CS3249 | User Interface Development

Final Group Project

Due Date

Note that the project submission is due on the 19th of April, 2017 (Wednesday, Week 14), before 23:59. There will be a group presentation on Thursday, 20th April, 2017. Please sign up for booking your slots for the presentation. We ask you to form your group the latest by Friday, March 17th, and update your group information at the following spreadsheet. You should also sign up a presentation slot in the same sheet. https://docs.google.com/spreadsheets/d/1r69WRT7SkwedCruL3zp7c2dpoJy7iaisHMmRINWkeg8

Grading

This project contributes to 35% of your total grades for this module. The gradation criteria is as follows -

- Documentation - 10%
- System Design, Implementation, Testing – 25%

Note that although this is a group project, and you will receive a group grade based on the overall quality of the project presented, each member in the group will likely to receive a different grade (either higher or lower than the group grade) based on a number of factors including: 1) the division of labor described in your document, 2) the commit history on github, 3) anonymised peer review. The person contributes more will receive a higher grade than the person contributes less.

Description

This project is a group assignment. We allow 4 students per group. The purpose of this assignment is to apply the lessons that you have learned in React and Redux in a real world application. You also need to setup a backend for your project. One possibility is to use the MERN stack (or alternatively, you may choose to hook your application to any other backend database of your choice). We also ask you to perform some unit testing and integrate them to your design in order to build a community service app: ETiCCS (Emerging Technologies in Cervical Cancer Screening) to help the volunteers, nurses, and doctors to fight cervical cancer in rural Ethiopia. This is a group project, so it's important to work together and distribute the work wisely and fairly. Since you will have four members, a possible division of labor can be 1 backend developer, 2 front-end developers, 1 tester and documentation creator (although documentation needs to be created by everyone, this person can help to synthesis everything together). However, you are free to decide among yourselves who is responsible for doing what.

Background

Cervical cancer is a highly preventable disease as demonstrated in countries with well functioning health systems. Cervical cancer, however, is the most common cause of cancer death among woman in sub-Saharan Africa. Especially women who live in rural settings with unreliable health care systems and women who are HIV infected are vulnerable to die of cervical cancer. The current WHO-recommended screening practice for resource-limited settings is based on the visual inspection of the cervix with acetic acid (VIA) followed by cryotherapy for suspected cases, ideally performed during a single visit. Up to now,

the impact of VIA has been limited due to overburdened clinics, a considerable rate of false positive results and the potential post- treatment discomfort and risk of HIV acquisition.

Recent advances in the understanding of cervical cancer as well as technological innovations give hope that this disease of poverty and inequality can also be controlled in remote and resource-poor settings. The aim of the proposal is to implement a novel, population-level home-based cervical cancer screening approach which specifically addresses the needs and constraints of rural African settings.

Your application help the volunteers, nurses, doctors to perform a dual-test screening strategy, which includes
(1) a community-wide, residence-based HPV survey using self-sampled genital secretions,
(2) a triage of HPV-positive women using nurse-led colposcopy specifically designed for remote clinical settings in low-resource countries and sample collection for a biomarker test done in the laboroatory
(3) an innovative electronic information systems which efficiently and in real time combines data captured in the field and in the clinic for quality control and monitoring and evaluation.

A rural community considered representative of Ethiopia will be selected as demonstration site. All households will be enumerated using a geographic information system design. Women will be offered in their homes to self-collect a vaginal sample for HPV DNA testing in the laboratory. All HPV DNA positive women will be invited to the clinic for nurse-led colposcopy and treatment when needed and collection of of a genital sample for biomarker testing in the laboratory. Novel cloud-based information technology will be used to ensure seamless communication between patient, clinic and laboratory as well as for instant consultation of colposcopic finding with remotely stationed expert when needed.

