

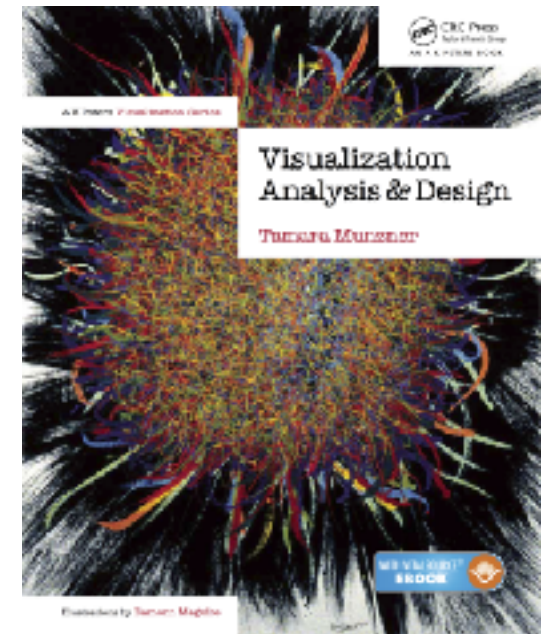
Visualization Analysis & Design

Analysis: Nested Model (Ch 4)

Tamara Munzner

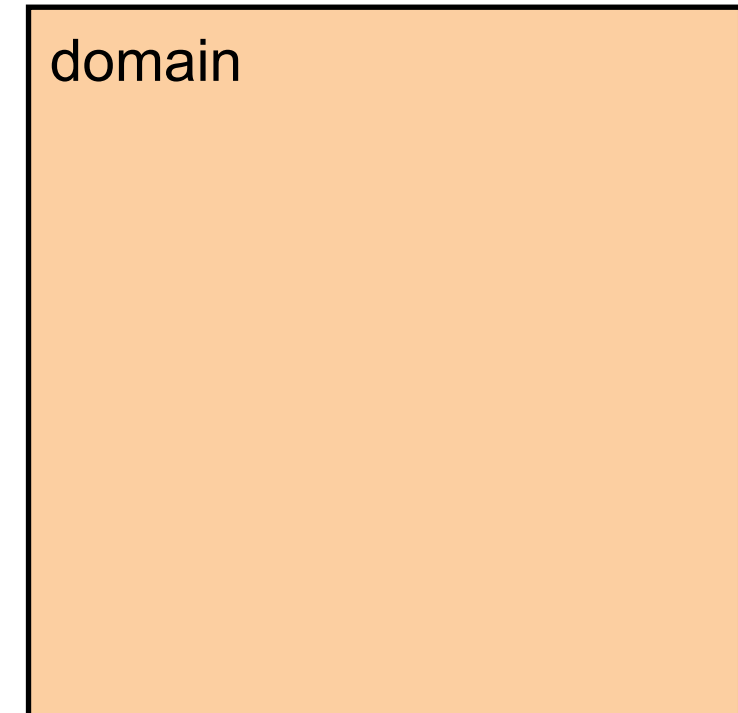
Department of Computer Science
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[@tamaramunzner](#)



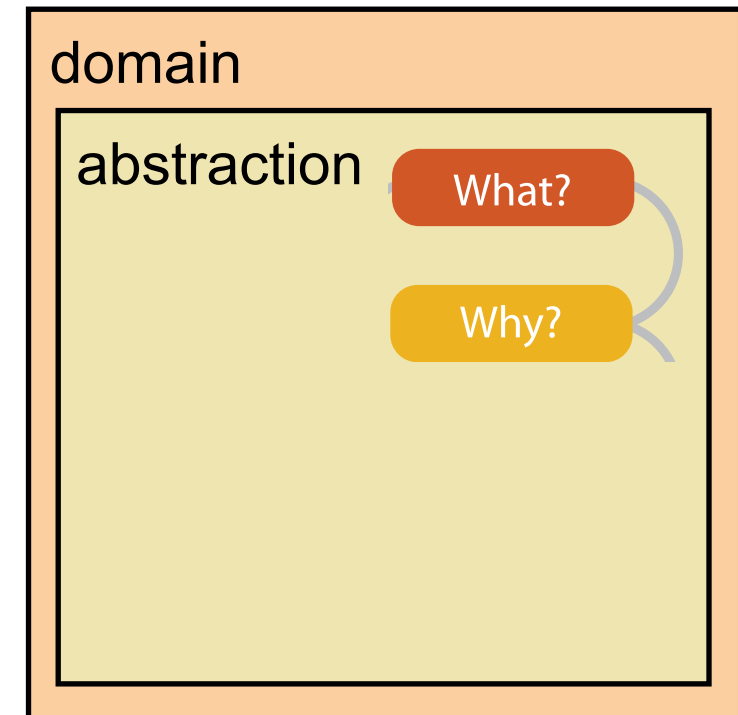
Analysis framework: Four levels, three questions

- *domain situation*
 - who are the target users?



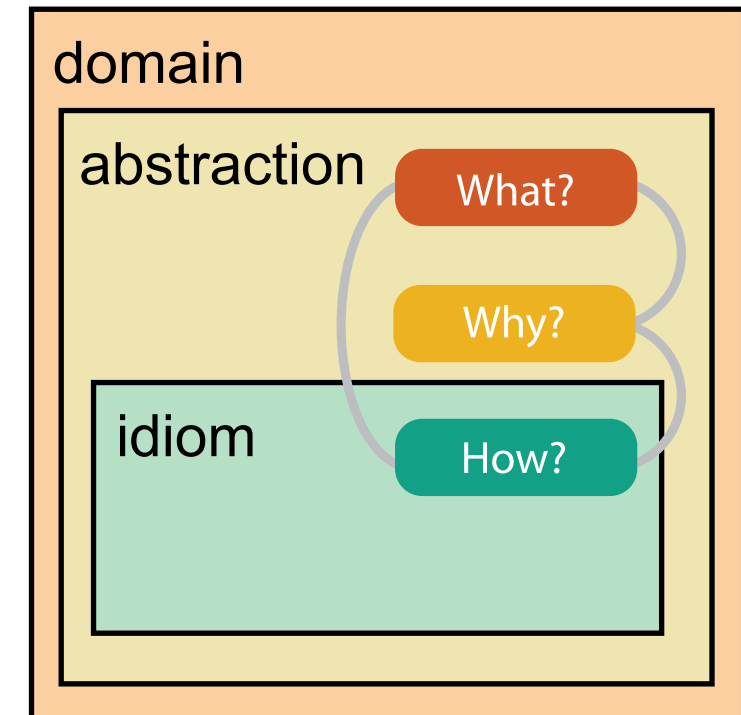
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 - translate from specifics of domain to vocabulary of vis
 - **what** is shown? **data** abstraction
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- *idiom*
 - **how** is it shown?
 - **visual encoding** idiom: how to draw
 - **interaction** idiom: how to manipulate

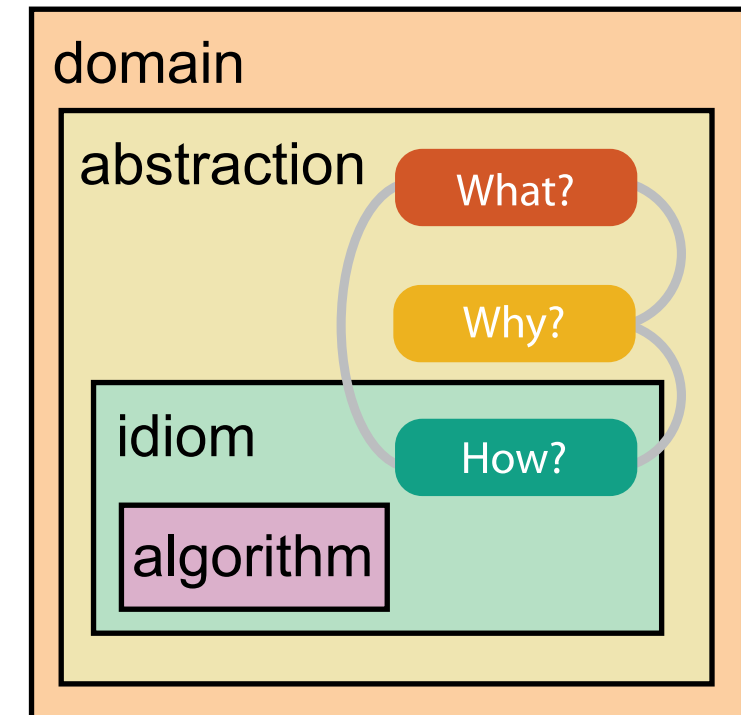


[A Multi-Level Typology of Abstract Visualization Tasks. Brehmer and Munzner. IEEE TVCG 19(12):2376-2385, 2013 (Proc. InfoVis 2013).]

