

# Module Learning Objectives

- Acquire the organizational know-how to implement machine learning
- Leverage Google's experience to avoid common pitfalls.

# Agenda

The ML surprise

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The secret sauce

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The ML and business processes

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The path to ML

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End of phases deep dive

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*TALENT*

# How Google does ML and its uses in organizations

Machine Learning on Google Cloud Platform

e Cloud

# *TALENT*

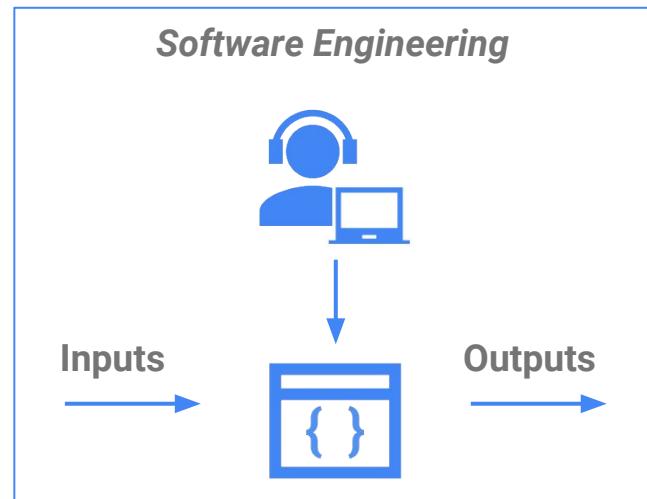
## What is ML?

Machine learning (ML) is the process of a computer writing a computer program to accomplish a task.

The computer figures out the “best” program to write by only looking at a set of examples.

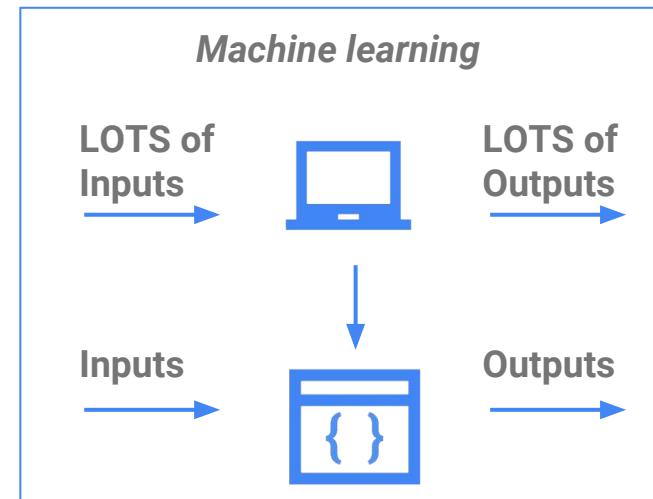
# TALENT

Software Engineers  
write program rules



# TALENT

Machine Learning figures  
out program rules



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## The Broccoli Surprise



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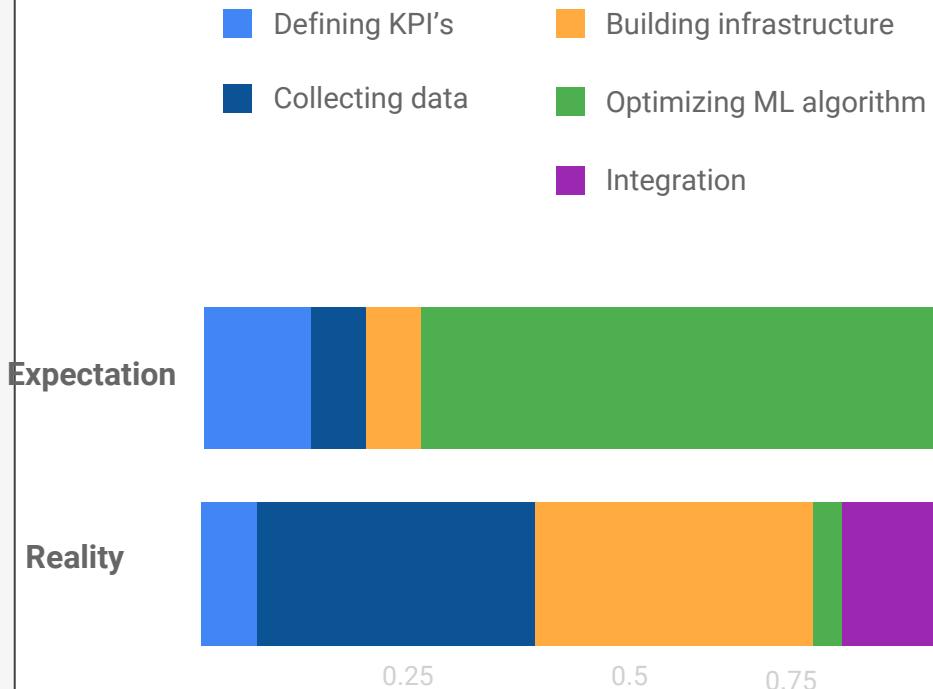
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## The ML Surprise

- Defining KPI's
- Collecting data
- Building infrastructure
- Optimizing ML algorithm
- Integration

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## ML Effort Allocation



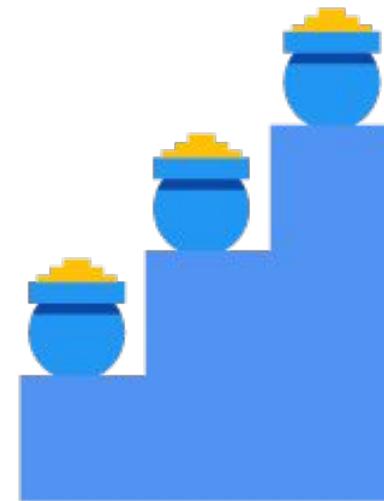
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Then why  
are we learning  
about ML?



