

DECODING GARTNER HYPE CYCLES OF EMERGING TECHNOLOGIES

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Introduction

Attribution

Primarily based on:

- ▶ Gartner Hype Cycle Report 2018
- ▶ Gartner Hype Cycle Report 2019
- ▶ Gartner Hype Cycle Report 2020

Why Track Technologies?

- ▶ Emerging Technologies take civilizations forward (most of the times)
- ▶ Effects can be positive or negative.
- ▶ Anxiety when it gets introduced.
- ▶ Shortcomings are highlighted disproportionately: even if there are 40k accidental deaths by normal cars, 1/2 by autonomous vehicle gets the front-page.
- ▶ Important to be informed about whats coming!!

What is a Hype Cycle?

“ The Gartner Hype Cycle is a device that lays out the path that technologies generally take, from their initial introduction into the market until their eventual maturation into useful components of broader solutions ” - (TBD)



(Ref:By Jeremykemp at English Wikipedia, CC BY-SA 3.0,
<https://commons.wikimedia.org/w/index.php?curid=10547051>)

Phase 1: Technology Trigger

Emergence

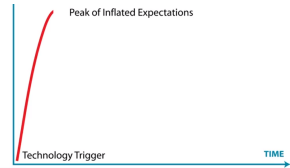
- ▶ When a new technology is discovered!!
- ▶ Gets mentioned in conferences
- ▶ Enthusiasm



Phase 2: Peak of Inflated Expectations

Excessive enthusiasm

- ▶ Gets mentioned even in non-technical forums
- ▶ Seen as solution for ALL problems.
- ▶ E.g. 3D printing my dinner!!



Phase 3: Trough of Disillusionment

Excessive disappointment

- ▶ Does not live up to ALL expectations
- ▶ Disillusionment
- ▶ Some die here!!



Phase 4: Scope of Enlightenment

Gradual adoption

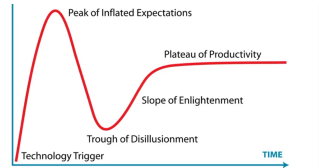
- ▶ Those who survive the trough
- ▶ May not solve ALL the problems but some specific ones.
- ▶ Focused development



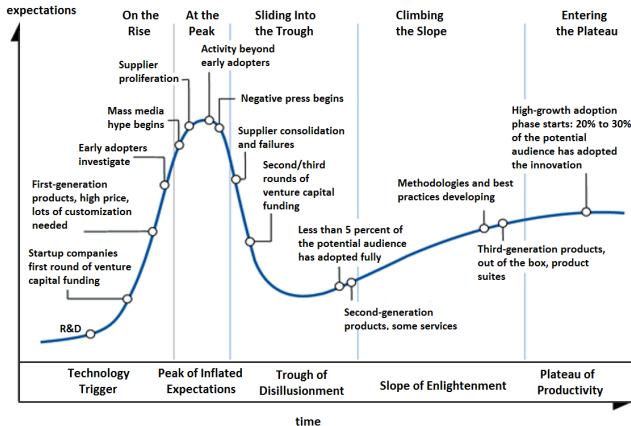
Phase 5: Plateau of Productivity

Practical adoption

- ▶ Good, mature products
- ▶ Survives longer



Summary : Phases



(Ref: By NeedCokeNow - Own work, CC BY-SA 3.0,

<https://commons.wikimedia.org/w/index.php?curid=27546041>)

What it is for?

“Clients use Hype Cycles to get educated about the promise of an emerging technology within the context of their industry and individual appetite for risk.”

