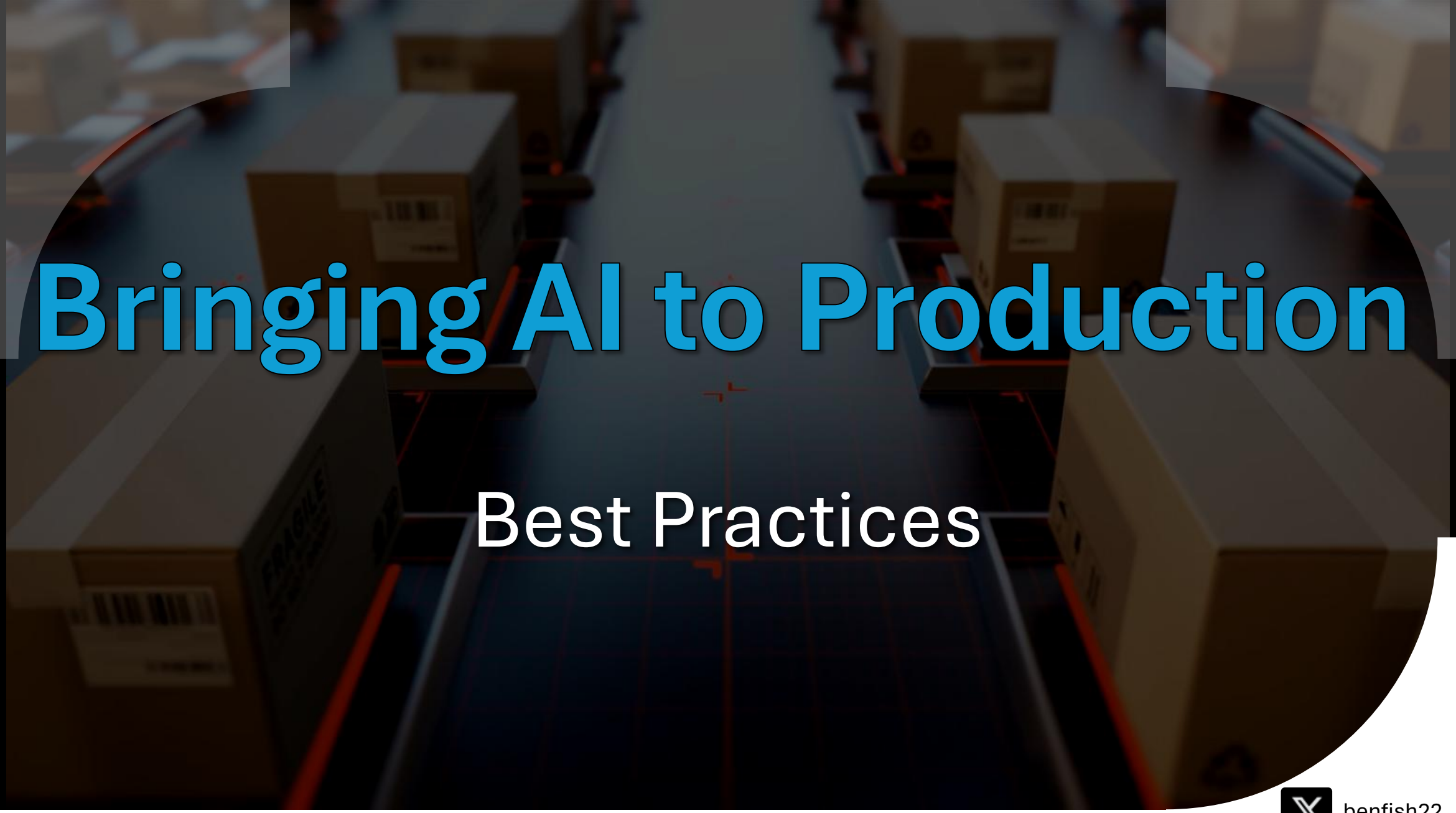

Bringing AI to Production

Best Practices

Ben Fishman

benfish22

benf22.github.io

Yearly investment in AI:

>100$ Billion

Thousands of companies

>20k papers

Yearly investment in AI:

>100$ Billion

Thousands of companies

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And still...