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Most of the impact  
comes along the way



Talent / Image layouts added per new [Template](#)

Course 1: How Google does ML

Module 3: How Google does ML

Lesson Title: **The secret sauce**

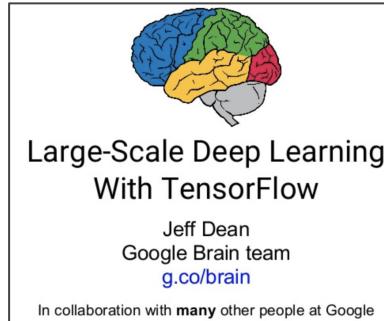
Format: Screencast



*TALENT*

<hello  
world>

$$y = mX + b$$



# TALENT

Get your hands dirty by practicing with technical skills



# TALENT

## Avoid these top 10 ML pitfalls

■ Defining KPI's ■ Collecting data ■ Integration ■ Infrastructure ■ Optimizing ML

- ■ ■ 1. ML requires just as much software infrastructure
- ■ ■ 2. No data collected yet
- ■ ■ 3. Assume the data is ready for use
- ■ ■ 4. Keep humans in the loop
- ■ ■ 5. Product launch focused on the ML algorithm
- ■ ■ 6. ML optimizing for the wrong thing
- ■ ■ 7. Is your ML improving things in the real world
- ■ ■ 8. Using a pre-trained ML algorithm vs building your own
- ■ ■ 9. ML algorithms are trained more than once
- ■ ■ 10. Trying to design your own perception or NLP algorithm

Animate to reveal each of the 10 points as he covers them

# Ugh, so that's the bad news, what's the good news?



Most ML value  
comes along  
the way



ML improves  
almost everything  
it touches



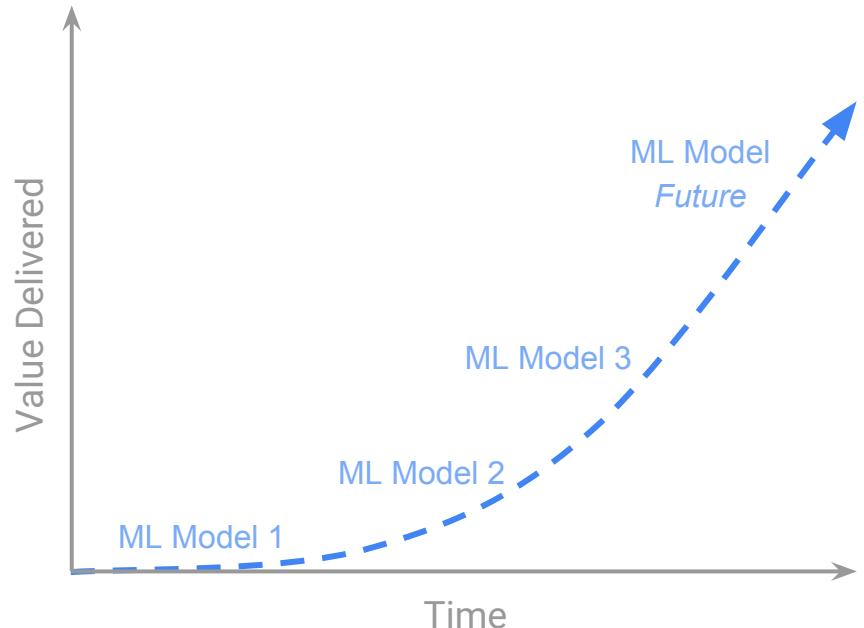
If ML is hard, it's  
hard for your  
competitors too



ML is a great  
differentiator

# TALENT

Value comes along the way



Talent / Image layouts added per new [Template](#)

Course 1: How Google does ML

Module 3: How Google does ML

**Lesson Title: The ML and Business Processes**

Format: Screencast

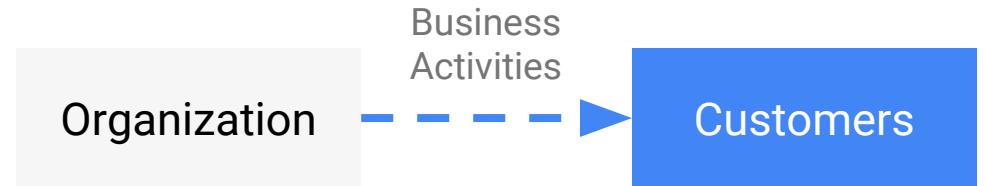
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No ML



