Reconfigurable Computing Through the Looking Glass

Chair: Marco D. Santambrogio, Politecnico di Milano

Diana Goehringer, Ruhr-University Bochum, Germany
Dirk van den Heuvel, TOPIC, Eindhoven, the Netherlands
Peter Hofstee, IBM, Austin, TX, USA
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A problem turned into an opportunity

The problem

How to handle complexity

A problem turned into an opportunity

The problem

How to handle complexity

The amazing solution

Reconfiguration

Unfortunately

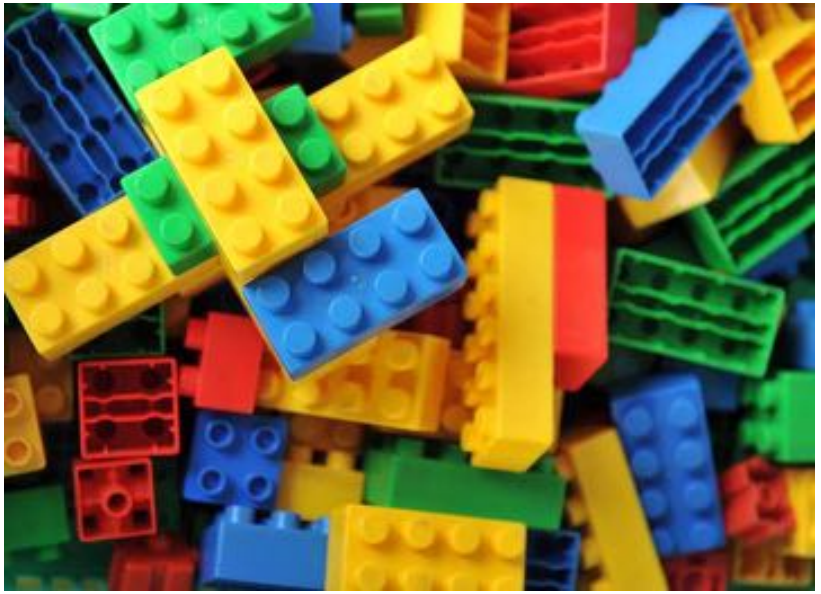
Unfortunately

What about:

- Power/Energy?
- Runtime Overhead?
- Design Complexity?
- etc…

But still…

… reconfiguration is everywhere



Reconfiguration in everyday life

Soccer
(Partial – Static)

Reconfiguration in everyday life

Soccer
(Partial – Static)

Football
(Complete – Static)

Reconfiguration in everyday life

Soccer
(Partial – Static)

Football
(Complete – Static)

Hockey
(Partial – Dynamic)

