CIS*3750 - System Analysis and Design in Applications

Luiza Antonie, Fall 2025, University of Guelph

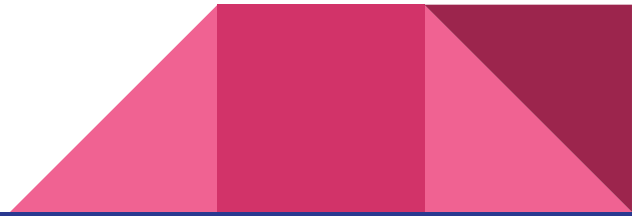
Course Outline Discovery & Discussion

Objective:

- To familiarize students with the course structure, key dates, expectations, and requirements by collaboratively reading and discussing the course outline.

Course Outline Discovery & Discussion

1. Split into groups (~7-8 students per group)
2. Read outline and discuss (~ 15-20 minutes)
3. Question compilation (2-3 questions per group)
4. Class discussion



Course Outline Discovery & Discussion

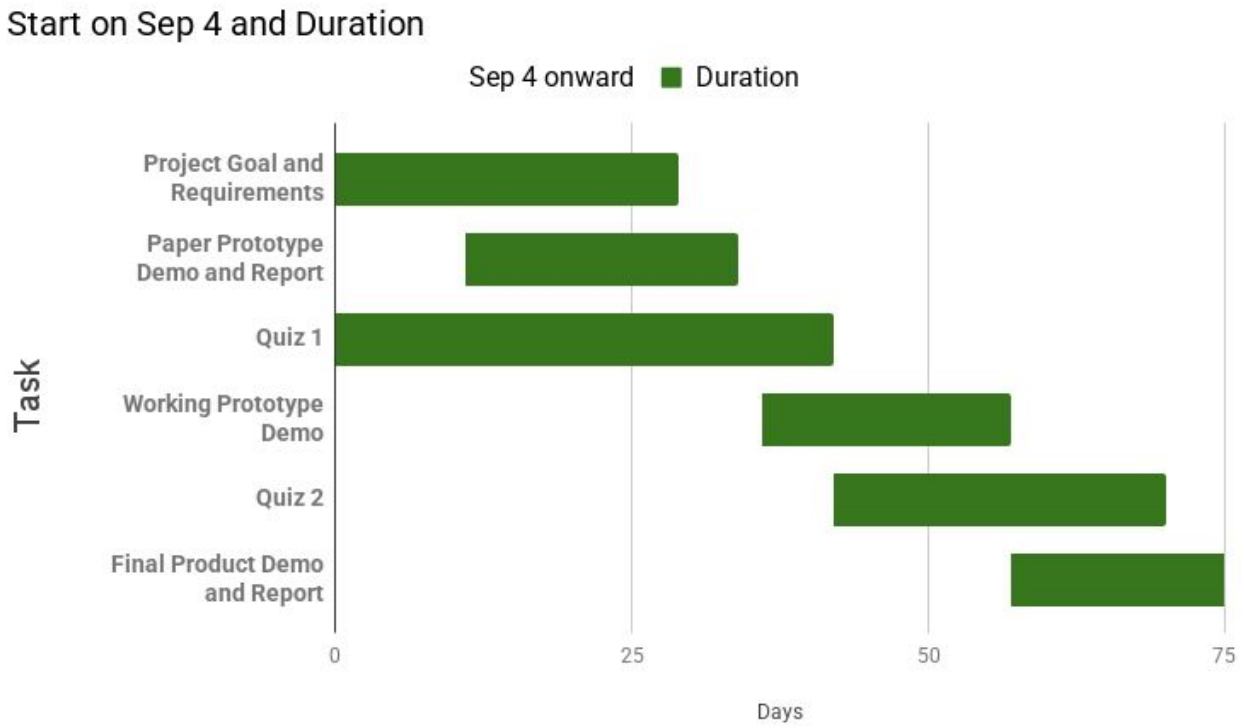
Labs - Reminder

- Start next week (the week of Sep 15)!!!
- You must attend your assigned lab section.