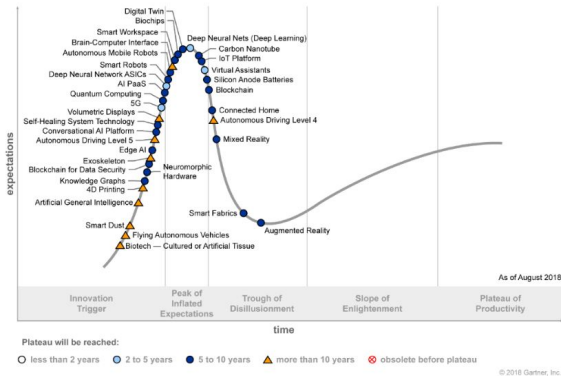
- Gartner

Hype Cycle distills more than 1,700 unique technologies into a list of must-know technologies and trends.

History of Gartner Hype Cycles?

Publishing these annually for more than 2 decades.

Trends in 2018



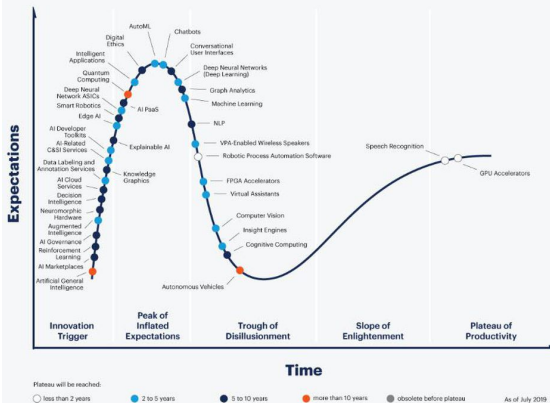
Trends in 2018: Emerging Technologies

- ▶ Democratized AI, as cloud computing, open source and the "maker" community open AI to the masses.
- ▶ Digitalized ecosystems, as companies shift from compartmentalized infrastructure to platforms that create broader ecosystems to connect humans and tech.
- ▶ Ubiquitous infrastructure, as limitless, always available infrastructure expands business opportunity.
- ▶ Transparently immerse spaces, as technology becomes more human-centric and creates smarter spaces.
- ▶ Do-it-yourself biohacking, as line between what is technology and what is human blurs.

(Ref:Gartner serves up 2018 Hype Cycle with a heavy side of AI - Alex Hickey)

Trends in 2019

Gartner Hype Cycle for Artificial Intelligence, 2019



gartner.com/SmarterWithGartner

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Trends in 2019: Emerging Technologies

- ▶ Sensing and mobility: light cargo delivery drones, IoT, autonomous driving levels 4 and 5
- ▶ Augmented human: a prosthetic arm that exceeds the strength of a human arm, robotic skin that is as sensitive to touch as human skin
- ▶ Postclassical compute and comms: 5G, low-earth-orbit (LEO) satellites
- ▶ Digital ecosystems: Knowledge graphs, synthetic data
- ▶ Advanced AI and analytics: Edge AI, Generative Adversarial Networks

(Ref: 5 Trends Appear on the Gartner Hype Cycle for Emerging Technologies, 2019 - Kasey Panetta)

Trends in 2019: AI

Gartner Hype Cycle for Artificial Intelligence, 2019



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Trends in 2019: AI

- ▶ Augmented intelligence: to be more efficient with automation, reduce mistakes.
- ▶ Chatbots: The change from “the user learns the interface” to “the chatbot is learning what the user wants”
- ▶ Machine learning: can solve business problems, due to big data and compute
- ▶ AI governance: creating policies to fight AI-related biases, discrimination and other negative implications of AI
- ▶ Intelligent applications: to support or replace human-based activities via intelligent automation, data-driven insights, and guided recommendations to improve productivity and decision making.

