



RED DRAGON AI

Where the jobs are in AI, and why

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 @mdda



About me

- Google Developer Expert for Machine Learning and Deep Learning
- Co-organizer of TensorFlow and Deep Learning SG meet up
- Background in Finance & ML
- Deep Learning Research
- Red Dragon AI

Red Dragon AI



- Deep Learning Consulting, Prototyping & Research
- Research - NeurIPS, EMNLP, ICML
- Education - Training Courses
- Google Partner
- Areas of research:
 - Conversational Computing
 - Natural Language Understanding
 - Text Generation
 - Natural Voice Generation - multiple languages
 - Graph Interaction & Reasoning

Outline

- Practical AI basics
 - Some key ideas
 - A concrete example
- More image stuff
- Text models
 - Pace of change
- Where are the jobs?



Practical AI Basics

ImageNet Competition

- 1000 different ‘things in images’
 - Breeds of Dogs
 - Airplane, Lamp, Kimono, Tusker
- Training set : Millions of accurately labeled images
- Goal :
 - Make a model to predict on unseen images
 - Measure ‘top-1’ and ‘top-5’ accuracies

Winning the ImageNet Competition

- Since 2012 : Build a Deep Learning network
- How to improve:
 - Vary building blocks
 - Vary how they are interconnected
 - Use big GPU farms, or create TPU devices...
- Achievements :
 - Models now better than humans (2015/16)
 - ... and are useful for non-ImageNet problems

Leveraging ImageNet

- Building / Training a full ImageNet model is expensive
 - But trained models are free(\$) and Free(-dom)
- Key idea :
 - Models have learned to ‘see’
 - On unknown classes, models are consistent
- So ...
 - Can build a new model on top of pretrained one
 - New model = Our task : Our images, Our classes

Quick Example

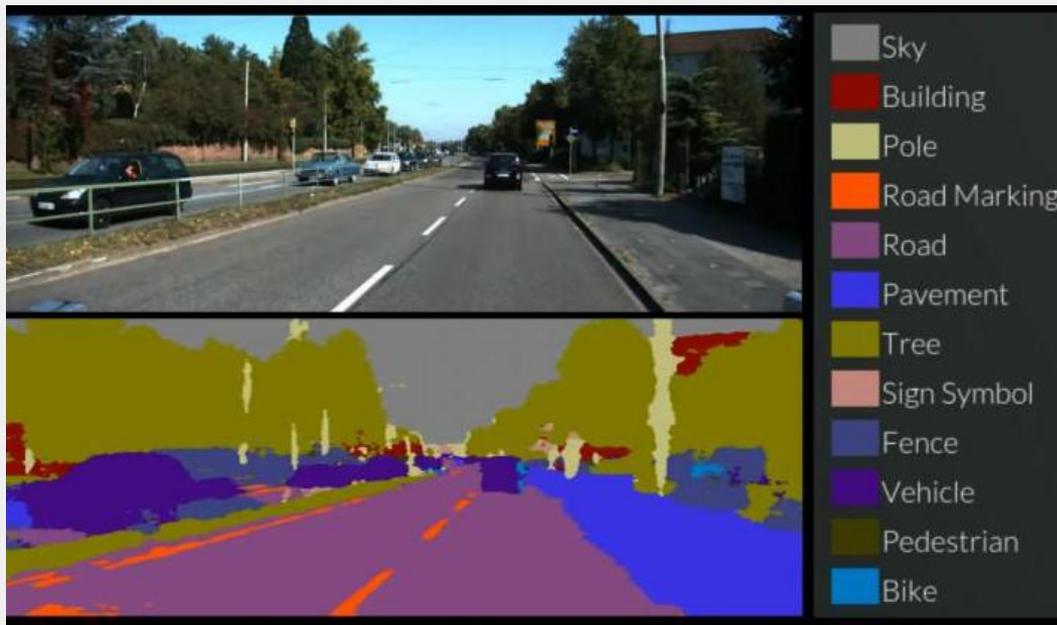
- This is from a student for our “Jumpstart Course”
 - Nicely laid out project
 - Good local flavour
 - (everyone gets to choose their own project)

- WALKTHROUGH



More Image Stuff

Advanced Computer Vision Course



- Object detection
- Object Tracking
- Counting things
- Image generation
- Colourization
- Facial recognition
- Plus much more...



Text



Text Tasks

- Is this product review good or bad?
- Is this comment spam (or offensive)?
- What does this customer want?
- What names are mentioned in this news article?
 - And who are they exactly?