Course Assessment

Description	Weighting (%)	Due Date
Project Goal and Requirements Assignment	15	Oct 3
Paper Prototype Demo and Report	15	Week 6 (Oct 6 week)
Quiz 1	15	Oct 16
Working Prototype Demo	10	Week 9 (Oct 27 week)
Quiz 2	15	Nov 13
Final Product Demo and Report	30	Week 12 (Nov 17/24 week)

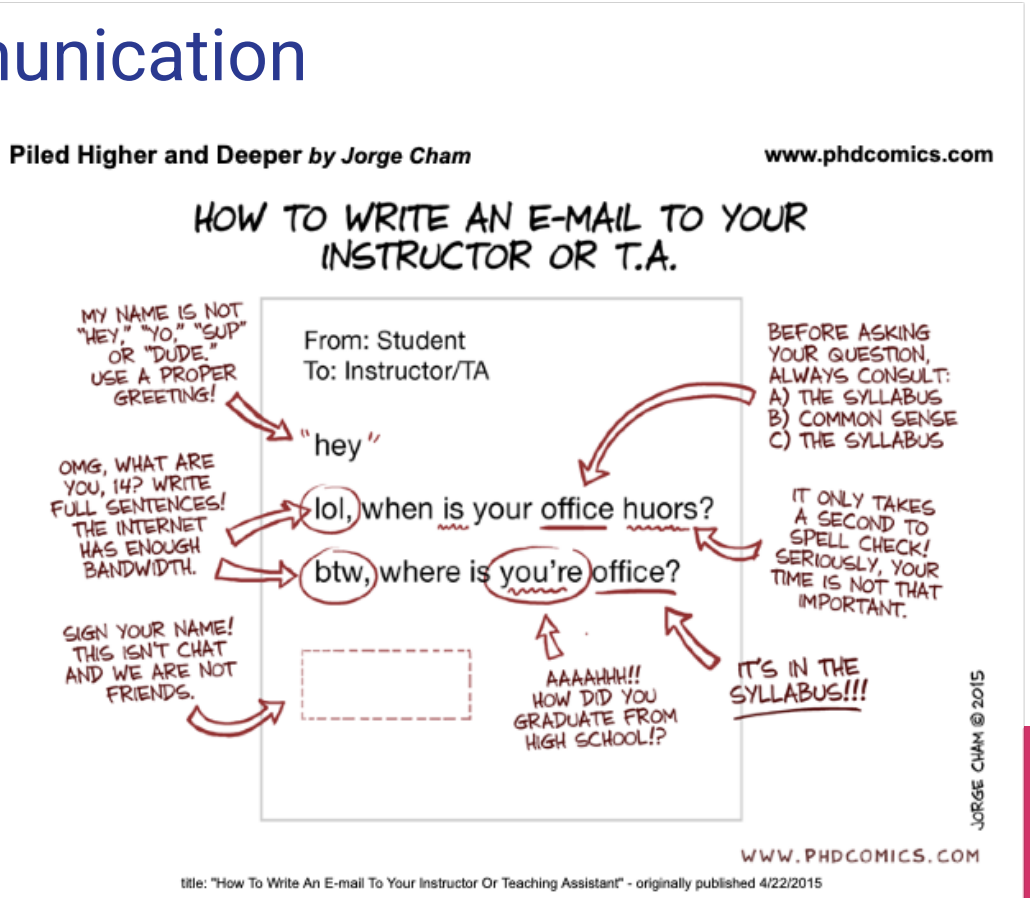
Course Assessment



Email Communication

- Course email: **cis3750@socs.uoguelph.ca**
- As per university regulations, all students are required to check their uoguelph.ca e-mail account regularly: e-mail is the official route of communication between the University and its students. When contacting the TAs and instructor by e-mail, please be sure to use your University of Guelph e-mail address. We apologize not to be able to reply to e-mail inquiries sent from outside the university.

Email Communication

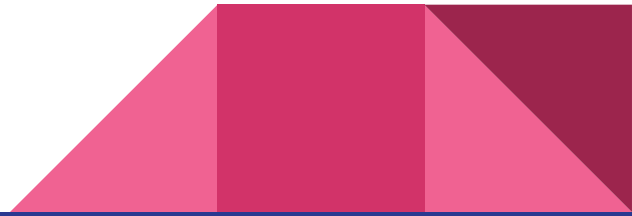


What’s this course about?