Systems has to be adaptive

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Structural modification

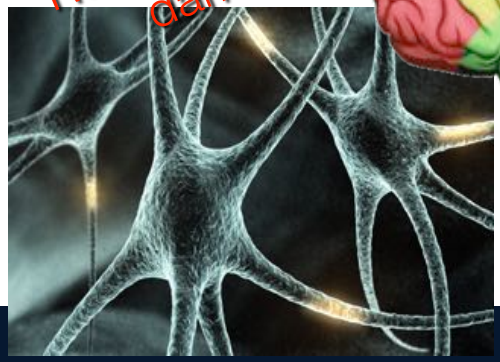
Recovery from a damage

Systems has to be adaptive

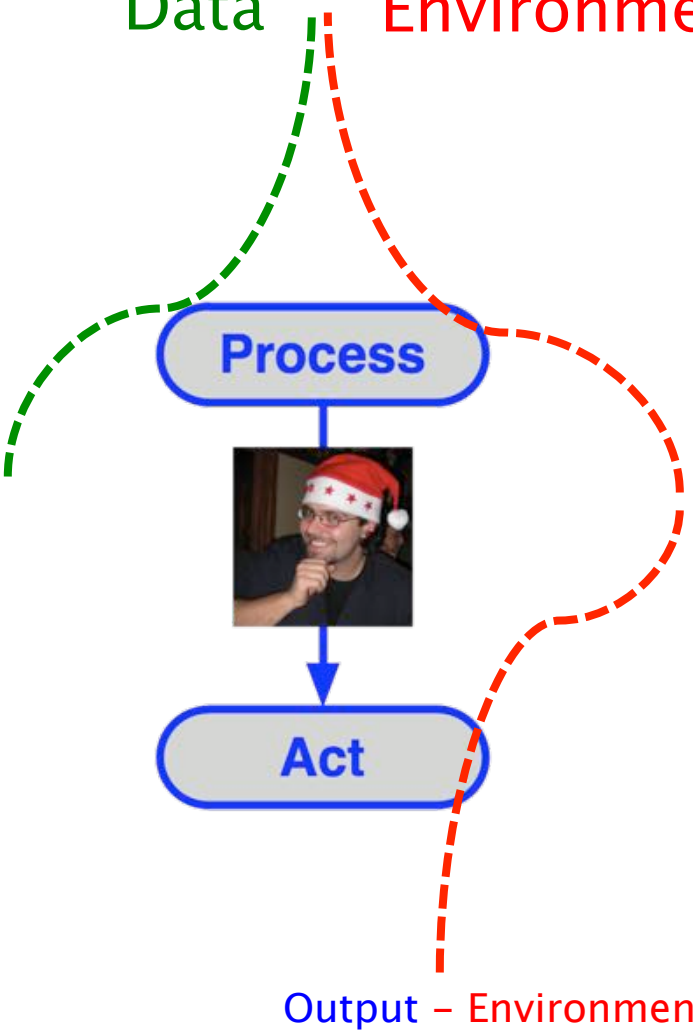
Structural modification

Behavioral evolution

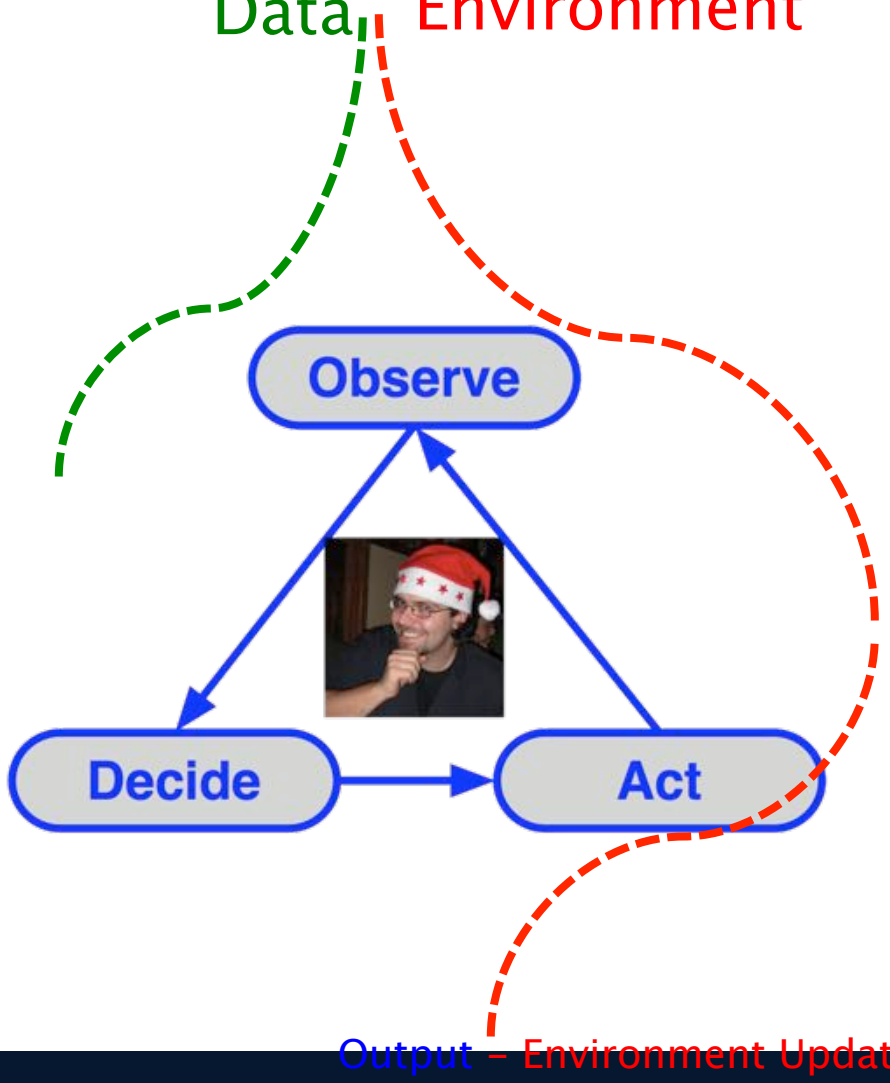
Recovery from a damage



Online Static Solution



Adaptive Solution



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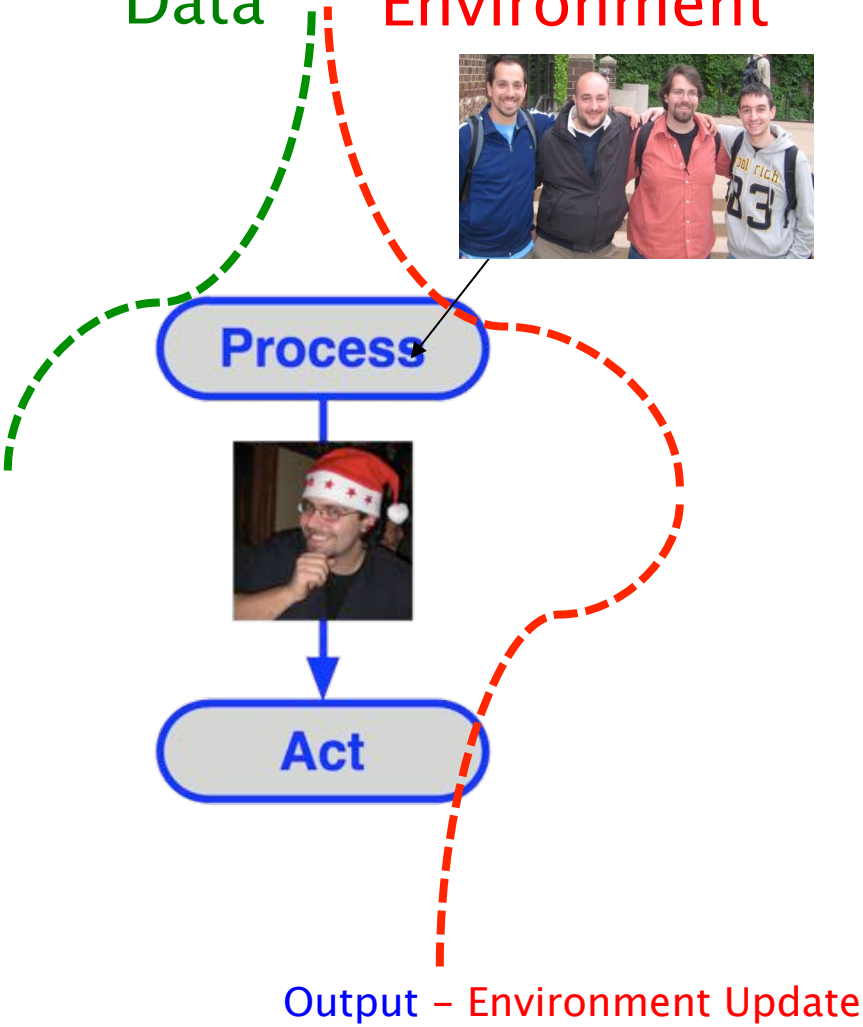
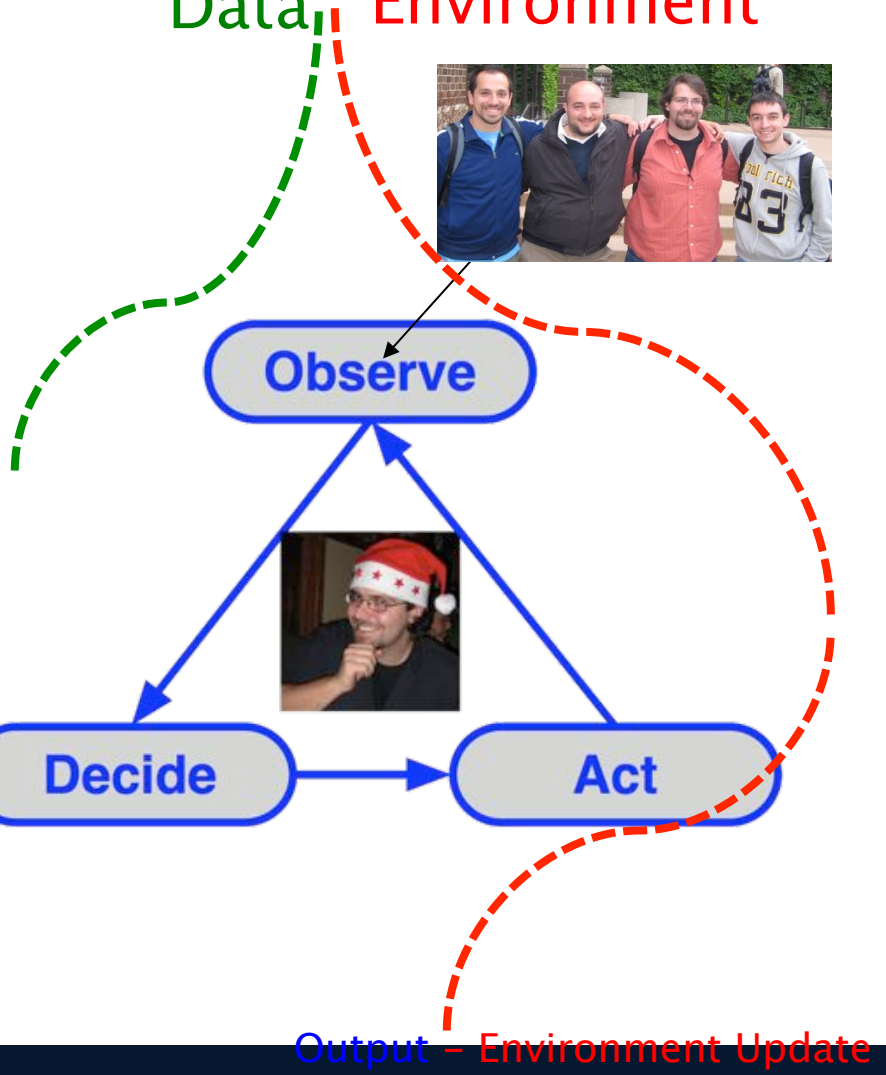