Example Task : Feedback Urgency

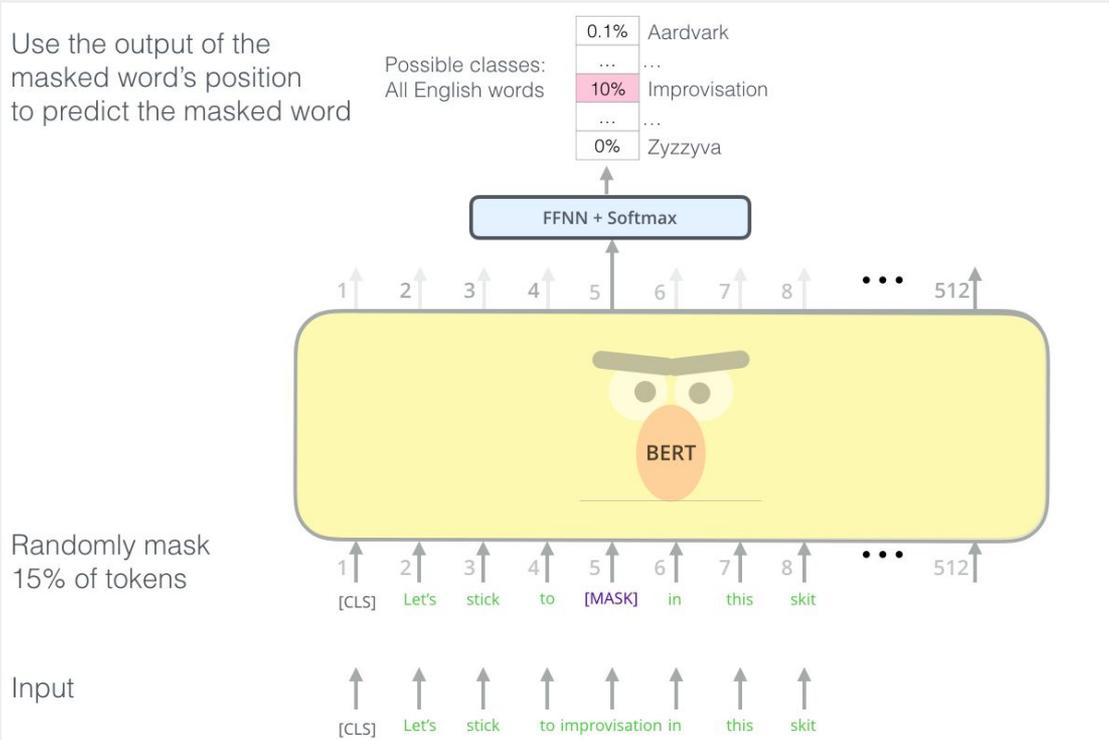
- Suppose we have a stream of incoming feedback
 - Some positive
 - Some mildly negative
 - Some urgently negative
- This is a classification task, so :
 - Think about actual goal (eg: value of each response)
 - Make a dataset (or use existing data creatively)
- Can we leverage other models (like ImageNet before)?

Language Models and BERT

- Natural Language Processing (NLP) revolutions:
 - Word embeddings (2012)
 - BERT etc (2018...)
- Dramatic improvements in text ‘insights’
- These advances create models that can be re-used

Training BERT (un-supervised)

Use the output of the masked word's position to predict the masked word



Example Task : Feedback Urgency

- Take a pre-trained BERT model
 - Use our annotated data
 - (Still need 100s of examples)
 - Train a new 'head' for the model
- Deploy combined model as an API
 - Run in a streaming setup
 - ... but also account for updated data, etc...