[A Nested Model of Visualization Design and Validation. Munzner. IEEE TVCG 15(6):921-928, 2009 (Proc. InfoVis 2009).]

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- *algorithm*
 - efficient computation

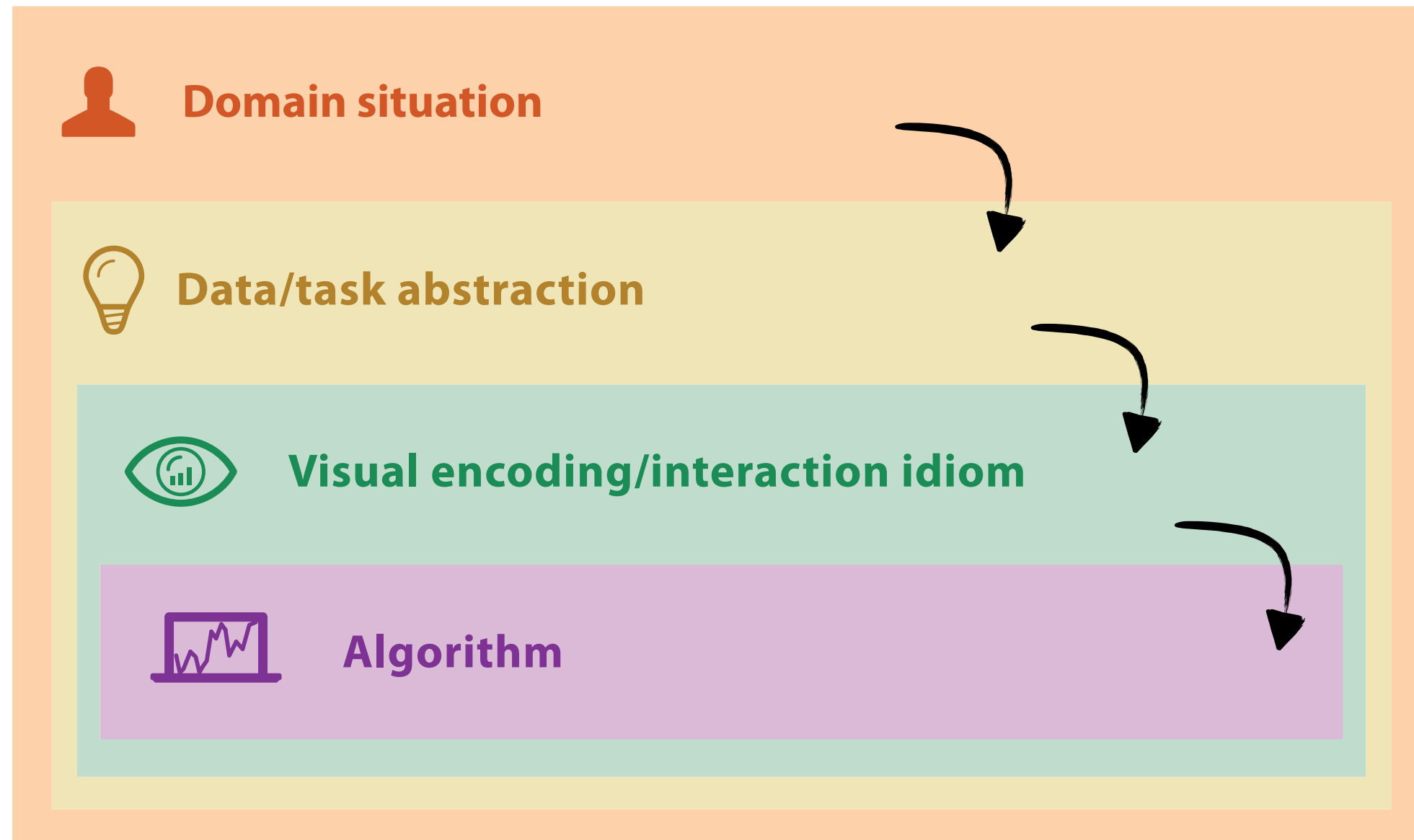


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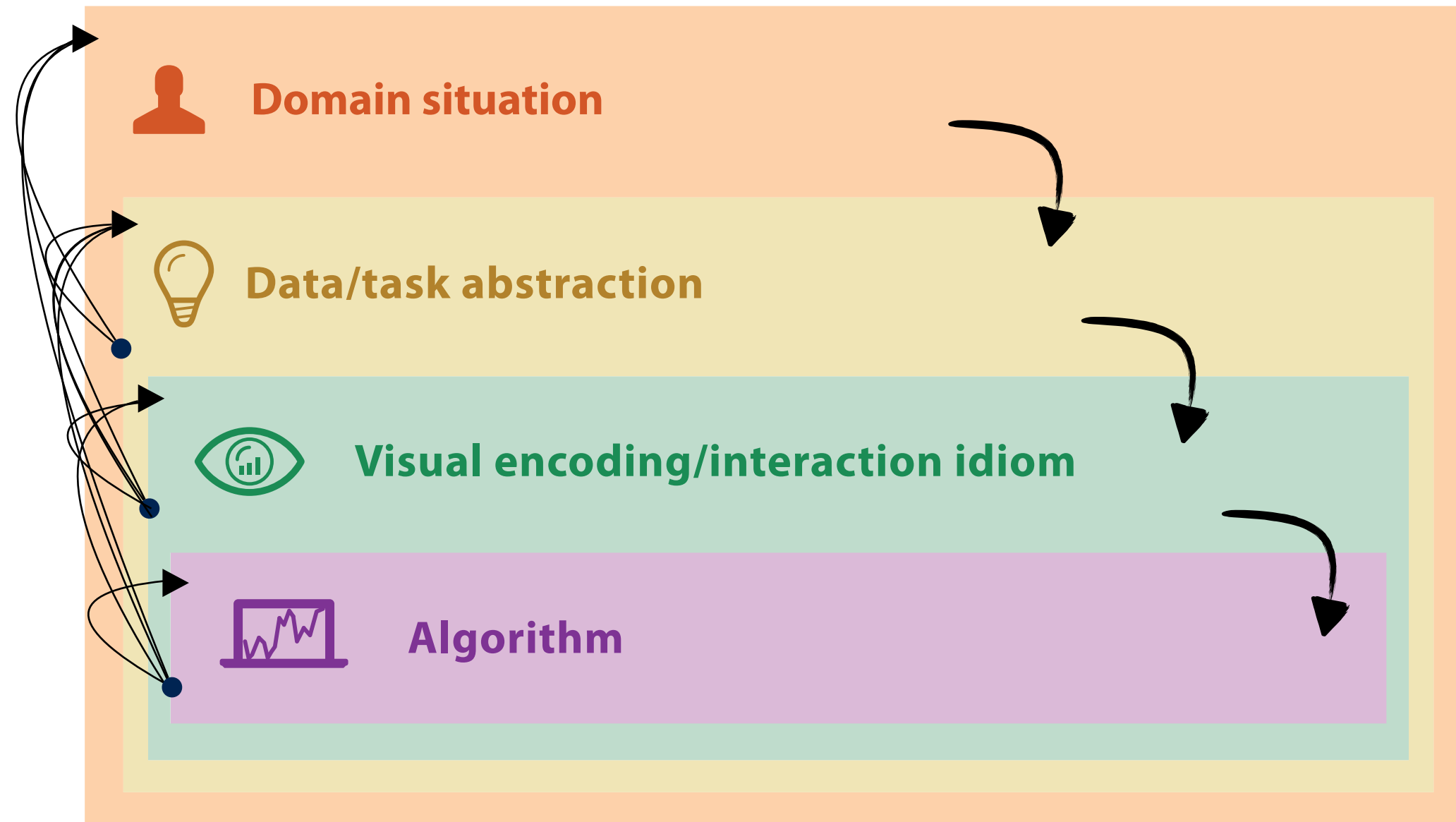
Nested model

