

Main Semester-Long Project

Two-person teams

- ▶ 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
 - ▶ Unless your main idea is a “product” such as a new messaging app

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

- ▶ Should be interesting in that an answer would affect how future developers would build related apps
- ▶ 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
- ▶ In typical artifacts, multiple components (or capabilities) make it difficult to figure out the relative importance
 - ▶ Ablation studies: consider the components and capabilities separately

Project Topic Ideas for NLP

Extremely small sample: just for discussion

- ▶ Understanding sender's intent from email
 - ▶ Extracting to-do items
 - ▶ Extracting which tasks are assigned and which are completed
- ▶ Developing a chatbot for car repair
- ▶ Dealing with custom named entities, e.g., apps, equipment
- ▶ Resolving pronouns <https://paperswithcode.com/paper/bridging-anaphora-resolution-as-question-1>
- ▶ Dealing with novel words
<https://arxiv.org/pdf/1811.03866.pdf>