Adaptive Solution



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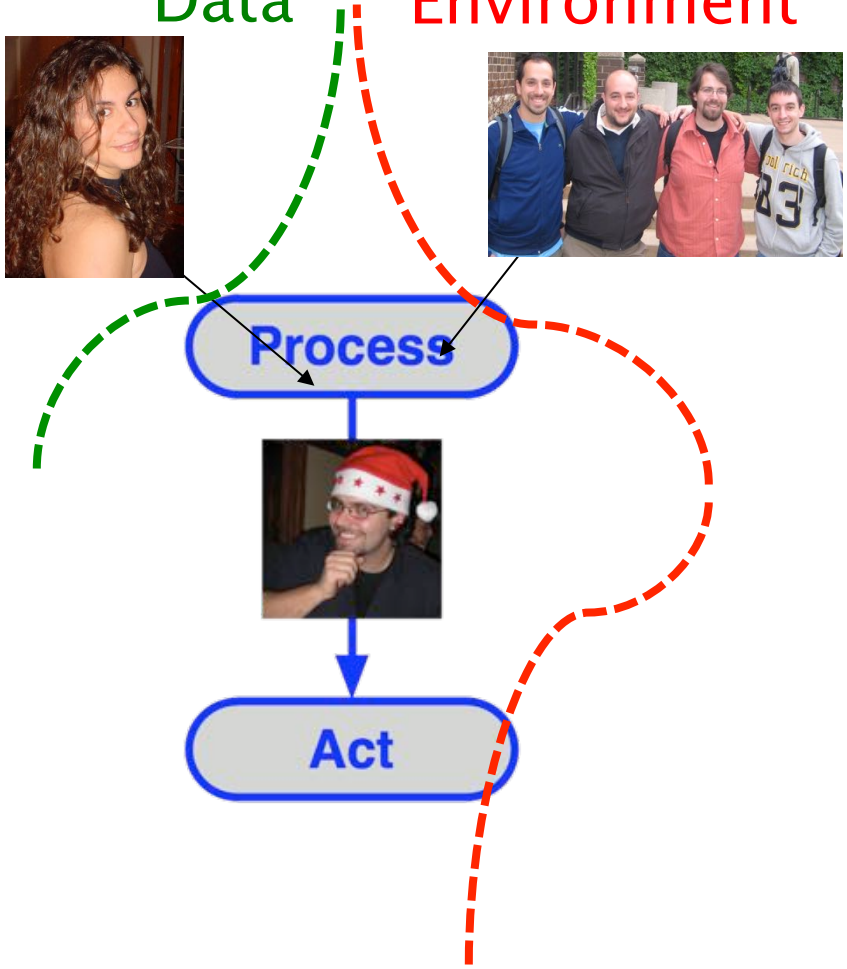
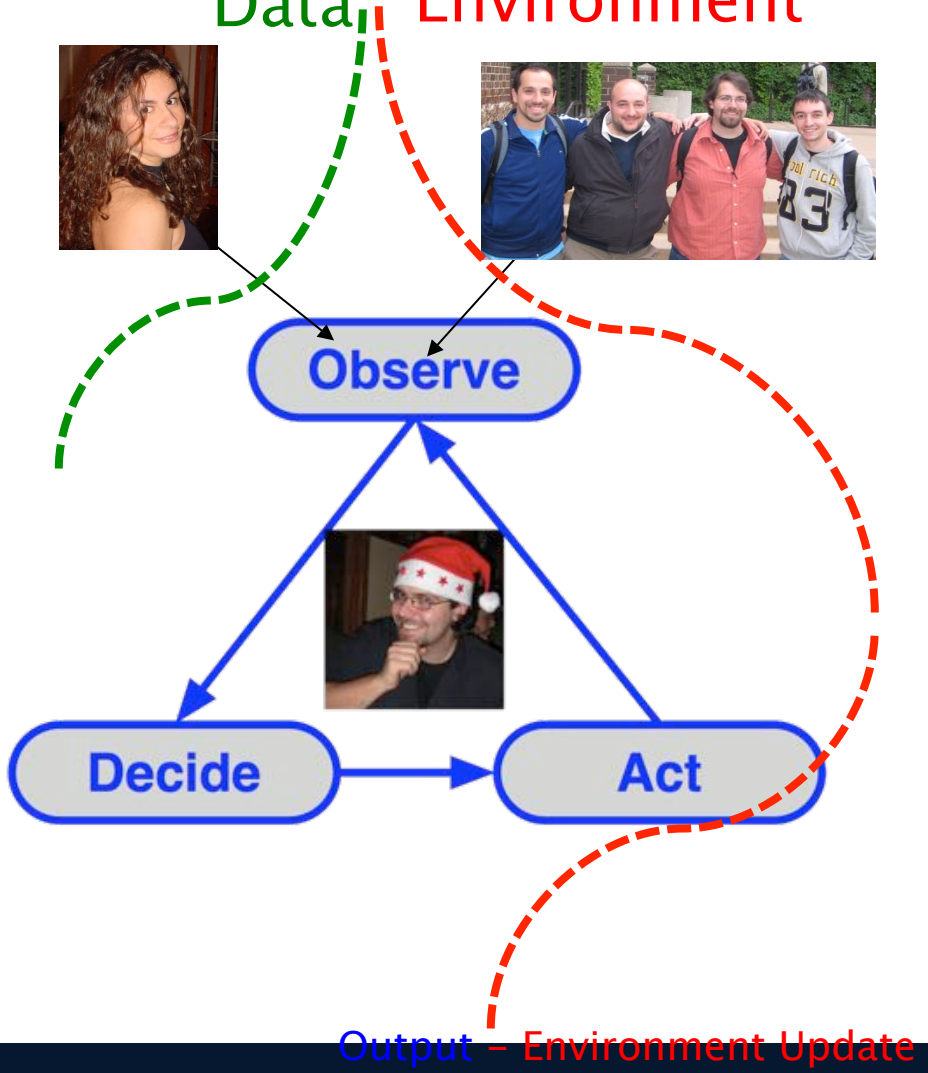