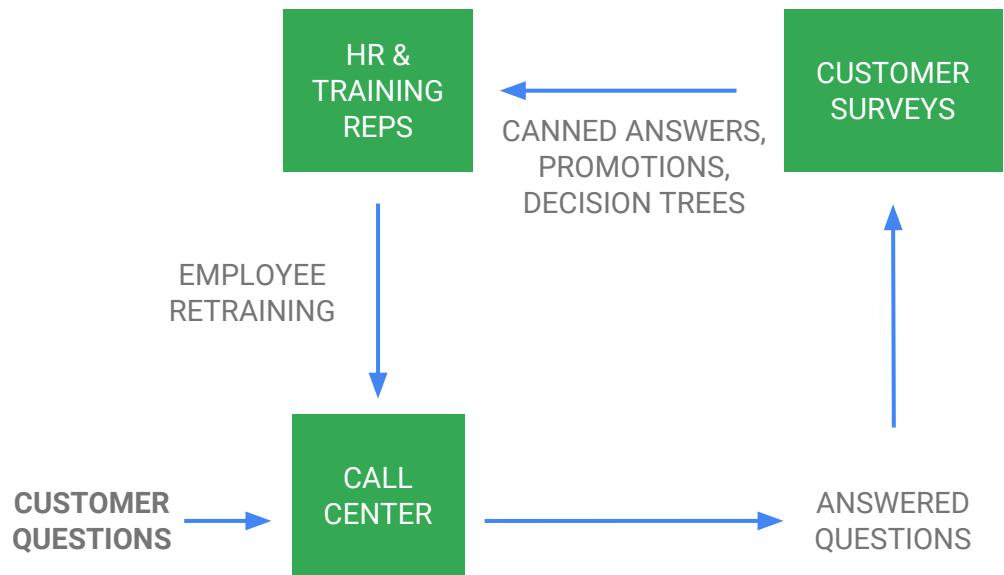
# TALENT

## Evolution of a Business Process

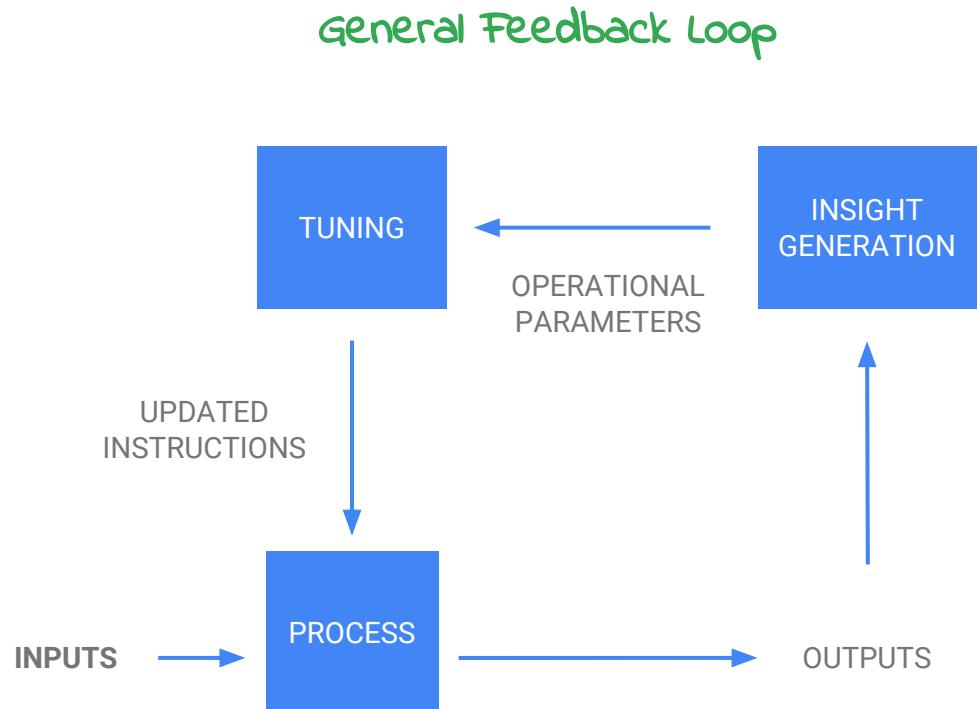


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## Example Call Center Feedback Loop



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# Path to ML: The 5 phases

How change happens in phases:

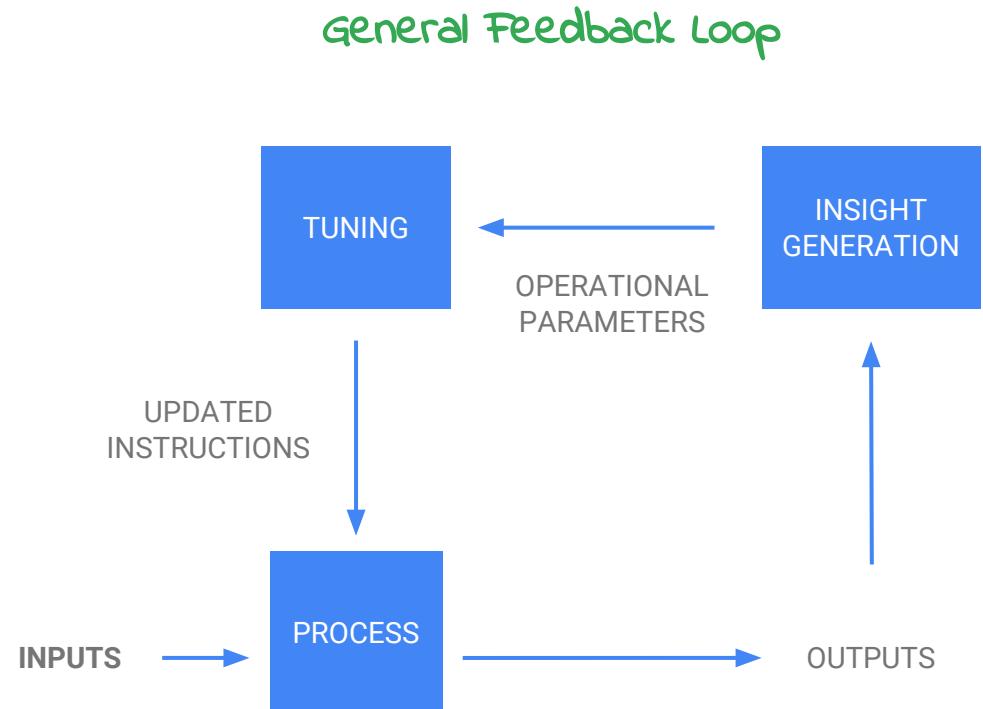
Step 1 - Individual contributor

Step 2 - Delegation

Step 3 - Digitization

Step 4 - Big Data and Analytics

Step 5 - Machine learning



# Path to ML: The 5 phases

How change happens in phases:

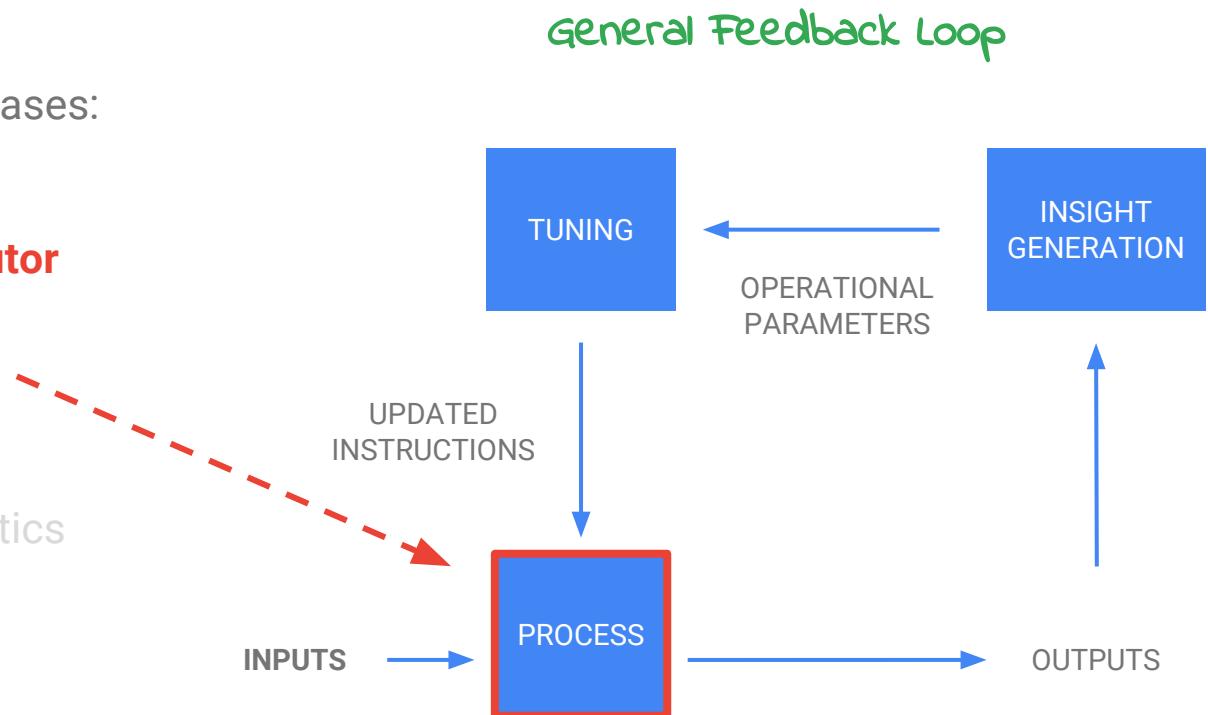
**Step 1 - Individual contributor**

**Step 2 - Delegation**

**Step 3 - Digitization**

Step 4 - Big Data and Analytics

Step 5 - Machine learning



# Path to ML: The 5 phases

How change happens in phases:

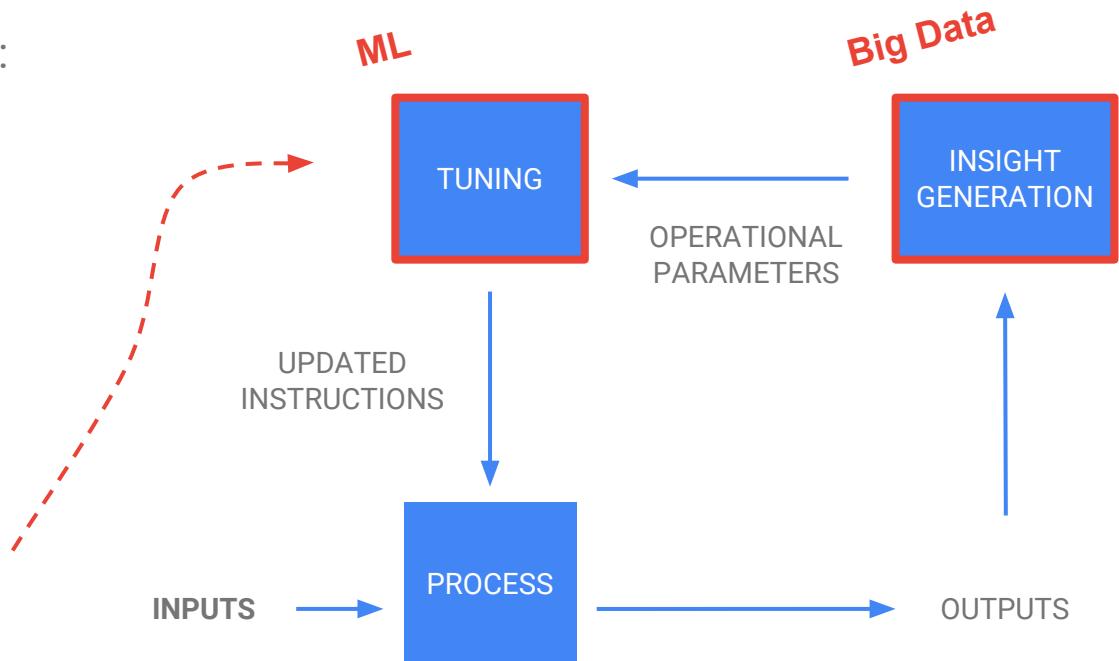
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**Step 5 - Machine learning**