- downstream: cascading effects



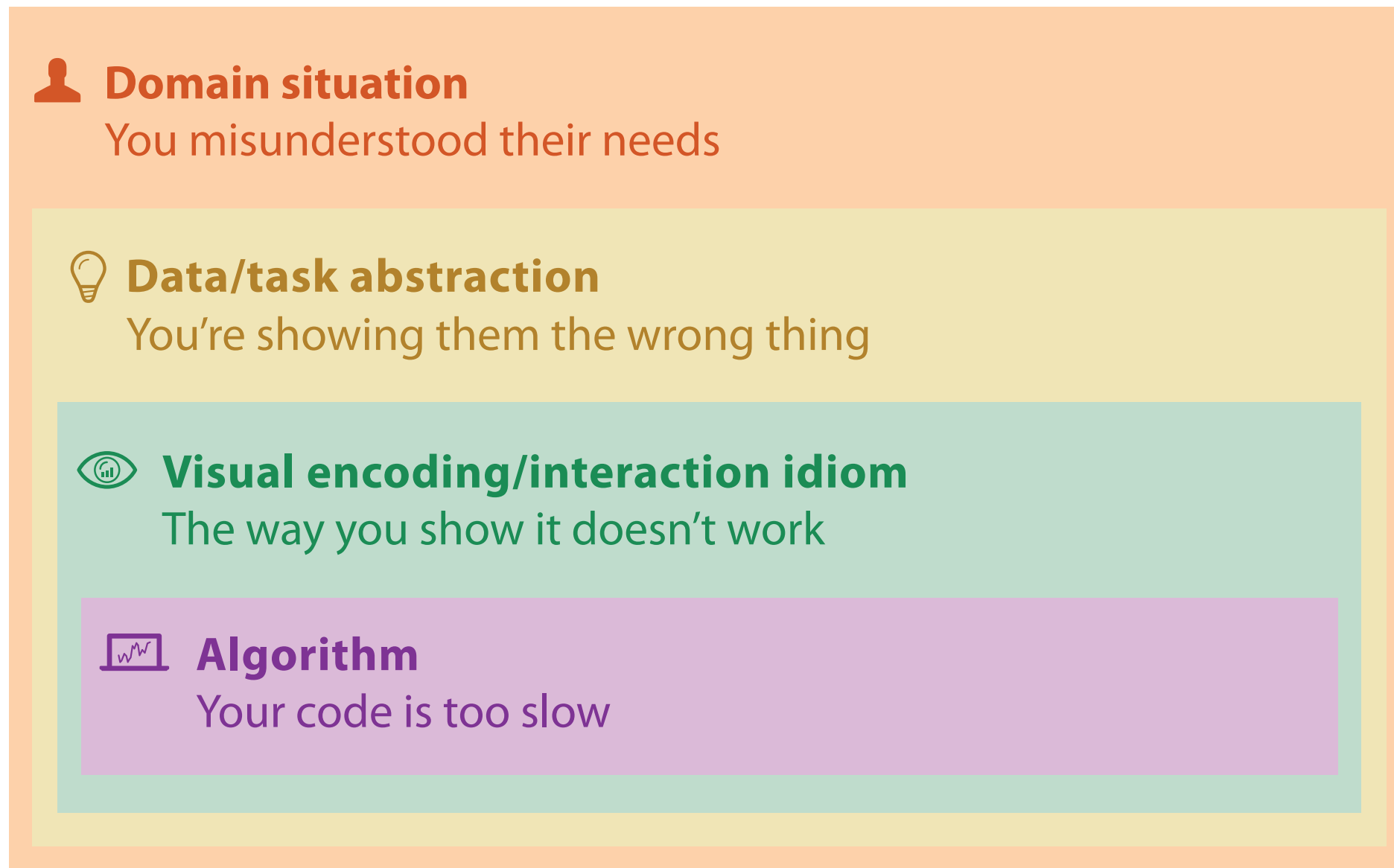
Nested model

- downstream: cascading effects
- upstream: iterative refinement



Why is validation difficult?

- different ways to get it wrong at each level



Why is validation difficult?

- solution: use methods from different fields at each level



Algorithm

Measure system time/memory

Analyze computational complexity

Why is validation difficult?