- Designing and building software
- Teamwork and communication
- Learning by doing
- Machine Learning System Design

Course Description

- This course is an introduction to the issues and techniques encountered in the design and construction of **machine learning** software systems. Topics include requirements and specifications, prototyping, design principles, object-oriented analysis and design, testing and debugging.
- CS in action!



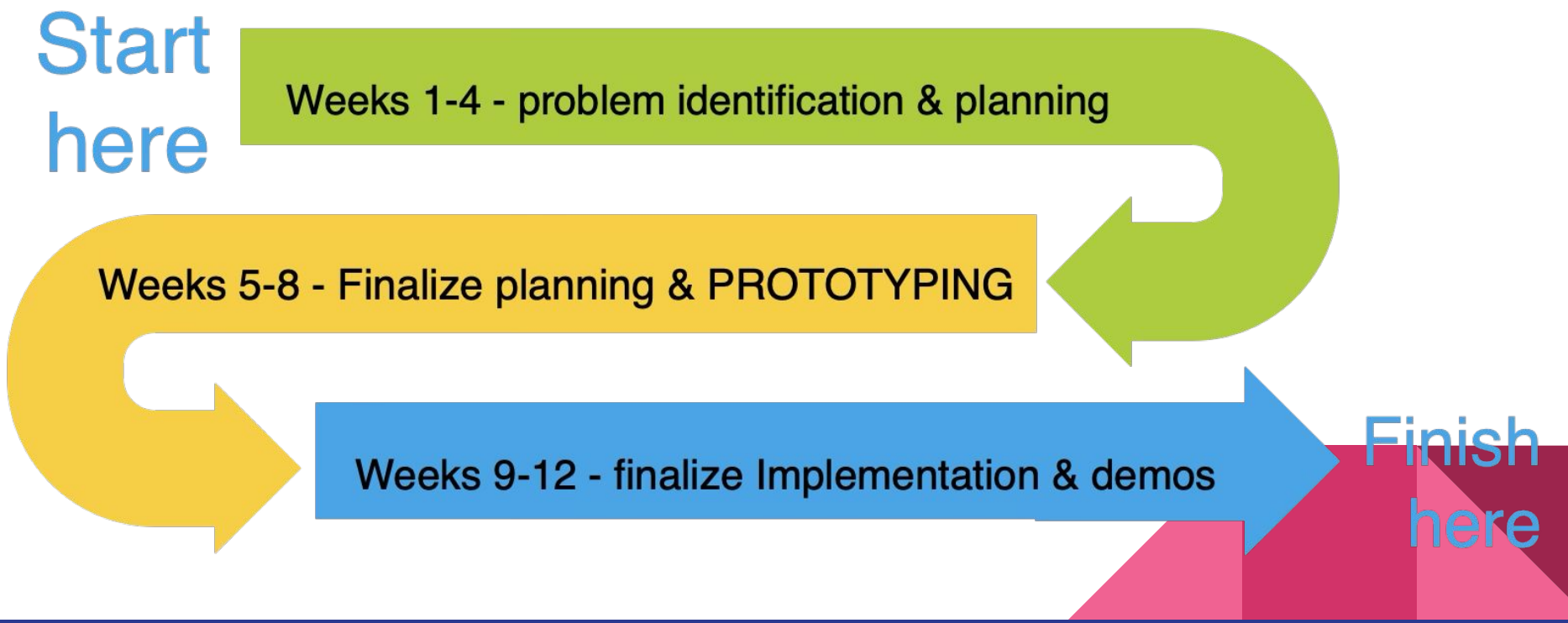
Learning Outcomes

1. Collect and critically evaluate client needs to **develop software requirements** that are specific, measurable, and categorized.
2. Estimate a timeline for software development by identifying dependencies in, establishing a prioritized list of, and **estimating production time for the software requirements**.

