CSCi 8980: Project Thoughts

Projects

- We've read papers, had discussion, now we get our hands dirty!

- Groups of any size (1, 2, 3)
  - Brainstorming HIGHLY encouraged!

- Main goal: learn something new, do something interesting

- It is **your** job to propose a project idea

- I will work with you to refine the project as needed

Learn something

- Don't do something you haven't already done
- Use this opportunity to stretch yourself to try someone new
  - Risk is encouraged!
  - If it "fails", you can tell us lessons learned

- Give a brief 1-2 slide presentation in 3 weeks
  - Get feedback from the class

Constraints

- Relate to some aspect of edge, IoT and/or cloud computing
- Resources
  - Your own "edge" devices
  - We can acquire Raspberry Pi's, other devices potentially
  - MSI has GPUs
  - "Cloud": Amazon AWS, Microsoft Azure, Google Compute
    - Most providers have free education use
  - Simulators: **iFogSim, EdgeCloudSim**
  - Chi@Edge may be accessible to us

Project Sources

- Did any paper interest you?
  - Some papers have code you can use as a starting point
  - Can also skim ahead to other papers

- Edge-ify an existing application
  - Build from scratch or start with something open-source
  - Take a cloud app/service/framework and 'edge-ify it'
  - "Google doc on the edge"

- Benchmarking
  - Performance and/or energy consumption of computations run on an edge device

Cloudlets from CMU

- All code is here:

- http://elijah.cs.cmu.edu/development.html

Two projects in our lab

- Armada – docker-based Edge framework
  - *Sumanth*
  - Serverless

- Constellation/Quasar geo-distributed IoT
  - *Mitch*
  - Extend IoT processing to geo-distributed area, e.g. FT

Cloud-edge App

- Define a way for an app to run both locally (edge) and/or remotely (cloud) based on dynamic conditions
  - Can the system go back and forth seamlessly?
  - Explore fidelity, performance tradeoff

- Figure out where to run components of an application: microservice placement?

Edge Applications

- ## Data-intensive
  - Hadoop, … on the edge

- ## Collaborative
  - Google doc on the edge

Device cloud

- Build a prototype of a far-edge device cloud
  - mobile <-> mobile
  - can you show this provides an advantage for some scenario?

Edge as-on-ramp

- Edge functions that are performed on data prior to uploading/download to/from the cloud
  - Filtering, transforming, privacy-protecting, …

Project Proposal

- The project proposal **must provide some evidence of feasibility**
  - Located software, data, etc.
  - Have the necessary resources or can get them

- The project **must contain a set of clear goals or objectives**
  - Ranked these from easy to hard (may not get to 'hard')

- Experimental plan
  - Where you will run it and how you will perform experiments

Recap

- You **must propose an idea of your own** and develop a project around it
  - Do something that excites you and will challenge you

- You are welcome to run **your** ideas by me in office hours at any time