- solution: use methods from different fields at each level

computer
science



Algorithm

Measure system time/memory

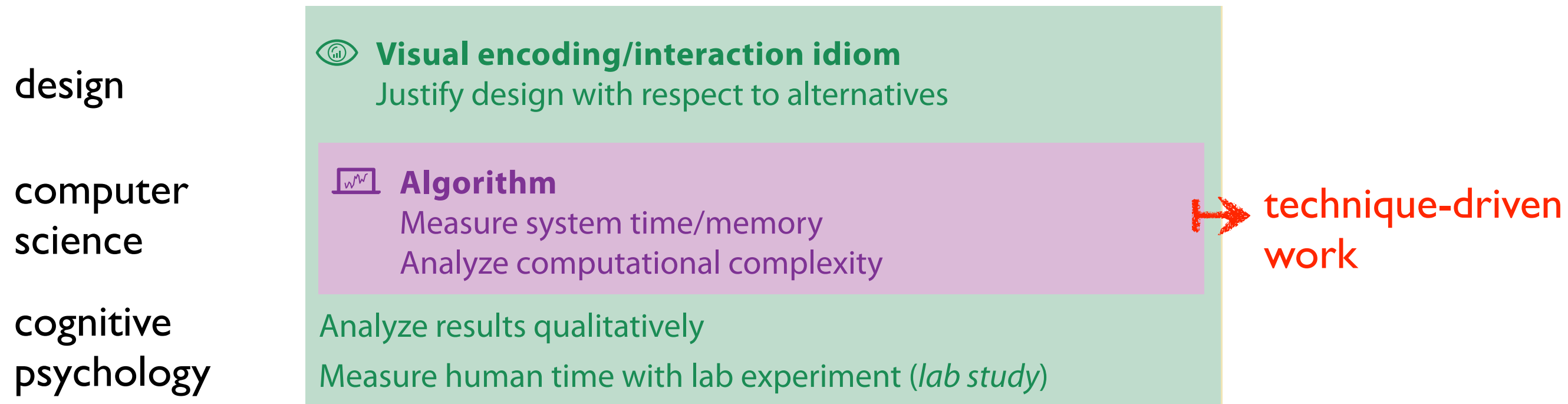
Analyze computational complexity



technique-driven
work

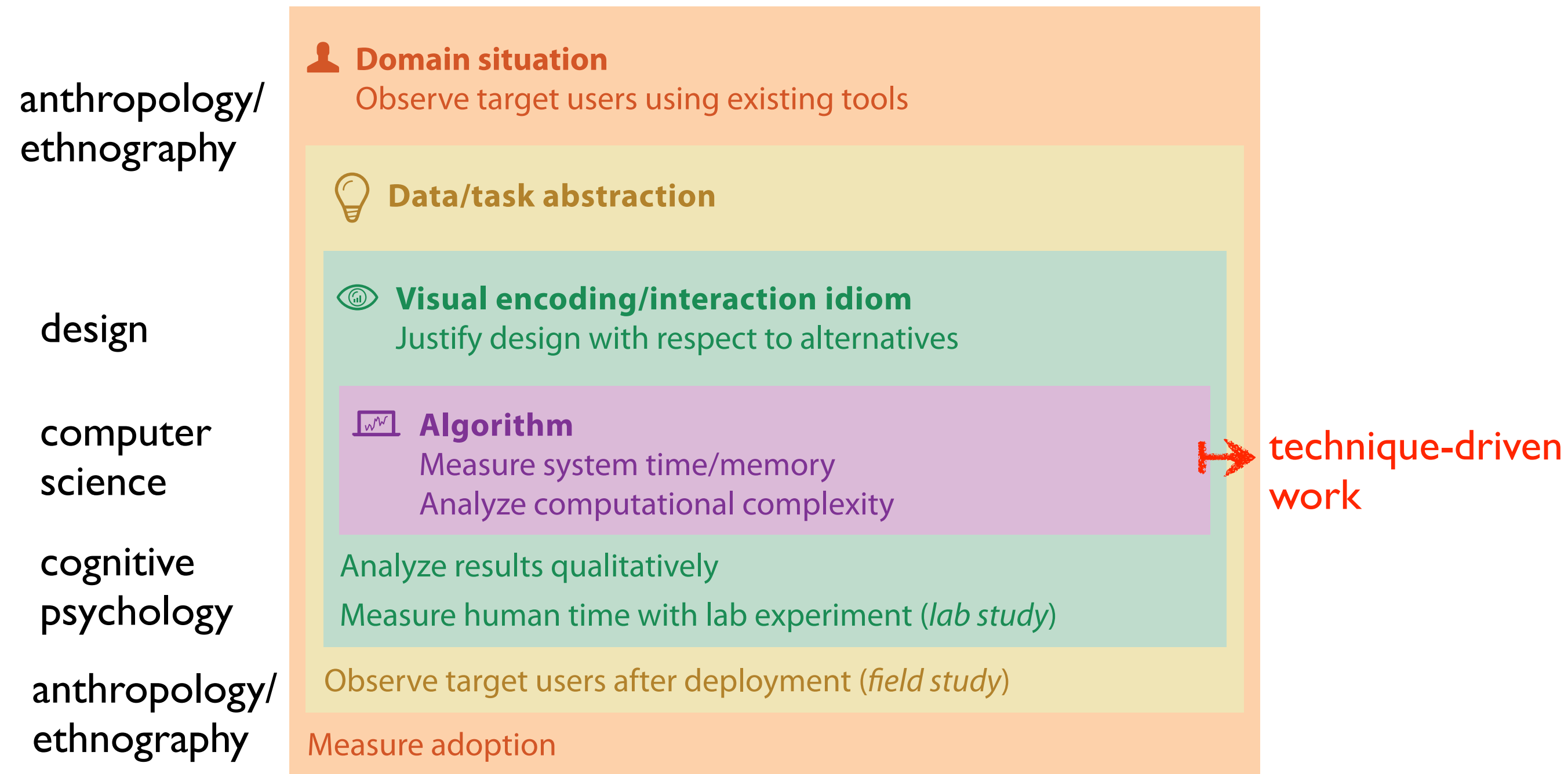
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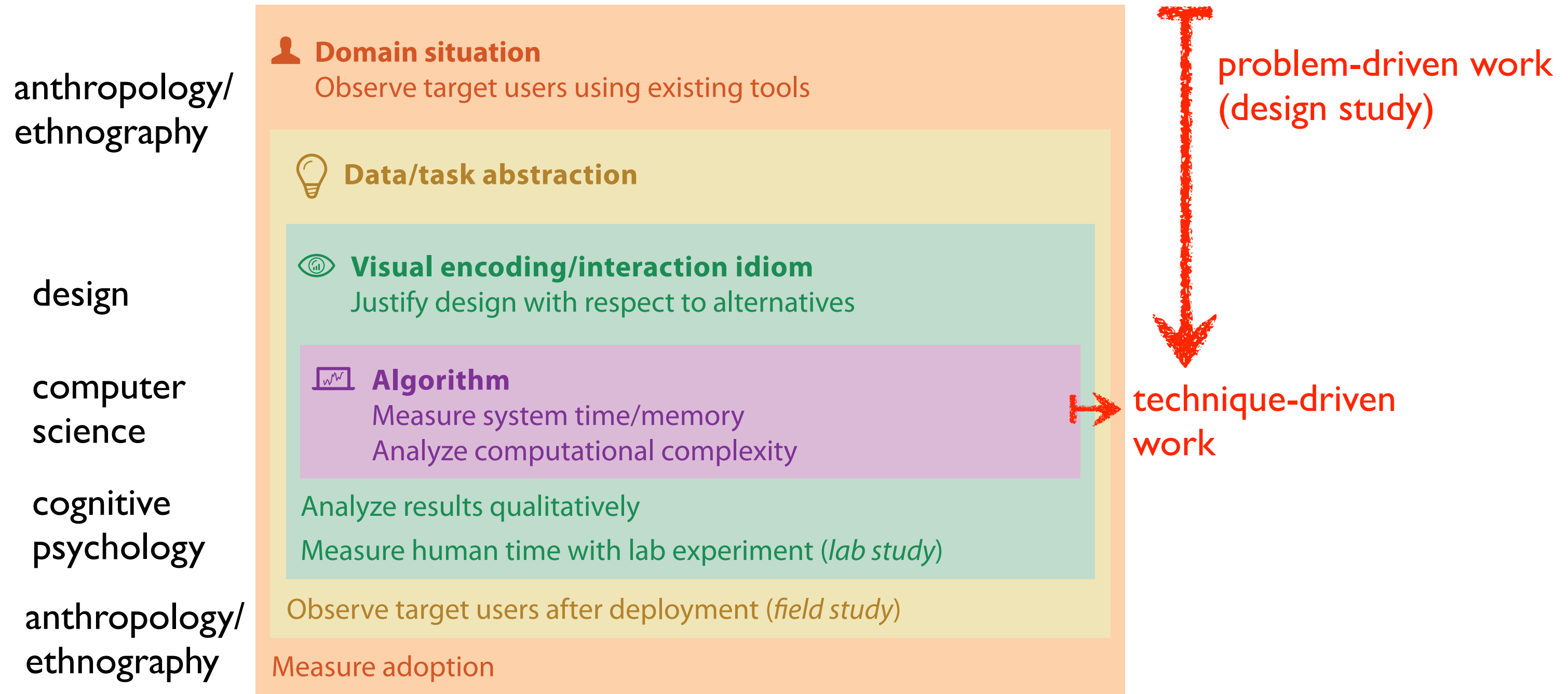
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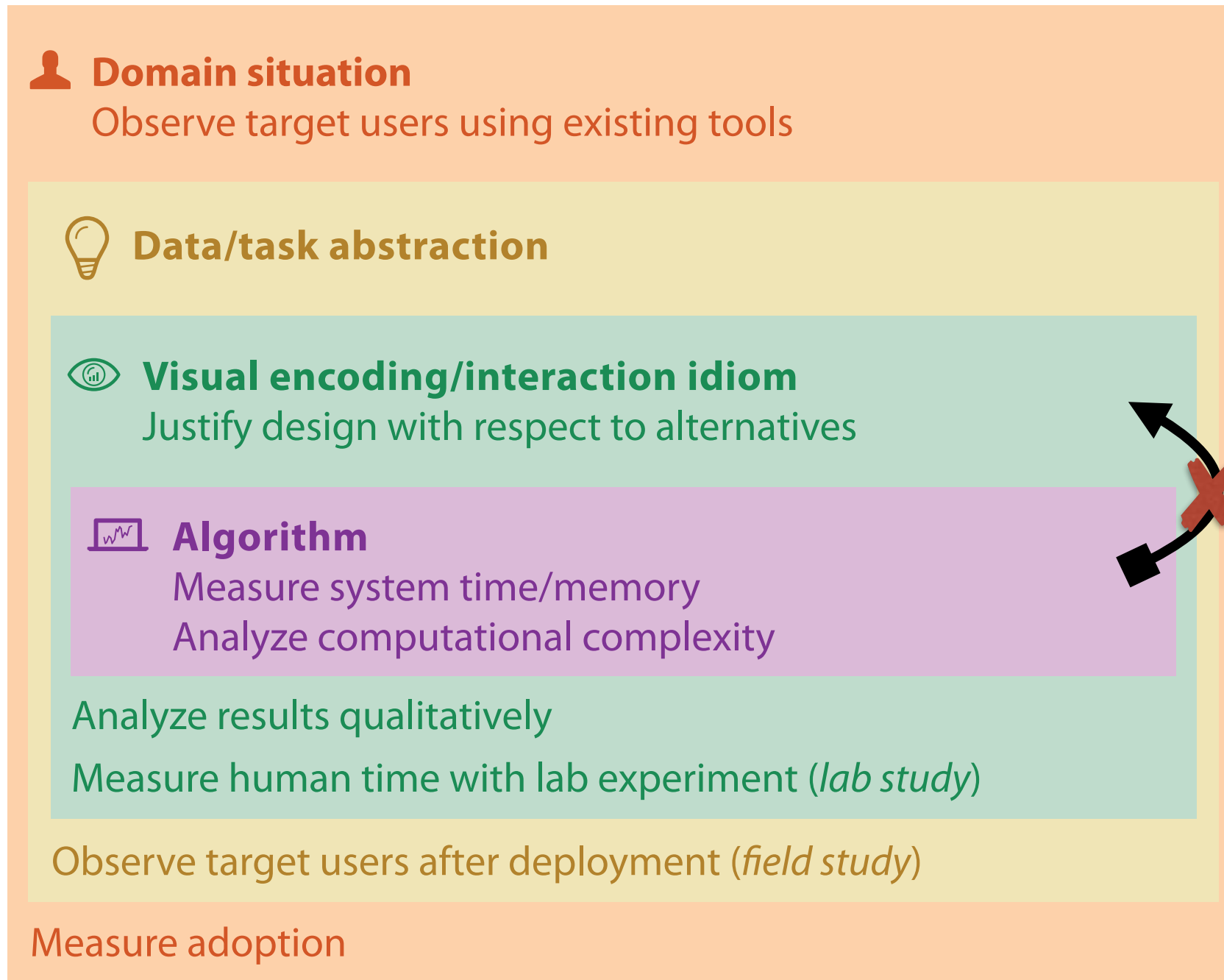