Learning Outcomes

3. Improve system design by collecting and synthesizing client feedback provided during **prototyping sessions**.
4. Create design artifacts to succinctly **communicate** software requirements to teammates and clients.
5. **Implement and test** a system's solution that addresses the client needs.

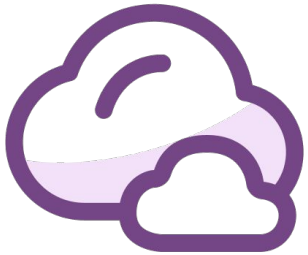
CIS 3750 Timeline



Machine learning software systems?

- What is machine learning?

- When you hear the term **machine learning**, what do you think it means?



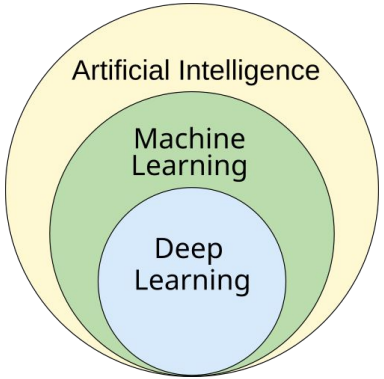
What comes to mind when you hear the term machine learning?

Spam Filtering, ML or not?

Sort AirBnB listings by province, ML or not?

Netflix recommending movies and TV shows, ML or not?

Machine Learning



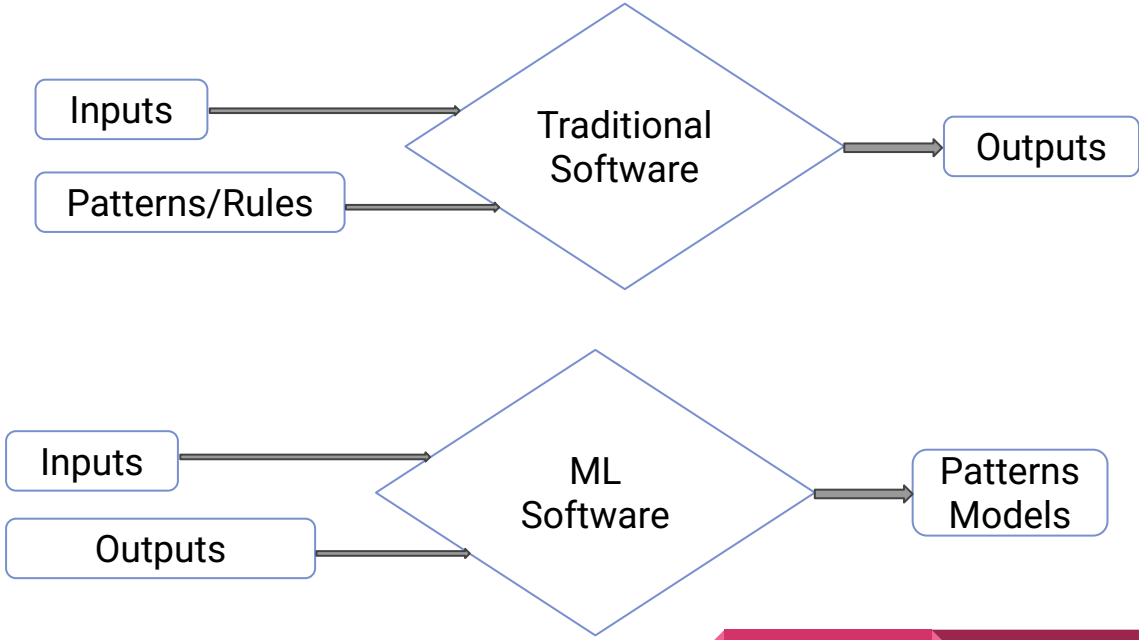
- Machine Learning (ML)
  - A subfield of artificial intelligence
  - Development of algorithms that **learn from data** and generalize to unseen data
  - Performs tasks without explicit programmed instructions

- "A computer program is said to learn from experience E with respect to some class of tasks T and performance measure P if its performance at tasks in T, as measured by P, improves with experience E" - Tom. Mitchell

