

Understanding and Improving the Infrastructures of AIOps

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Supervisor: Heng Li
Co-supervisor: Foutse Khomh

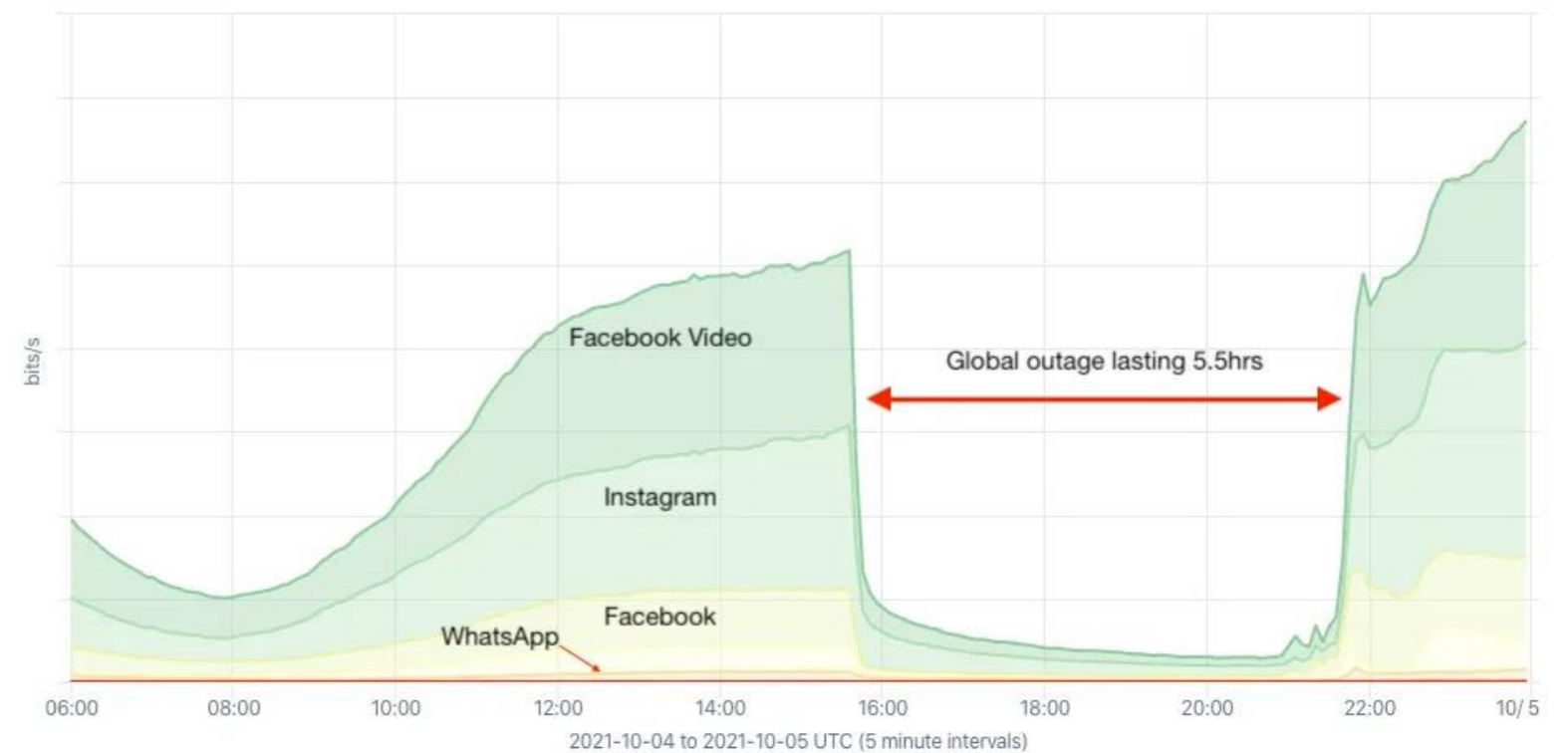
Department of Computer and Software Engineering,
Polytechnique Montréal, Canada
May 2023



First, real-world examples

Facebook's massive outage costs the company an estimated \$60 million in revenue.

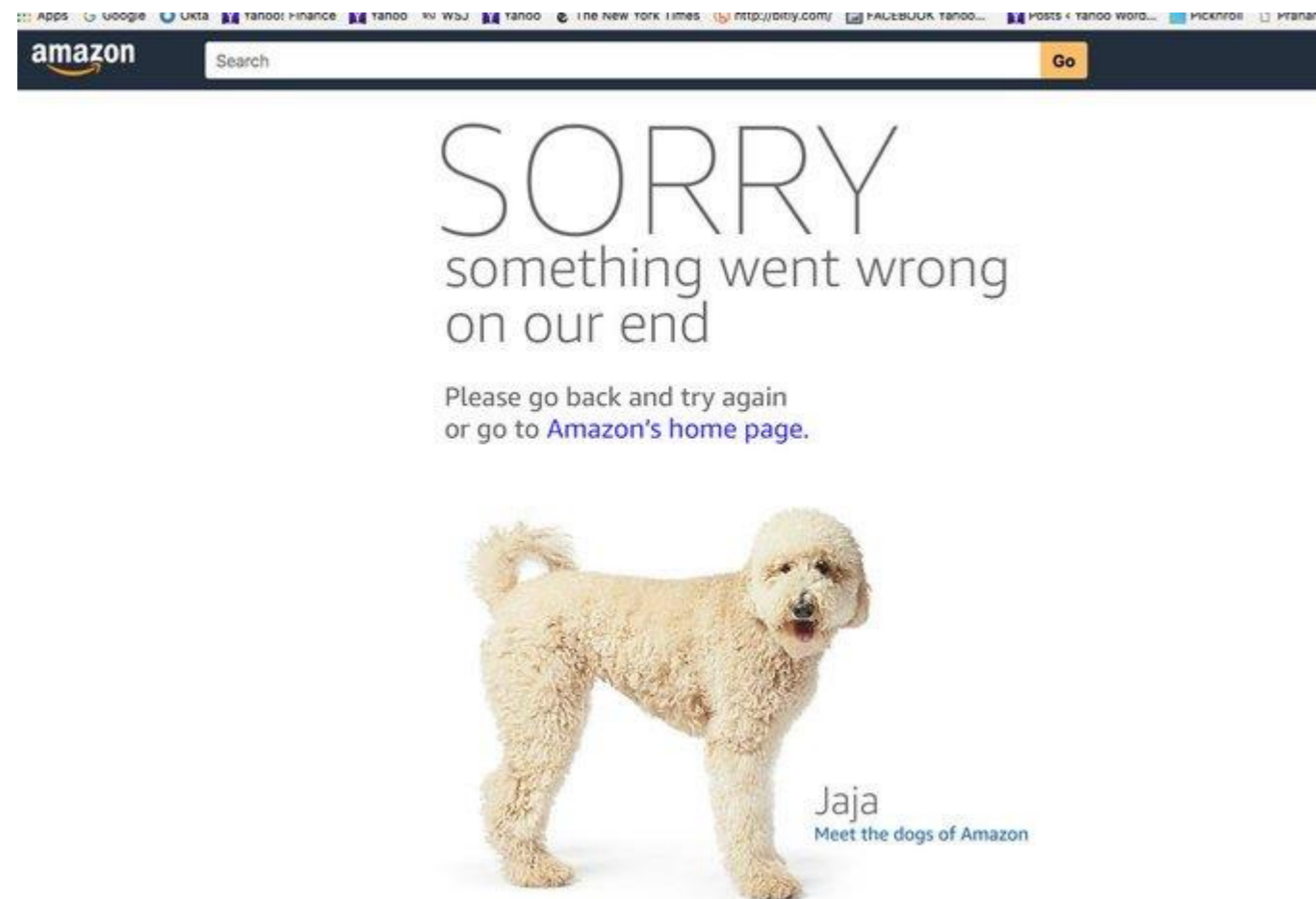
Top OTT Service by Average bits/s Internet Traffic served by Facebook
Oct 04, 2021 06:00 to Oct 05, 2021 00:00 (18h) Global outage 4-Oct-2021