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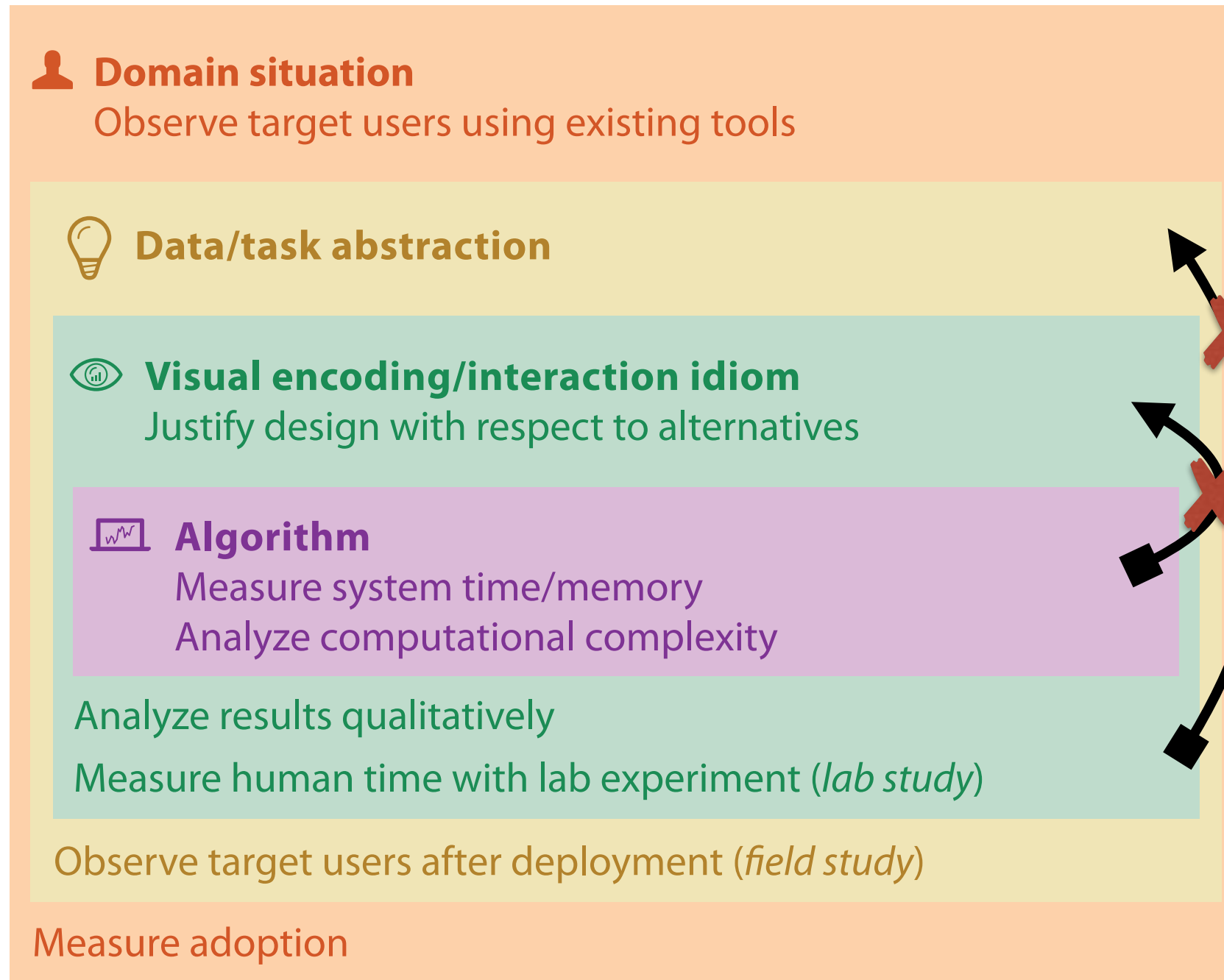


Avoid mismatches



computational benchmarks
do not confirm idiom design

Avoid mismatches



lab studies do not confirm task abstraction

computational benchmarks do not confirm idiom design

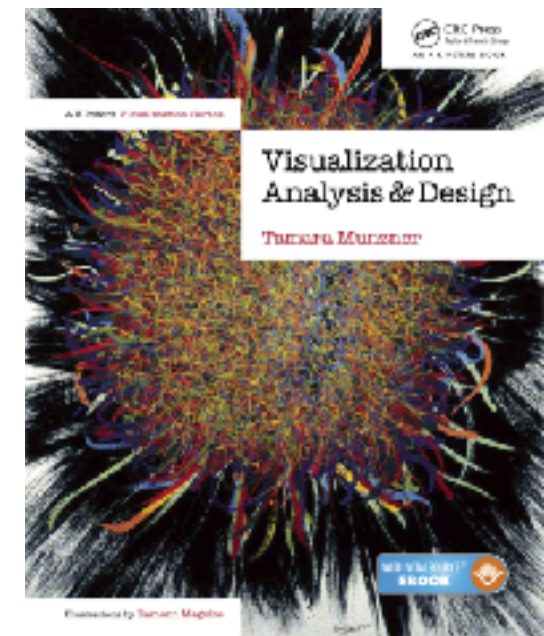
Visualization Analysis & Design

Analysis: Nested Model (Ch 4) II

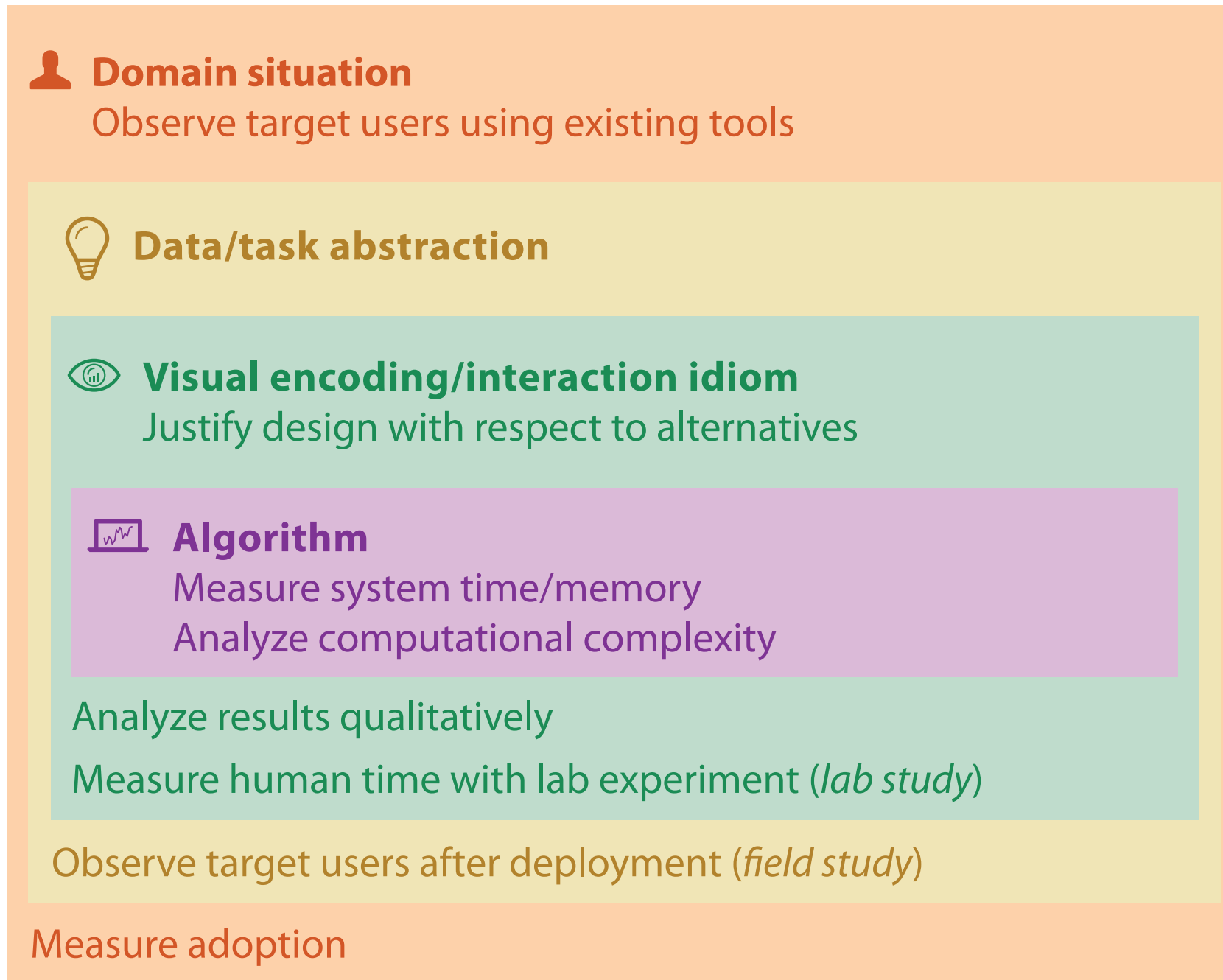
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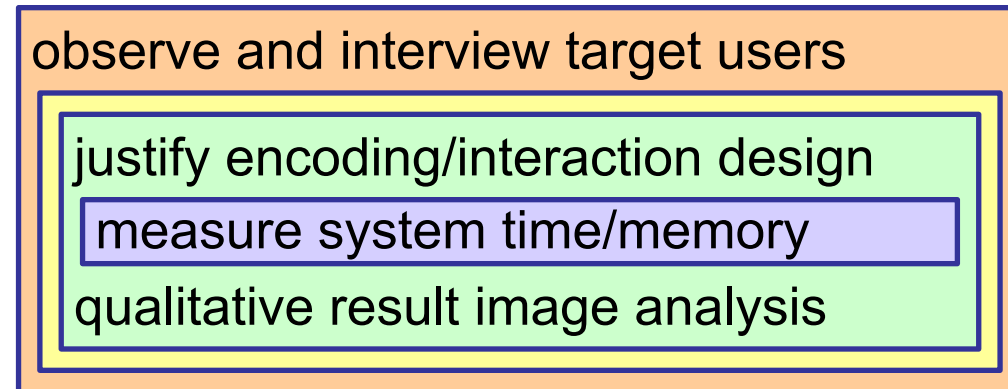