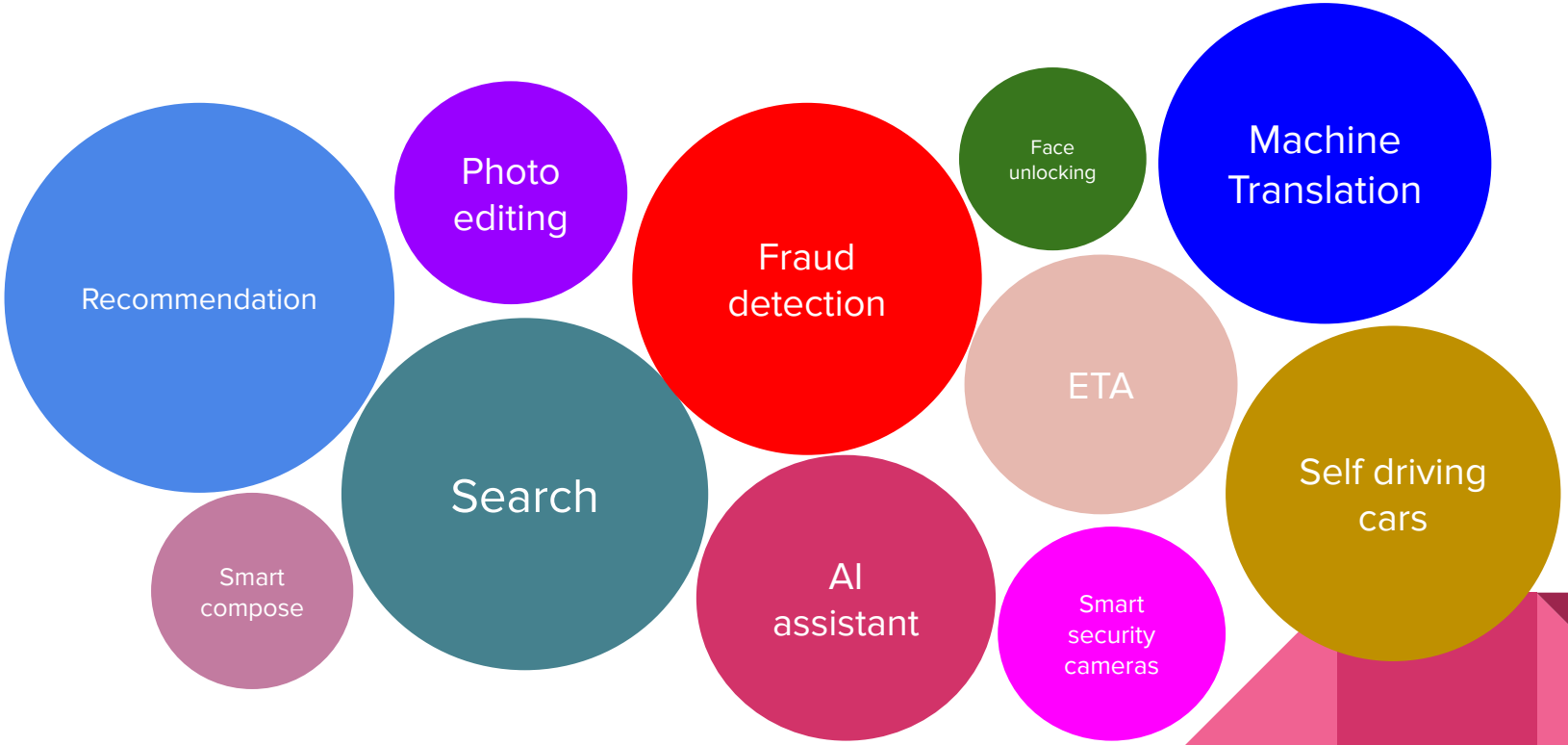
Image source: https://en.wikipedia.org/wiki/Machine_learning