<https://www.cnet.com/tech/mobile/facebook-massive-outage-costs-the-company-an-estimated-60-million-in-revenue/>

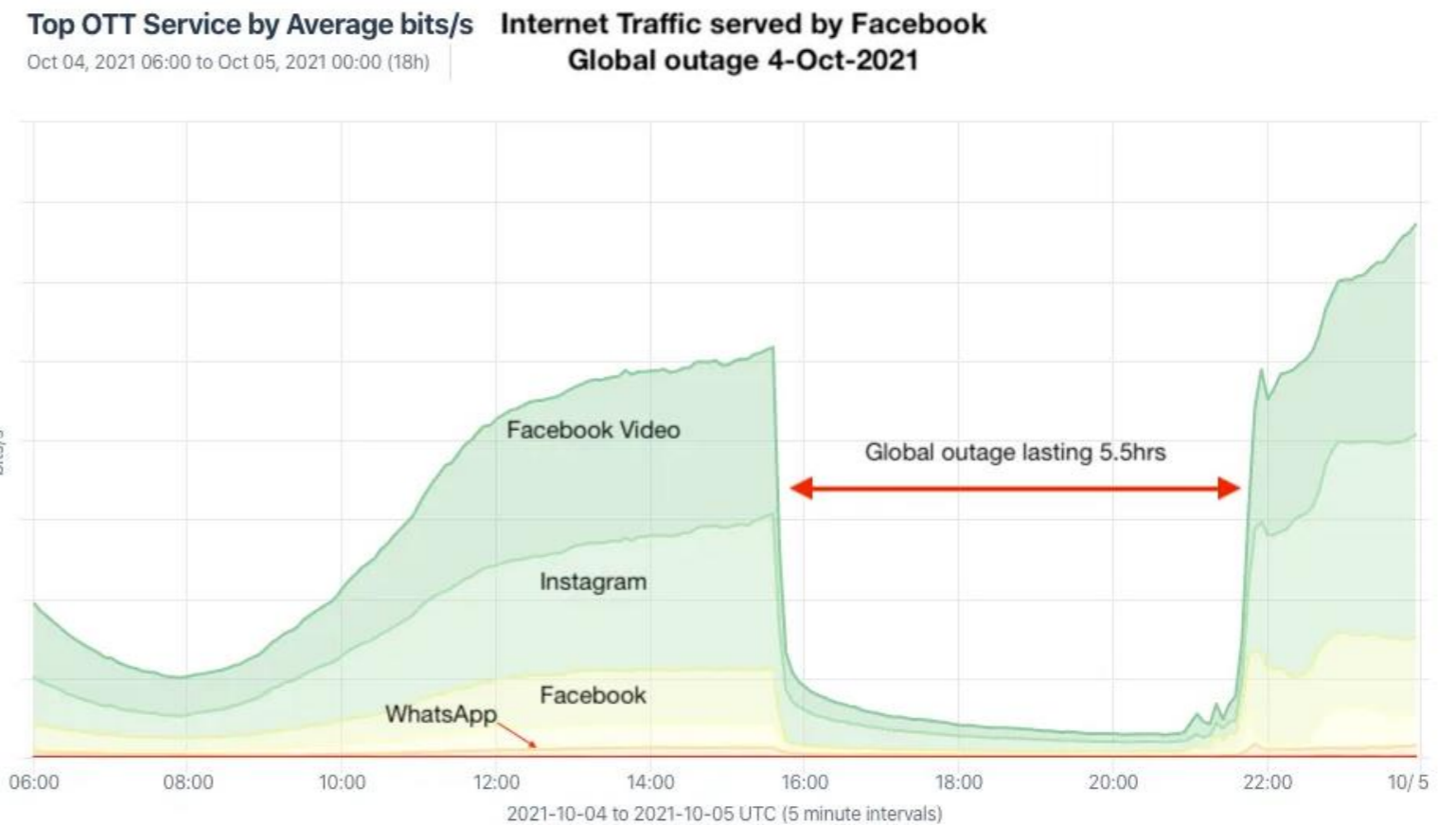
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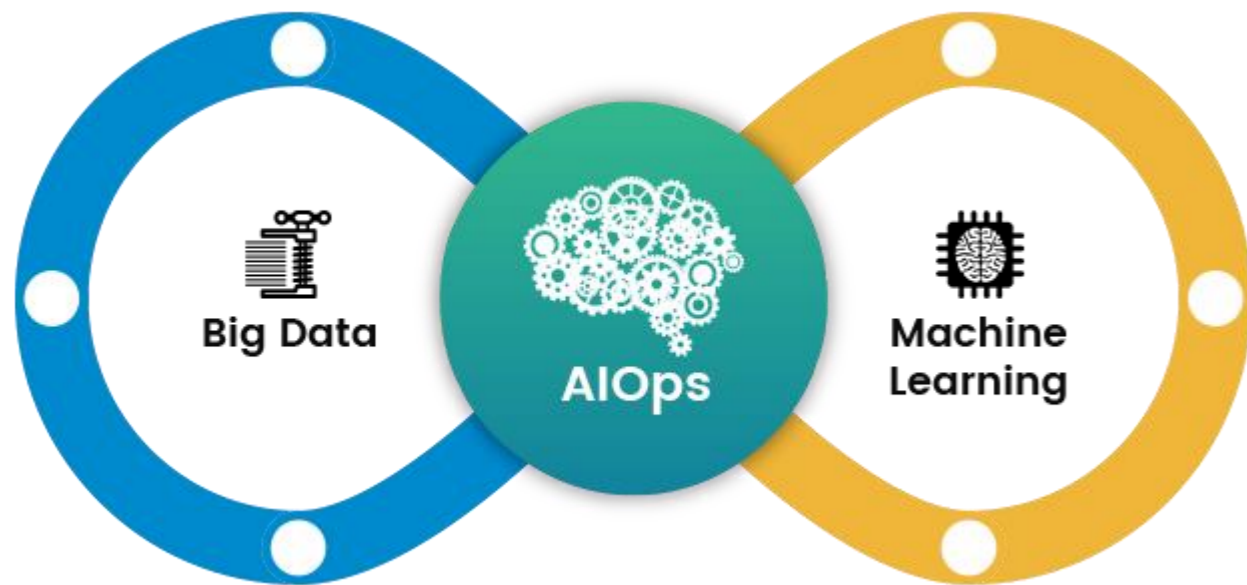
The solution?
AIOps

