Overview of Machine Learning at Google

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“Artificial intelligence would be the ultimate version of Google... It would understand exactly what you wanted, and it would give you the right thing. We’re nowhere near doing that now. However, we can get incrementally closer to that, and that is basically what we work on.”

— Larry Page, 2000
Machine learning is now a crucial component of almost every Google service.
Machine learning helps tackle problems at scale

Content filtering — eg:

- Detecting >99.9% Gmail spam and phishing
- Filtering out porn/violent imagery from results when Safe Search is turned on
- Option for YouTube channel owners to hold potentially offensive comments for review
Tensor Flow: machine learning open to all

Eg: sorting cucumbers in Japan

Eg: spotting sea cows in Australia
Cloud ML: mainstream machine learning

Pretrained models (APIs):

- **Vision** API lets you understand content of an image. Eg: spot faces/words, classify by type...
- **Natural Language** API lets you analyse meaning of text. Eg: extract information about people/places/things...
- **Translate** API lets you identify language and convert text into another language; >90 languages supported

Platform to **customise own models**

**Professional services team** providing education and support
Vision: a new era of AI-assisted science

- Helping scientists understand hugely complex cause and effect relationships
- Spotting patterns humans cannot
Vision: a new era of artistic exploration?

• An aid to creativity for artists
• A tool for curators to encourage artistic exploration

artsexperiments.withgoogle.com
Where we are, really?

It feels like a **seminal moment**
- Pace of change in lab matched by applications
- At start of applying to real world problems

BUT

Many **big research challenges remain** - eg:
- Improving the understandability of models

There are **issues to work through** regarding implementation - eg:
- How best to ensure that systems are fair/functioning?
- Are there areas where we shouldn’t use these systems?
- Ways to support transition in jobs/employment?