80% - 90% of the AI projects **FAIL**

Why?

How to Improve?

Ben Fishman

Education

- Ph.D. Candidate – Computer Science
- M.Sc. Electrical Engineering
- B.Sc. Bio Medical Engineering

Industry

- Director of AI & Algo @ Microsoft
- Senior Data Scientist @ Microsoft
- Team Lead @ Mobileye

Background

- Computer Vision
- Audio
- Speech
- ML/ DL/ GenAI

The Main Reasons for Failure

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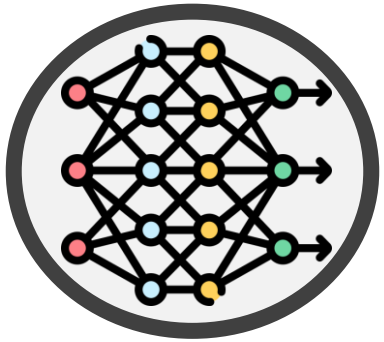
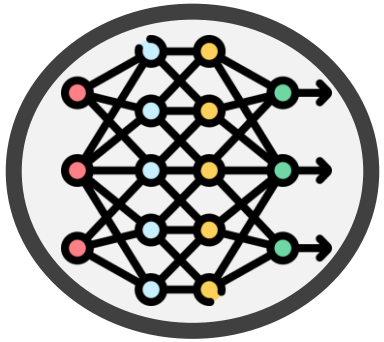


AI doesn't fit the
Core Problem

The Main Reasons for Failure

Wrong **Trajectory**



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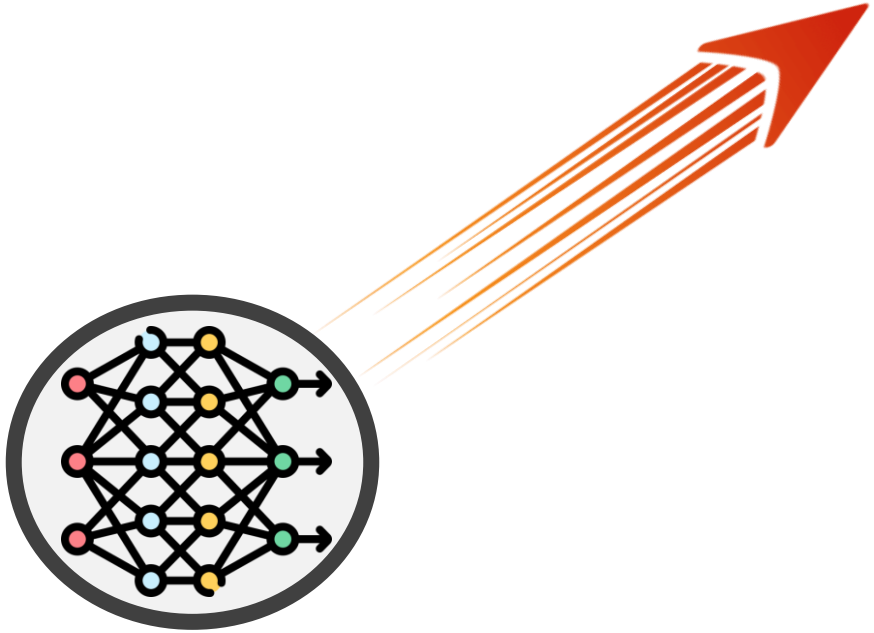