(Ref: Top Trends on the Gartner Hype Cycle for Artificial Intelligence, 2019 - Laurence Goasduff)

Trends in 2020

Hype Cycle for Artificial Intelligence, 2020



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Trends in 2020: Emerging Technologies

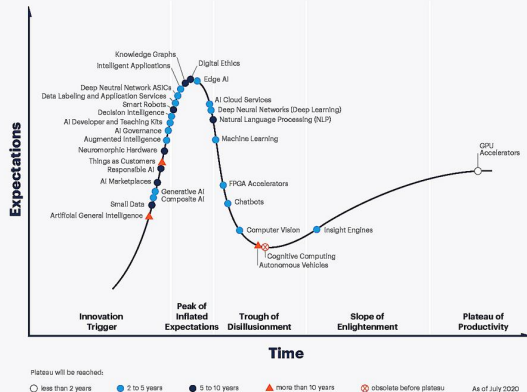
Unique trends:

- ▶ Composite architectures: plug-and-play like Lego blocks, packaged business capabilities built on a flexible data fabric, to respond to rapidly changing business needs.
- ▶ Algorithmic trust: to shift from trusting central authorities to trusting algorithms, Block-chain
- ▶ Beyond silicon: Use synthetic DNA in place of silicon or quantum architectures to perform computation or store data. (still rudimentary)
- ▶ Formative AI: adaptive ML, generative AI to create new novel content (images, video etc.) or alter existing content
- ▶ Digital me: digital versions of ourselves, health digital twins, authentication, access and payment.

(Ref: 5 Trends Drive the Gartner Hype Cycle for Emerging Technologies, 2020 - Laurence Goasduff)

Trends in 2020: AI

Hype Cycle for Artificial Intelligence, 2020



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Trends in 2020: AI

- ▶ In spite of COVID, nearly half of AI investments intact. About a third are planning to increase. 16% suspended and 7% decreased the investments.
- ▶ AI is starting to deliver
- ▶ Five new entrants — small data, generative AI, composite AI, responsible AI and things as customers
- ▶ Two mega trends: Democratization, Industrialization

(Ref:2 Megatrends Dominate the Gartner Hype Cycle for Artificial Intelligence, 2020 - Laurence Goasduff)

Trends in 2020: Democratization of Artificial Intelligence

- ▶ “ Gartner foresees developers being the major force in AI”
- ▶ Along with data scientists and data engineers, developers would be key.
- ▶ Engineering complements data science to deliver AI at scale

(Ref:2 Megatrends Dominate the Gartner Hype Cycle for Artificial Intelligence, 2020 - Laurence Goasduff)

Trends in 2020: Industrialization of AI platforms

- ▶ “ Responsible AI and AI governance also become a priority for AI on an industrial scale”
- ▶ Enables the reusability, scalability and safety of AI, which accelerates its adoption and growth.

(Ref:2 Megatrends Dominate the Gartner Hype Cycle for Artificial Intelligence, 2020 - Laurence Goasduff)

Trends in 2020: AI

- ▶ Chatbots: 100% increase in adoption rates in 2-5 years
- ▶ GPU Accelerators are the nearest-term technology to mainstream adoption
- ▶ AI-based minimum viable products replacing pilot projects
- ▶ To focus on narrow AI than the General AI, as it is not commercially viable.
- ▶ Small data, Generative AI enter Hype Cycle.
- ▶ Responsible AI: Concentrating on the ethical and social aspects of AI
- ▶ Things as Customers: a smart device or machine or that obtains goods or services in exchange for payment

(Ref:What's New In Gartner's Hype Cycle For AI, 2020 - Louis Columbus)

Trends in 2020: Embedded AI

- ▶ Stage: Peak of inflated expectations
- ▶ Time required to plateau: 2 to 5 years
- ▶ Supercomputers in the pockets, Edge computing systems
- ▶ Era of IoT, 5G and portable medical devices
- ▶ Applications for manufacturing, retail, smart cities, and more

(Ref: AI Technologies That Featured In Latest Gartner Hype Cycle - Ram Sagar)

Trends in 2020: Generative AI

- ▶ Stage: Innovation Trigger
- ▶ Time required to plateau: 2 to 5 years
- ▶ Paint auction-worthy art, generate songs and even create faces of people who never existed.
- ▶ Disadvantage: Malicious online players can now generate disinformation in the form of images and videos that can fool many.