Analysis examples: Single paper includes only subset of methods



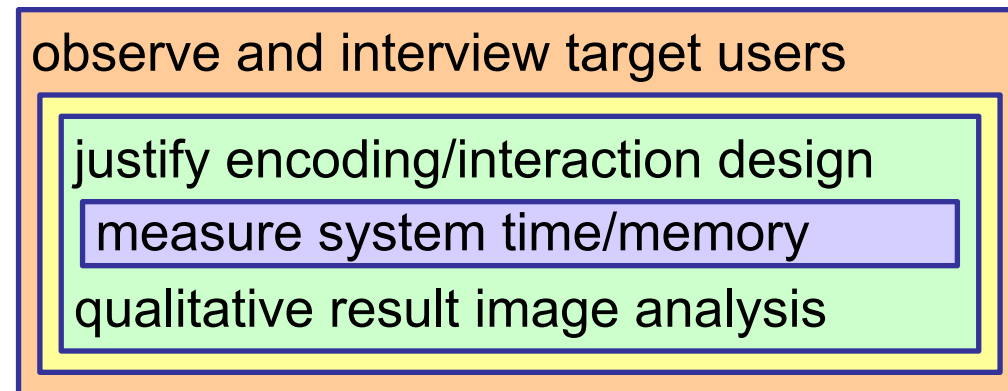
Analysis examples: Single paper includes only subset of methods

MatrixExplorer. Henry and Fekete. InfoVis 2006.

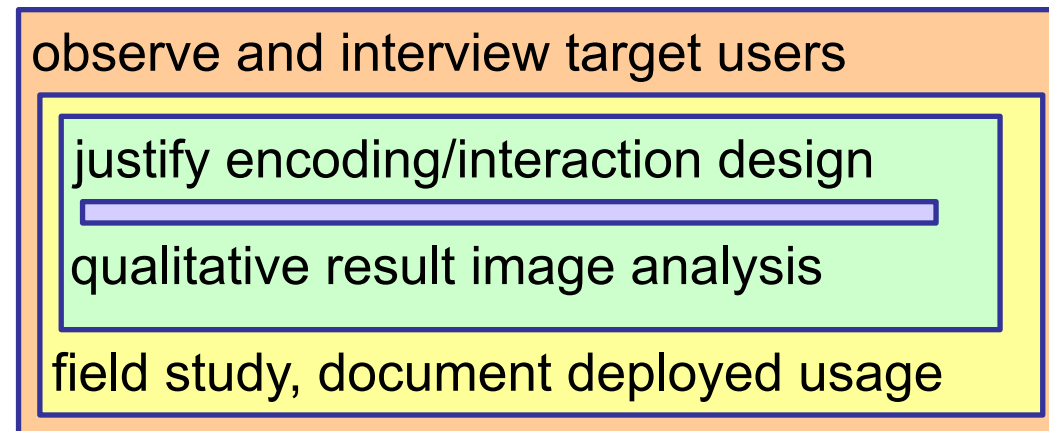


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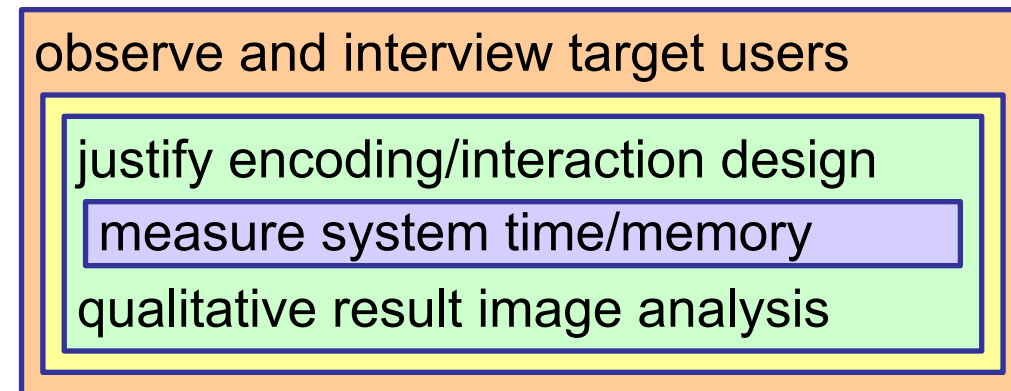


LiveRAC. McLachlan, Munzner, Koutsofios, and North. CHI 2008.

