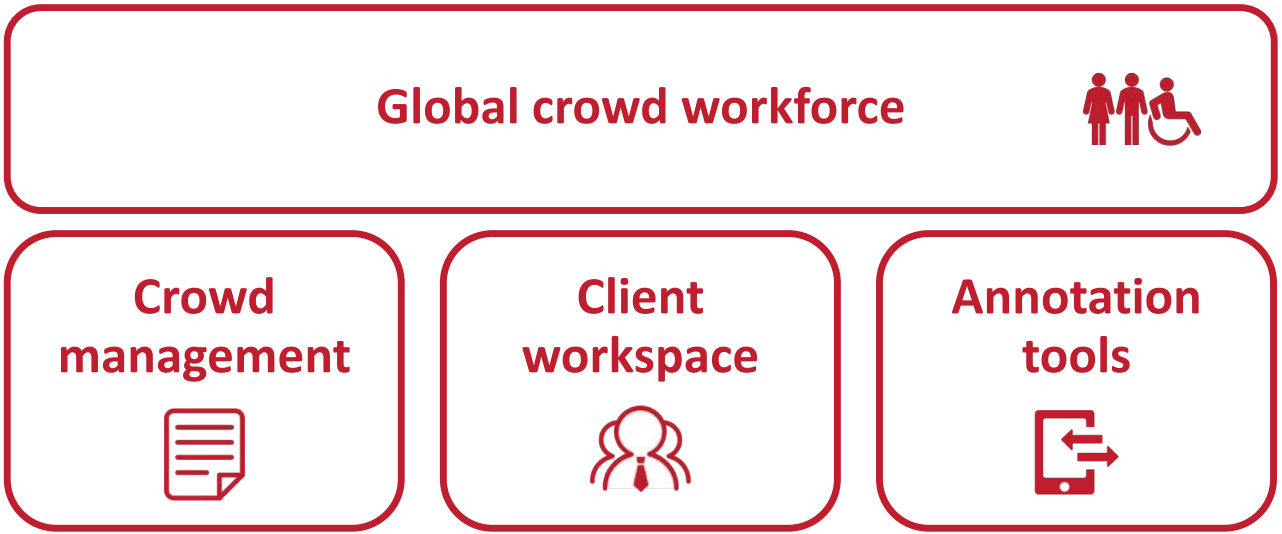


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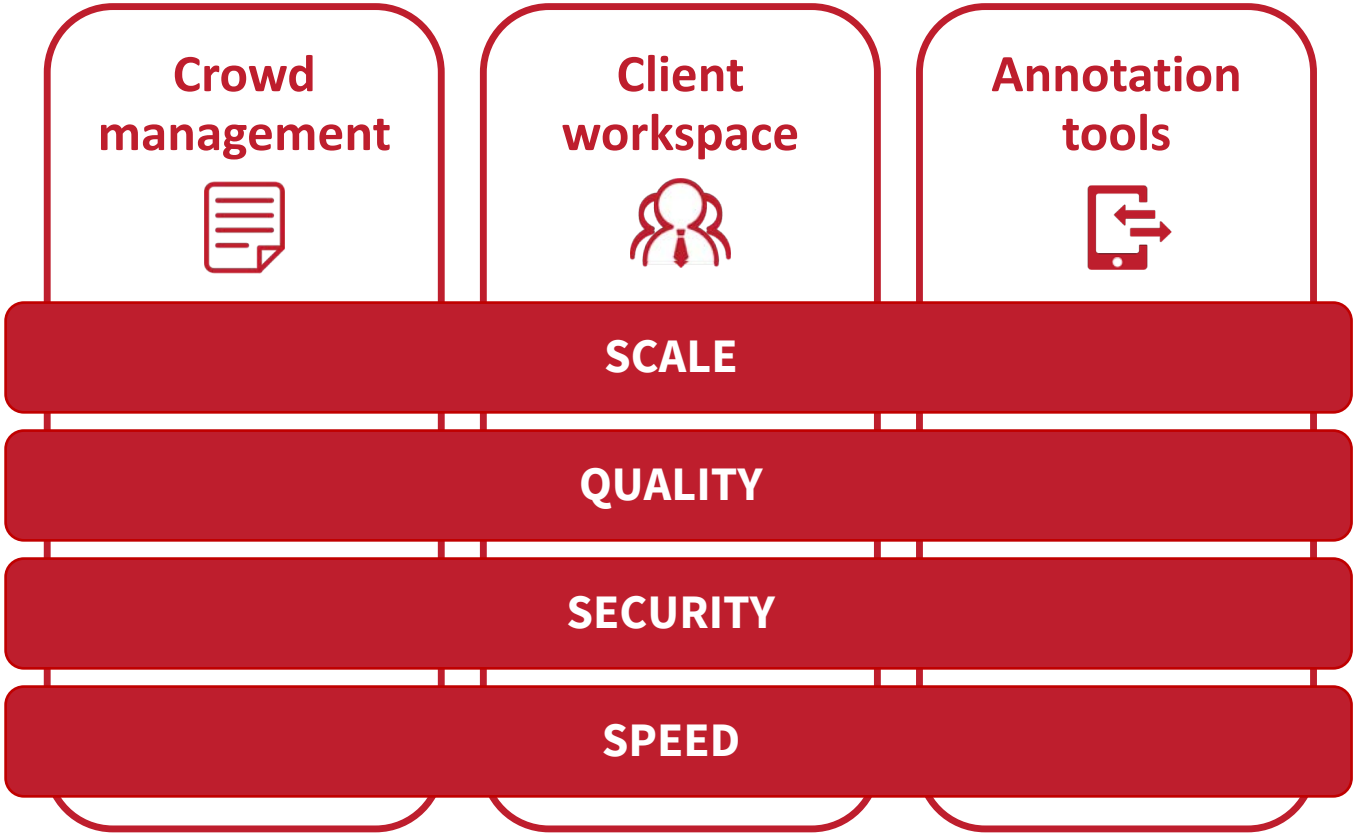
Figure Eight demo