Adaptive Solution



Online Static Solution

Data

Environment

Process

Act

Output – Environment Update

Adaptive Solution

Data

Environment

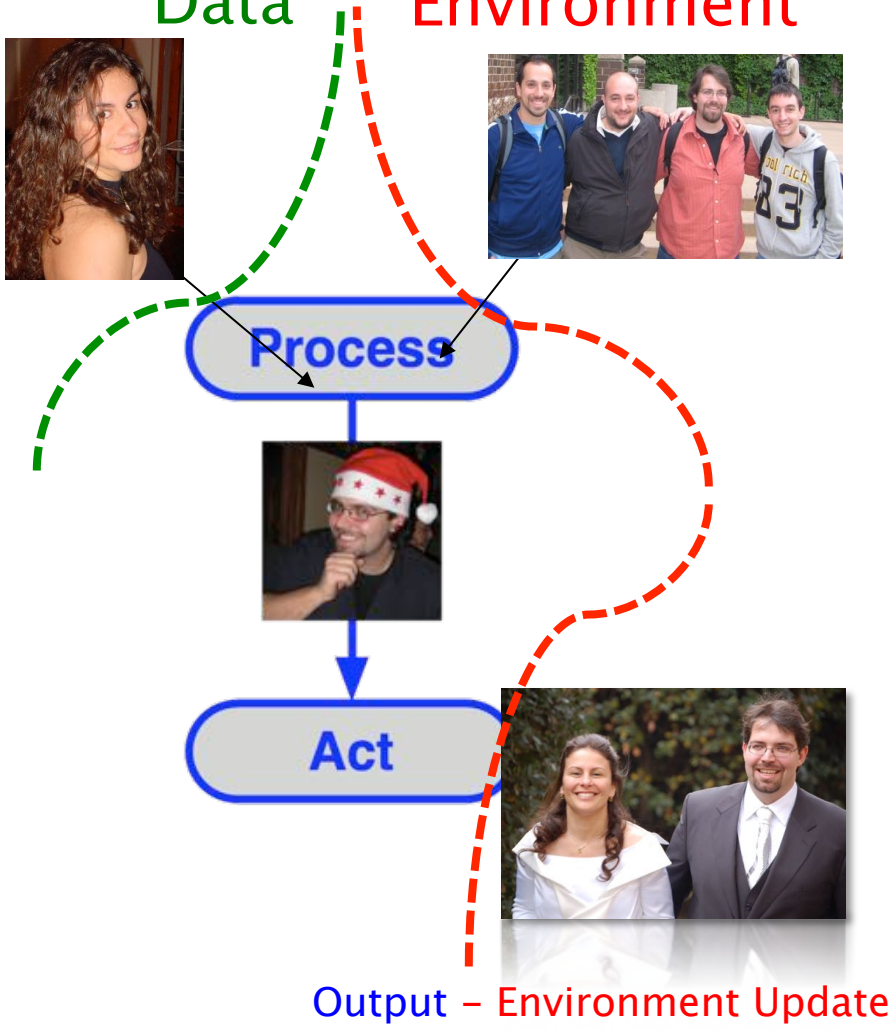
Observe

Decide

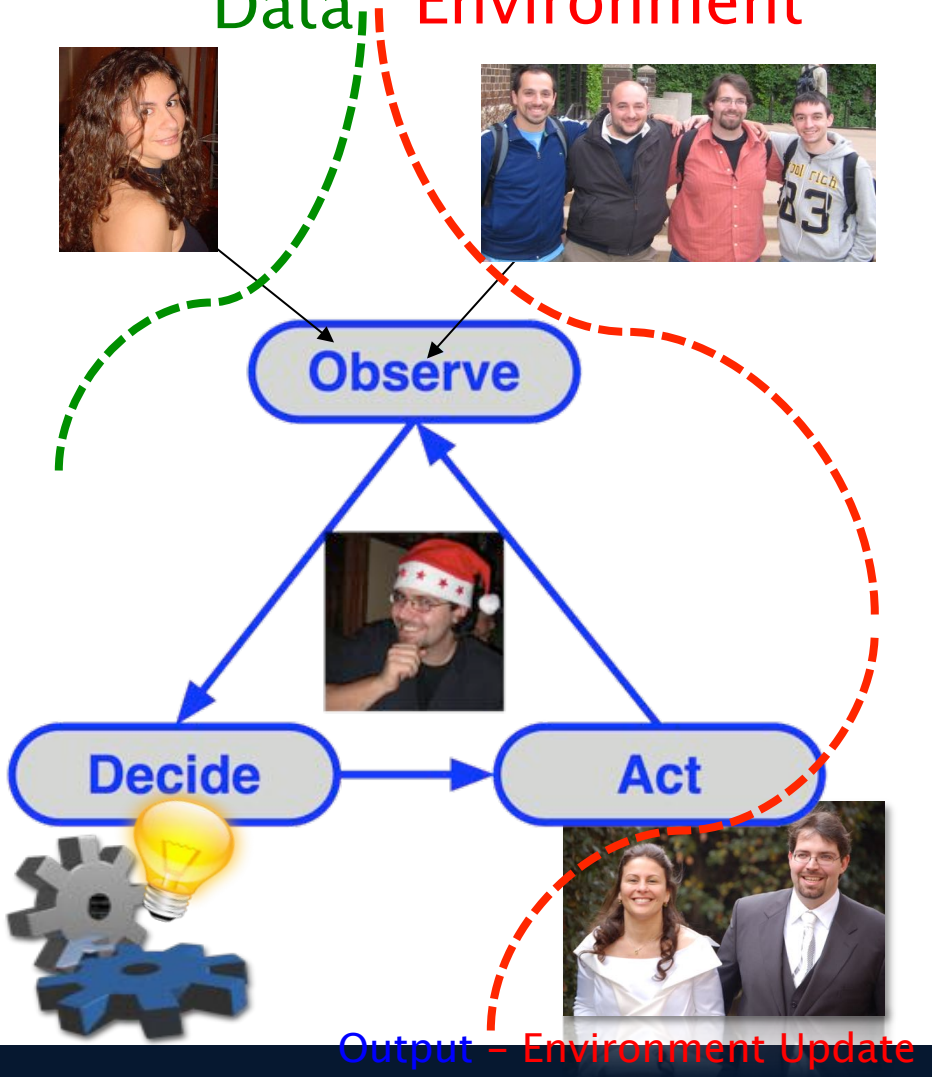
Act

Output – Environment Update