Below is a flow-chart of the screening process. The community worker will visit the households. in the community and collect a self-sample (sample taken by the woman herself) for HPV testing from eligible women (age 25 years and above/no history of cervical cancer, no active pregnancy and intact uterus) who agree to participate in the screening. All women above age 25 years will be seen face-to-face, consent to participate will be solicited and eligibility will be determined (no history of cervical cancer, intact uterus, no pregnancy) The collected samples will be passed to laboratory for testing, and the results will be passed to the clinic. The nurse in the clinic will invite the women with positive results to visit the clinic to perform two more tests (P16 biomarker and colposcopy). If either of the two tests is positive, the woman will be sent to see a gynecologist. The gynecologist performs another colposcopy and takes a cervical biopsy if indicated. To facilitate this process, you are asked to design the interfaces for the different stakeholders: volunteer (community and household interface), lab technician (lab interface for three tests), clinic nurse (nurse interface), gynecologist (doctor interface), and pathologist. Note that the diagram below misses another stakeholder, which is the **pathologist**. Pathologists are needed since both the biomarker and biopsy tests are two stage tests: samples first need to be prepared by lab technician, then further tested by the pathologist, so there is an additional pathologist interface (for two tests) needed. We provide the requirements for all the interfaces below. For each interface, we provided a list of requirement and a rough wireframe for you**. The wireframe is just a suggestion, and sometimes it may not exactly match the requirement. We will ask you to modify the wireframe in your app so that your interface can match the exact requirement in the description. Also, although there are many interfaces, there are many reusable elements of the interface, and you should think about how to design your react components so that you can reuse as many of your lower level components as possible.**

Community

All eligible women

absent   present

declined   HPV tested

Lab

Clinic nurse

Nurse needs info on:
(i) all HPV tested
(ii) all absent

Gynecologist

Laboratory

HPV pos   HPV neg

list of all HPV tested

(iii) all HPV results

seen at clinic   not (yet) seen at clinic

Clinic

P16 biomarker   +   colposcoopy
(nurse)

abnormal   normal

(iv) all participants
seen at clinic
(v) all p16 tested and
all colpo results

Laboratory

p16 neg   p16 pos

list of all p16 tested

(vi) all p16 results

Gynecologist

seen by gynecologist

colposcopy
(gynecol)

abnormal   normal

Biopsy + treatment

(vii) all women seen
by gynecologist

all women who are either
- p16 pos or
- nurse colpo abnormal

Volunteer interface contains the community and household interface:
Community interface contains the following elements (suggested wireframe provided below)
- a list of household
- for each household, to show if the work has been completed or not
- for each household, show the address, show status (visited or not), if visited (show when it was visited), show any remarks made for that household
- each household is clickable, and will lead to household interface

http://community-page.html/

Community Page

Household Name ▲	Address	Visited?	Time ▼	Completed?	Remarks
Household #1	UTown Residence	☑	17:59.020117	☑	
Household #2	School of Computing	☐		☐	
Household #3	Arts Canteen	☑	23:25.010116	☐	
Household #4	Yousuf Ishaq House	☑	02:12.091116	☑	
Household #5	Centre for Quantum Computing	☐		☐	

Household interface contains the following elements

- a list of people in the household
- for each person, show name, gender, AGE, relationship to the elder, participation status, eligible status (eligible = female + age >19yrs)
- can add family member (a family member information form)
- each family member can be also be deleted
- edit family member information
- edit basic information
- Potential participant (all women aged 25+years (seen face-to-face=must be present)):
- Consent to participate
- eligibility checklist (survey form)
-
- participation status: consented (signed consent) or refused or Pending
- social demographic form (survey form)
- reproductive health form (survey form)
- self-collected HPV Sample (form)

http://household-page.html/#1/

Household #1

Name	Gender	Age	Relationship to Elder	Participation Status	Eligible Status	
Debjyoti Ghosh	Male	29	Son	N/A	☐	👤✗ Edit
Danny Kim	Male	34	Nephew	N/A	☐	
Chen Chen	Female	26	Daughter	Consented	☑	
Pin Sym	Female	42	Wife	Rejected	☑	

Lab technician can perform three sets of tests (HPV test, biomarker, biopsy test). For each test, the interface is similar, but with minor differences. We provide three suggested wireframe below, but in your app, you may want to use tabs so that the technician can easily switch among the tests.

HPV Lab interface (lab technician)
- List of HPV samples (ordered by patient ID) [Can be searched by patient]
- Check the sample if it is received (if received is ticked, the date it is ticked will be entered into this sample and displayed)
- Only for received samples, it can check if test is done
- Only if test is done, can enter the result

Note: sample reception and sample testing are done on different days. So one list confirms reception, those received will be forwarded to list: 'to be tested'.