AIOps

Artificial Intelligence for IT Operations

AI Ops

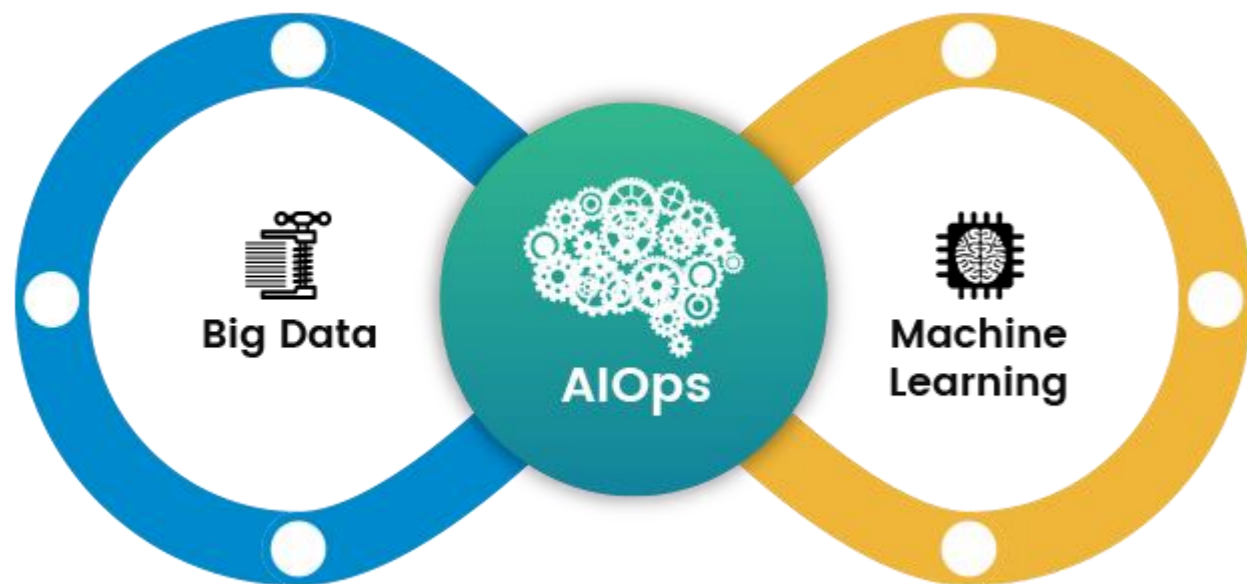
Artificial Intelligence for IT Operations



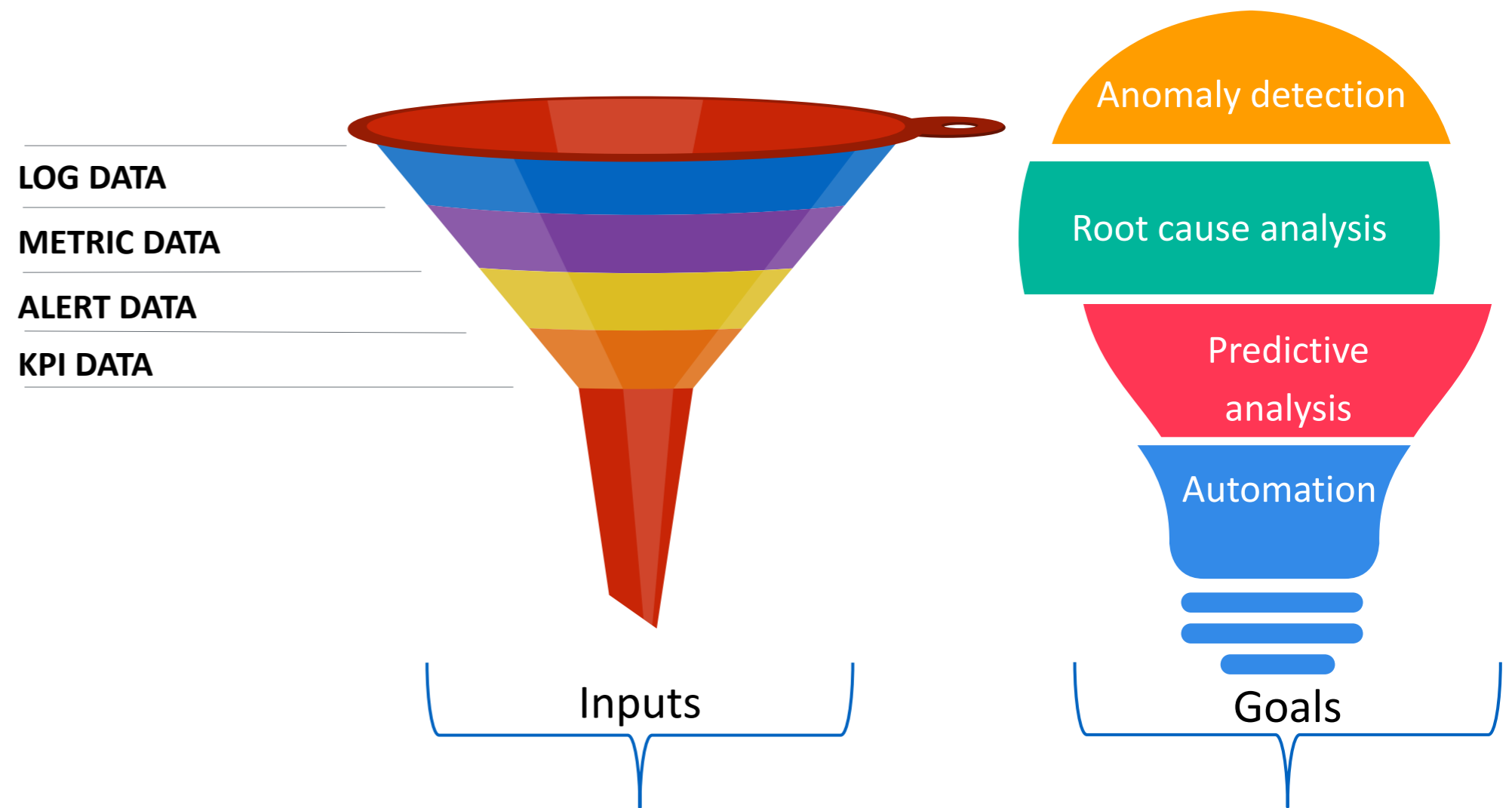
<https://medium.com/applied-data-science/how-wide-automation-and-aiops-can-help-you-in-your-business-d1ddf67e7124>

