CS Research Approach

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(Slides created for Innovative Data Technologies Lab members)

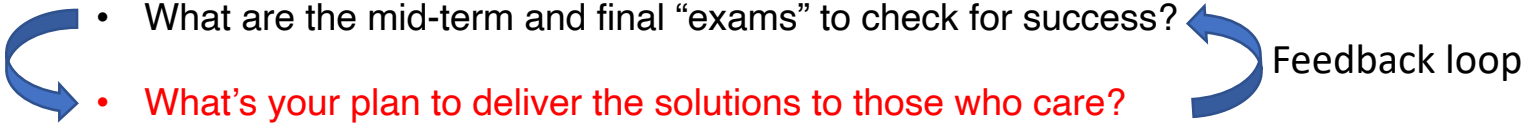
The Heilmeier Catechism

- What are you trying to do? Articulate your objectives using absolutely no jargon.
- How is it done today, and what are the limits of current practice?
- What is new in your approach and why do you think it will be successful?
- Who cares? If you are successful, what difference will it make?
- What are the risks?
- How much will it cost?
- How long will it take?
- What are the mid-term and final “exams” to check for success?

George H. Heilmeier, a former DARPA director from 1975 to 1977

The Heilmeier Catechism – Adjustments to perform research in CS

- What's the problem? Articulate the problem using absolutely no jargon.
- Who cares? If you are successful, what difference will it make?
- How is it done today, and what are the limits / challenges of current practice?
- What is new in your approach, how different is it from existing work, and why do you think it will be successful?
- What are the risks and what's your risk mitigation plan?
- What's your execution plan?
- How long will it take?
- What are the mid-term and final "exams" to check for success?
- What's your plan to deliver the solutions to those who care?
- Retrospect!



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CS Research – A consumer-focused approach

- Problem
  - What's the problem
  - Who's complaining about it (Customers)
  - What's the benefit / improvement if the problem is solved
  - Get feedback from customers
- Gap analysis
  - What are the current approaches and gaps?
  - Define problem in detail and what are the challenges in solving it?
  - Get feedback from customers
- Solution
  - What's the solution?
  - What's the evaluation strategy to demonstrate benefit with the solution?
  - What's the design?
    - benchmarks
    - solution
    - real applications
  - How to deploy it?
  - Implement prototypes
  - Get feedback from customers
- Implement, Demonstrate, and Deploy
  - How to implement and resolve challenges
  - Test improvement with benchmarks
  - Demonstrate the benefit / improvement
  - Get feedback from customers
  - Deploy in real systems