Online Static Solution



Adaptive Solution



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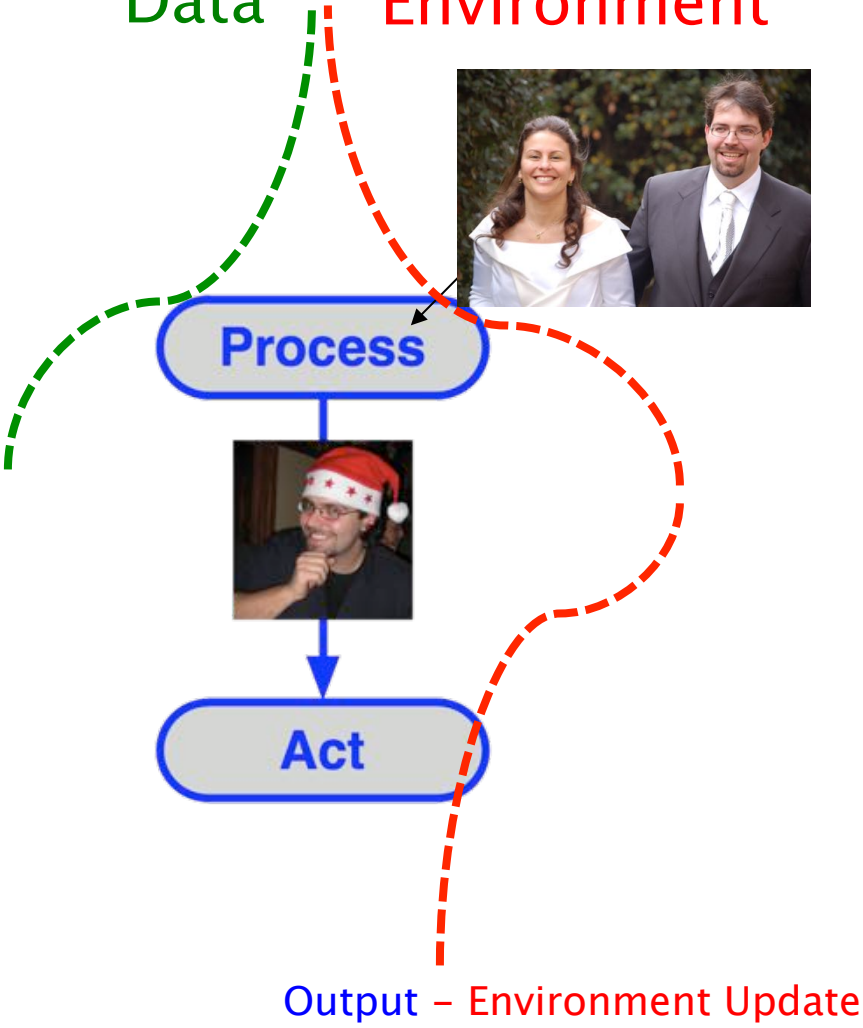

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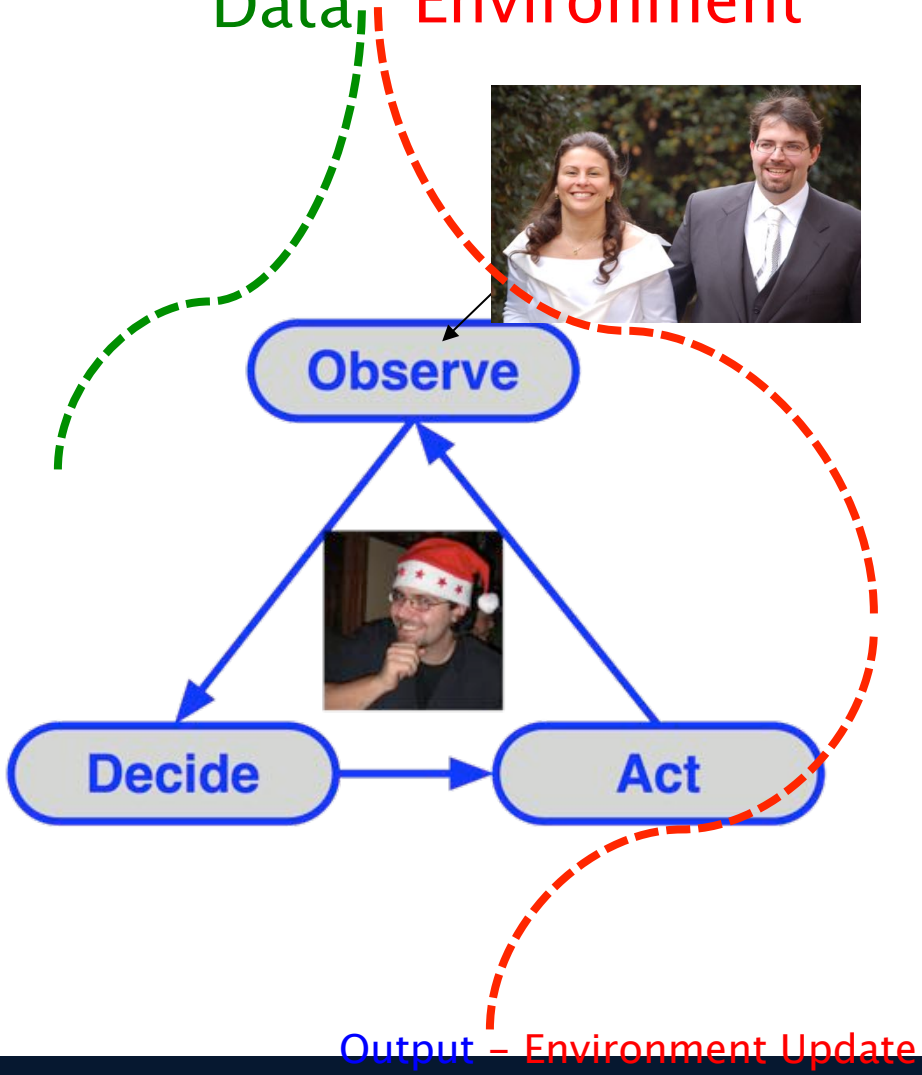
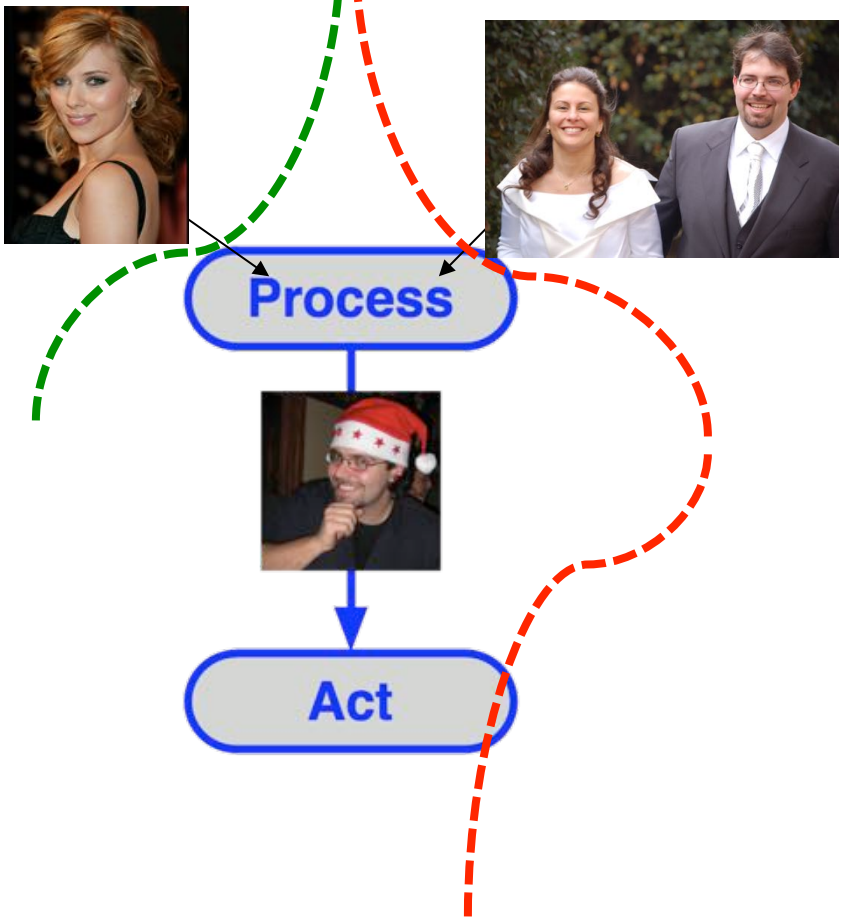


