

Acceleration With A Steering Wheel

Machine Learning, Technical Debt, and DevOps

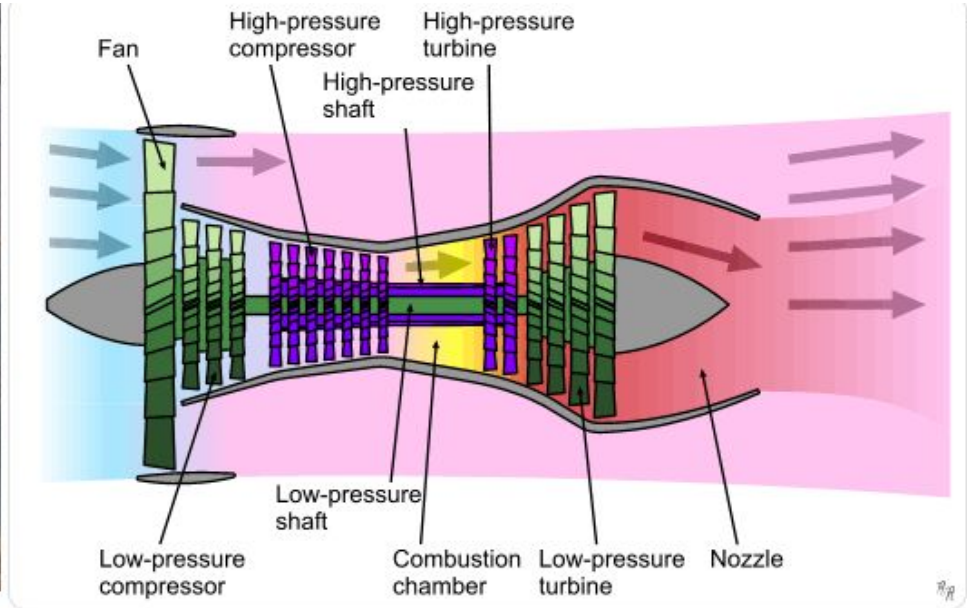
Adam Burke

Nov 2018

<https://www.linkedin.com/in/adamburke/>

@AdamBurkeware

What Kind of Accelerant is Machine Learning?





Speaker Background

Architect, Head of QA and Tools

Asia Electronic Trading Technology, Bank of America Merrill Lynch, 2006-2018

Other development + lead roles, including big data and analytics, reference data, smart order routing, order management, software critic, agile coach



How Do DevOps Techniques Deliver Acceleration?

Version Control

Automated deployment and orchestration

Code Review

Blue / green deployment

Unit tests

Canary deployment

Automated functional tests

Short iterations

Continuous build servers

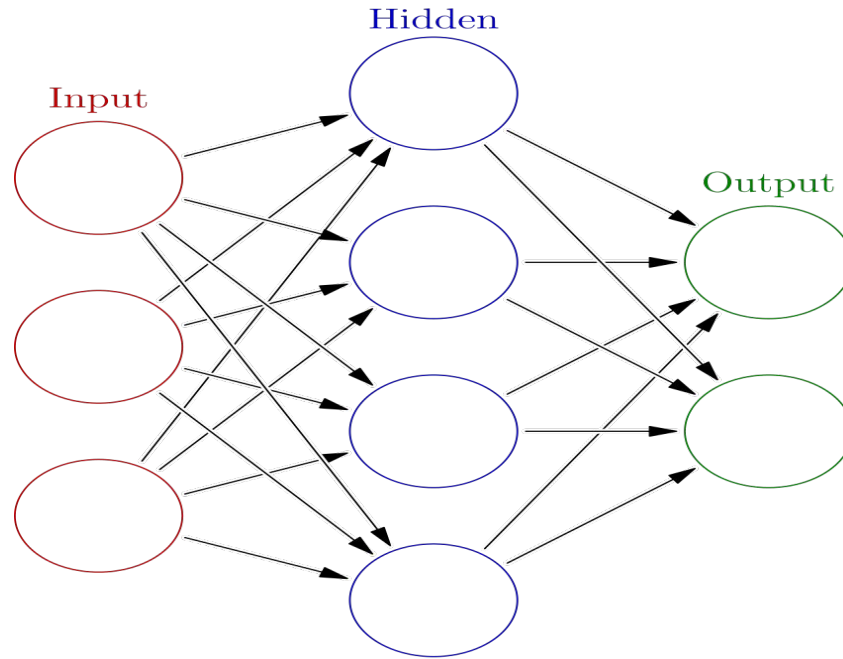
Cross-functional teams

... all accelerate processes through **transparency, feedback and control**





Machine Learning





Celestine Omin ✓

@cyberomin

Following



It's always fun when I speak to founders and potential founders and they are quick to tell me how they want to use AI/ML to improve customer retention and improve LTV. Truth is, they don't even need ML. A properly written SQL is what you need.

