Main Semester-Long Project

Teams of three students

Combinations across sections are OK

- Problem
  - Interesting to you
  - Some prospect of being useful broadly
  - Needn't be new but may have a new twist on an old problem
- Envisioned software artifacts
- Underlying sources of knowledge
  - Lexicons or location services
  - Software libraries
  - Datasets for evaluation
  - Way to have humans help evaluate
- What you will contribute to the world's body of knowledge?

Software Artifact

Not needed in detail in the early report

- High-level view of your method
  - Identify what knowledge is needed to carry out the method
  - Identify what knowledge is available
- Processing "pipeline" or graph
  - Main components, ideally mostly based on existing libraries
  - What *you* will *add* to complete the artifact
- Don't get stuck in product-like details

Scientific Thinking

Critical thinking going beyond the artifact

- What do we learn from the exercise?
- What reusable knowledge will you create?
- State hypotheses that relate to the main topic
  - One or more about the quality of your solution
  - One or more about the effectiveness of specific components in your approach
- Describe how you will evaluate these hypotheses

Hypotheses and Evaluation

The nature of the evaluation depends on the specific hypothesis being evaluated

$$\boxed{\text{Hypothesis} \neq \text{assumption}}$$

- Should be interesting in that an answer would affect how future developers would solve their problems
- Should nontrivial and nonobvious
- A comparative framing helps
  - Vary the nature and amount of input (data or supervision)
  - Vary the methods
- Good to identify one or more baselines ($\approx$ prior methods)
- In typical artifacts, multiple components (or capabilities) make it difficult to figure out the relative importance
  - Ablation studies: consider the components and capabilities separately

Immediate Actions for Students

- Look ahead in the course schedule
  - You don't need to read up in detail
  - Try to get a sense of what topics are relevant to this course
- Look at what kinds of research are showing up
  - Google Scholar may be easiest to search
- Identify some themes that you find interesting
- Identify project partners
  - Use the themes to find like-minded people
  - Discuss working styles and schedules for compatibility
  - Discuss how hard they and you will work on the project

Project Ideas for Social Computing and Decentralized AI

Just meant to stimulate your imagination

- Agentic AI models (multiagent)
- Technologies to identify and promote
  - Emergence of or changes in social norms
  - Diffusion of ideas and innovations
  - Identifying proximal social activities from phones (and sensors)
- Swarms
- Negotiation
  - Especially, from a human angle
- Social apps or agent-based social simulations
  - Health behaviors, e.g., diet or social distancing in parks
  - Cooperative ride sharing or electric vehicle charging
  - Promoting proximal social activities such as walking or eating
- Competitions relating to multiagent systems technologies
  - Negotiation: look for ANAC
  - Robocup soccer teams