(Ref: AI Technologies That Featured In Latest Gartner Hype Cycle - Ram Sagar)

Trends in 2020: Responsible And Explainable AI

- ▶ Stage: Innovation Trigger & Peak of inflated expectations resp.
- ▶ Time required to plateau: 5 to 10 years
- ▶ Machine learning algorithms are infamous for their black-box nature
- ▶ Growing demand for explain-ability
- ▶ Medical diagnosis or credit card risk estimation

(Ref:AI Technologies That Featured In Latest Gartner Hype Cycle - Ram Sagar)

Trends in 2020: Self Supervised Learning

- ▶ Stage: Innovation Trigger
- ▶ Time required to plateau: 5 to 10 years
- ▶ Availability of pre-trained models are almost negligible due to less data, needing more accurate results

(Ref: AI Technologies That Featured In Latest Gartner Hype Cycle - Ram Sagar)

Trends in 2020: AI Augmented Development

- ▶ Stage: Peak of inflated expectations
- ▶ Time required to plateau: 5 to 10 years
- ▶ AI assisting organizations in design, development and deployment of their software products
- ▶ To take care of the mundane debugging tasks through automation.

(Ref: AI Technologies That Featured In Latest Gartner Hype Cycle - Ram Sagar)

Transitions

- ▶ Thirteen technologies have either been removed, re-classified, or moved to other Hype Cycles compared to last year.
- ▶ Robotic process automation software is now removed
- ▶ Graph analytics and Reinforcement Learning to the Hype Cycle for Data Science and Machine Learning, 2020

Top 10 Strategic Technology Trends for 2020

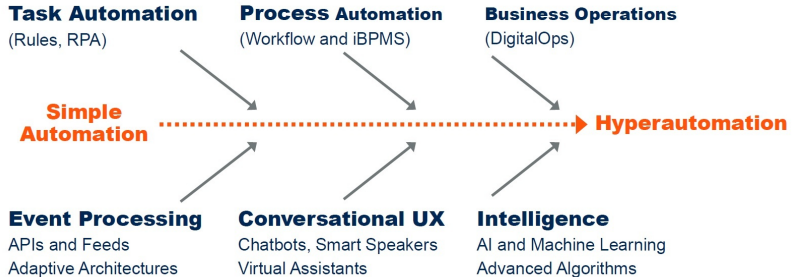
(By- Michael Miller)

Broad categories

- ▶ People-Centric Trends
- ▶ Smart Spaces

People-Centric Trends

The Path to Hyperautomation

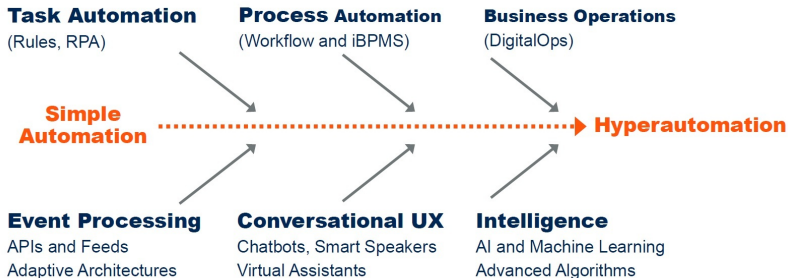


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Hyperautomation

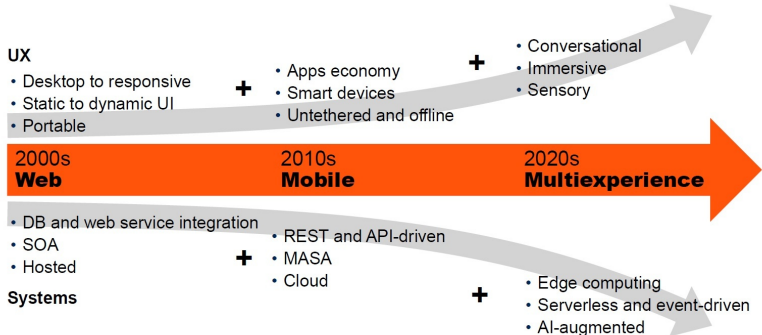
The Path to Hyperautomation



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Evolving From Web to Multiexperience



Democratization





Democratization Is About Empowering Everyone



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Cognitive Augmentation

Take me to the next level	Go the last mile
 <p>Train me. Show me the possibilities.</p>	 <p>Human in the loop.</p>
Pass the Baton	Symbiosis
 <p>It's your turn now.</p>	 <p>One cannot live without another.</p>

Train Machines to Do Their Best. Train People to Be Their Best.