AIOps

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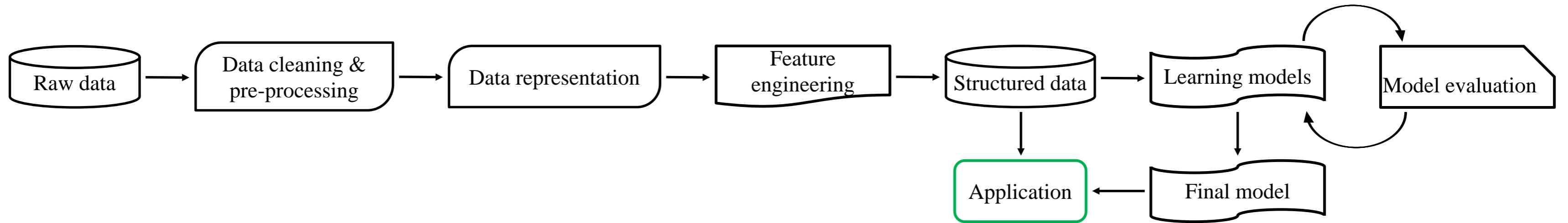
AI Ops

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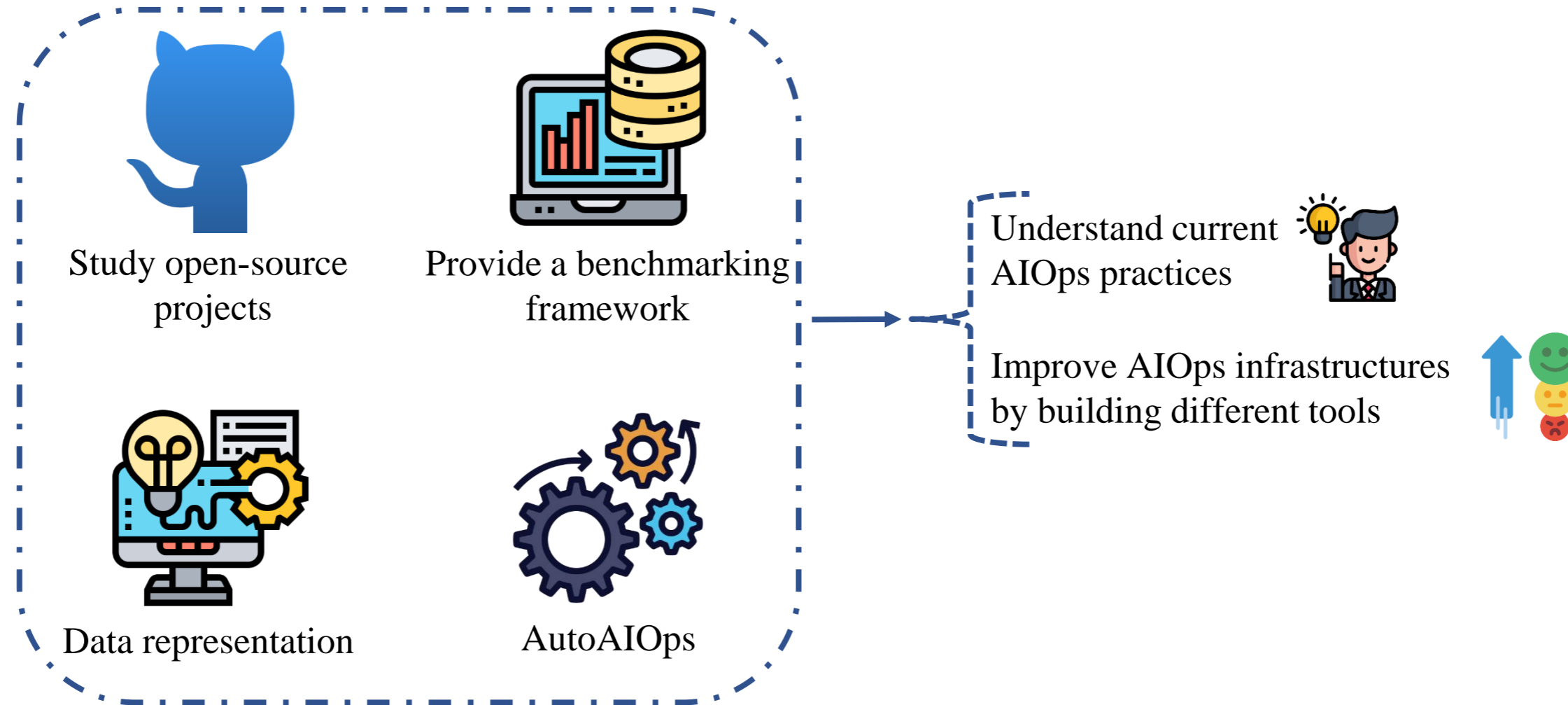
AI Ops uses **IT operations-related data**, utilizes advanced analysis technologies such as **Machine Learning** and **static analysis**, to reach valuable **insights** or enhance the system's **quality** by actions such as monitoring and automation.

Aghili et al., 2022

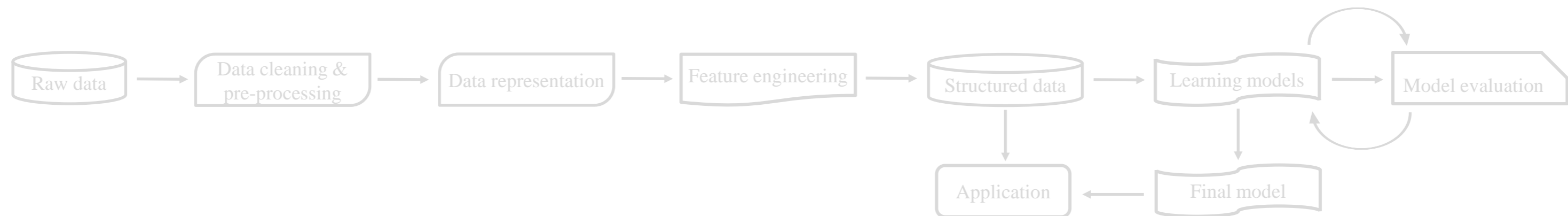
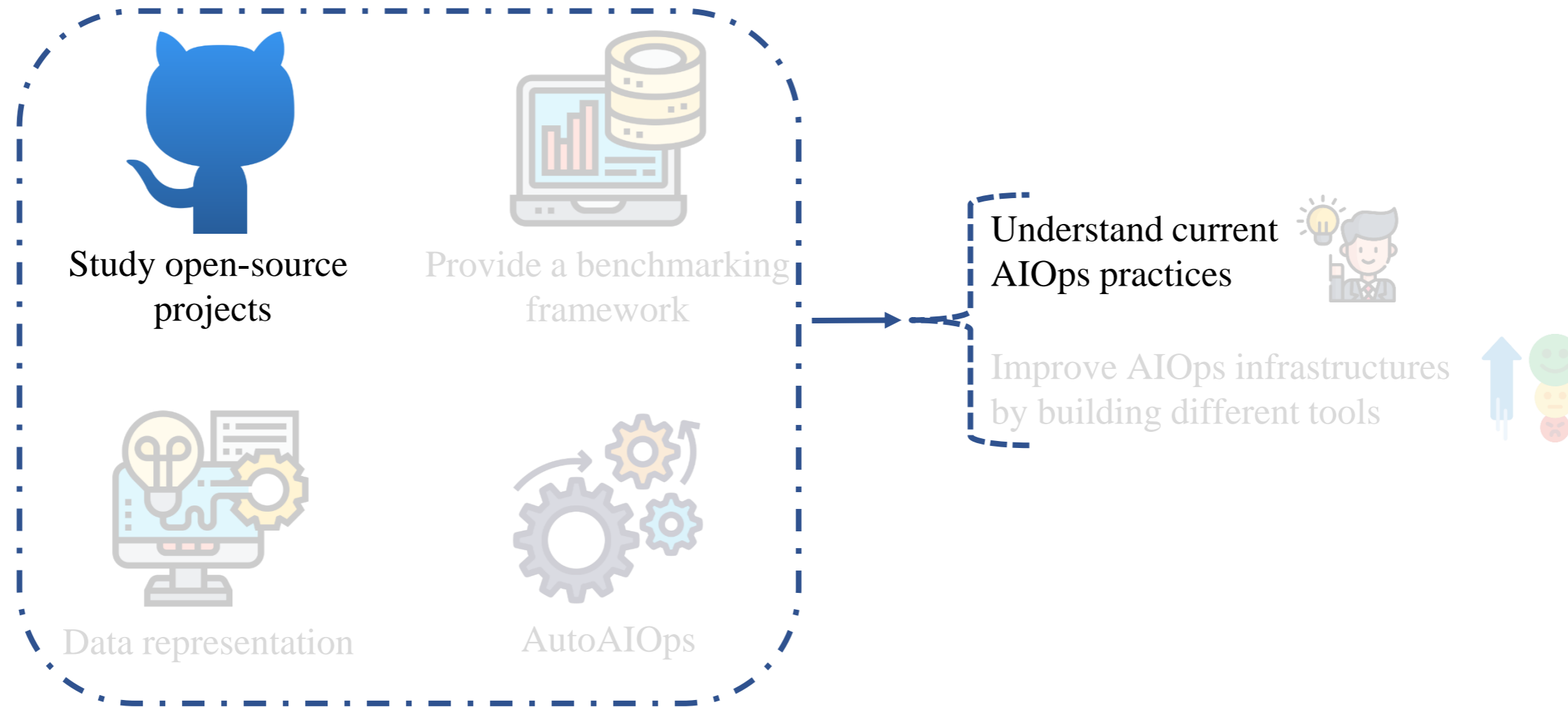
AI Ops workflow