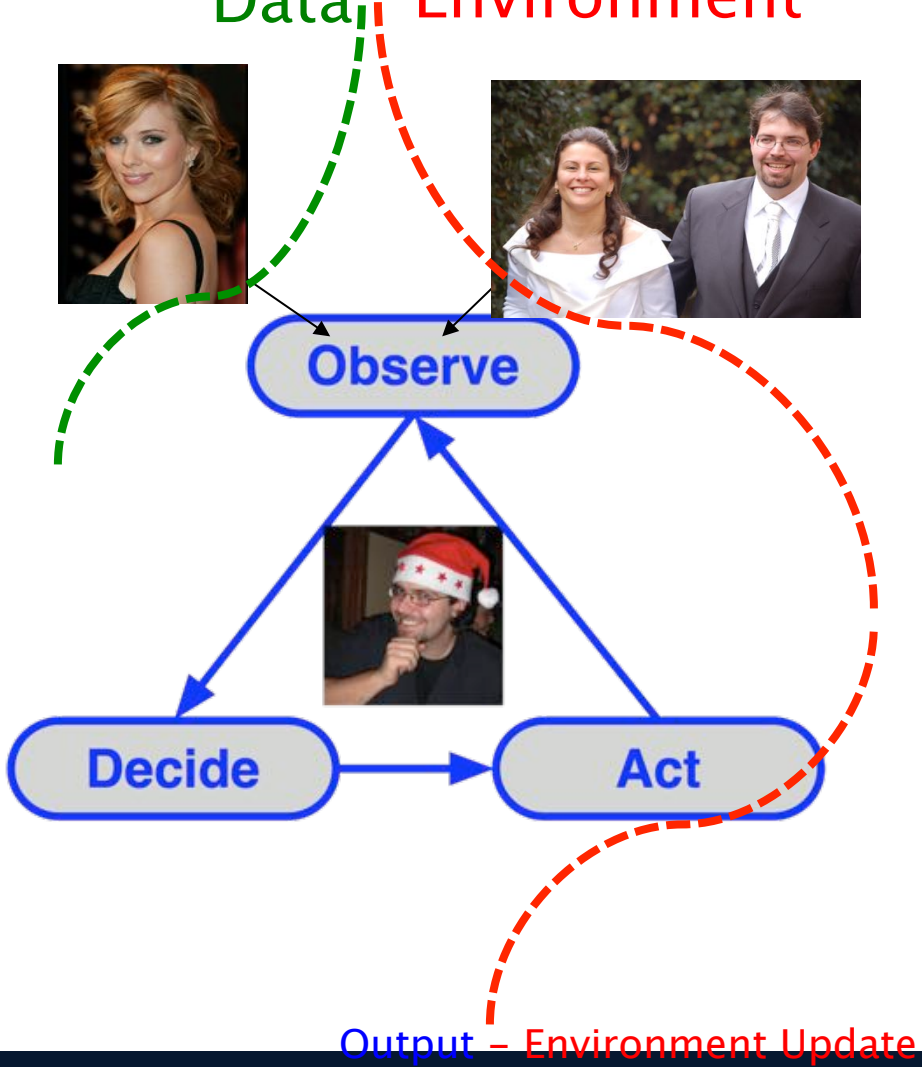
Online Static Solution

Data Environment



Adaptive Solution

Data Environment



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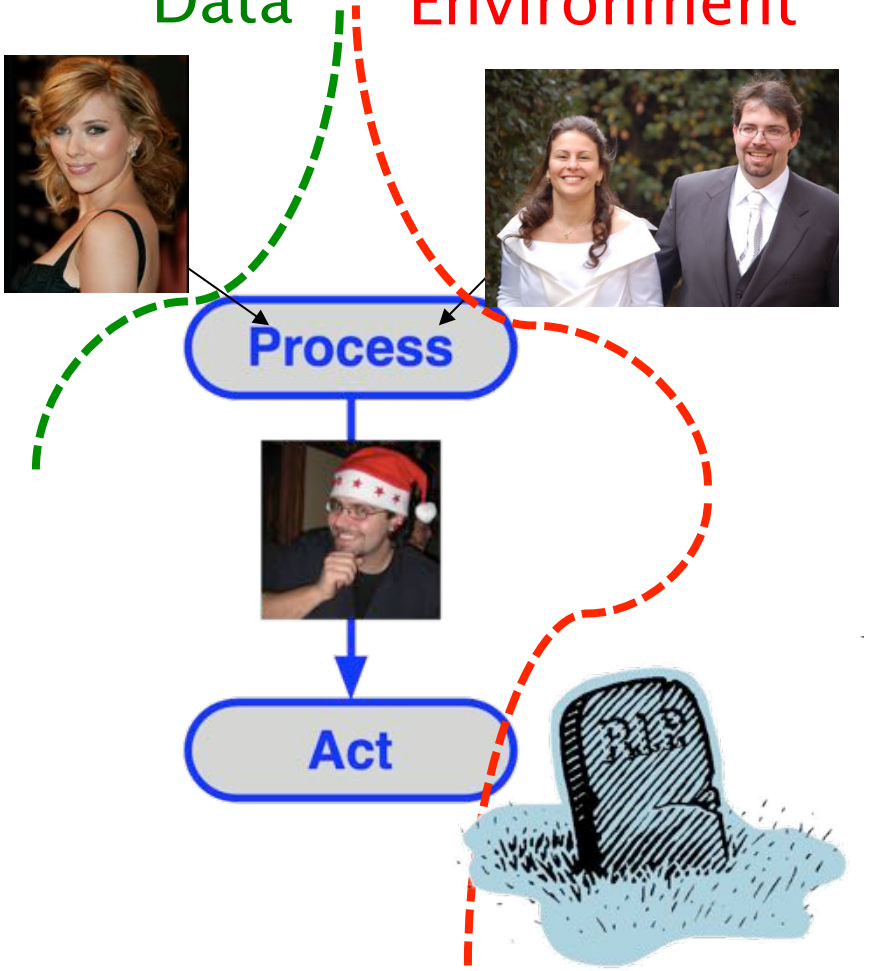

