Making the Switch: Transitioning to a Career in AI

Jad Saab
Program Director,
Insight Artificial Intelligence
Outline

1. Defining and exploring AI:
   - Deep Learning and MLE
   - Example projects
2. Making the transition
3. AI case studies @ Insight
4. Q + A
Jad Saab

Mechatronics Engineering

Neural and Behavioural Sciences

Brain-Computer Interfaces for people with paralysis

Brain signals

Decoder

Cursor Velocity & Click

Electrode array
Major tech companies are making AI a key focus for their future.

Many startups innovating in this space too.
But what does AI mean?
The traditional definition

Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.
The traditional new definition (more or less)

**ARTIFICIAL INTELLIGENCE**
Early artificial intelligence stirs excitement.

=  

**DEEP LEARNING**
Deep learning breakthroughs drive AI boom.
Our working definition

**ARTIFICIAL INTELLIGENCE**
Early artificial intelligence stirs excitement.

**MACHINE LEARNING ENGINEERING**

**DEEP LEARNING**
Deep learning breakthroughs drive AI boom.
Diving into the Deep end

(Learning)
Hype Cycle for Emerging Technologies, 2018

As of August 2018
A Handful of Industry Use Cases

<table>
<thead>
<tr>
<th>NLP</th>
<th>Computer Vision</th>
<th>Reinforcement Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural language understanding for Alexa</td>
<td>Self-driving cars</td>
<td>Complex industrial systems</td>
</tr>
<tr>
<td>Named entity recognition in the news</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language translation</td>
<td>On-device deep neural network for facial identification</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inappropriate content detection</td>
</tr>
</tbody>
</table>

Amazon
Bloomberg
Apple
Microsoft
Waymo
Facebook
YouTube
Bonsai
Deep Learning Frameworks

- Keras
- PyTorch
- TensorFlow
- Caffe
- mxnet
- Theano
- DL4J
- CNTK
Deep Learning Frameworks

Start here →
(but don't stay here)

Keras

PyTorch

TensorFlow

Caffe

mxnet

Theano

DL4J
Deep Learning Frameworks

Keras

PyTorch

TensorFlow

Caffe

mxnet

deep learning

Theano

DL4J

Get good at one of these
Transfer learning provides a base for multiple tasks with a single model

Pre-training
BERT (2018) - Google
GPT-2 (2019) - OpenAI

Pre-trained model on large corpus

Reading comprehension
Input Question: Where do water droplets collide with ice crystals to form precipitation?
Input Paragraph: Precipitation forms as smaller droplets coalesce via collision with other raindrops or ice crystals within a cloud.
Output Answer: within a cloud

Named entity recognition
Apple CEO Tim Cook introduces 2 New iPhones at Cupertino Flint Center event

Generating synthetic text
In a shocking finding, scientist discovered a herd of unicorns living in a remote, previously unexplored valley, in the Andes Mountains.

The scientist named the population, after their distinctive horn, Ovid's Unicorn. These four-horned, silver-white unicorns were previously unknown to science.
Embeddings provide dense, context-filled representations of language, images and more

Word Embeddings (word2vec, Glove)

Image embeddings for reverse image search

N Input Images → Embedding Model → Fast distance comparison with other image embeddings saved ahead of time → Similarity Score

Vector_1

Vector_2

Vector_3

Vector_n

Image_1: 56%
Image_2: 1%
Image_3: 74%
...
Image_n: 0.6%
The increasing need for MLEs
Data Science Land

1. Load CSV file
2. Load into Jupyter notebook
3. Build and validate model
4. Present to stakeholders
5. Win?

Good luck!!!

Software Engineer Land

Production environment
The MLE bridges the gap
The MLE loop takes care of the entire lifecycle of an ML-powered product:

**ANALYZE**
- Find performance bottleneck

**SELECT APPROACH**
- Craft list of experiments

**MEASURE**
- Build opinionated dashboard

**IMPLEMENT**
- Code models and pipeline
According to O'Reilly's report on the topic, here's what differentiates an MLE:

- Stronger SWE req's than typical DS role
- Holistic thinking about data product
- Able to monitor data products in production
Example Fellow project

Automating Front-end Development

- Built a model for *program synthesis*, based on research in image captioning, to go from sketch to HTML

- Connects a computer vision model (CNN) with a language model (GRU) which feeds into a decoder model (GRU) to generate code
Example Fellow project

Transfer Reinforcement Learning

- Built a platform for automating updates to control policies following changes to a mechanical system
- Creating a powerful pipeline built around AWS Batch for quickly training models and comparing performance
How Insight can help with the transition
Insight Programs

- Full-Time Programs
- Fully Remote Sessions
- Applicant Mentorship Available
- Scholarships Available
- No educational requirements for 5 of the 7 programs
- Fellows come from academia AND industry
Diversity, Equity, and Inclusion at Insight

Insight is committed to improving access to opportunities for traditionally underrepresented groups in tech. In addition to interventions to improve access to the Fellows Program, we’re also working to provide an equitable experience where all Fellows feel a sense of belonging in the Insight Community. Here are a few ways we’re making it happen:

**Admissions**
- Insight candidate mentorship program for underrepresented groups
- Insight & partner company sponsored scholarships available
- Learn more at: insightfellows.com/scholarships

**Fellows Program**
- DEI Summit, with lightning talks, panel discussions, and keynote speaker
- Data ethics & bias training
- Team dedicated to initiatives that improve the Fellow experience

**...And Beyond**
- Insight alumni provide mentorship to incoming Fellows
- Affinity groups to continue supporting the alumni community
What Sets Insight Apart

Fellow Outcomes

Fellows earn 24% more than industry standards

In addition to an average base salary of $127,363, Fellows receive an average bonus of $11,200.