Q&A

Comprehensive Solution for Training Data



Crowd Management Capability

Appen Connect manages interactions with our global crowd of over 1 million people

Crowd management

Client workspace

Annotation tools

Crowd Management Capabilities

Recruiting

Attracting, onboarding, and providing opportunities for qualified annotators who meet business requirements

Onboarding

Educating and evaluating annotator competence — before they're deployed on a project

Quality Assurance

Managing our global workforce productivity and accuracy to exceed quality targets

Payments

Manage to generate invoice and payment for workers across the globe

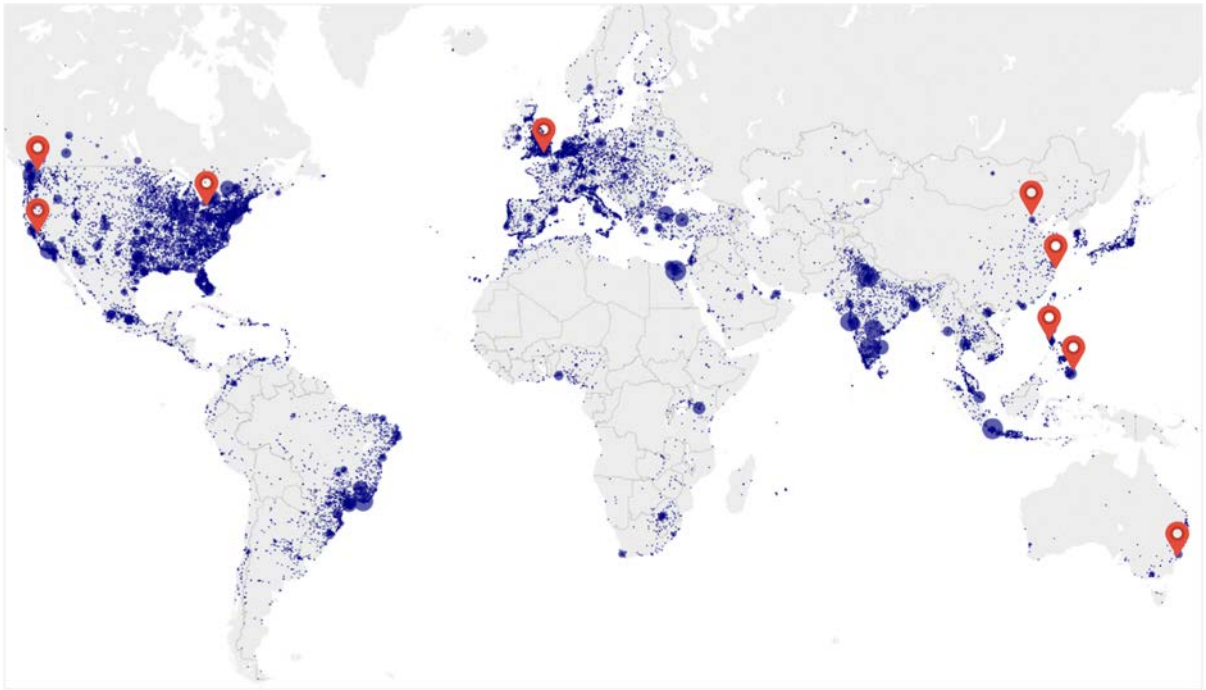
Flexible Scaling

Ramping annotator resources — remote, on-site, or in a secured facility — in different geographies, as project requirements change