Objectives



Objectives





Objective 1

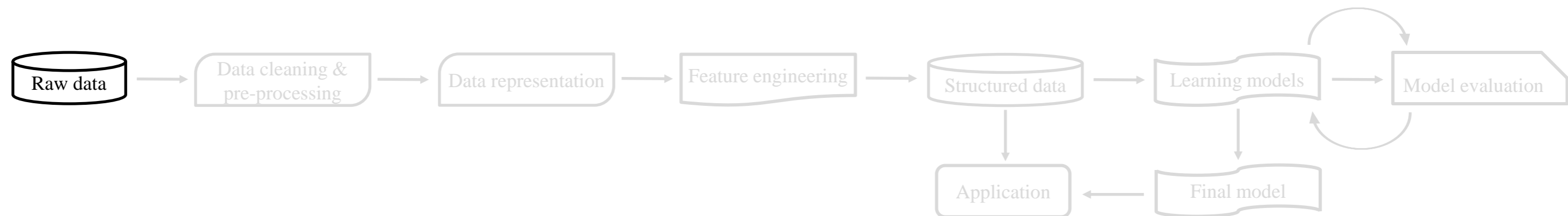
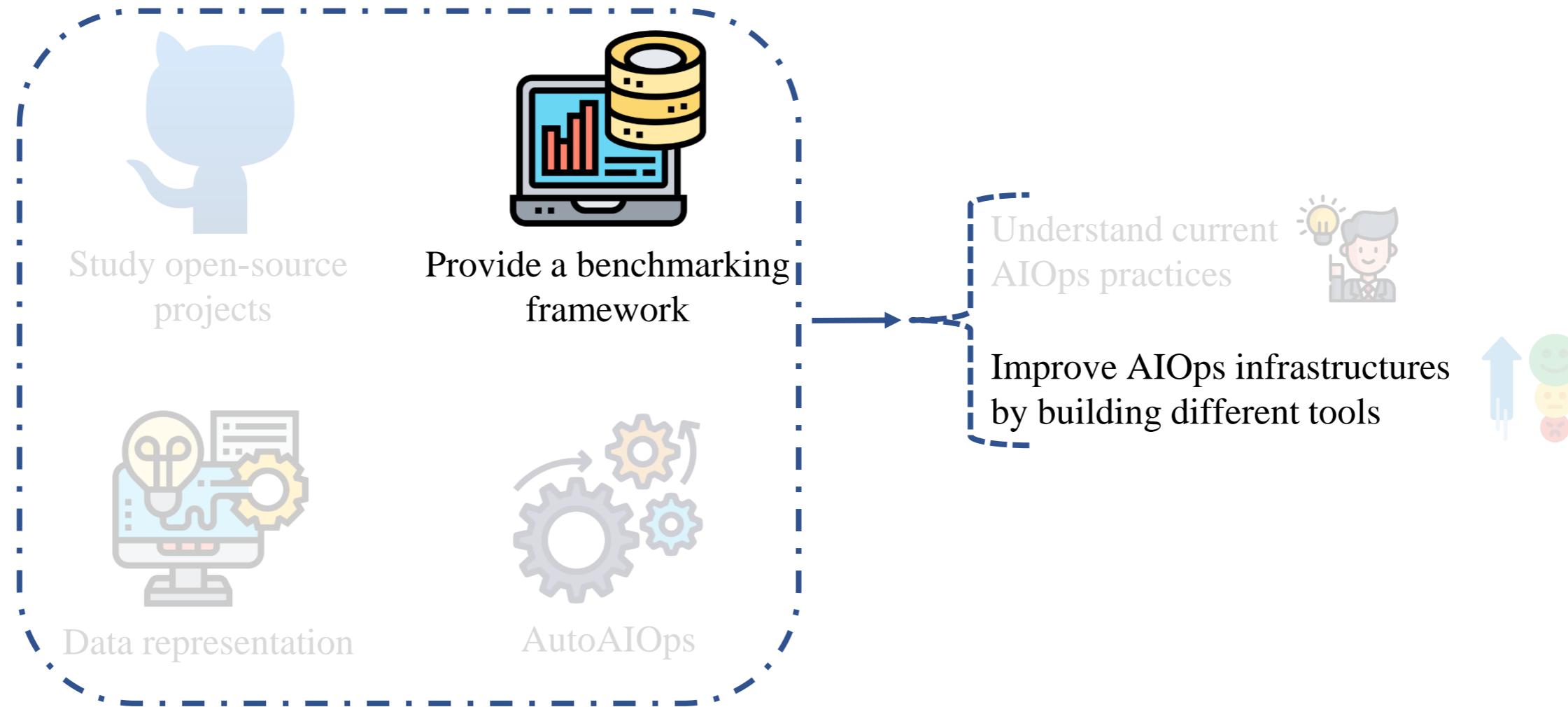
Studying the characteristics of AIOps projects on GitHub

No prior study has systematically studied AIOps practices in real-world and open-source projects.

