

ICTD Capstone Software Design for Underserved Populations

CSE 482b

Projects! April 1, 2021

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Schedule

- Today
 - Project Assignment
 - Capstone Process
 - Break into groups

- Next Week
 - Covid-19 vaccine background
 - Cold chain information system
 - Group meetings with course staff

Projects

1. Vaccine Stock Tracker
 - Ali Byott, XY Lim, Elijah Greisz, Young Bin Cho, Michael Wiem
2. Vaccine Passport
 - Corbin Phipps, Eric Fan, Tevin Stanley, Bethany Kassala
3. Immunization Campaign Planning System
 - Simplicio DeLeon, George Zhang, Linda Do, Mayki Hu
4. Notification / Registration tool
 - Kaytlin Melvin, Livia Kong, Tianao Shi, Emily O'Neill
5. Vaccine Impact Modelling tool
 - Joseph Ammatelli, Joely Nelson, Kenny Krivanek, Tevin Stanley

1. Vaccine Stock Tracker

- Problem: A country needs to keep track of vaccines as they are used in immunization campaigns
 - This is going to be particularly important for Covid vaccines as they are expensive, limited in availability, and are likely to be supplied irregularly
 - Tracking vaccines needed for initial allocation as well as collecting unused vaccines after a campaign
- This project could be integrated into our existing Cold-Chain Information System
 - Mobile application for vaccine logisticians
 - Dashboard for ministry of health
 - Deployment in Uganda underway

2. Vaccine Passport

- Allow verification of vaccination status
- Basic model allows established authorities to enter vaccine information and others to verify credentials
- Should have some basis in cryptography or digital signatures
- Could involve mobile apps for vaccinated and/or verifiers
- Need to consider multiple different components of the system
- Topical and controversial!

3. Immunization Campaign Planning Tool

- Developing countries will likely rely on campaigns for Covid immunization
 - Identify population group and locations
 - Plan for campaign with supplies and schedule
 - Required data: demographics and health system information
- Create various web based planning tools
- Will require some background research and domain knowledge
- Possible applications of Algorithms or AI

4. Notification and registration tool

- Tool to support tracking of individuals for immunization
- Possibly target needs of a developing country (such as Uganda)
- Multi-dose vaccines complicate this problem
- Integrate across multiple messaging technologies

5. Vaccine impact modelling tool

- Develop framework for modeling impact of Covid vaccination
- Framework would allow various different models to be used
 - Fairly naïve models could be implemented initially with a mechanism for domain experts to add models later
- Scenario: tracking progress of global immunization and predicting impacts of different immunization approaches and coverages
- Variables to consider: Vaccine type, populations, coverage by dose, efficacy on different strains
- Possibly set up as a global modelling tool

CSE Capstone courses

- **Capstone Goals**

- Projects must be large enough to require teams of several students to work on over one quarter.
- Students must apply concepts from more than one sub-area of CSE (at the 300-level and above).
- The work must involve a substantial design effort.
- Students must present their work using formal oral presentations and written reports.
- Efforts must culminate in an interesting, working artifact.

What we expect in a capstone

- Group projects
 - About five people
 - Different roles
- Design and Implementation
- Multiple check points and expert review
- Working, useful software
- Reasonable software process
- Presentation of results

Schedule

Schedule (Dates tentative)

Project Pitch	April 13
Progress Report and Prototype	May 11 / May 13
Final Presentations	June 1 / June 3
Deliverables due: Code, Write up	June 11

Course Mechanics

- Group development of projects
- Lectures/class meetings for first few weeks
- Regular group meetings with course staff
- Later class sessions for presentations and demos
- Specific deliverables will be specified during the quarter
- Final turn in will include code and a paper (~10 pages)

Deliverables

- Weekly progress reports
 - Templates will be provided
- Specific artifacts
 - E.g., key use cases, architectural diagram, minimum viable product definition
- Codebase
- Working prototype / demo
- Paper
 - 10-page paper, conference format, LaTeX (overleaf)
- Turn in (and comments) through Gradescope

Project Teams

- Select a PM (Project Manager)
 - Manage schedule
 - Track tasks
 - Organize meetings
- Document plans and tasks
- Divide work based on rolls
 - Allow some specialization
- Set up mechanism for communication
- Regular meetings

Software Process

- “Good Process”
 - Practice what you learned in Software Engineering
 - Software tests, code reviews, etc.
- Version control (probably Git)
- Documentation
- Early prototype and minimum viable product
- Bug and task tracking

Architecture and Software Choices

- Flexibility in choice of design, languages, and tools
- Vaccine stock tracker should be based on CCIS
- Several Android phones will be available for groups choosing a mobile component
- Scope technology choices

Design Choices

- There is lots of flexibility in the projects
- You will need to choose what to emphasize
- Choose scenarios / use cases early
- Some projects can apply to developed world (and it is fine to focus on developed world)
- Discuss ideas with course staff

Course grading

- Composite grade for project and adjustment by individual
- Not curved
- Multiple aspects will contribute to the grade
 - Domain research
 - Quality of the solution
 - Software quality
 - Documentation
 - Supporting artifacts
 - Presentations
 - Paper
- Teams will have input on weighting of criteria

Goals for course projects

- Develop realistic prototypes of systems that could have significant social impact
- Gain understanding of global covid vaccination efforts
- Build a working system
 - Robust enough to show off to others
 - Prototype that could be refined to a real system for at scale deployment

Advice for successful projects

- Start work on design and scoping immediately
- Plan to work as a team
 - Schedule and roles
 - Determine supporting technologies
 - Communicate with the course staff
 - Share responsibilities on components
- Identify a minimum viable product
 - Implement a “narrow path”
 - Extend a working system
- Presentations, Documentation, Write up and Communication about project is very important
 - There is much more to technology projects than coding