# TALENT

## Path to ML: The 5 phases

 Individual contributor

 Delegation

 Digitization

 Big Data and Analytics

 Machine learning

# TALENT

## Path to ML: The 5 phases



Step 1 - Individual contributor

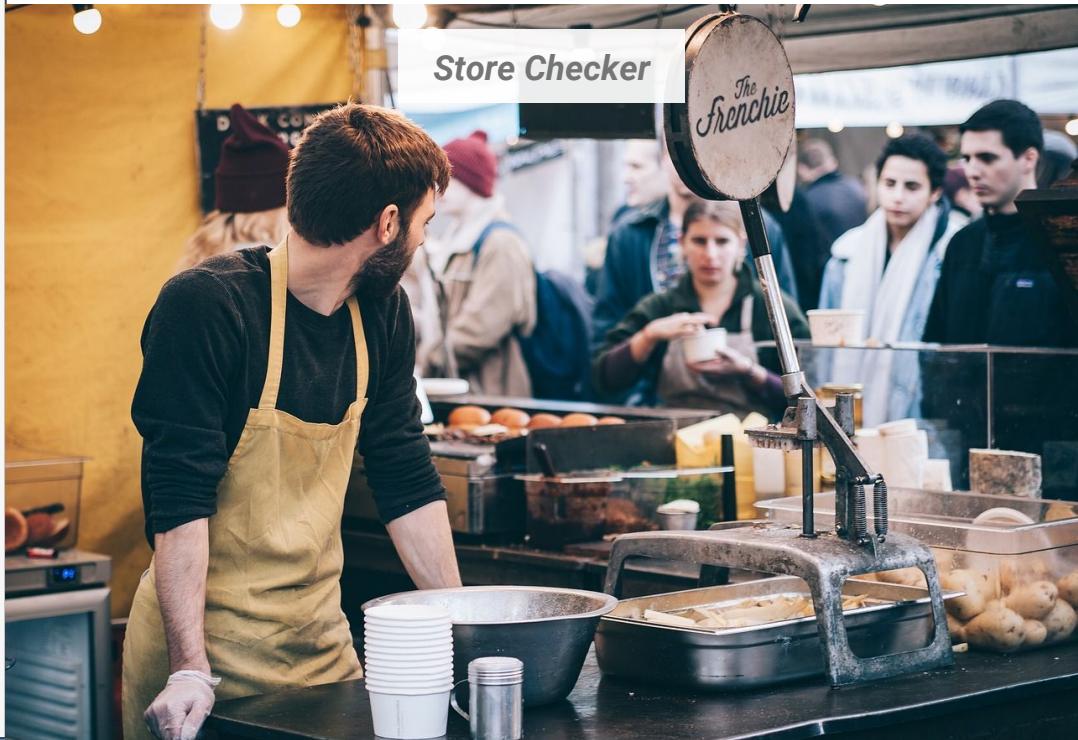


# TALENT

## Path to ML: The 5 phases



Step 2 - Delegation



# TALENT

## Path to ML: The 5 phases



Step 3 - Digitization



**TALENT**

## Path to ML: The 5 phases



Step 4 - Big Data and Analytics



**TALENT**

## Path to ML: The 5 phases



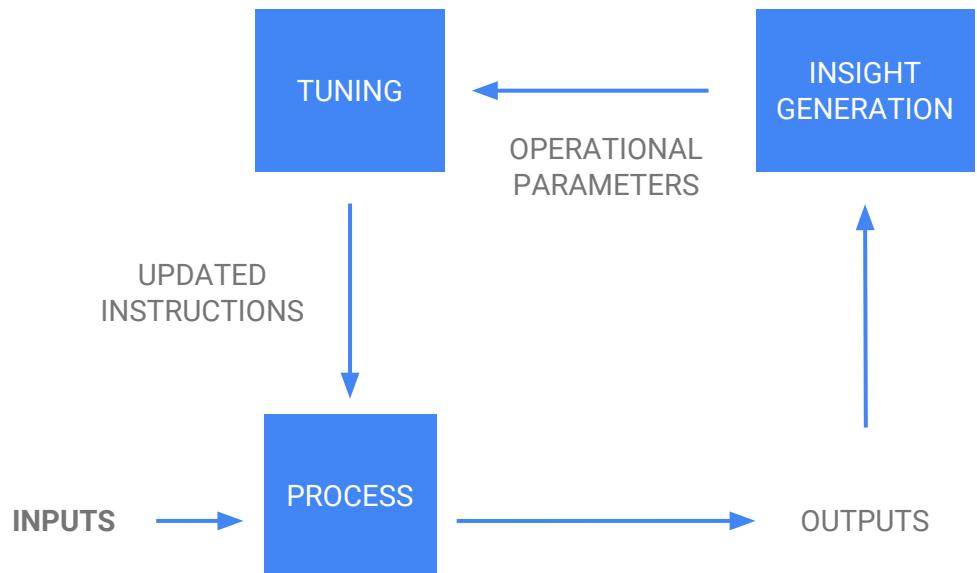
Step 5 - Machine learning

*YouTube Recommendation Engine*



# TALENT

## Path to ML: Your turn



Course 1: How Google does ML

Module 3: How Google does ML

Lesson Title: **The Path to ML**

Format: Screencast

# TALENT

## The Path to ML

Step 1 - Individual contributor

Step 2 - Delegation

Step 3 - Digitization

✓ ✗ Step 4 - Big Data and Analytics

Step 5 - Machine learning

Animation note: Fade in arrows as he talks about going through steps and fade in check and X when he mentions the word “obstacles”. 0:10 and 0:35 respectively

# TALENT

1 - Individual contributor

2 - Delegation

3 - Digitization

4 - Big Data and Analytics

5 - Machine learning



Prototype and try out ideas

# TALENT



1 - Individual contributor



2 - Delegation



3 - Digitization



4 - Big Data and Analytics



5 - Machine learning

- **Dangers of skipping this step:**
  - Inability to scale
  - Product heads make big, incorrect assumptions that are hard to change later
- **Dangers of lingering too long here:**
  - One person gets skilled and then leaves
  - Fail to scale up the process to meet demand in time

# TALENT



1 - Individual contributor



**2 - Delegation**



3 - Digitization



4 - Big Data and Analytics



5 - Machine learning



*Gently ramp up to include more people*

# TALENT



1 - Individual contributor



**2 - Delegation**



3 - Digitization



4 - Big Data and Analytics



5 - Machine learning

- **Dangers of skipping this step:**
  - Not forced to formalize the process
  - Inherent diversity in human responses become a testbed--great product learning opportunity
  - Great ML systems will need humans in the loop
- **Dangers of lingering too long here:**
  - Paying a high marginal cost to serve each user
  - More voices will say automation isn't possible
  - Organizational lock-in