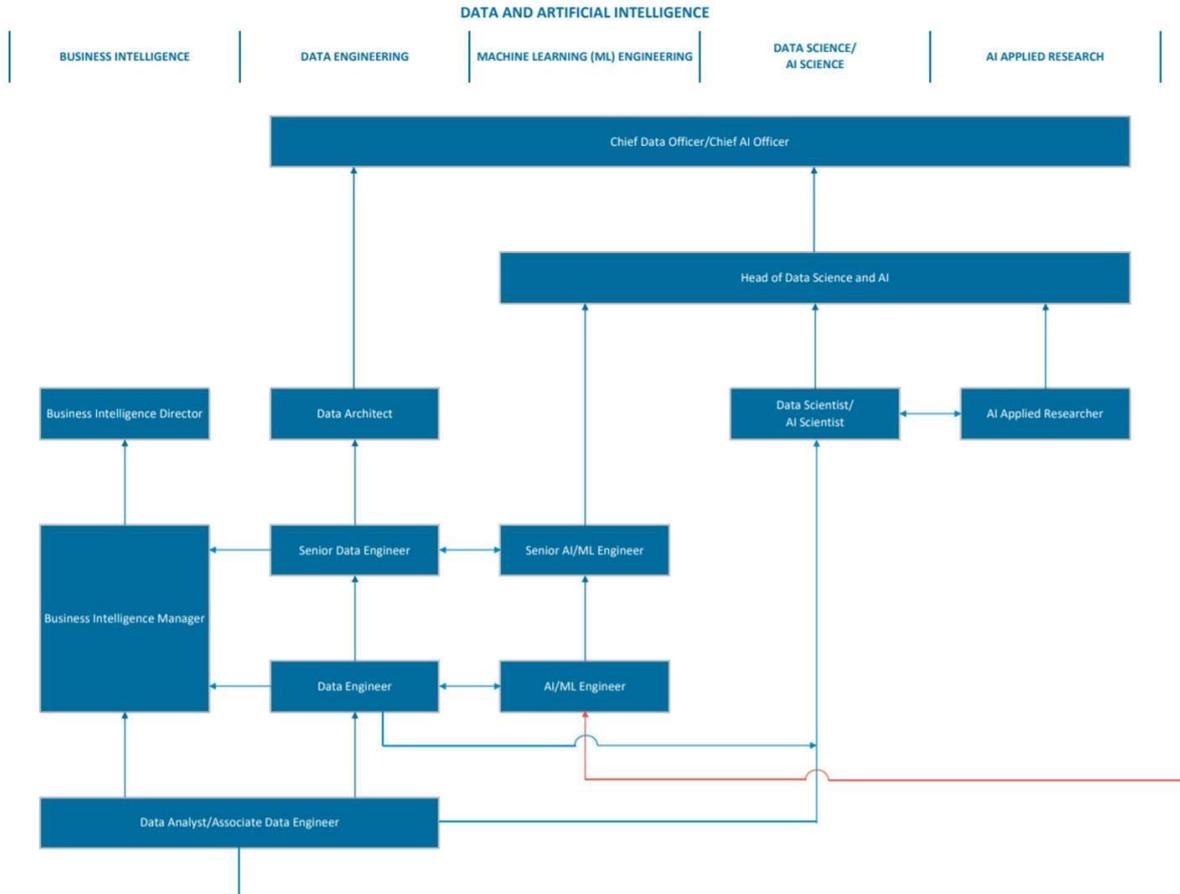
Pace of Change

- AI tech scene is moving fast
 - New models -> New capabilities
- Getting latest stuff into production...
 - ... needs people with many different skills
 - ... and the task is never 'finished'
 - ... but (unlike manual labour) it scales 'easily'



Jobs

SKILLS FRAMEWORK FOR INFOCOMM TECHNOLOGY
CAREER PATHWAY



RED DRAGON AI

[Main Infocomm Site](#)

[Career Pathways Diagram](#)

Some of the Job Roles

- Research :
 - Obvious model creation/research value here
 - But industry usage is different from 'pure' datasets
- Developer :
 - Pick up practical AI skill-set = v. doable
 - No need to reinvent the wheel
 - Much 'AI' is now an applied science (+art)

Some of the Job Roles

- Engineers : Understand how these systems are different
 - Cloud / servers
 - Reliability, scaling, versioning, clustering
 - Mobile
 - Making model smaller, lower latency, privacy

Some of the Job Roles

- Analyst : Increase value proposition
 - Go beyond spreadsheets, SQL or visualisation
 - Leverage domain expertise
- Manager :
 - Understand how ML thinking is different
 - Managing research is different from implementation



Our Courses

(Quick Advert)

Red Dragon Courses

- Currently a set of 5 courses
 - Covering different aspects of AI
- Held in conjunction with SGInnovate
 - Significant funding available for SC/PR
 - Have a look at :

<https://www.sginnovate.com/talent-development>

Jumpstart Course

- Starting from the basics
 - 2 week-days ‘face-to-face’ + video content
 - Play with real models & Pick-a-Project
 - Knowledge / portfolio building, with Certificate
- Prerequisites :
 - Most participants already do some programming
 - Python element isn’t super-difficult for them
 - Willingness to learn ...

More Advanced Courses

All independent, but require Jumpstart

- **#2 - Advanced Computer Vision**
 - Covers all the CV models mentioned so far
- **#3 - Advanced NLP & Sequences**
 - Attention, Transformers : Very up-to-date
- **#4 - Self-Supervised Learning**
 - Super-hot area of research
- **#5 - Models to Production**
 - Serving models on servers, or mobile.
 - Processes for managing Data Science, etc



Conclusions

Conclusion

- Being a Developer is already a key skill
 - Totally reasonable to add Deep Learning
- But there are other skills required
 - Engineering roles (keeping models alive)
 - Data roles (training quickly gets ‘tricky’)
 - Strategy roles (understand where AI can be applied)
- Fundamentally : makes strategic sense for Singapore



Q&A via Chat

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Thank You

Feedback Form:

- Please follow the link in the zoom chat box to send in your feedback
- You will receive a link to the Scavenger Hunt secret letter upon completion.

Next Session:

Introduction To Cybersecurity: What's With The Hype?

02:30pm (GMT+08) – Training Room 2