Project Management

Facilitating end-to-end project design, regular communication, and reporting with client

Importance of Crowd Management



Crowd Scale

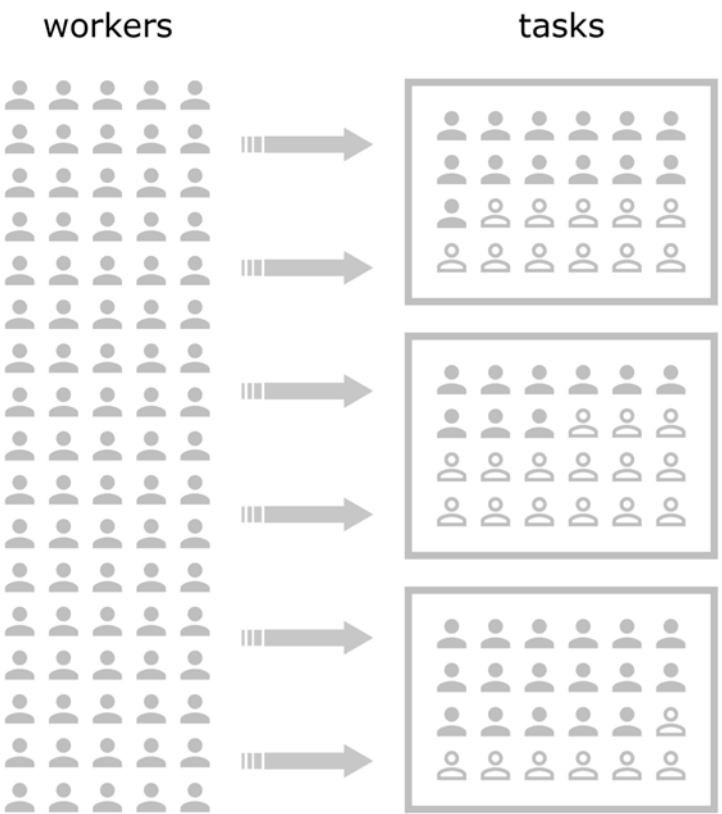
- >1M crowd
- 70k+ cities
- 130+ countries
- 180+ languages

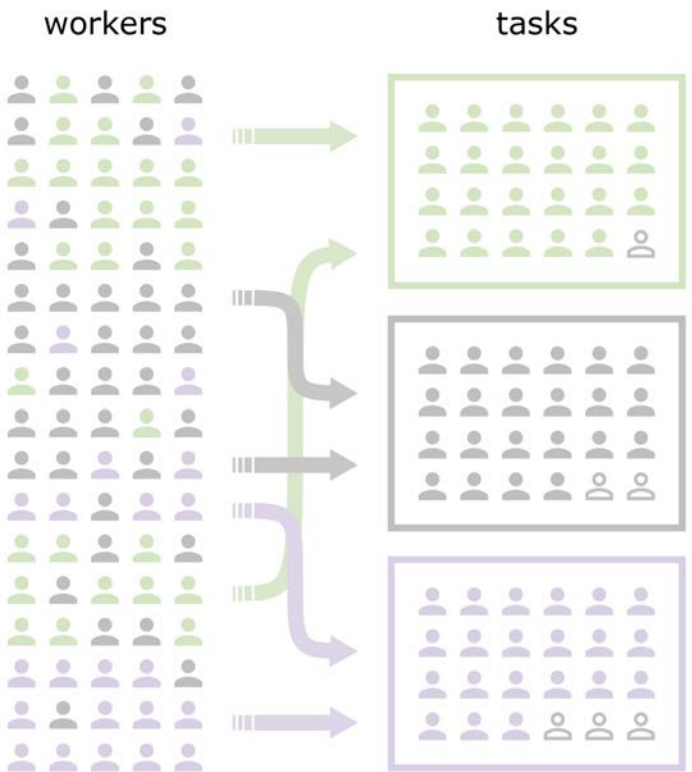
PM Scale

- ~250 PMs
- 9 offices

Efficiency is key

AI will improve how we curate and allocate work





Client Workspace

Client workspace provides self-service capabilities that tightly integrate with our customers