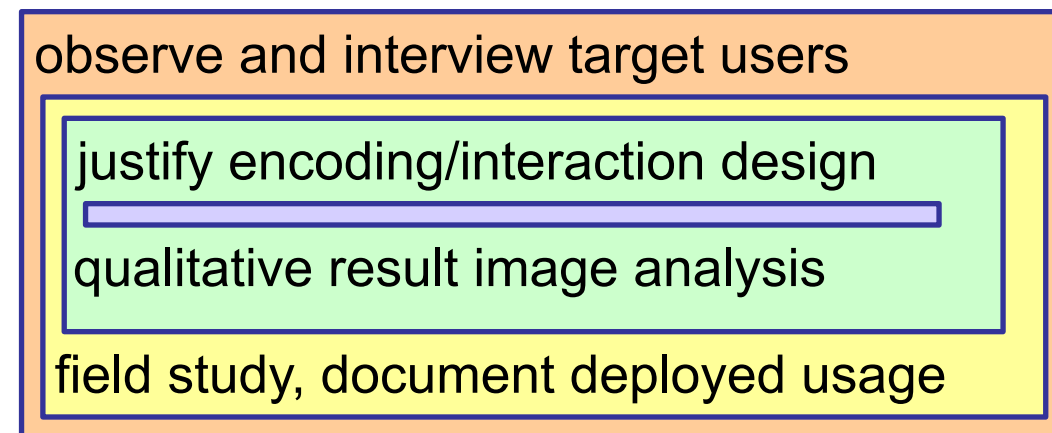


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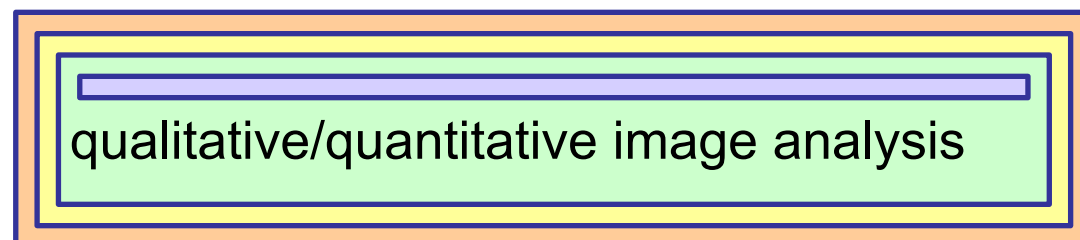
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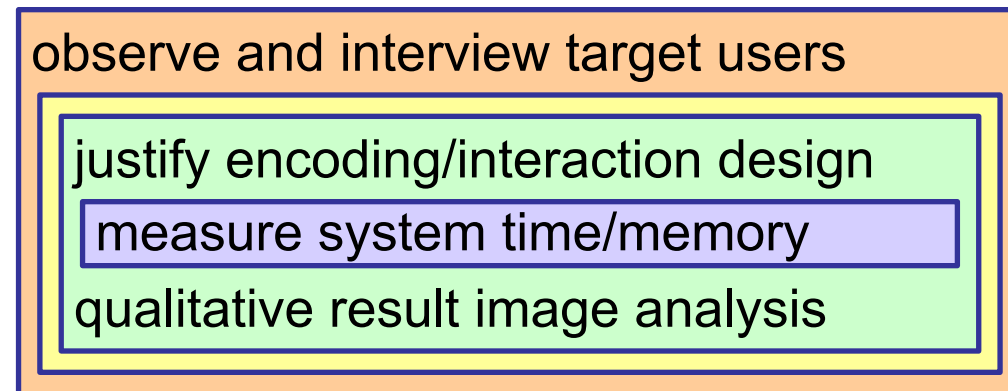


An energy model for visual graph clustering. (LinLog)
Noack. Graph Drawing 2003

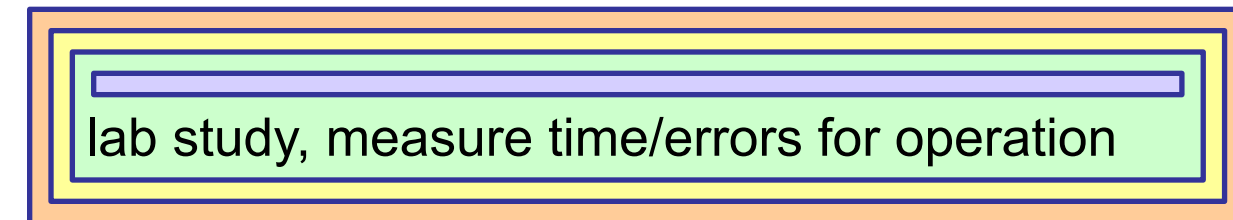


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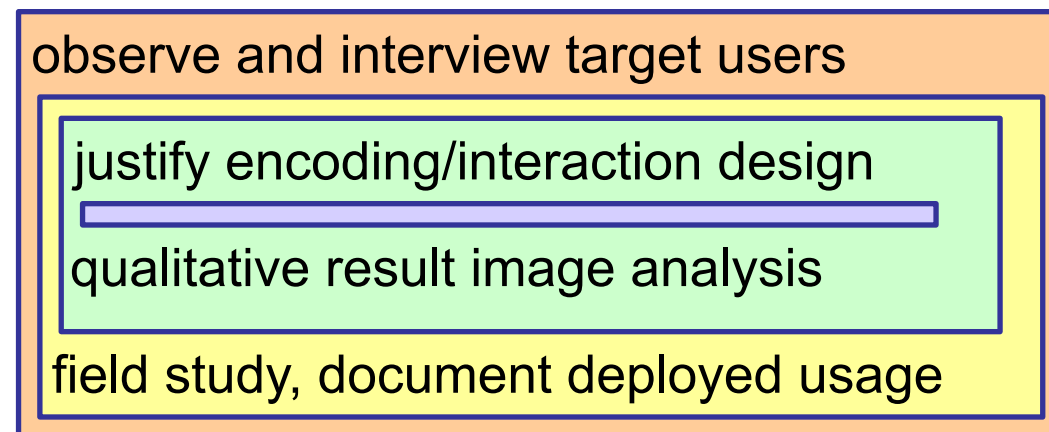
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Effectiveness of animation in trend visualization.
Robertson et al. InfoVis 2008.



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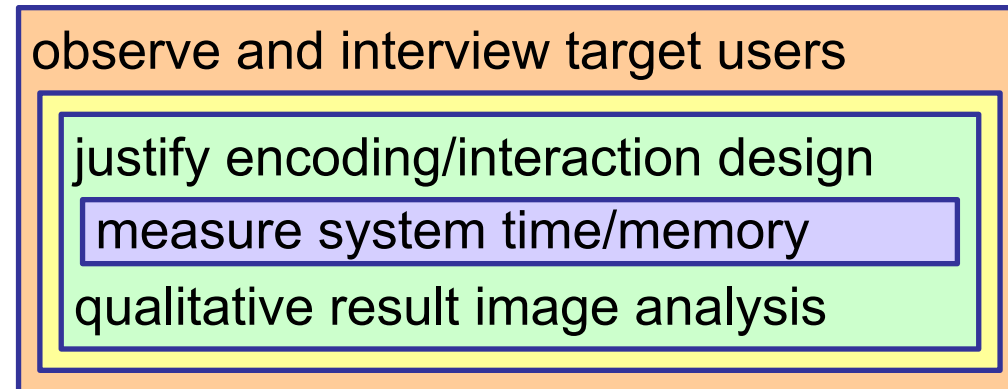


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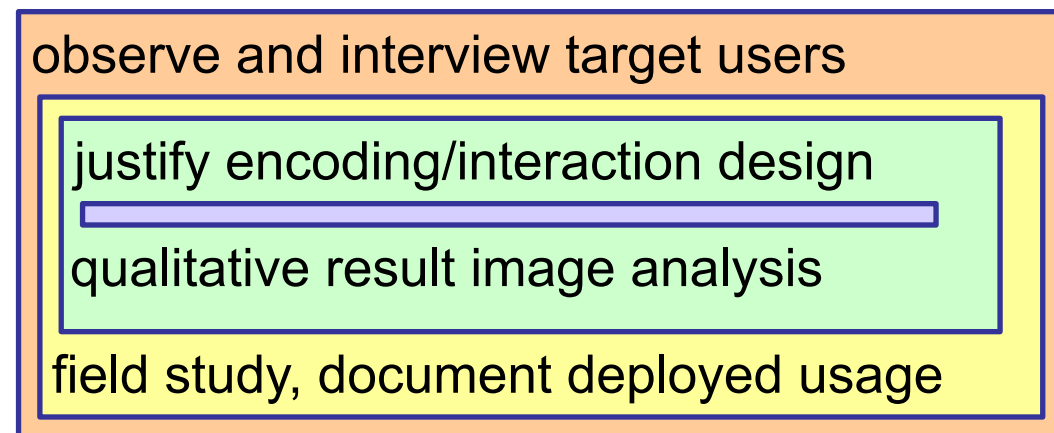


