Introduction to Research
(in Data Management)

Amr Magdy

Assistant Professor
Computer Science and Engineering
www.cs.ucr.edu/~amr/

What is research about?

- We solve unsolved problems
  - Unsolved not unsolvable

- Examples:
  - How to fly faster?
  - How to cure cancer?
  - How to enable a machine to see?
  - How to understand all data generated by human?

- Research is about finding solutions for unsolved problems in different life aspects
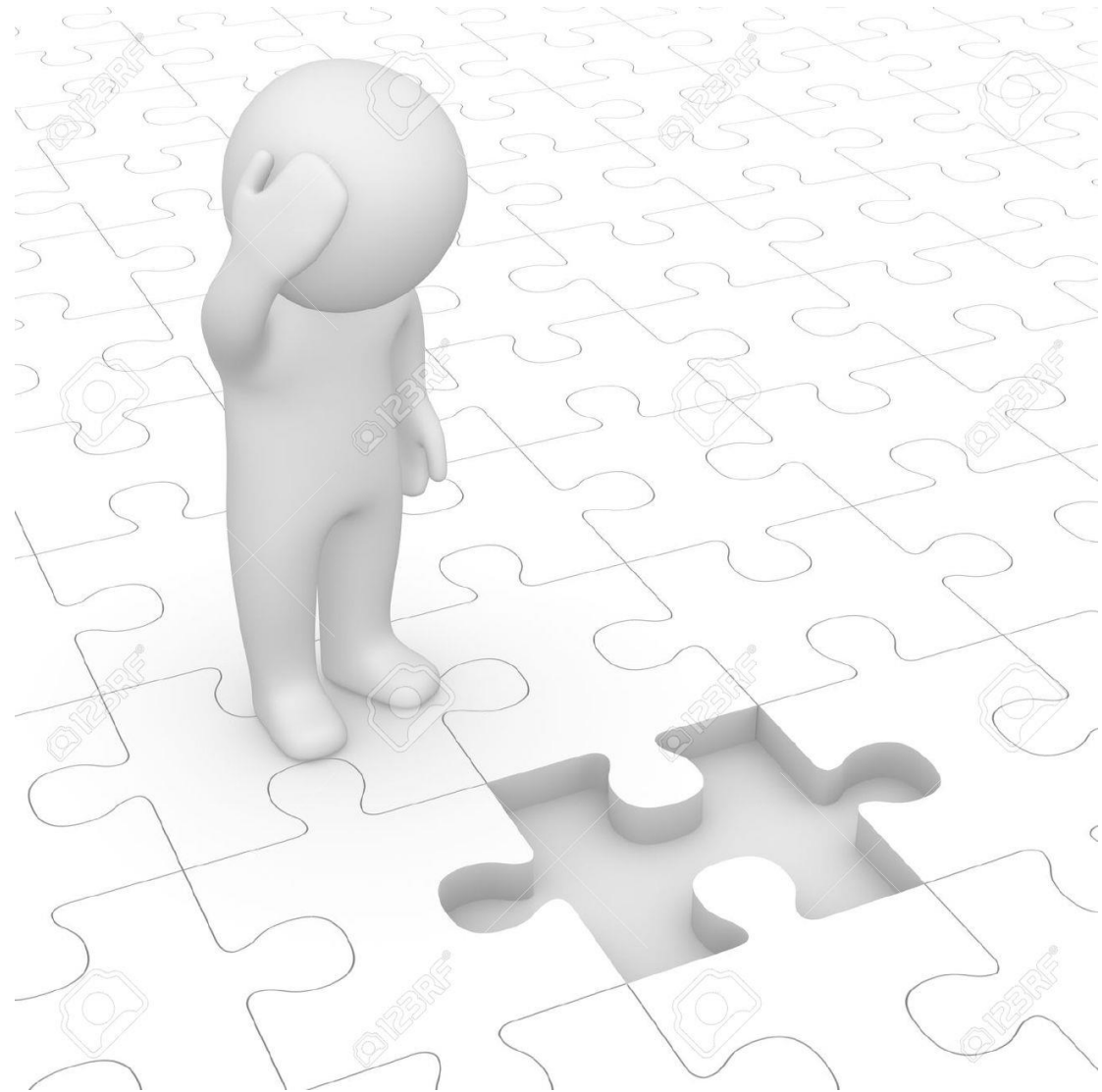 - Health, engineering, behavioral sciences…etc

Is research that big?