# TALENT



1 - Individual contributor



2 - Delegation



**3 - Digitization**



4 - Big Data and Analytics



5 - Machine learning



*Automate mundane parts of the process*

# TALENT



1 - Individual contributor



2 - Delegation



**3 - Digitization**



4 - Big Data and Analytics



5 - Machine learning

- **Dangers of skipping this step:**
  - You will always need infrastructure
  - IT project and ML success tied and the whole project will fail if either does
- **Dangers of staying here too long:**
  - Your competitors are collecting data and tuning their offers from these new insights

# TALENT



1 - Individual contributor



2 - Delegation



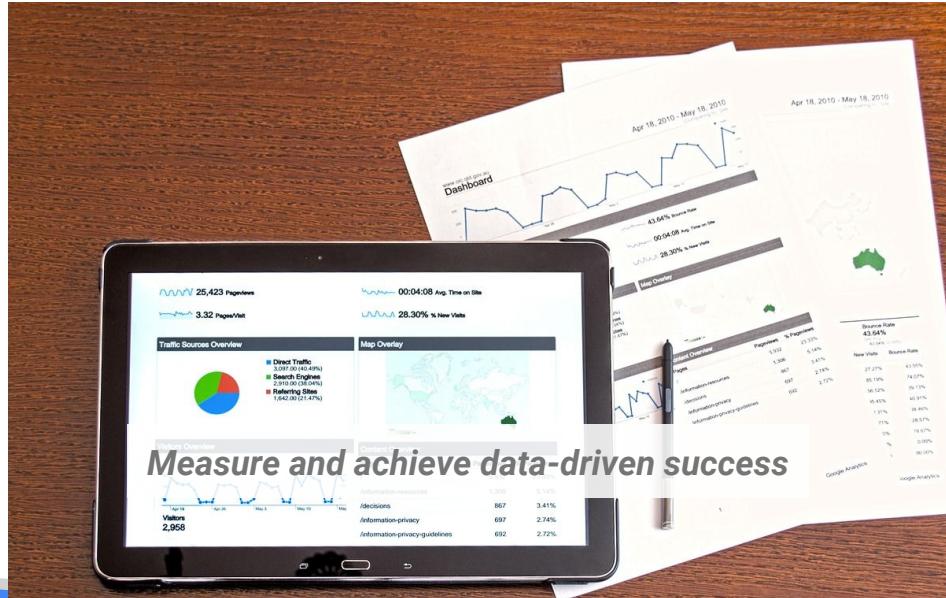
3 - Digitization



4 - Big Data and Analytics



5 - Machine learning



# TALENT



1 - Individual contributor



2 - Delegation



3 - Digitization



**4 - Big Data and Analytics**



5 - Machine learning

- **Dangers of skipping this step:**
  - Unclean data means no ML training
  - You can't measure success
- **Dangers of staying here too long:**
  - Limit the complexity of problems you can solve

# TALENT



1 - Individual contributor



2 - Delegation



3 - Digitization



4 - Big Data and Analytics



5 - Machine learning



Automated  
feedback loop  
that can outpace  
human scale



Talent / Image layouts added per new [Template](#)