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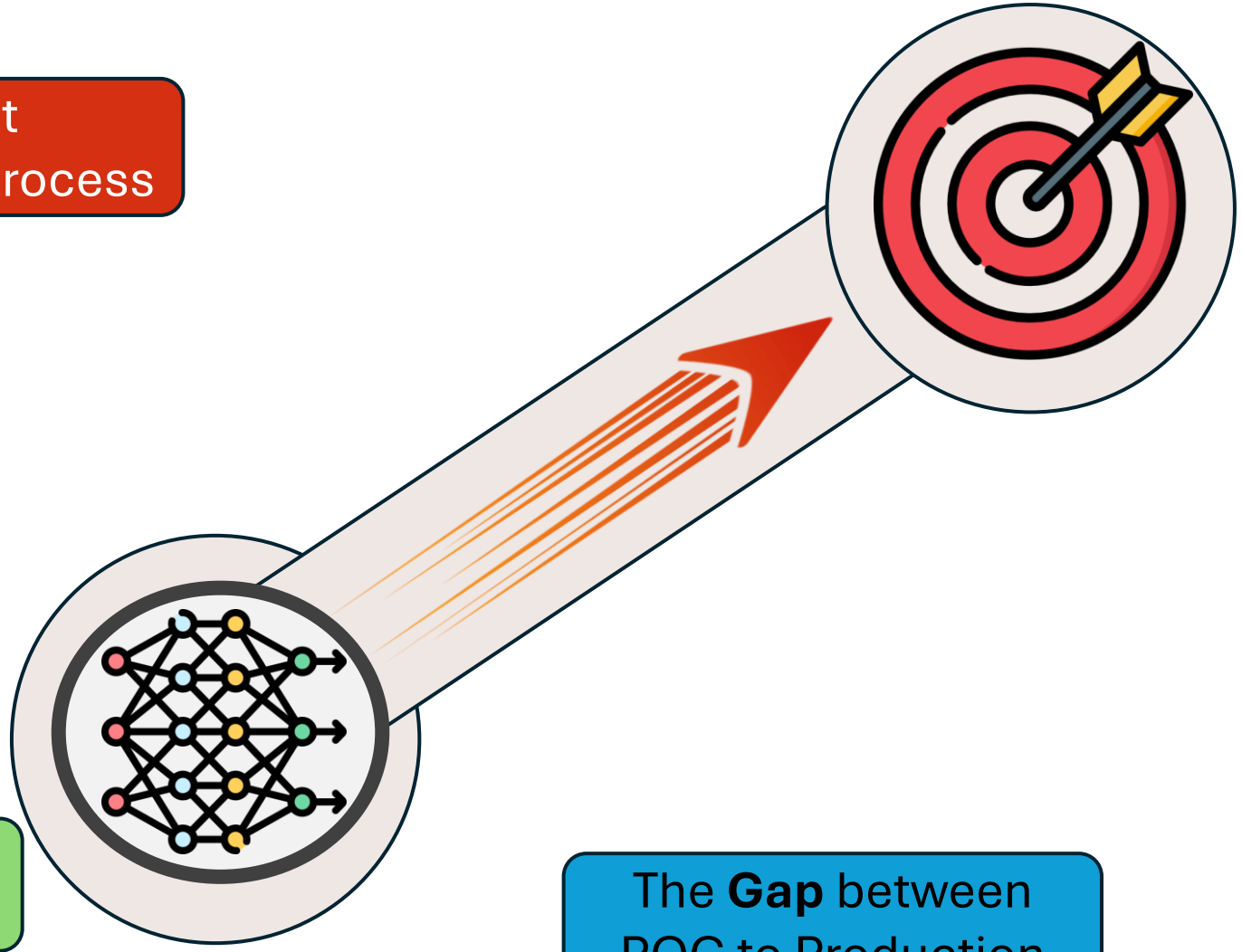