Source: Data reported from Fellows that completed Insight 2017-2019, compared to corresponding market data reported on Glassdoor in May 2020.
What Sets Insight Apart

**Fellows join top companies in advanced roles**

Number of Insight Fellows who have joined each of our top 20 hiring companies

<table>
<thead>
<tr>
<th>Company</th>
<th>Fellows</th>
</tr>
</thead>
<tbody>
<tr>
<td>facebook</td>
<td>107</td>
</tr>
<tr>
<td>Wayfair</td>
<td>51</td>
</tr>
<tr>
<td>Apple</td>
<td>50</td>
</tr>
<tr>
<td>Amazon</td>
<td>48</td>
</tr>
<tr>
<td>Vanguard</td>
<td>38</td>
</tr>
<tr>
<td>Google</td>
<td>33</td>
</tr>
<tr>
<td>Microsoft</td>
<td>33</td>
</tr>
<tr>
<td>CVS Health</td>
<td>32</td>
</tr>
<tr>
<td>Capital One</td>
<td>30</td>
</tr>
<tr>
<td>LinkedIn</td>
<td>30</td>
</tr>
<tr>
<td>Yelp</td>
<td>30</td>
</tr>
<tr>
<td>Intuit</td>
<td>26</td>
</tr>
<tr>
<td>Nielsen</td>
<td>24</td>
</tr>
<tr>
<td>Uber</td>
<td>24</td>
</tr>
<tr>
<td>Stitch Fix</td>
<td>19</td>
</tr>
<tr>
<td>Square</td>
<td>18</td>
</tr>
<tr>
<td>Bloomberg</td>
<td>16</td>
</tr>
<tr>
<td>IBM</td>
<td>16</td>
</tr>
<tr>
<td>Netflix</td>
<td>15</td>
</tr>
<tr>
<td>Macy's</td>
<td>15</td>
</tr>
</tbody>
</table>
What makes up the Fellows Program

Project-based Learning

WHY

● Show teams your full potential

WHAT

● Learn skills in a cutting-edge area

● Build your portfolio with highly-demanded technologies

HOW

● Actively learn by building

● Gain hands on experience with guidance from industry experts
What makes up the Fellows Program

Company Visits & Demos

WHY
● Meet the team members you'd work with
● Present to the teams that fit you

WHAT
● Over 38% of demos lead to an interview
● 3x higher for Fellows than traditional applications *

HOW
● Get your foot in the door with the hiring manager
● Guidance on presenting to hiring managers, and prep for each company

* Source: Jobvite 2019 Recruiting Funnel Benchmark Report
What makes up the Fellows Program

**Interview Preparation & Coaching**

**WHY**
- Interviews naturally have noise
- Interviews require deliberate and customized practice

**WHAT**
- Insight Fellows get jobs **40% faster** with personalized support, with up to **24% higher salaries** than comparable professionals

**HOW**
- Personalized preparation for your interviews
- One-on-one mock interviews for each company to help you show the relevant skills
- Negotiation support for offers
Structure of the Program: Week 1

- Introduction to program and high-level concepts in the field
- Select a project and set up cloud computing environment
Structure of the Program: Weeks 2-4

- Fellows work on their projects
- Hiring managers from Insight’s partner companies visit and meet with Fellows, chat about team, culture, values, open roles, desired skills and experiences
Structure of the Program: Weeks 5-7

- Present completed projects to hiring companies
- Mock interviews and help each other prepare for interviews.
Structure of the Program: Weeks 8+

- Begin interviewing with companies, with personalized preparation
- Introductions to new companies continue through demos and resumes
Structure of the Program: Receiving offers

Percent of Fellows that receive offer in relevant field

Source: Date of accepted offer reported by Fellows that joined Insight during 2017-2019
Pay-it-Forward Network

Successful Fellows create a lifelong network

- Past Fellows mentor new Fellows, just as the previous Fellows did for them
- The Fellow community accelerates learning through participation on our exclusive knowledge platform
- Deferred membership dues enable the program for future Fellows

3500+ DATA SCIENTISTS & ENGINEERS
Insight Guarantee

When you become a Fellow, Insight makes a guarantee to you with three components:

- **$100K+ SALARY**
  You accept an offer for a position that earns at least $100,000 USD annually.

- **WITHIN 6 MONTHS**
  You accept an offer dated within 6 months of the end date of the 7-week training program.

- **IN A RELEVANT FIELD**
  You accept an offer within a field relevant to the programs offered by Insight.

Fellows receive the full membership benefits for the remainder of their careers, even if their financial commitment is waived as a result of the guarantee not being satisfied.
Upcoming Application Deadline

To apply, visit: apply.insightfellows.com

Next application deadline: Monday, November 2

Next session begins: Tuesday, January 19, 2021
Want to learn more?
Visit: insightfellows.com

Questions?
Email us at: info@insightfellows.com
Email me at: jad@insightdatascience.com