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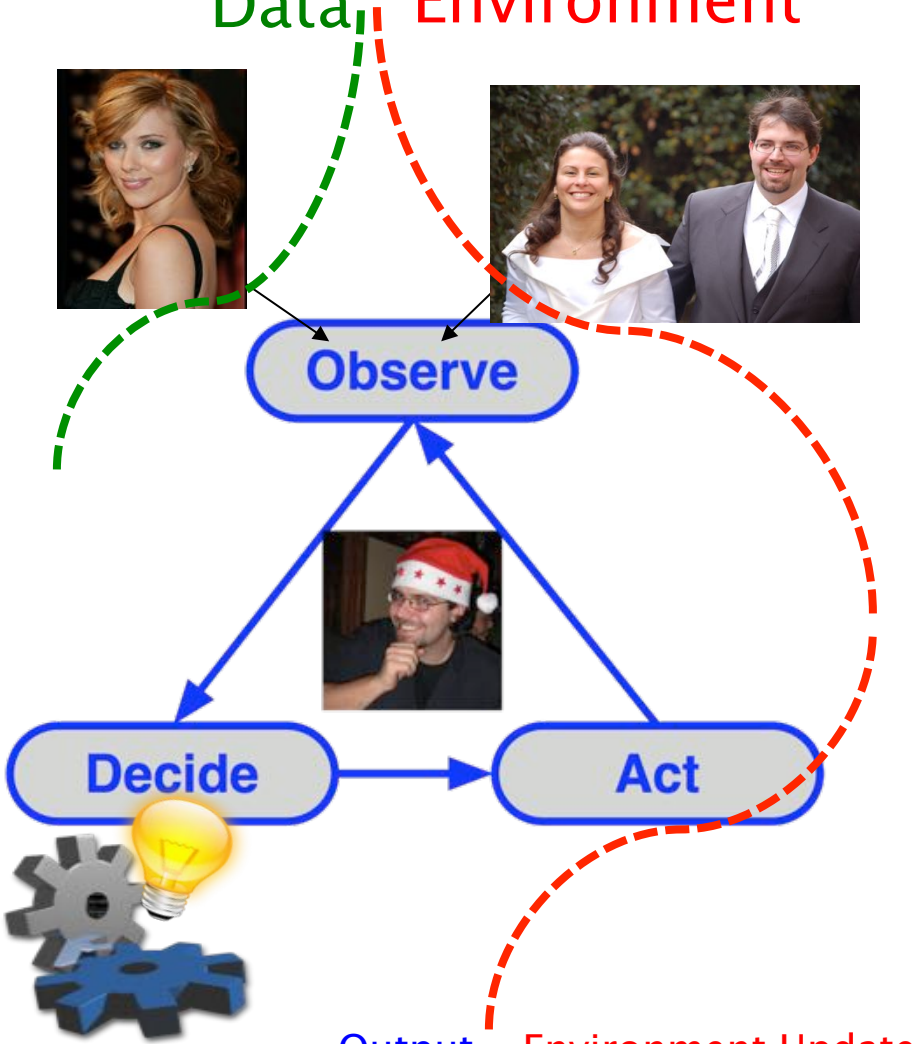

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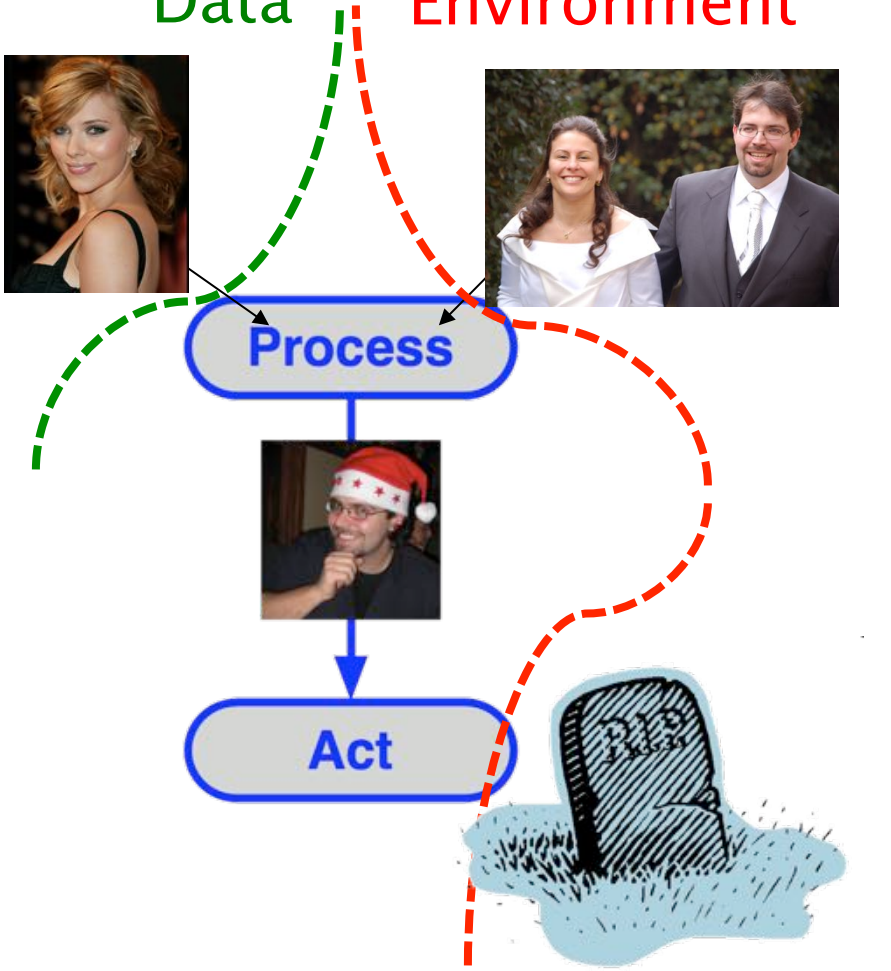