AI doesn't fit the **Core Problem**

The **Gap** between POC to Production

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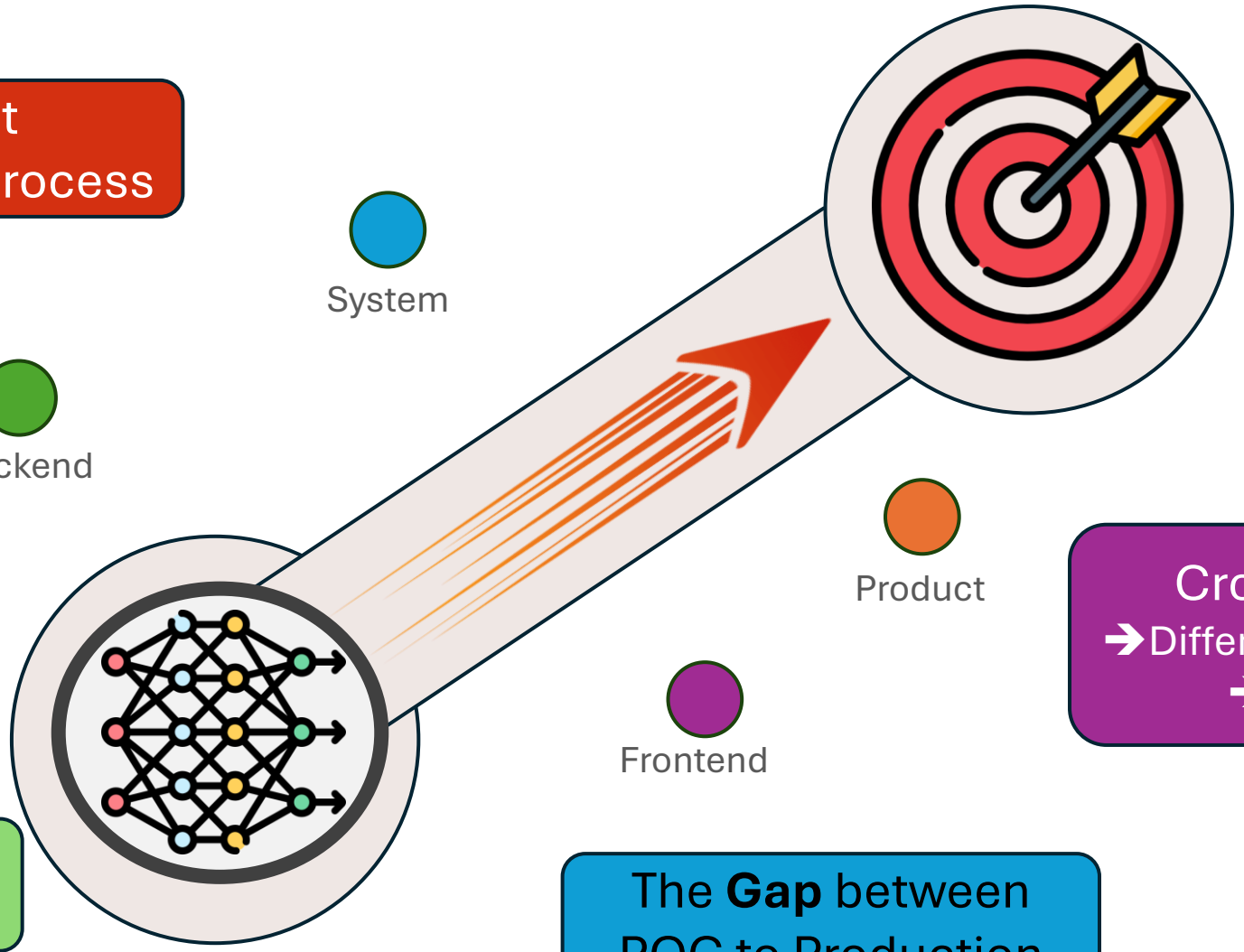

Cross Domain Teams
➔Different Development Process
➔ Lack of Trust in AI

AI doesn't fit the **Core Problem**

The **Gap** between POC to Production

The Principals

Application oriented algo

Invest in Data & Evaluation

Make it a factory

Divide & Conquer

Don’t be naïve

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Application Oriented Algo

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Run E2E (sooner rather than later)