- It is,
  - but many MANY teams contribute to that big problems

- Example: how to enable a machine to see?
  Subproblems:
  - How a human see?
  - How to make an artificial eye?
    - How to take photos? (Camera) - How to make it better? …..etc
  - How to make an artificial vision brain?
    - How to segment photos? - How to know objects? …...etc
  - How to connect eye to brain?
  - How to …………...

Is research that big?
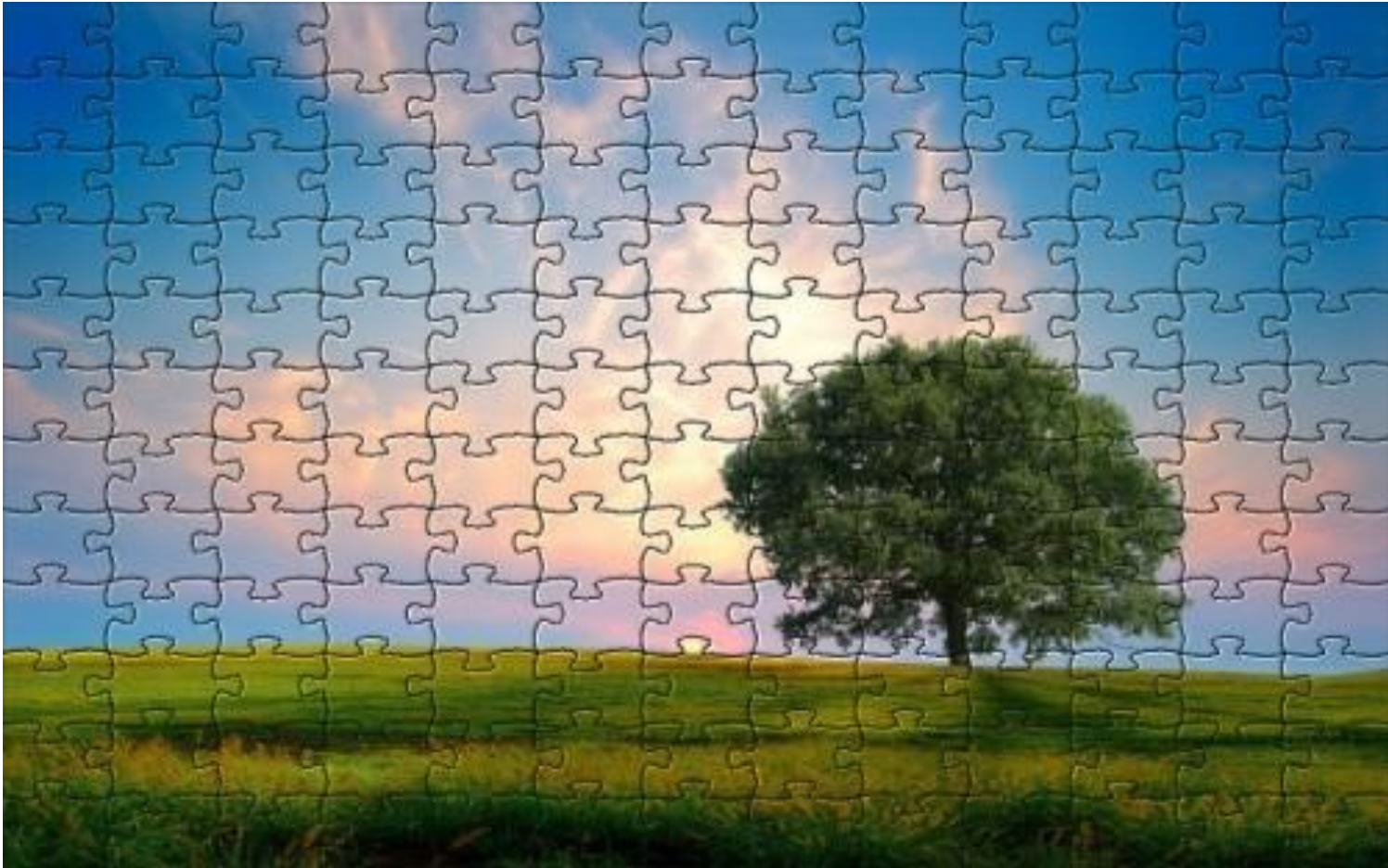
> It is a big puzzle

Is research that big?