Crowd management

Client workspace

Annotation tools

Client Workspace Capabilities

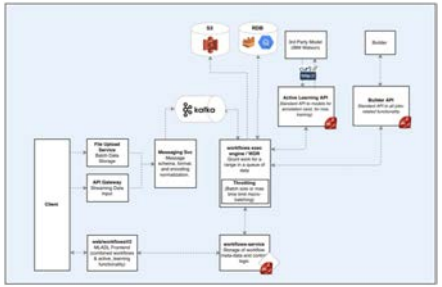
Upload Data	Design Job	Select Worker	Launch & Monitor	Get Result
• Upload raw data manually • Automate data upload through API	• Graphical interface and code to design annotation tools • Design Instructions • Develop test questions • Config quality control method	• Pick worker channels • Setup preference for worker expertise level • Define price	• Launch job • Monitor Status • Rich report on budget/expense	• Download annotated data manually • Automate data download through API

Importance of Client Workspace

Completely Self-Served

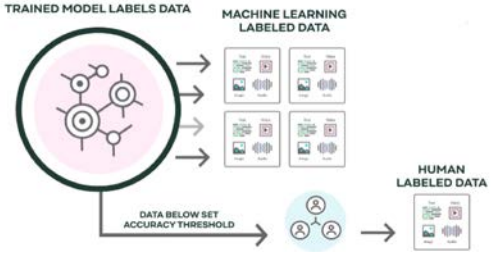
- Interface to design, build, route and monitor jobs
- Enables customers to upload data to the platform for annotation, judgment and labelling

Embedded into client's workflow



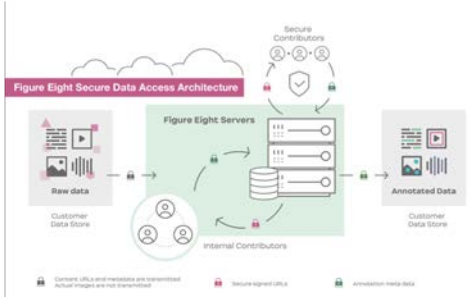
- API or Workflow integration are available
- Operations on the F8 platform can be part of the client business process

Annotation automation



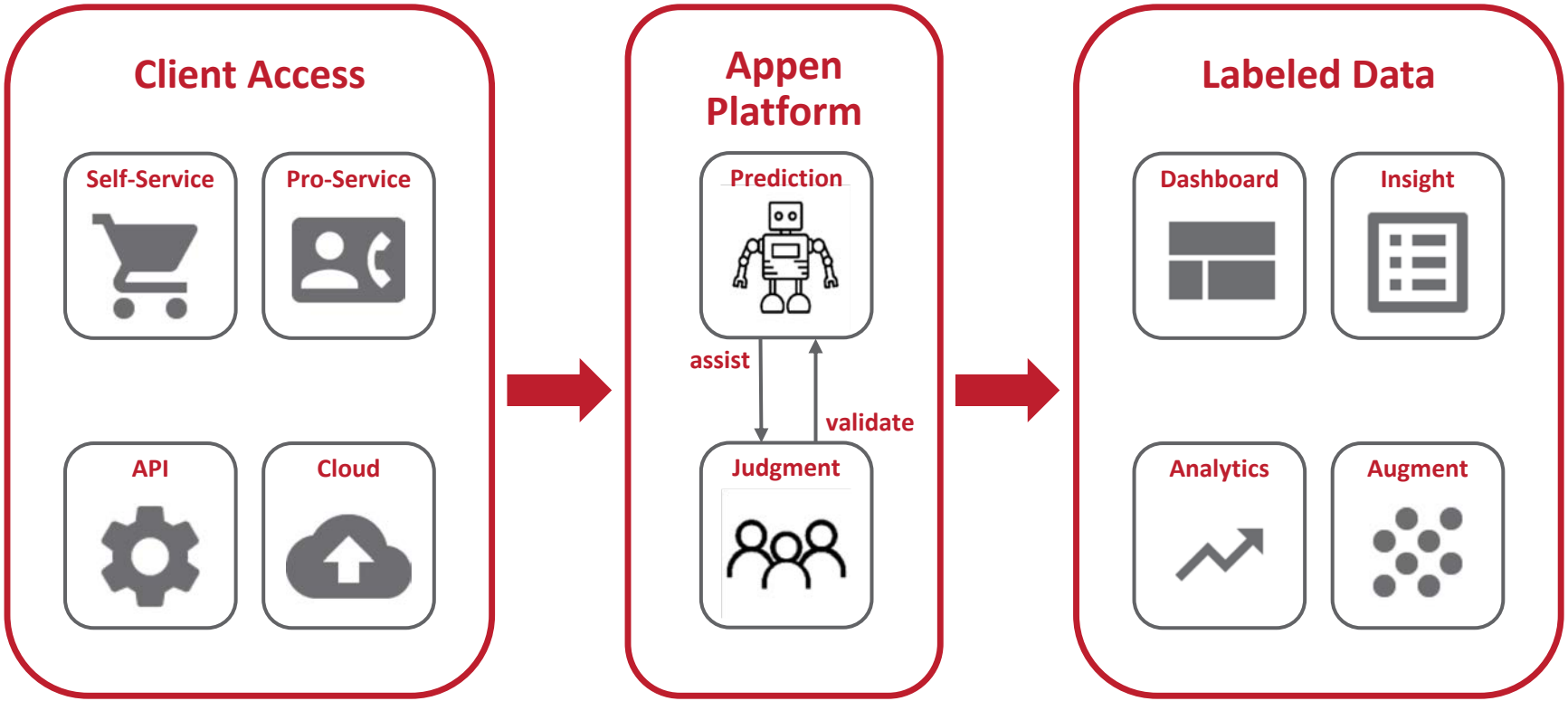
- Combines machine learning and human-generated training data labels to provide annotation automation that is up to 100x faster than human solutions

