Building an AI-First Enterprise Culture
Osama bin Laden’s compound in Abbottabad, Pakistan (2011)
Join us beginning at 1:25 p.m. EDT today as we tweet the #UBLRaid as if it were happening today.

11:50 - 1 mai 2016

1 011 990 personnes parlent à ce sujet
3:30 pm EDT - @POTUS watches situation on ground in Abbottabad live in Situation Room #UBLRaid
Handling and Mishandling Estimative Probability: Likelihood, Confidence, and the Search for Bin Laden

Jeffrey Friedman & Richard Zeckhauser

95%
80%
60%  WTF?!?!
40%
30%
President Obama reportedly complained that the discussion offered ‘not more certainty but more confusion,’ and that his advisors were offering ‘probabilities that disguised uncertainty as opposed to actually providing you with useful information.’
“If we did not take action, he might slip away. And it might be years before he resurfaced.”
What does this have to do with AI?
Everything!

(Well, not *everything*, but this is a talk and hyperbole is a strong rhetorical device)
“Over the past decades computers have broadly automated tasks that programmers could describe with clear rules and algorithms. Modern machine learning techniques now allow us to do the same for tasks where describing the precise rules is much harder.”

Bezos 2017 Letter to Shareholders
This is a cat.

This is most probably a cat.

This cat is dead and alive.
Developments in Language Processing

Traditional NLP

N-grams

Word Embeddings
Chief Financial Officer

Chief Scientist

@integrateai | @humekathryn
Head of Procurement
(Lloyd’s cool too!)

Chief Digital Officer
(Shawn’s responsible too!)
Sunk costs

Angry customers

Lost trust

Unfair treatment
How can businesses reap the rewards while managing the risks?
The Raw Ingredients of an AI product

Deep understanding of a business problem

Data, data, data

Algorithmic capability

Integrations and interfaces

Hilary Mason
Cloudera Fast Forward Labs
<table>
<thead>
<tr>
<th>Scope &amp; Design</th>
<th>Data &amp; Models</th>
<th>QA &amp; Production</th>
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<tbody>
<tr>
<td>What is the business problem?</td>
<td>What data do you have?</td>
<td>Can we scale the model?</td>
</tr>
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<td>Size of the prize &amp; breakeven point?</td>
<td>How do you collect it?</td>
<td>Which is best?</td>
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<td>Initial experiment and total solution scope?</td>
<td>Are features ready for the algorithm?</td>
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<td>Map the current process &amp; constraints</td>
<td>Will this work or should we pivot?</td>
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<td>What are privacy and fairness concerns?</td>
<td>Have we addressed security vulnerabilities?</td>
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Scope & Design

What is the business problem?

Size of the prize & breakeven point?

Initial experiment and total solution scope?

Map the current process & constraints
High drop off in conversion but incentives are expensive
How spend marketing dollars and maintain healthy margins?
Likelihood to convert

(0.88, 0)

Recommendation (0=don’t offer incentive)
Design

Where does this fit into the entire business process?
“There is often a difference between the quantity you want to measure and the one you can measure.

When these differ, your model will become good at predicting the quantity you measured, not the quantity for which it was meant to be a proxy."
Design

What level of certainty does the problem demand?
Scope

What is the scope of our initial experiment?
Legal

Who owns what?

Data Rights

Model Rights

Outputs Rights

Competitive Insights and Data Sharing
Do

Engage business heavily
Map out process in detail
Evaluate breakeven for experiment

Don’t

Pick problem with weak outcome signal
Aim for 100% automation on day one
Expect full process transformation
“Unrealistic beliefs on scope – often hidden and undiscussed – kill high standards. To achieve high standards yourself or as part of a team, you need to form and proactively communicate realistic beliefs about how hard something is going to be.”

Bezos 2018 Letter to Shareholders
Data & Models

What data do you have? How do you collect it?

Are features ready for the algorithm?

Will this work or should we pivot?

What are privacy and fairness concerns?
Data Collection

How do tools capture information?
Data Collection

How much data provide to vendor? How often?
Data Collection

Who is your cloud provider and why?
Data Collection

How much data should we share with our vendor?
Does our PIA ask the right questions?
Data Collection

Removing attributes doesn’t always remove bias

Data Exploration

Do you have a motivated subject matter expert?
Data Processing

Representation choices impact algorithmic performance
Model Prototyping

Experiment fast and accept it may not work
Model Prototyping

Ambiguity around right to an explanation

Pedro Domingos @pdmdomingos · Jan 28
Starting May 25, the European Union will require algorithms to explain their output, making deep learning illegal.

Kathryn, I checked with my lawyers (PwC Legal) in the EU. We have a pretty strong personal data protection practice. Their view re GDPR does not go that far. You have to disclose to the customer what data you have, how you use it. If you use it for modelling you should disclose what personal data are used as input for what models, what are the outcomes of these models (how they can impact that person) and what are the "principles" of this profiling or modelling. By principles one can understand a statement that this is done by "machine learning" as opposed to disclosing the full algorithm. A relief :-).
<table>
<thead>
<tr>
<th>Model Type</th>
<th>Amount of data</th>
<th>Structure of data</th>
<th>Subject Matter Expertise</th>
<th>Explainability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>Small ok</td>
<td>Less Complex Features</td>
<td>Selecting the features</td>
<td>Medium-High</td>
</tr>
<tr>
<td>Bayesian</td>
<td>Small ok</td>
<td>Hierarchical Features</td>
<td>Defining the priors</td>
<td>Medium-High</td>
</tr>
<tr>
<td>Deep Learning</td>
<td>Large only</td>
<td>Hierarchical Features</td>
<td>Little (Labeling)</td>
<td>Low</td>
</tr>
<tr>
<td>Reinforcement Learning</td>
<td>Explore/Exploit</td>
<td>Depends (Deep vs. Classical)</td>
<td>Simulate the environment</td>
<td>Depends (Deep vs. Classical)</td>
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Model Prototyping

Not all models need to be explainable
Evaluating fairness and bias

Will there be a cut on accuracy or an opportunity for new markets?
Do

Pretend to be a customer
Cut your losses if doesn't work
Evaluate for fairness

Don’t

Get bogged down by perfect data
Stop with PII and compliance
Add unnecessary constraints
QA & Production

Can we scale the model? Which is best?

What are the integrations and how often should we retrain?

Are we tooled to measure and report on results?

Have we addressed security vulnerabilities?
Models provide insights.
Products provide impact.
Production

Can we scale the model?
Integrations

Where do the outputs go?
Evaluation/Interpretation

How do we know it’s working?
Maintenance & Optimization

How often do we update the model?
DevOps and Security

Have we identified and addressed the right security risks?

The wrong user can impact product performance

Dads been using my Spotify! Lol wtf

Been wondering why my playlists have been all screwed up lately..... 😃
<table>
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<tr>
<th>Do</th>
<th>Don't</th>
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<tr>
<td>Focus on impact</td>
<td>Undestimate integrations</td>
</tr>
<tr>
<td>Devote FTE to experiments</td>
<td>Assume you need realtime updates</td>
</tr>
<tr>
<td>Validate security posture</td>
<td>Abandon ship too soon</td>
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Keys to success
1. Empower everyone to play a role
2. Communicate with executives to inform risk-reward decisions
3. Develop processes to learn, adapt, experiment, and cut
4. Cultivate mindset with science/tech that success starts with impact
5. Celebrate real expectations and hard-earned wins
There’s no silver bullet.

We are empowered to design the future we want to live in.
Thank you!