When to use Machine Learning

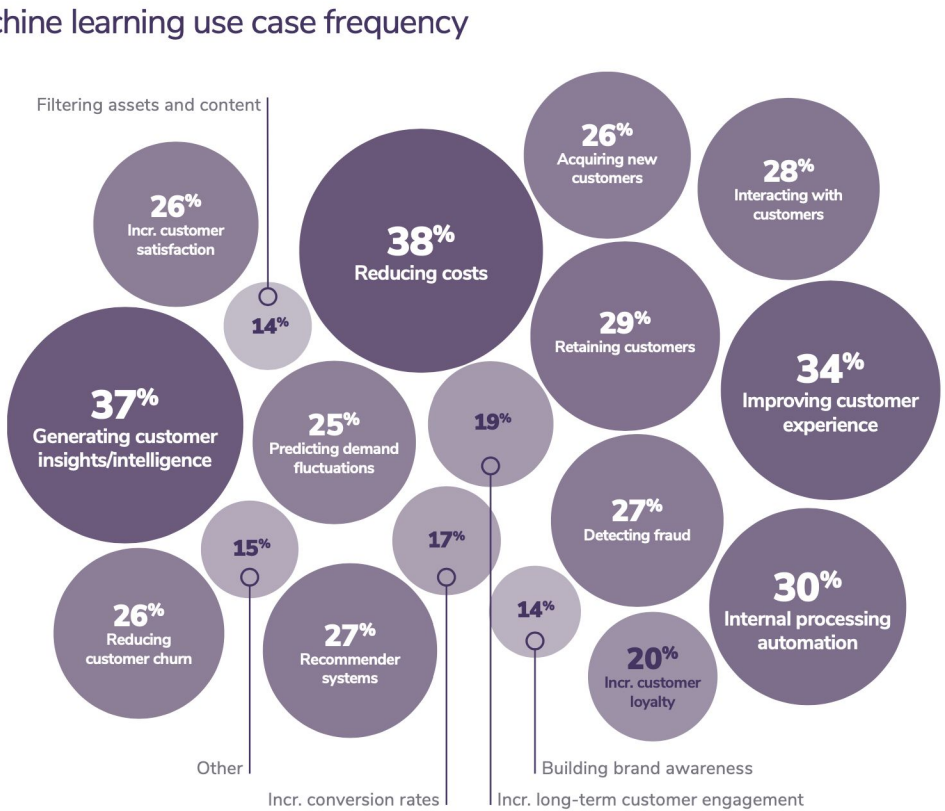
- ML
  - Learn
  - Complex patterns
  - Existing data
  - Make predictions
  - Unseen data



ML is in almost every aspect of our lives



Enterprise use cases



Why ML Systems Design?

- ML algorithms is the less problematic part.
- The hard part is to **how to make algorithms work with other parts to solve real-world problems**.