Benefits of such a study:

- Help researchers and practitioners understand current status of AIOps
- Guide researchers and developers to adopt best-performing AIOps solutions
- Identify the most common problems in AIOps practices

Objectives





Objective 2

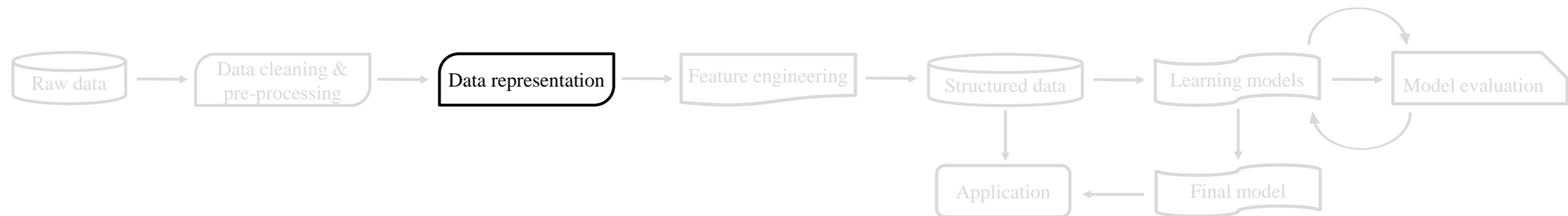
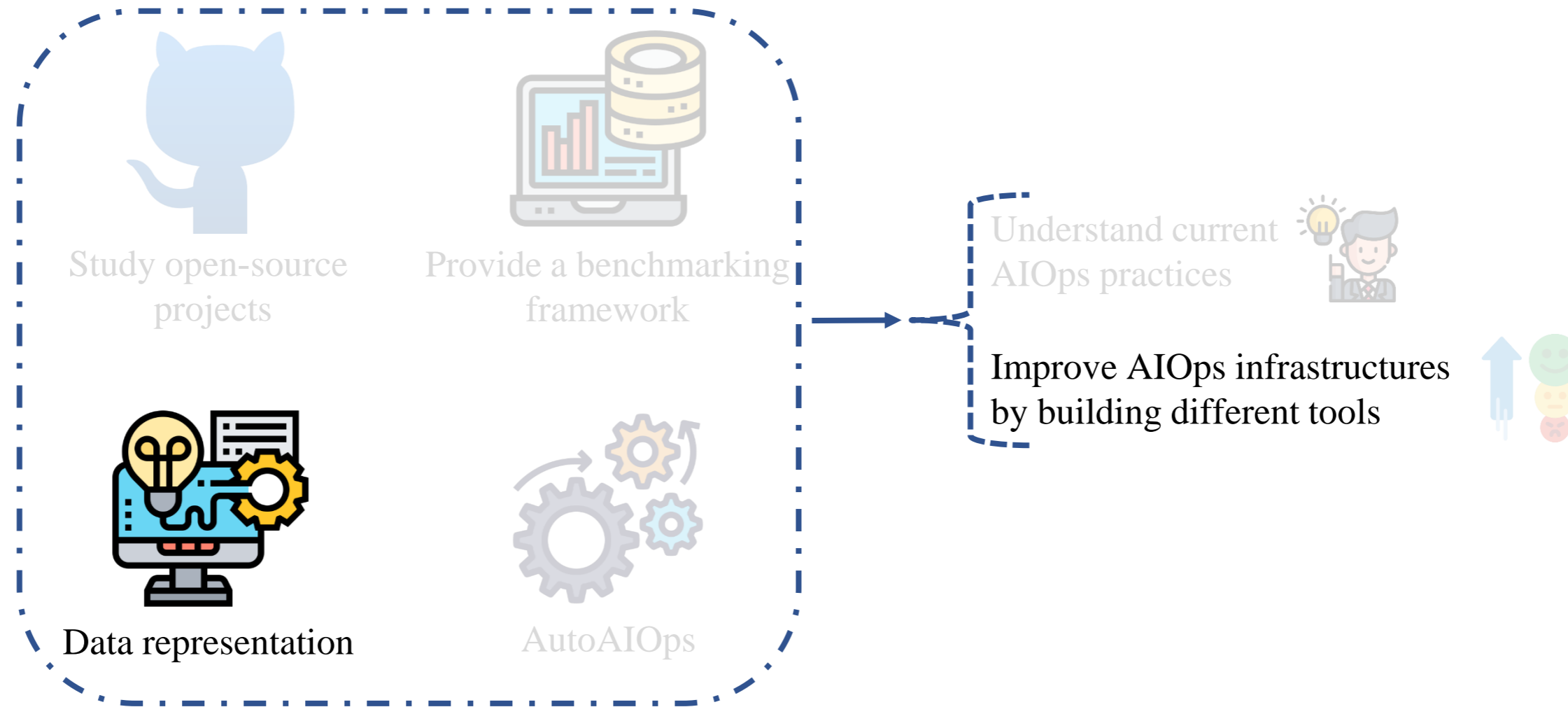
Providing a customizable benchmarking framework for AIOps solutions

No previous study provide a benchmarking framework for AIOps studies.

Benefits of such a framework:

- Fill the gap of lack of AIOps datasets
- Customizable based on researchers' requirements
- The generated datasets can be used for AIOps downstream tasks