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Transparency and Traceability

Six Pillars of Trust



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Smart Spaces

Toward a Smarter, Faster, More Flexible Edge



Edge 2019

Static processes
Hierarchic architectures
Static network topology
Edge and cloud

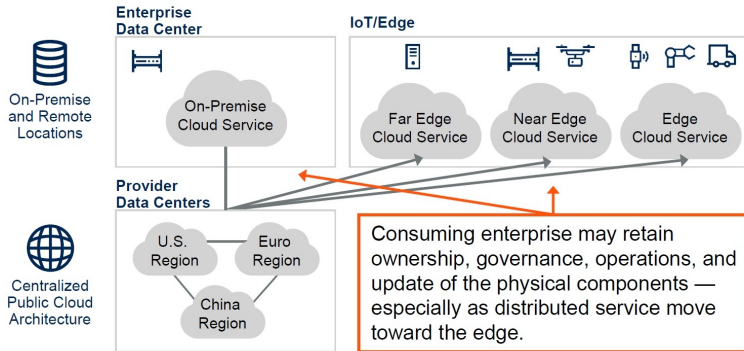
Edge 2025

Adaptive processes
Fog/Mesh architectures
Dynamic network topology
Distributed cloud to the edge

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Distributed Cloud Extends to the Edge



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Autonomous Things

Form Follows Function

Autonomous Things	Environment
Robots	Sea
Drones	Land
Appliances	Air/Space
Vehicles	Controlled



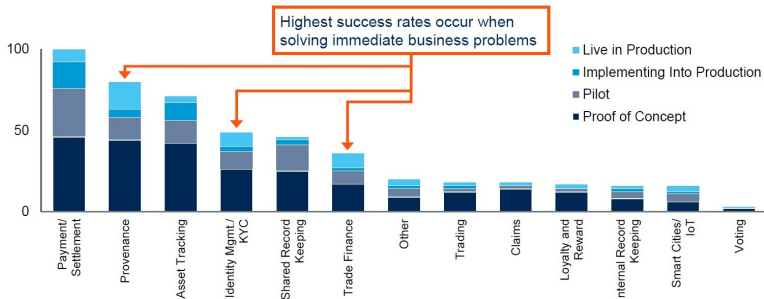
Full Autonomy	No Human Control
High Automation	Human Override
Conditional Automation	Human-Directed
Partial Automation	Full Human Control
Human-Assisted	

Nonfunctional Tipping Points: Regulation and Social Acceptance

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The Business Needs to Lead on Blockchain



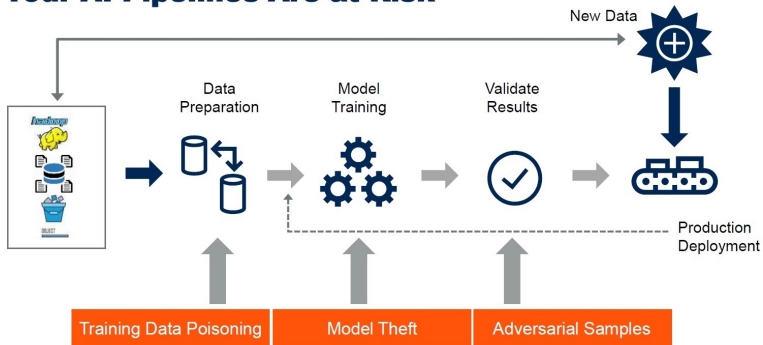
For success, blockchain initiatives must be demand-led, not solution-led

n = 490, excludes use cases with the phrases of "Strategy Consulting" and of "Other,"
Blockchain Use Cases — "Blockchain Trials Show Pragmatism Emerging Across Industries" (G00387725)