- Better **understanding the app**
- **Simple** (off-the shelf) → **Complex**

Application Oriented Algo

App: Detecting pedestrians crossing the road

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Be Relevant

- **Test** (only) what you need
- **Fix** (only) what you need

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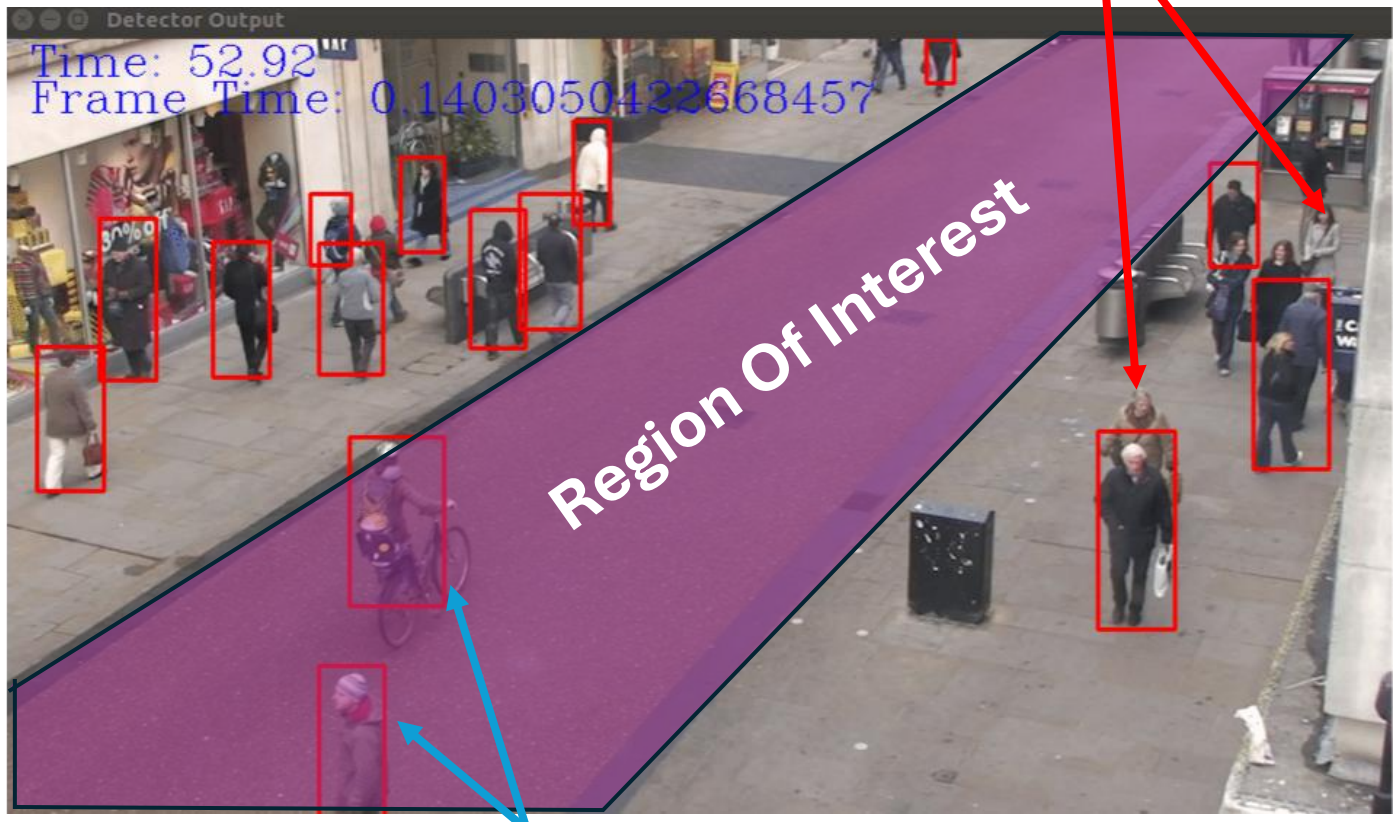