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Research problem elements

To address a research problem, answer six questions:

1. What is the problem?

2. Why it is important?

3. Why it is challenging?

4. What are the limitations of the related work?

5. What are the novel contributions?
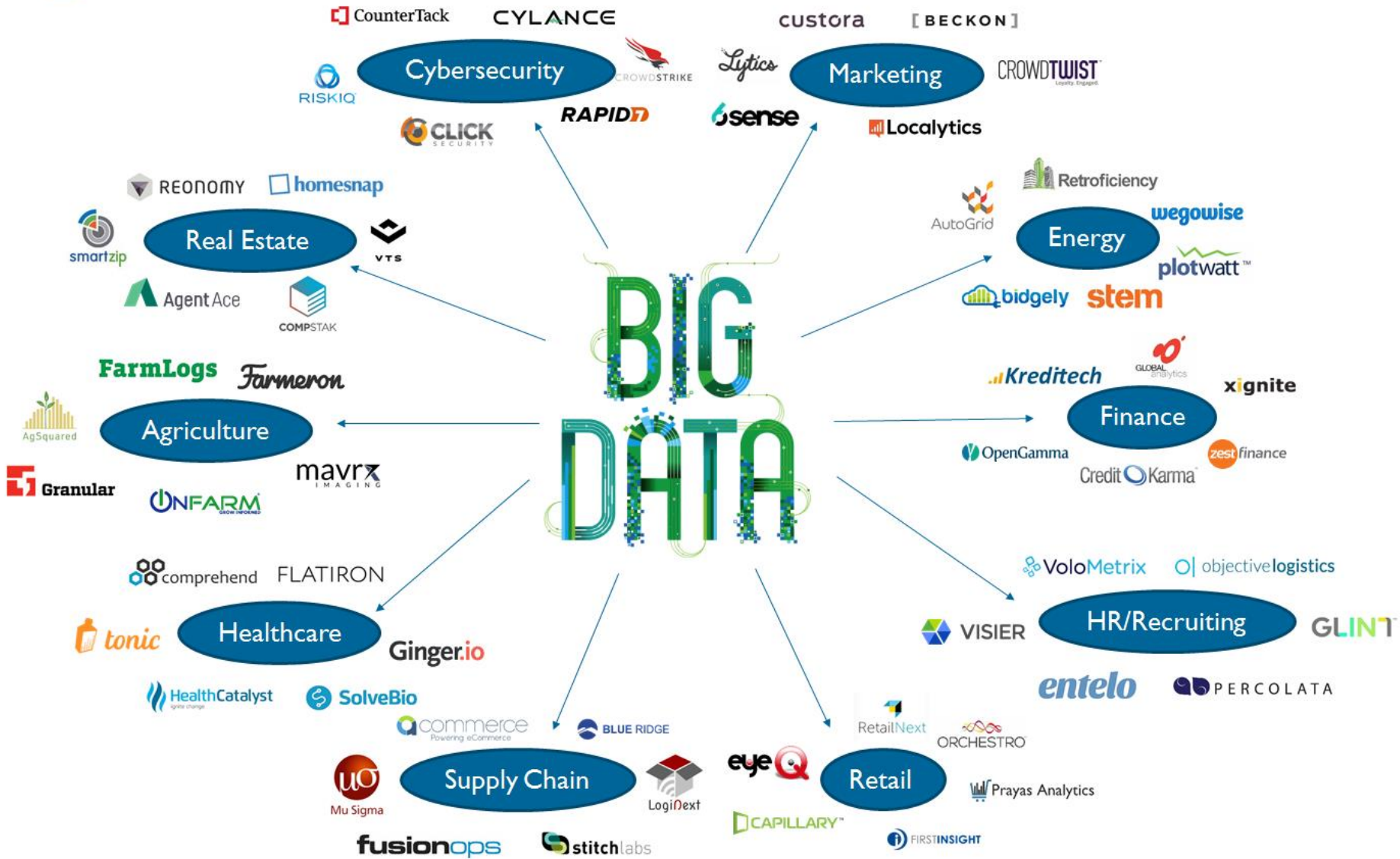
6. What is the validation method?

Introduction to Data Management Research

The digital world

> Data sources:
>> Business: retailers, enterprise, etc
>> Humans: games, social media, crowdsourcing, etc
>> Science: astronomy, biology, satellites, etc
>> ….
> 199x: Internet services provided to public
> 200x: Internet comes to mobile devices (revolution)
> Now: ?