Objectives





Objective 3

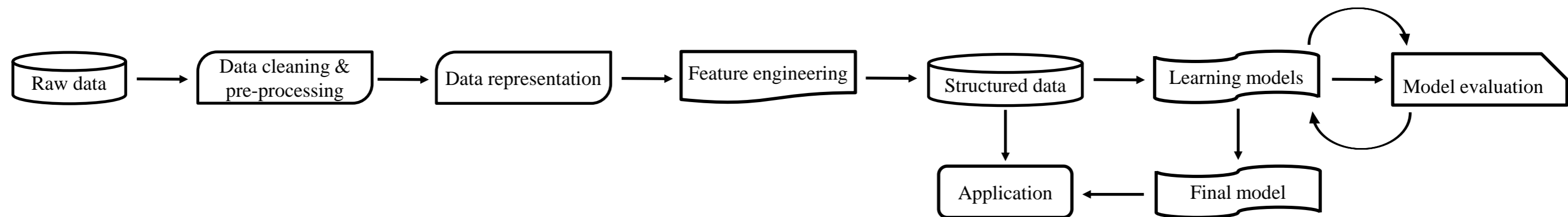
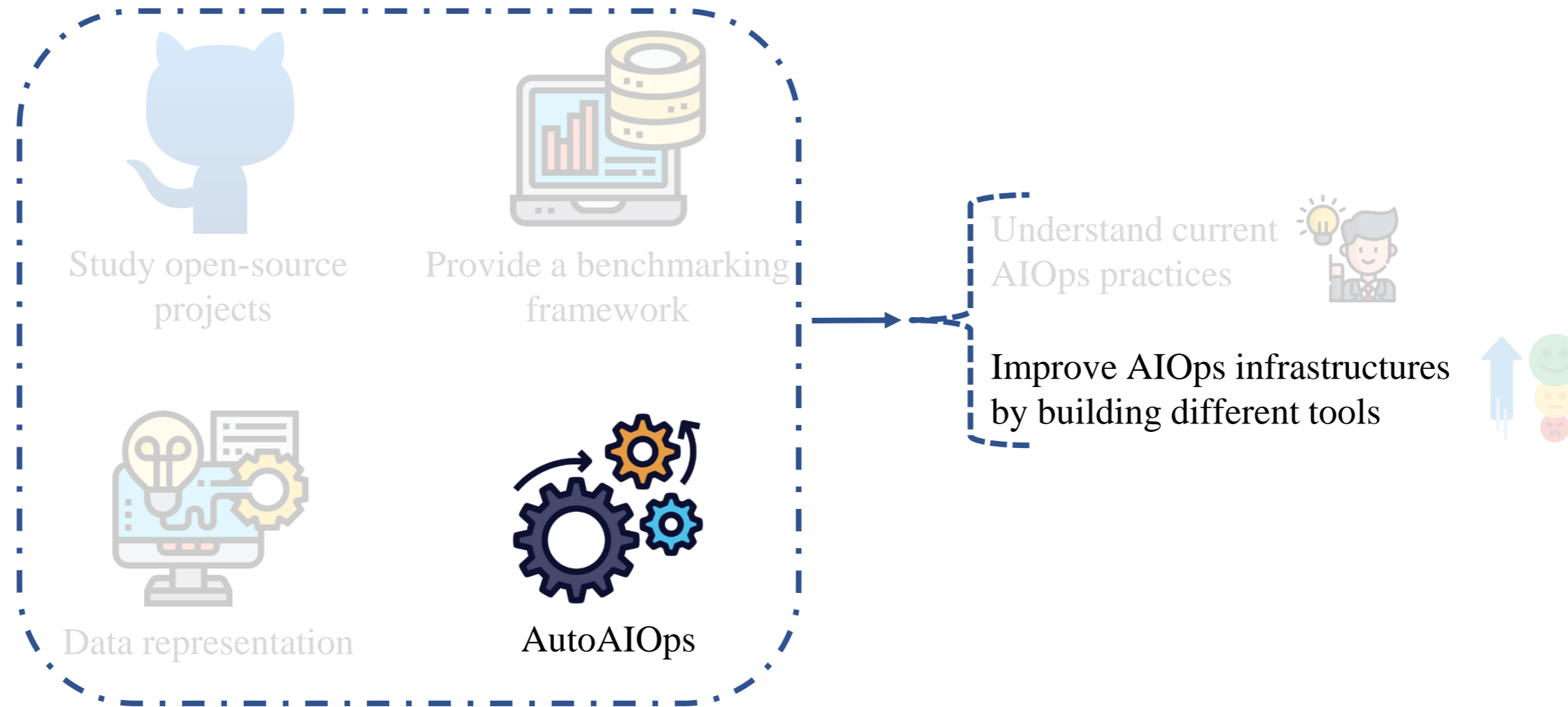
Efficient representation of AIOps heterogeneous data types

None of existing work proposes a representation approach specifically for AIOps data types.

Benefits of such a representation:

- Minimize information loss
- Able to handle heterogeneous AIOps data types
- Efficient in terms of combining AIOps common data types

Objectives





Objective 4

An automation framework for AIOps workflows

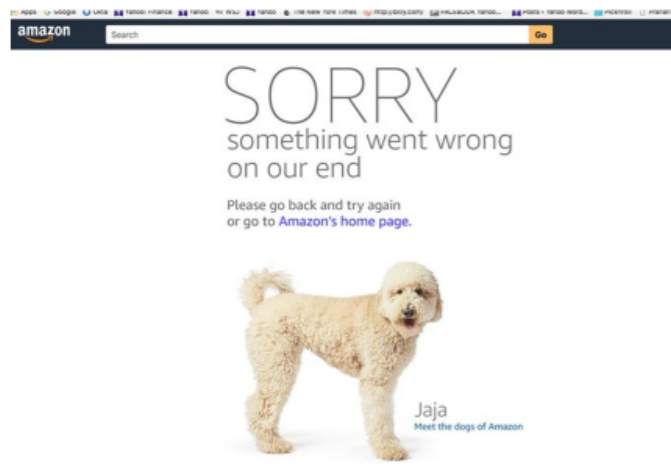
No automation framework exist specifically for AIOps applications.

Benefits of such a framework:

- Reduces the time and human effort of building AIOps pipelines
- Specified for AIOps data types and downstream tasks
- Optimal for common AIOps workflows such as log parsing

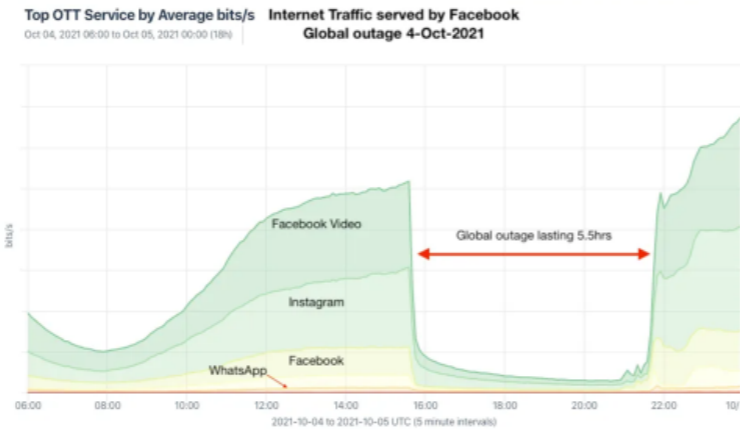
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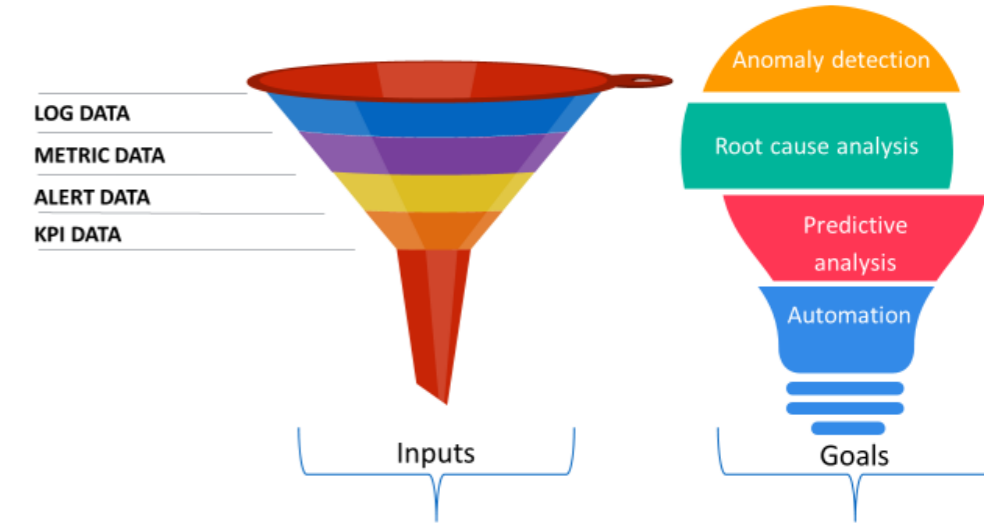


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AIOps Artificial Intelligence for IT Operations