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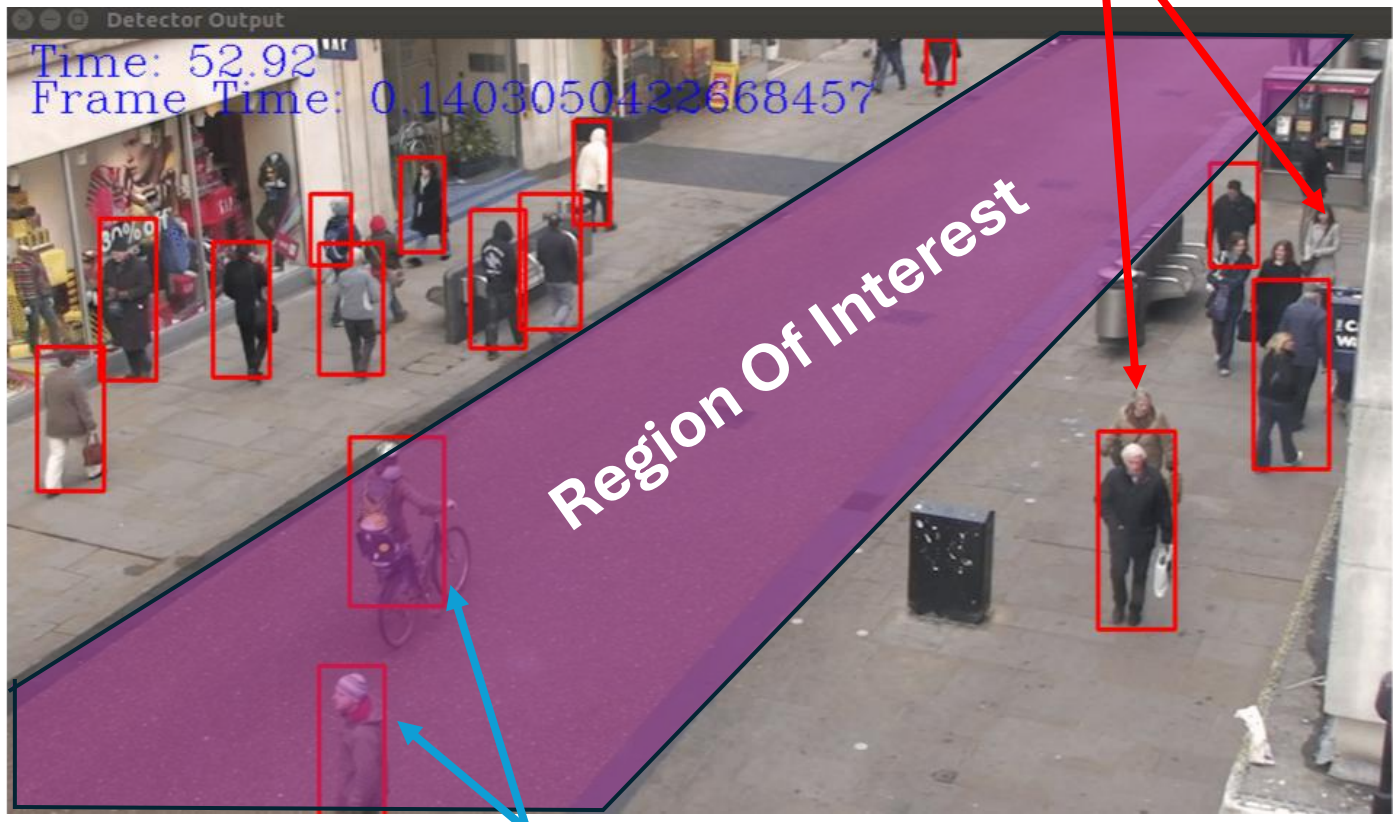

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Align with other stake holders

- **Product**
- **System**

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Invest in Data & Evaluation

Evaluation

Data

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Data

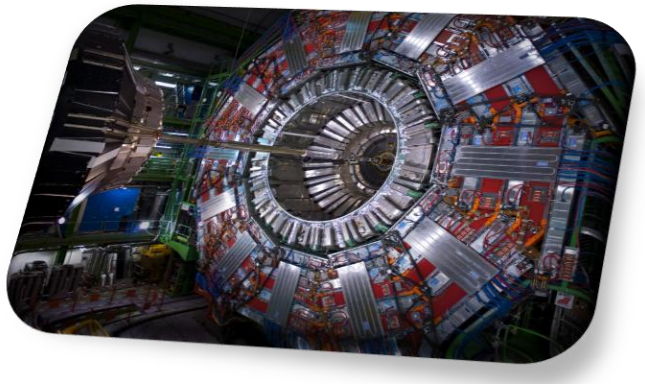
❖ **Companies tend to underestimate their importance**

Invest in Data & Evaluation

Evaluation

Data

- Companies tend to underestimate their importance
- The compass & accelerator of the development process



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Evaluation Engine

Accurate

Reliable

Easy to use

Fast

Focuses you

Raises problems fast

Provides confidence

Time Investment!