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Your AI Pipelines Are at Risk



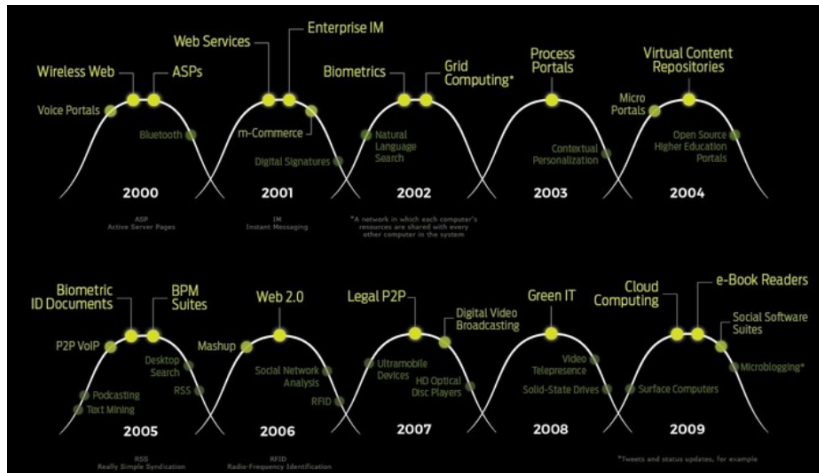
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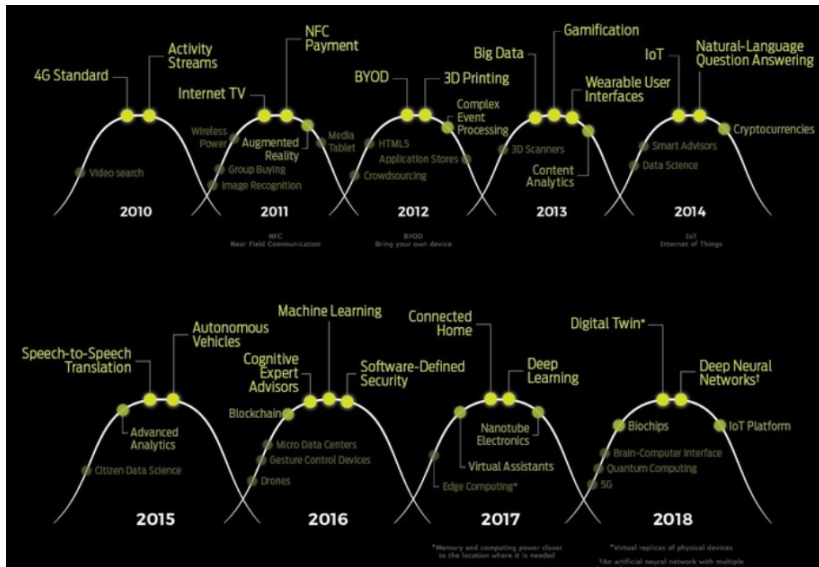
Evaluation of Predictions

Over the Years by Duncan Stewart

Publishing these annually for more than 2 decades. Top trends over years:



Over the Years by Duncan Stewart



Over the Years by Duncan Stewart

- ▶ Some technologies surpass the hype. 4G wireless networks (2010) and cloud computing (2009) are both trillion-dollar industries today. Neither really went through the classic Gartner “trough of disillusionment” and have been consistently hot trends for a decade now.
- ▶ Some technologies follow the classic Hype Cycle almost perfectly. 3D printing (2012) was definitely over-hyped. But although the “factory in every home” hype did not ever happen enterprise 3D printing came out of the trough quite nicely, and will soon be a \$3 billion industry, growing at 12-13% per year

(Ref: The Gartner Hype Cycle over the years - Duncan Stewart)

Over the Years by Duncan Stewart

- ▶ Some technologies are overhyped, and never fulfill their promise. E-book readers (2009) and BYOD (Bring Your Own Device, 2012)
- ▶ Some technologies may do well one day. . . but it can take an awfully long time. Podcasting was shown ascending the hype curve in the 2005 edition, and many expected it to be the Next Big Thing soon. Did not happen, but may happen. Same with Autonomous vehicles (2015).