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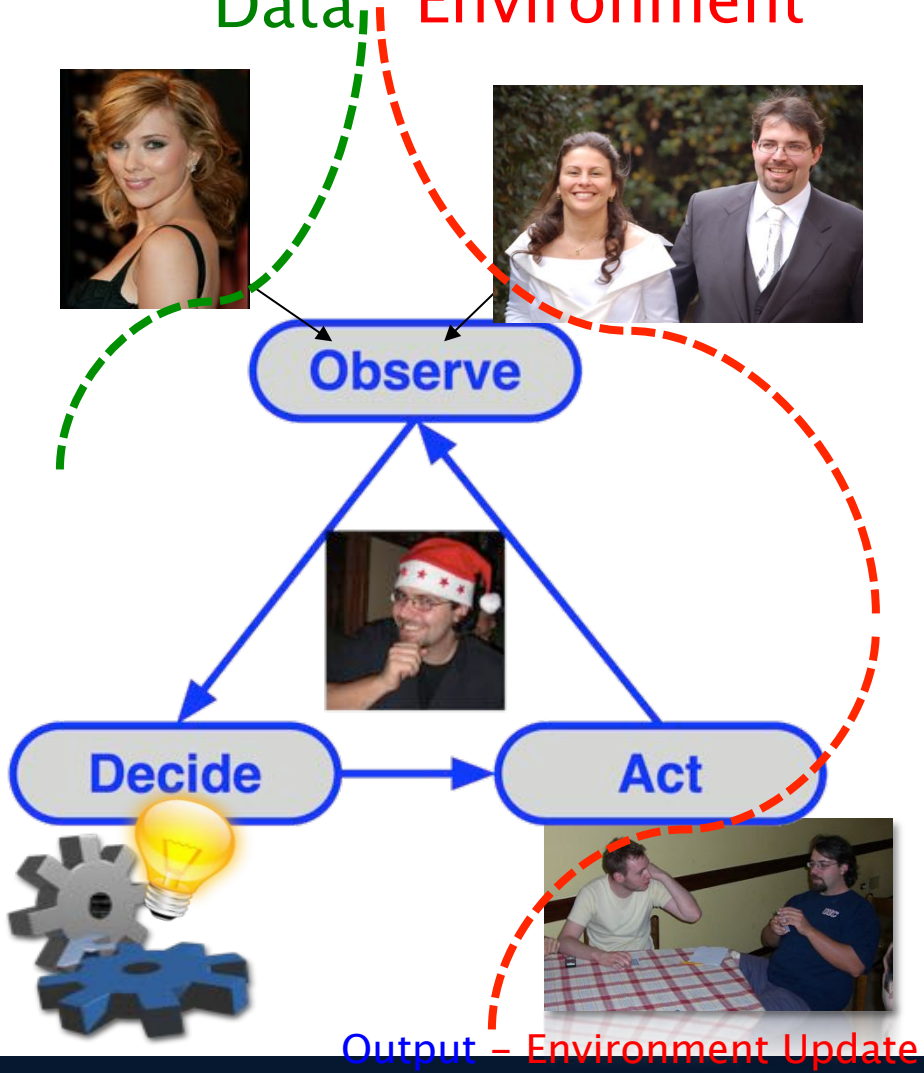
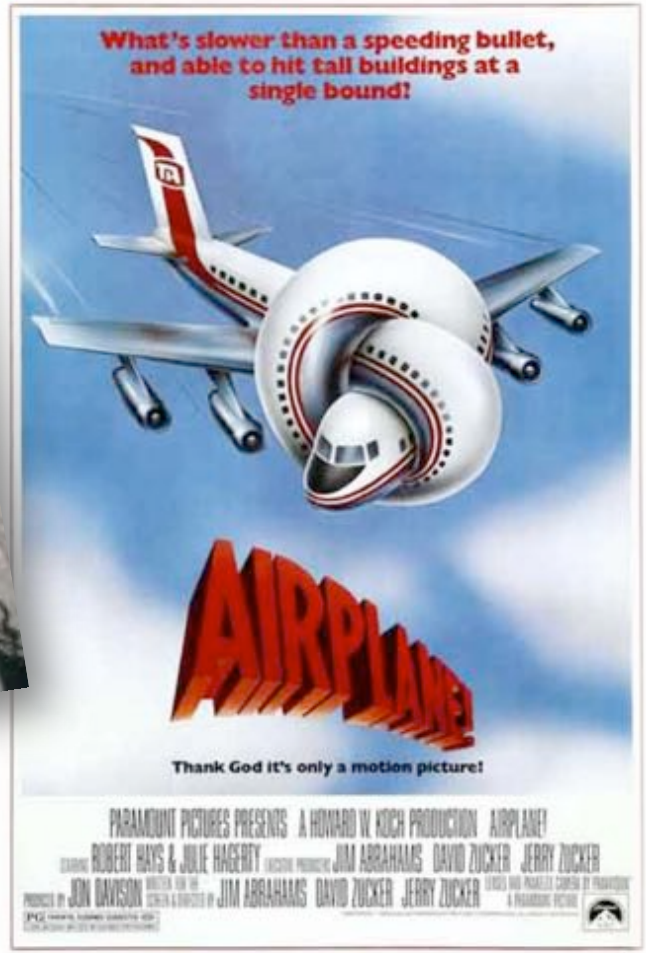


Are you going to take a "self-aware" airplane?



Summing up…

- Self-awareness, buzzword or not?
- What about the overhead (monitoring, reconfiguration, etc.)
- How to handle design complexity
- On how to express goals
- Do we need new programming models?
- Are you really willing to take a "self-aware" airplane?
- To be Homogeneous or not, that's the question
- Best effort Vs meeting a specific requirements

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RAW 2016 Social Event

- 1st RAW Social event
  - Where: Kingston Mines
  - When: Monday May the 22nd @9pm

Sponsored by TOPIC EMBEDDED SYSTEMS

- Free food and drink untill 12am
- Entrance with tickets
  - Look for Marco or Diana for the tickets
  - all the seats are sold out

RAW 2016 Social Event

- Kingston Mines
  - @ 2548 North Halsted Street, Chicago

- How to get there
  - BUS 8
    - Stop: Halsted & Wrightwood
    - Stop: Halsted & Altgeld
  - Red Line (L)
    - Stop: Fullerton

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RAW 2016 Social Event