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Metrics

Raw Metrics
Not enough

→

Refined Metrics
Fits your application

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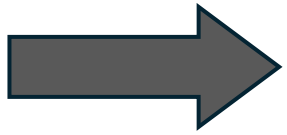

Refined Metrics
Fits your application

Human in The Loop

Invest in Data & Evaluation

Data

Invest in Data & Evaluation

Data

- Data Collection
- Data Annotation
- Data Analysis
- Data Engineering
- Data Roles
- Datasets Creation

- Legal
- Privacy
- Responsible AI
- Curation
- Auto Labeling

Invest in Data & Evaluation

Data

- Data Collection
- Data Annotation
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Data Roles

- Data Manager
- Data Analyst
- Data Engineers
- Data Collectors
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Make it a Factory

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Problem: Many technical challenges ➔ Inefficient work + Focus distraction

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Solution: Solve them

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Infra/ MLOps

Commonality

Teamwork

Make it a Factory

Problem: Many technical challenges ➔ Inefficient work + Focus distraction
Solution: Solve them

It's not appealing and not deliverable – BUT it is crucial for success

Infra/ MLOps

- Data Pipelines
- Parallelization
- Training Acceleration

Commonality

Teamwork

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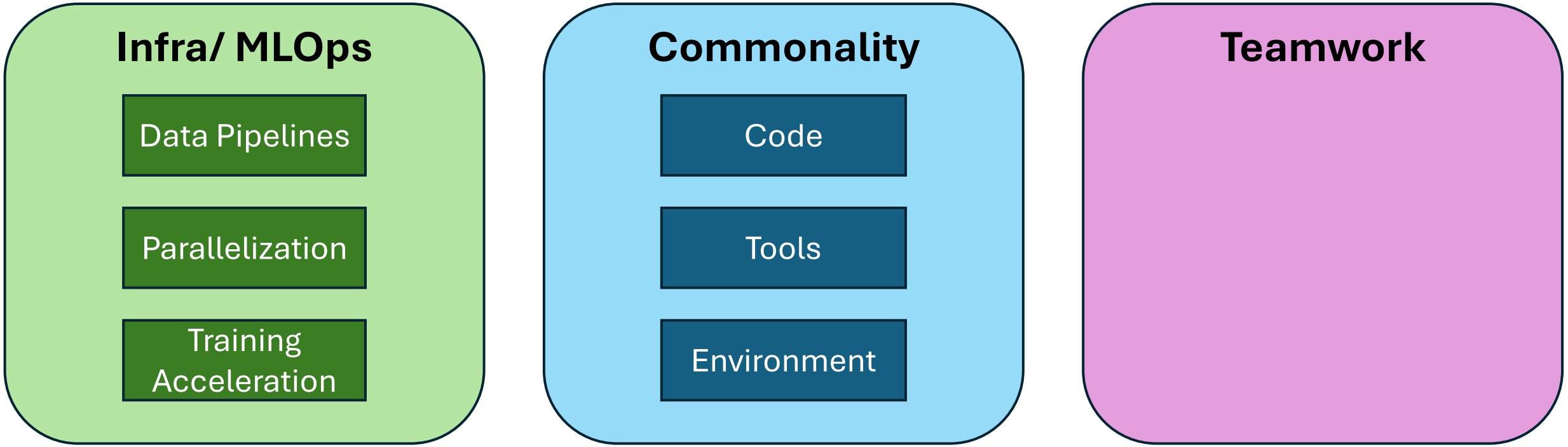