Secure Data Access



- Data is encrypted end-to-end, both in transit and at REST using TLS/HTTPS
- Customers completely own and govern their data

Client Workspace Roadmap



Annotation and data collection tools

Annotation and data collection tools provide platform for crowd to complete annotation and data collection tasks

Crowd management

Client workspace

Annotation tools

Annotation and data collection tool capabilities

Image and Video

Image mark-up
Video mark-up

Speech and Language

Transcription
Audio QA
Translation
Text tagging

Relevance

Relevance
Side-by-side
Classification
Object tagging

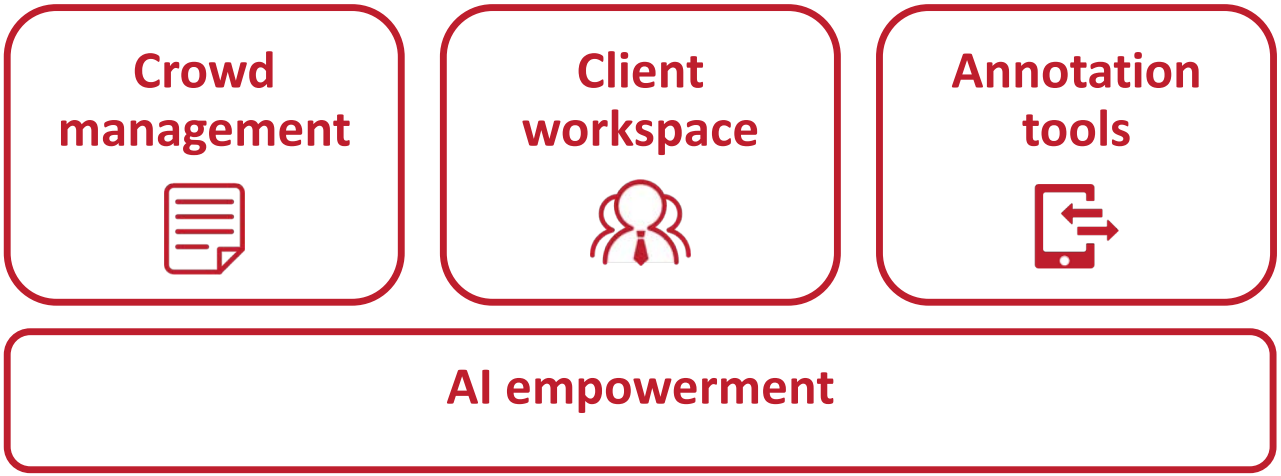
Data collection

Speech collection
Text collection
Image collection
Video collection
iOS / Android