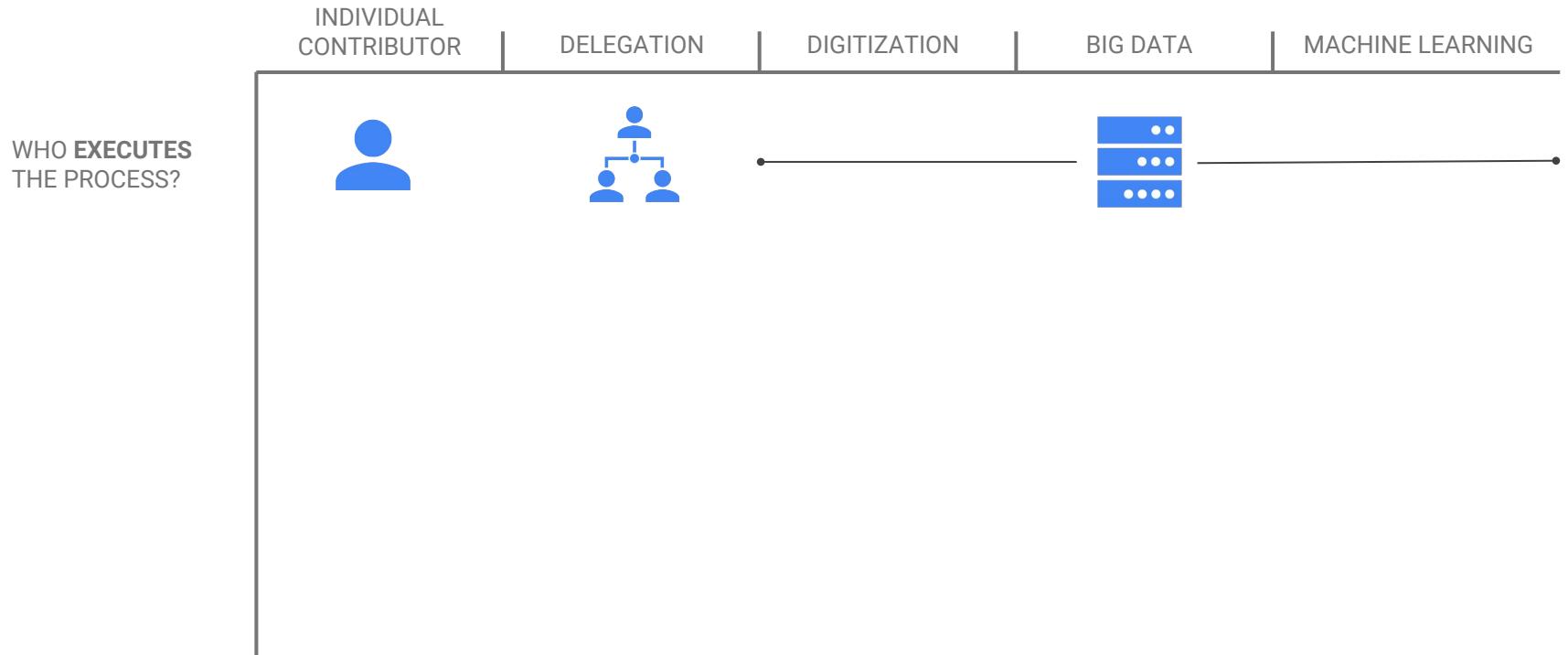
Course 1: How Google does ML

Module 3: How Google does ML

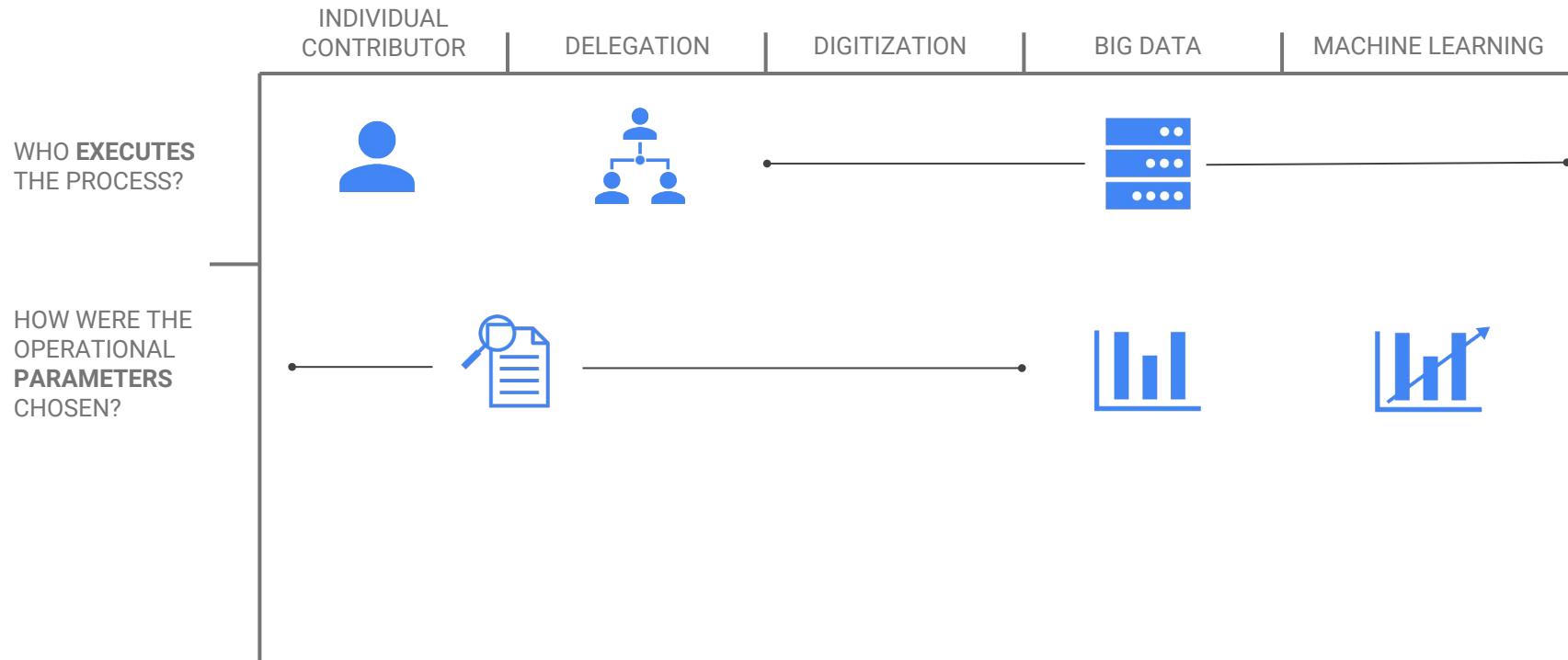
Lesson Title: **End of phases deep dive**