(Ref: The Gartner Hype Cycle over the years - Duncan Stewart)

Over the Years by Duncan Stewart

- ▶ Many technologies never come out of the trough. I am not even talking about augmented reality glasses (2011). Yes, Google Glass.
- ▶ Conclusion: You have to do your own work. The Hype Cycle is a great graphic, and a useful visualization. But it is a lousy predictor. Being at the hype peak doesn't guarantee that a given technology will succeed massively

(Ref: The Gartner Hype Cycle over the years - Duncan Stewart)

Criticism By Patrick Crouch

- ▶ Personally, couldn't find a single example of tech-oriented company using the Hype Cycle to determine spending or strategy.
- ▶ So who's using it? Answer: Marketers.
- ▶ Most technological advances come from the combination or misuse of a variety of technologies, not from one technology being researched
- ▶ The Gartner Hype Cycle is more of a scapegoat for failing/unrealized technical promise than a useful tool

(Ref: The Gartner Hype Cycle - Does the Gartner Hype Cycle Invalidate Itself? - By: Patrick Crouch)

Criticism By Shaun Snapp

- ▶ Abysmal history of technology predictions: Windows phone would become 2nd most popular smart phone platform with 19.5% share. Its not even 3%.
- ▶ Getting the predictions right, is not Gartner's primary concern.

(Ref: Disregarding Gartner's Deeper Technology Insights and Predictions - By: Shaun Snapp)

Conclusion

Lessons

- ▶ We're terrible at making predictions. Especially about the future. Out of 200 unique technologies that have ever appeared on a Gartner Hype Cycle for Emerging Technology, just a handful of technologies have been identified early and traveled even somewhat predictably through a Hype Cycle
- ▶ An alarming number of technology trends are flashes in the pan. Just over 50 individual technologies appear for just a single year on the Hype Cycle - never to reappear again.

(Ref: 8 Lessons from 20 Years of Hype Cycles - Michael Mullany)

Lessons

- ▶ Lots of technologies just die. Period.
- ▶ The technical insight is often correct, but the implementation isn't there
- ▶ We've been working on a few core technical problems for decades: Speech recognition, Internet micropayments
- ▶ Some technologies keep receding into the future: Quantum Computing, Brain/Computer Interfaces

(Ref: 8 Lessons from 20 Years of Hype Cycles - Michael Mullany)

Lessons

- ▶ Lots of technologies make progress when no-one is looking:
Head Mounted Displays ie VR AR, Speech Generation
- ▶ Many major technologies flew under the Hype Cycle radar:
Virtualization, No SQL, Open Source

(Ref: 8 Lessons from 20 Years of Hype Cycles - Michael Mullany)

What Next?

- ▶ Build Solid foundation in Data Sciences, Machine Learning, Deep Learning, etc.
- ▶ Don't ignore seemingly mundane, Data Engineering and Results Interpretation.
- ▶ Build specific domain expertise and projects therein.
- ▶ Github, Kaggle, Meetups ...

Additional References

- ▶ What's New In Gartner's Hype Cycle For AI, 2019 - Louis Columbus
- ▶ Gartner Hype Cycle - J Scott Christianson
- ▶ Gartner Hype Curves - Joining Dots dot com
- ▶ Pitfalls in Technological Predictions - Xiaoliang Wang
- ▶ Riding the Hypecycle to Infinity and Beyond - Sam Adams, RTI International

Thanks ... yogeshkulkarni@yahoo.com