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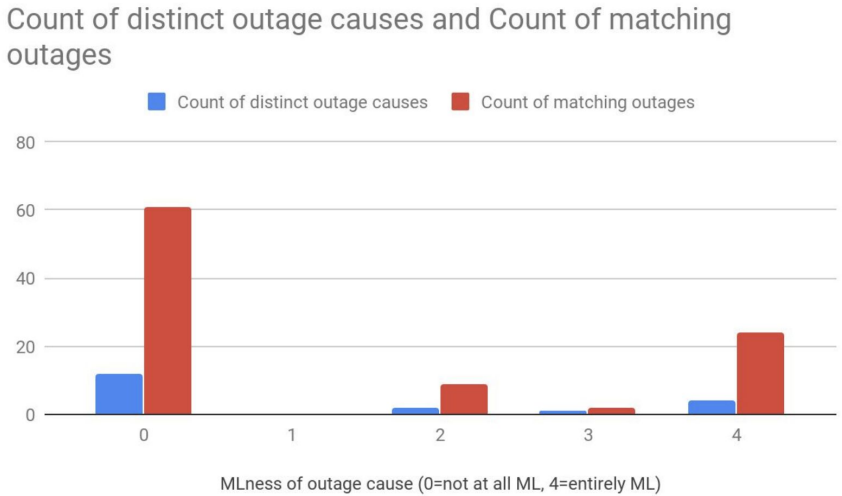
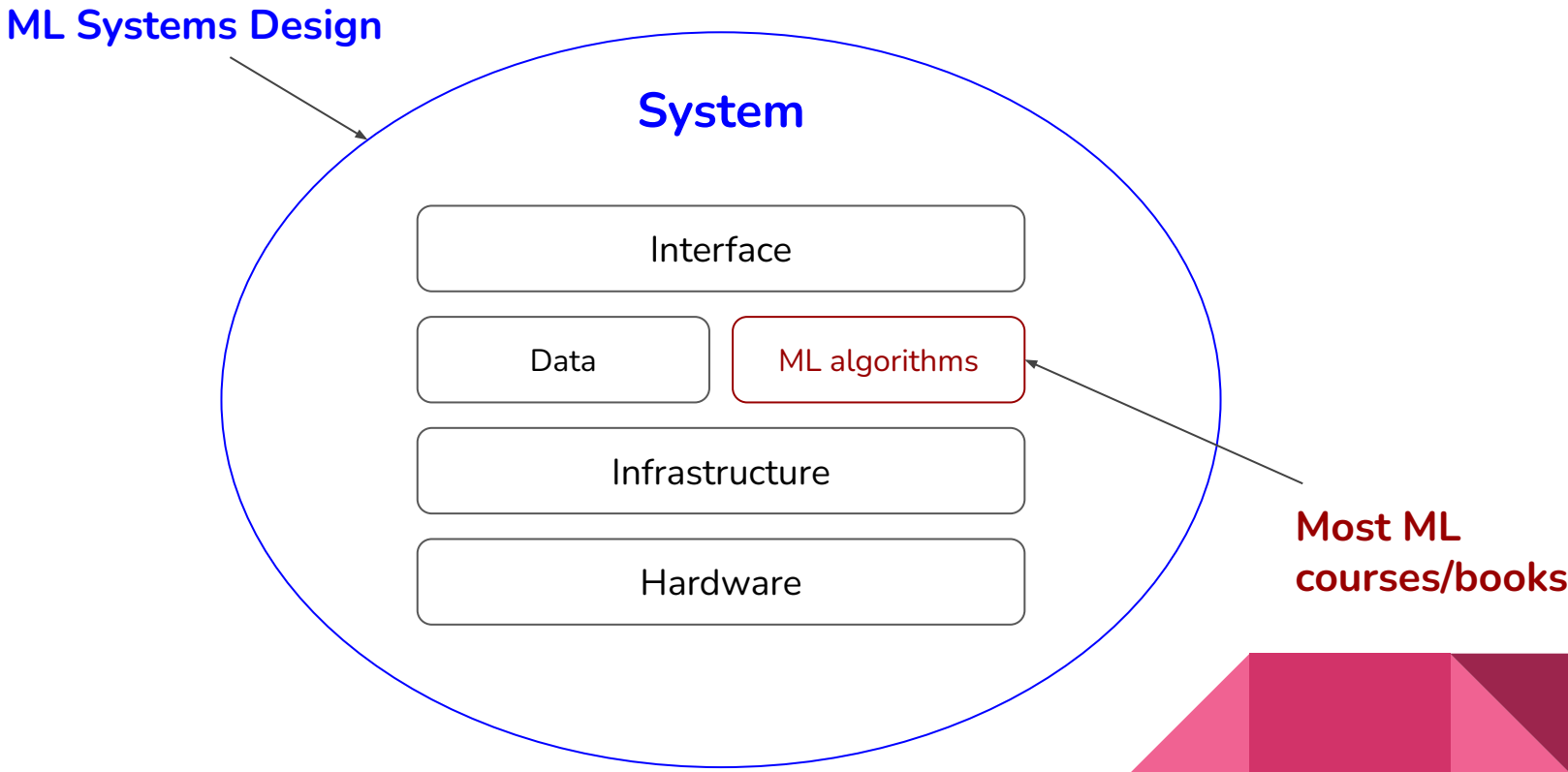
- The hard part is to **how to make algorithms work with other parts to solve real-world problems**.
- 60/96 failures caused by non-ML components




ML Systems Design
System
Interface
Data
ML algorithms
Infrastructure
Hardware
Most ML courses/books