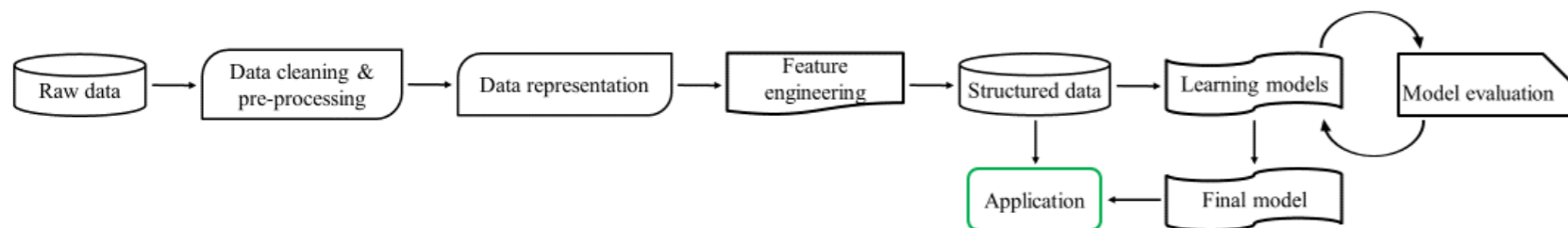


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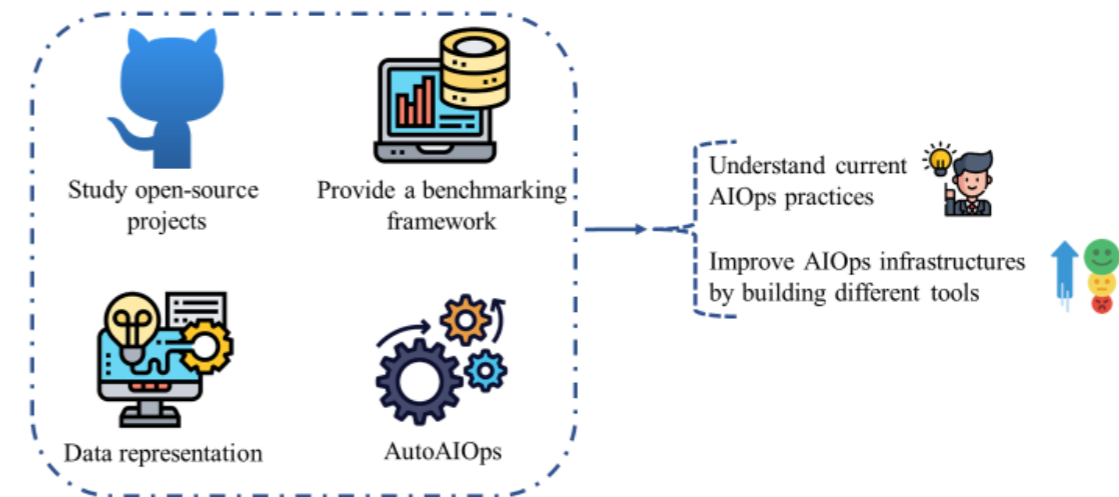


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AIOps workflow



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All icons are from <https://www.flaticon.com/>

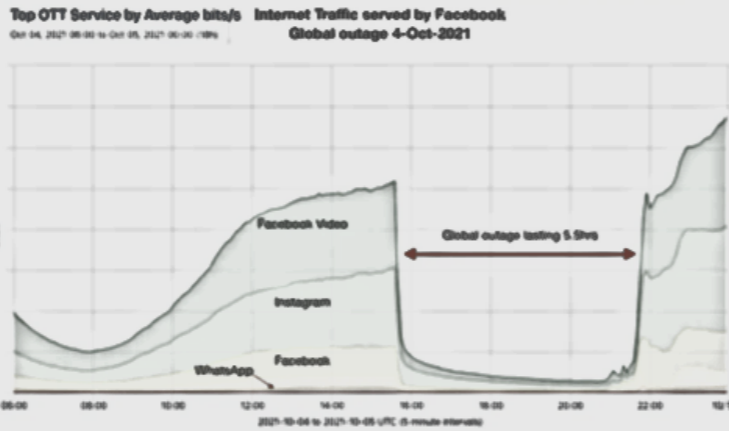
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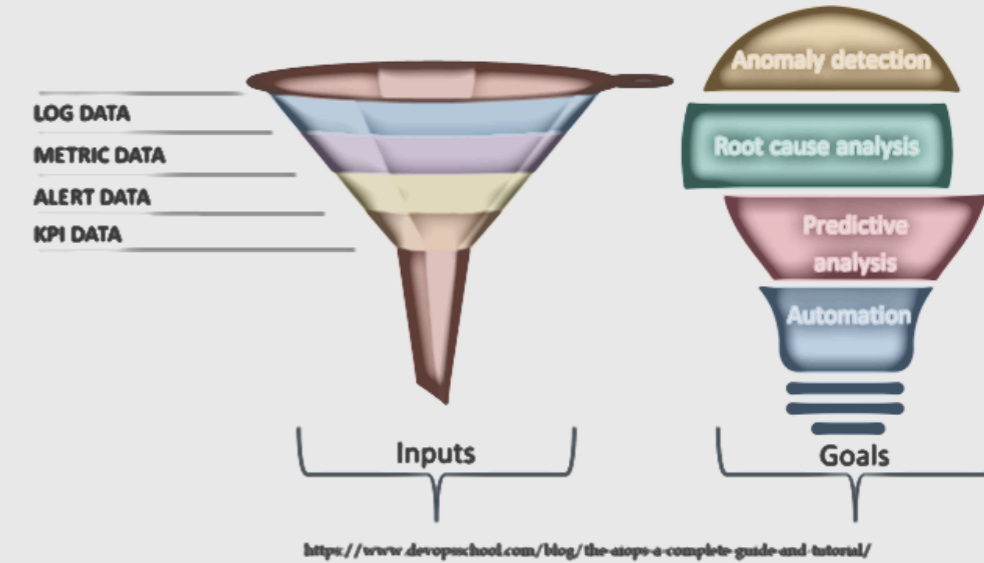


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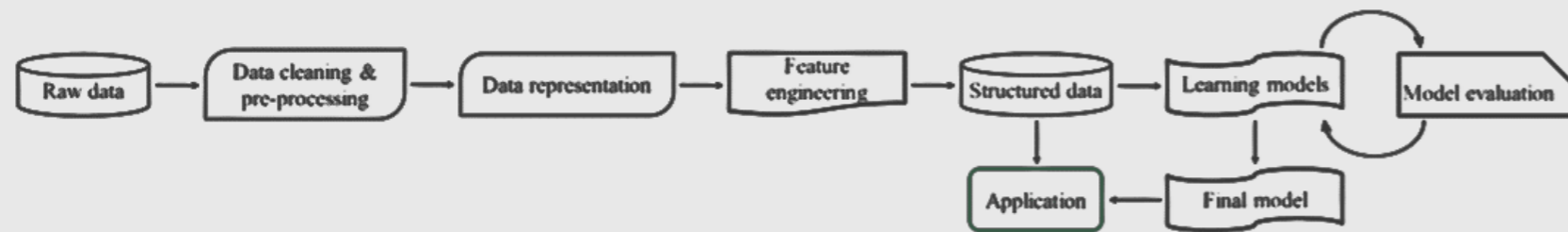


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