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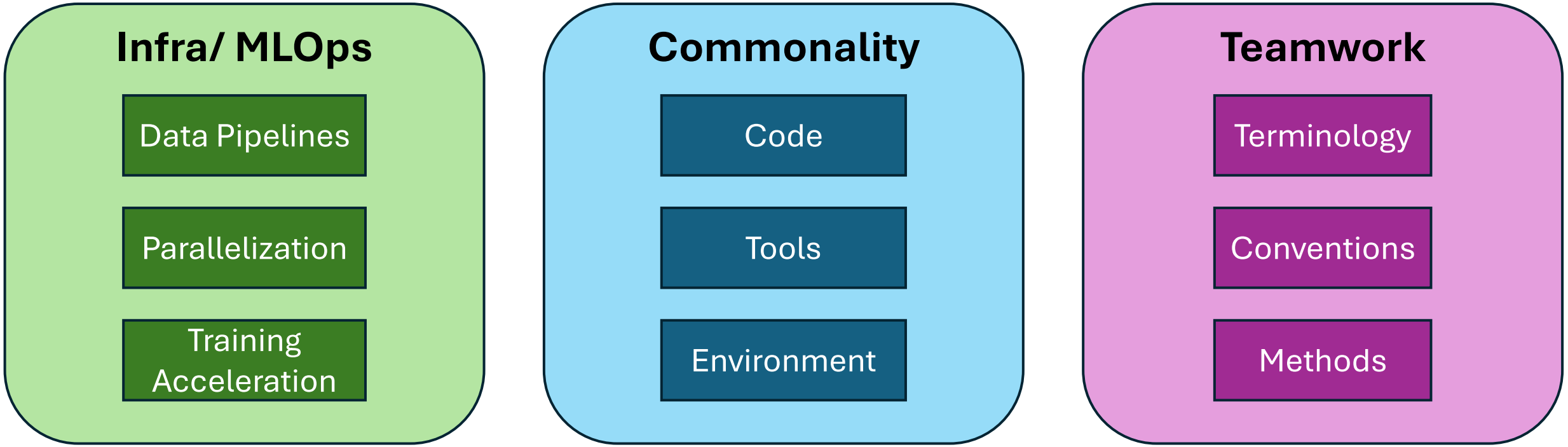

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Divide & Conquer

Divide **large** problems into **smaller** problems ➔

Easier to solve them

Divide & Conquer

Time

Modules

People

Divide **large** problems into **smaller** problems ➔

Easier to solve them

Divide & Conquer

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People

Divide & Conquer

Time

Modules

People

Split your timeline into smaller segments:

- To improve in small **incremental steps**
- To **name & control** your status
- To be able to **reproduce**
- To show **progress**

Divide & Conquer

Time

Modules

People

Split your timeline into smaller segments:

- To improve in small **incremental steps**
- To **name & control** your status
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Version everything

Code Version

Algo Version

Data Version

Dataset Version

Metrics Version

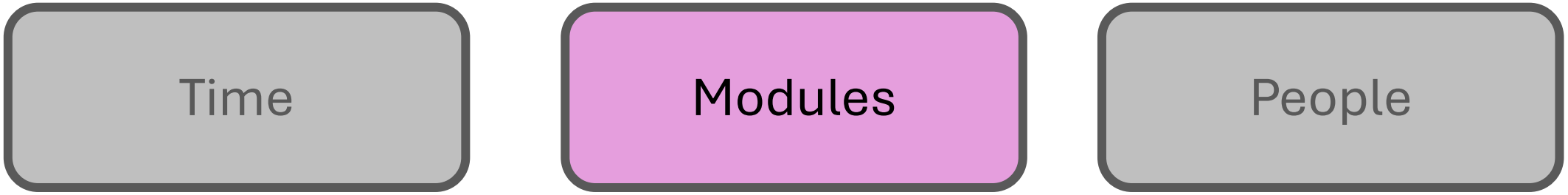
Divide & Conquer

Time

Modules

People

Divide & Conquer



Algo Modules

Modularity rather than E2E models

Dev Modules

Separate module for each functionality

(Data preparation, training …)

Divide & Conquer

Time

Modules

People

Algo Modules

Modularity rather than E2E models

Smaller tasks are simpler

Interpretability

Debuggability

Dev Modules

Separate module for each functionality

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Faster Development

Better Control

Reproducability

Divide & Conquer

Time

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Algo Modules

Modularity rather than E2E models

Smaller tasks are simpler

Interpretability

Debuggability

Dev Modules

Separate module for each functionality

(Data preparation, training ...)

Faster Development

Better Control

Reproducability

Modulate more than you already have

Divide & Conquer

Time

Modules

People

Divide & Conquer

Time

Modules

People

Split the work between team members

Separate roles in the team

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Be in touch

Bring Them Home