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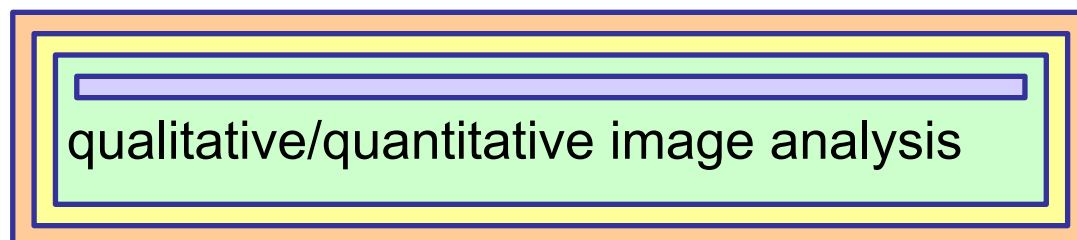
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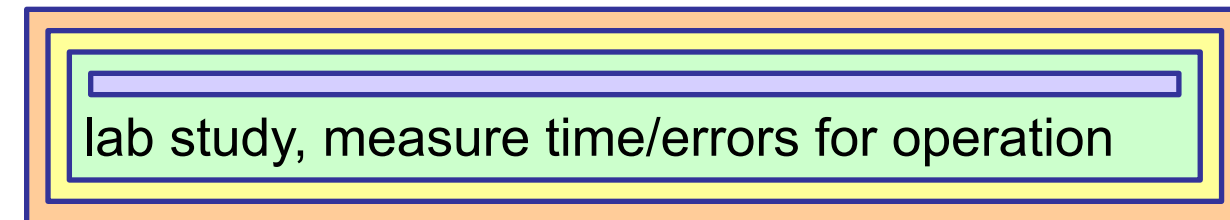
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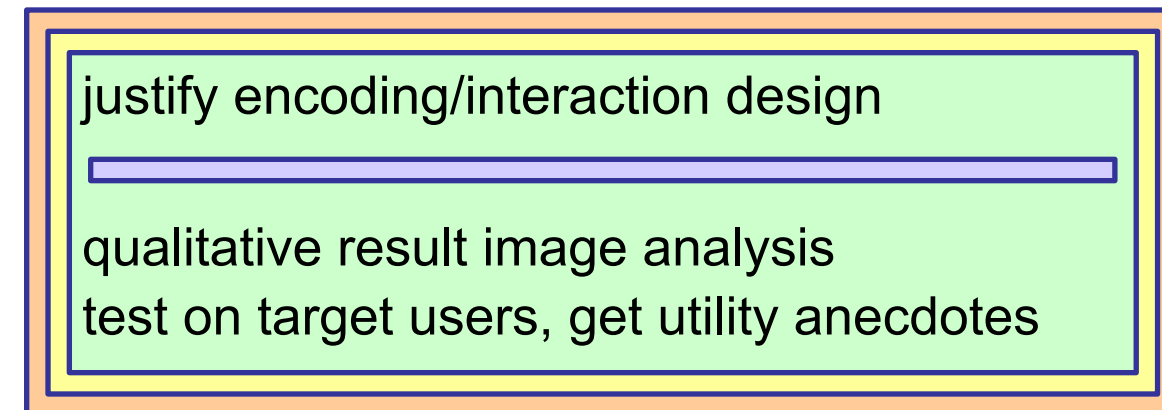
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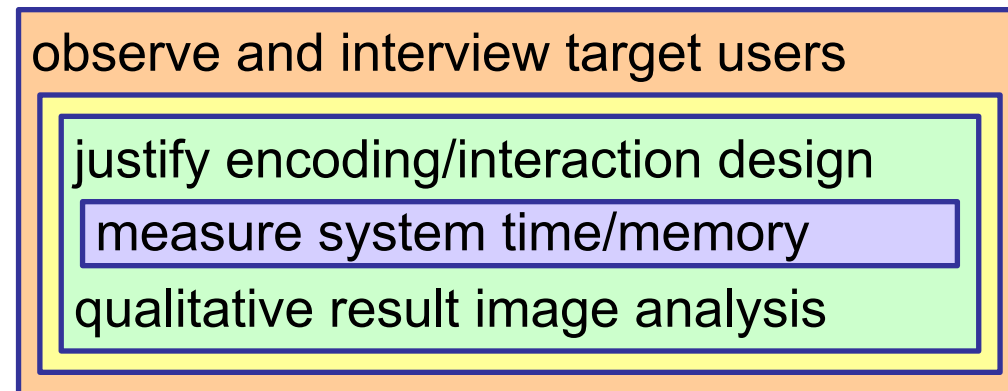


Interactive visualization of genealogical graphs.
McGuffin and Balakrishnan. InfoVis 2005.

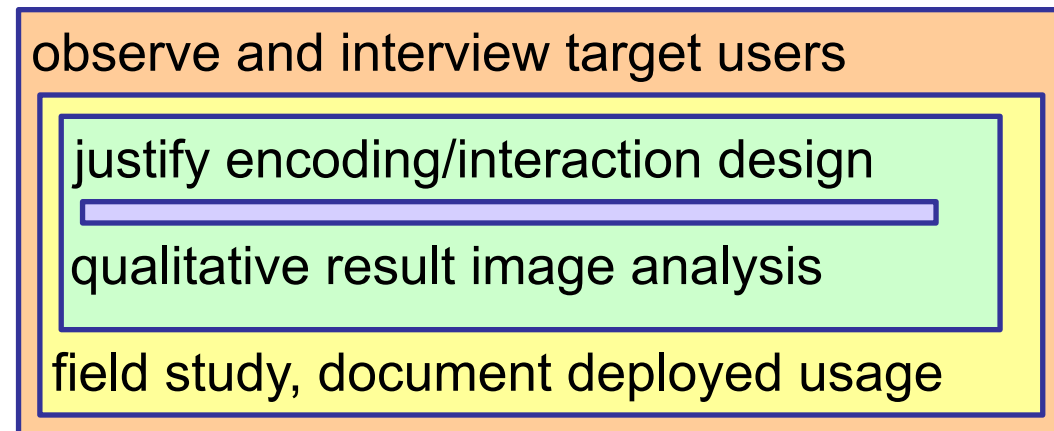


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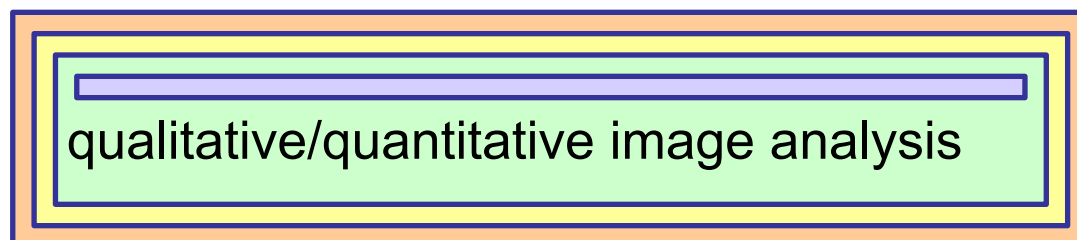
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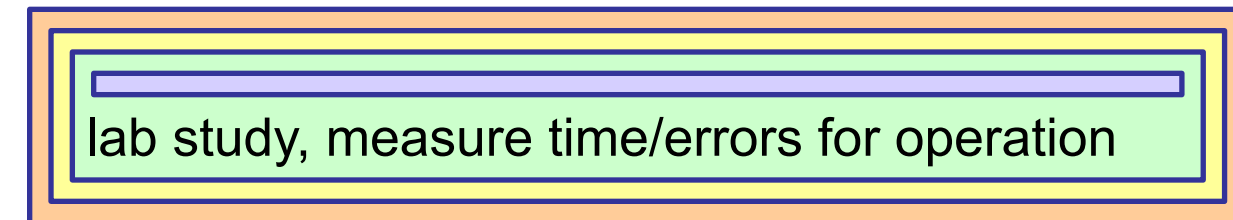
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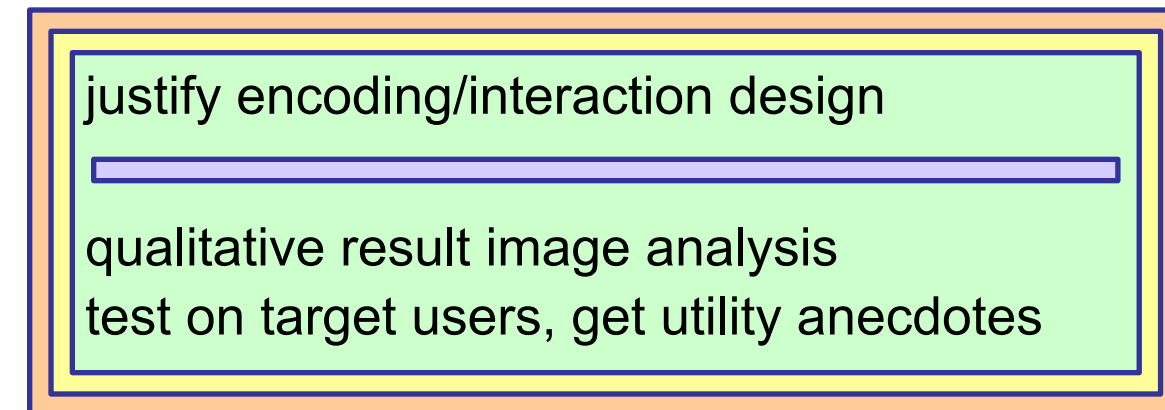
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Flow map layout. Phan et al. InfoVis 2005.