Startups Using Big Data

Data is the new Oil

The Economist

The world's most valuable resource is no longer oil, but data

The data economy demands a new approach to antitrust rules

FORTUNE

BRAINSTORM TECH

Why Data Is The New Oil

Jonathan Vanian
Jul 11, 2016

Forbes

Tech

APR 2, 2012 @ 11:09 AM

Is Data The New Oil?
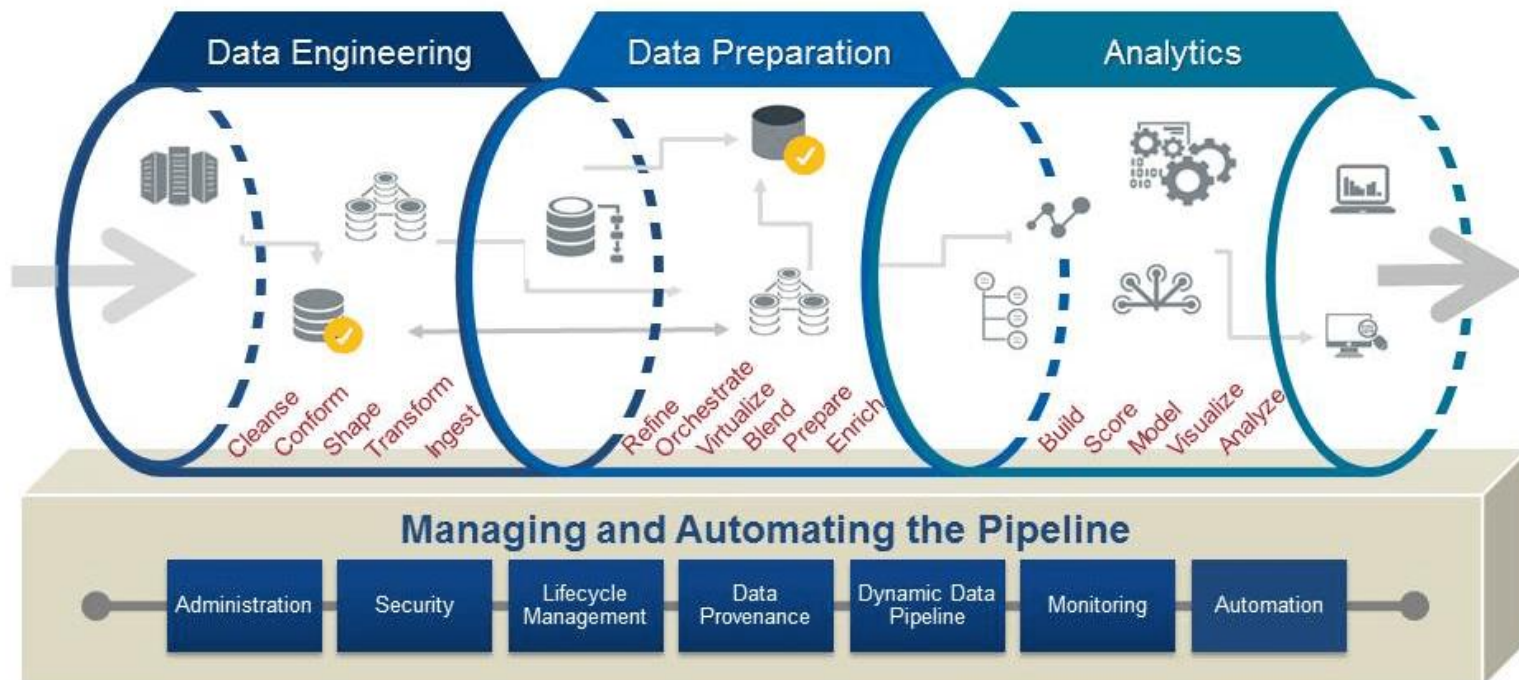
Oil Refinery vs. Data Refinery

"Data is just like crude. It's valuable, but if unrefined it cannot really be used."

Michael Palmer

Oil Refinery vs. Data Refinery

> **"Data is just like crude. It's valuable, but if unrefined it cannot really be used."**
>
> **Michael Palmer**

Stages and Activities

> Stages:

> > Identifying a problem

> > Proposing a solution

> > Realizing and validating the solution

> > Documenting the research (writing papers)

> Activities:

1. **Reading**: existing work, prior knowledge,…etc
2. **Coding**: your solution, related work, utilities,…etc
3. **Writing**: papers, summaries,…etc
4. **Presenting**: your problem, solution, surveys, etc