Annotation and data collection tools roadmap

Image	Video	Speech and Language	Text	Translation
				
Annotation speed up to **10x**	Annotation speed up to **100x**	Improved transcription speed	Improved text annotation speed	Improve translation speed
Enhanced quality	Enhanced quality	Enhanced quality	Enhanced quality	Enhanced quality

Leading technology to enable our crowd and customers



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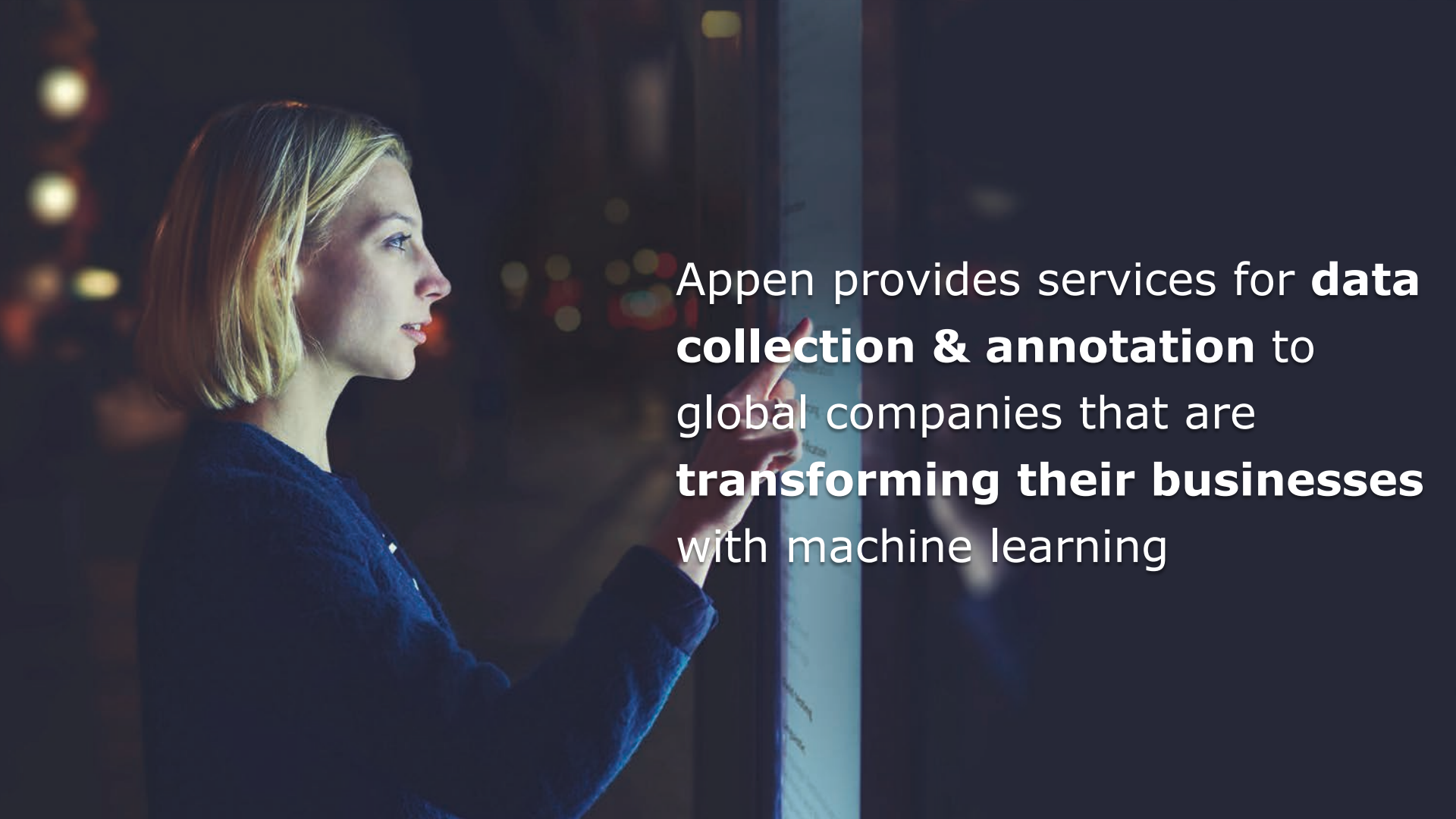
Appen provides services for **data collection & annotation** to global companies that are **transforming their businesses** with machine learning

Thank you

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