Format: Screencast

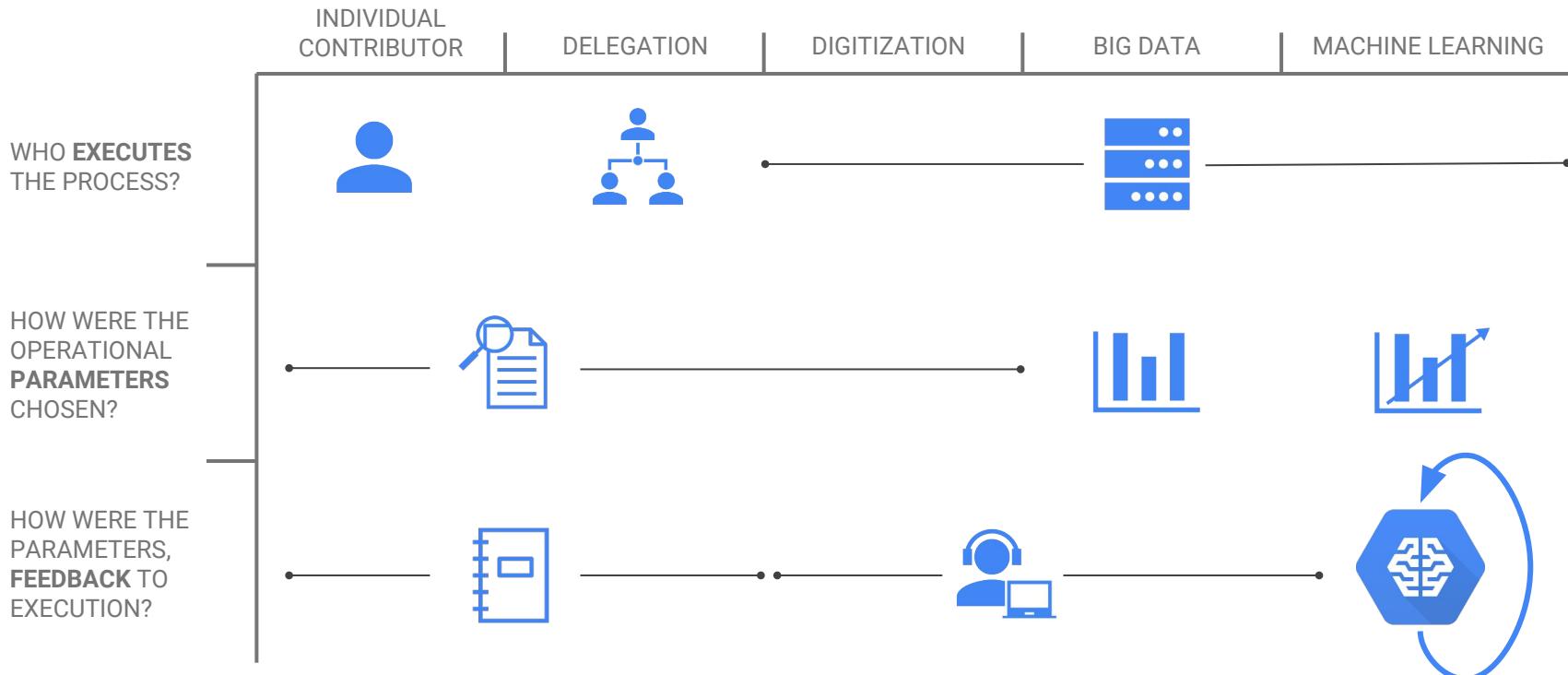
# Reviewing the Path to ML: 5 phases



# Reviewing the Path to ML: 5 phases



# Reviewing the Path to ML: 5 phases



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Final Reminders

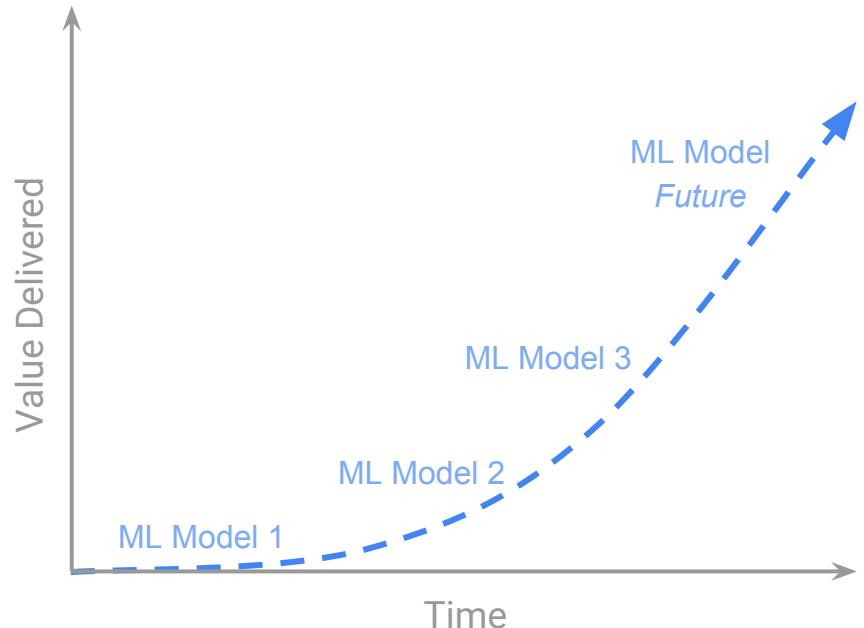
# TALENT

Don't Leap into a Fully ML Solution



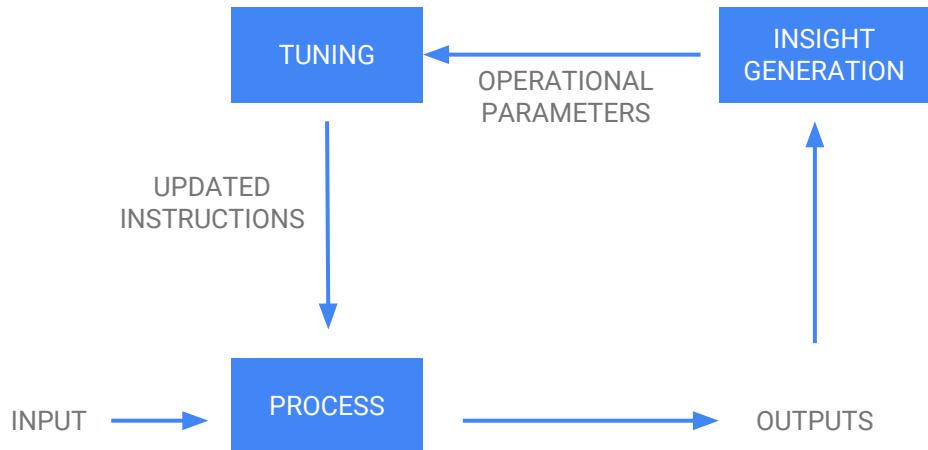
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ML is a Journey



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The Path to ML ...



...Means automate the blue boxes!

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Google can help



Google Cloud Platform



[cloud.google.com/training/](http://cloud.google.com/training/)

*TALENT 100% width*

*(Josh's content is Next Steps)*

# cloud.google.com