4:04 PM - 21 Apr 2018 from [Lagos, Nigeria](#)

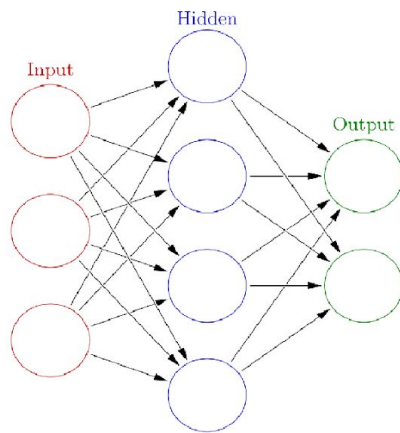
374 Retweets **775** Likes





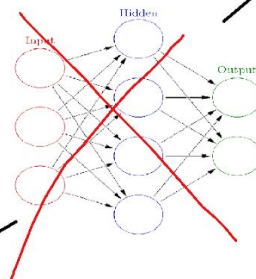
Baidu Speech To Text Translation

Straight from sound to Chinese characters - no intermediate “phonic transcription” format



你好!

~~ni3hao3!~~





Flavours of Technical Debt

The explanation I gave to my boss, and this was financial software, was a financial analogy I called "the debt metaphor". And that said that **if we failed to make our program align with what we then understood** to be the proper way to think about our financial objects, then we were gonna continually stumble over that disagreement and that would **slow us down** which was **like paying interest on a loan**.

Ward Cunningham

Technical debt describes a universal software development phenomenon: *design or implementation constructs that are expedient in the short term but set up a technical context that can make future changes more costly or impossible.*"

ACM SIGSOFT definition



Technical Debt As A Black Box

The most crippling technical debt is entangled with **lack of understanding**

Not understanding the **current usage** of a system

Not understanding the **impact of a change** on **our system**

Not understanding the **impact of a change** on **other systems**

Not understanding the **original intent of code**

Not understanding **where to introduce a fix**



DevOps Is The Steering Wheel For Machine Learning





Data Becoming Code

Processes built around vending data transform into developing data model artifacts

Started re-evaluating other data distributions (non-ML) as data model artifacts best treated as releases

Eg tuned statistics releases standardized as production artifacts

Protocol dictionary migrated from database to git

If Software Eats The World, Better Use Version Control!

Gregory Hohpe





Other Organizations

Sculley et al - Machine Learning: The High-Interest Credit Card of Technical Debt

Google

“[A]rguably the most important reason for using a machine learning system is precisely that *the desired behavior cannot be effectively implemented in software logic without dependency on external data*. There is little way to separate abstract behavioral invariants from quirks of data. The resulting erosion of boundaries can cause significant increases in technical debt”



Other Recommendations

Receiver system automated testing of data model expected behaviour

Data dependency declarations and manifests (ie gradle for services and data models)

Static analysis of data dependencies

Ethical debt review - what is the machine learning about your organization from your data

Eg Amazon hiring assistant that selected against word “women” in CVs

<https://www.theverge.com/2018/10/10/17958784/ai-recruiting-tool-bias-amazon-report>



Organizational Impact

DevOps (Jez Humble and Dave Farley)

The painful and liberating awakening
to new responsibilities

Agile Marketing (Jim Ewel et al)

DevOps eating the world

AppInfra (Ned Lowe)

QuantDev (just made that one up
now)



Know Your Accelerant

DevOps accelerates through feedback, transparency and control

Machine Learning accelerates through black box statistical inference

Black boxes generate technical debt

DevOps techniques main mechanism for paying down that debt

New data sources stretch software responsibilities throughout the enterprise



Adam Burke
<https://www.linkedin.com/in/adamburke/>
@AdamBurkeware