HPV Lab Interface

Patient ID ▲	Name	Age ▲	No. of samples ▲	No. of samples received	Remarks
P0124593	Chen Chen	29	3	2	
P0124587	Radhika Apte	31	2	2	
P0124587	Becky Bart	22	1	0	

Sample ID ▲	Received	Received Date ▼
S3219	☑	23/02/2016
S4167	☐	
S1171	☐	

Test Status
Done

Test Date
25/02/2016

Test Report\Positive

Remarks
None

Biomarker lab interfaces (lab technician)
- List of positive HPV test (ordered by patient ID) [Can be searched by patient]
- Check the sample if it is received (if received is ticked, the date it is ticked will be entered into this sample and displayed) (biomarker sample is collected in clinic by nurse)
- Only for received samples, it can check if bio marker slides are done (cells from the sample are put on microscopic slides)
- If the slides are done, then at another day, check if the bio marker's staining is done (the interpretation of the stained slide is done by the pathologist

Note: sample reception, slide preparation and slide staining are done on different days. So one list confirms reception, those received will be forwarded to lists: 'slide to be done' and 'to be stained'.

Biopsy lab interfaces (lab technician)
- List of biopsy samples (ordered by patient ID) [Can be searched by patient] (Samples are taken by gynecologist)
- Check the sample if it is received (if received is ticked, the date it is ticked will be entered into this sample and displayed)
- Only for received samples, it can check if biopsy slides are done
- If the slides are done, then at another day, check if the biopsy's staining is done

Note: sample reception and sample staining are done on different days. So one list confirms reception, those received will be forwarded to lists: 'slide to be done' and 'to be stained'.

http://biopsy-lab-interface.html/

Biopsy Lab Interface

Patient ID ▲	Name ▲	Age ▲	No. of samples ▲	No. of samples received	Remarks
P0124593	Chen Chen	29	3	2	
P0124587	Radhika Apte	31	2	2	
P0124587	Becky Bart	22	1	0	

Sample ID ▲	Received	Received Date ▼	Slide Prep Status	Slide Stain Status
S3219	☑	23/02/2016	☑	☑
S4167	☑	29/03/2016	☑	⊟
S1171	☐			

Pathologist interface (as mentioned earlier, biomarker and biopsy are two stage tests. They first need to be prepared by lab technicians, then by pathologist to get the final result)

- List of stained biomarker slides received
- Check the slides received (if received is ticked, the date it is ticked will be entered into the sample and displayed) [one slide per sample]
- After receive, can enter result for each patient (sample result will be sent to clinic nurse)
- Note: sample reception and sample testing are done on different days. So one list confirms reception, those received will be forwarded to list: to be tested.
- List of stained biopsy slides received
- Check the slides received (if received is ticked, the date it is ticked will be entered into the sample and displayed) [one slide per patient]
- After receive, can enter result for each patient biopsy (histology) results will be sent to gynecologist)

Note: sample reception and sample testing are done on different days. So one list confirms reception, those received will be forwarded to list: to be tested.

http://pathologist-interface.html/biomarker/

Pathologist Interface (Biomarker Slides)

Sample ID ▲	Reception Status	Date Received	Test Status	Test Date	Remarks
S3219	☑	23/01/2017	☑	25/02/2017	
S7395	☑	29/01/2017	☐		

Sample ID
S3219

Test Report
Negative

Remarks
None

http://pathologist-interface.html/biopsy/

Pathologist Interface (Biopsy Slides)

Sample ID ▲	Reception Status	Date Received	Test Status	Test Date	Remarks
S3219	☑	23/01/2017	☑	25/02/2017	
S7395	☑	29/01/2017	☐		

Sample ID
S3219

Test Report
Negative

Remarks
None

Clinic Nurse Interface
- List of HPV positive sample (ordered by patient), and whether or not the biomarker result is positive, negative, or pending
- Check patient informed (HPV result or Biomarker result)
- Check patient has been seen in the clinic
- Check physical examination done (if examined, also indicate whether the result is positive or negative, if positive, the patient will be appear on the gynecologist's interface)
- Check biomarker sample taken, if positive, the patient will be appeared on the gynecologist's interface
- Check questionnaire done (questionnaire will be taken first for every household women (aged over 19yrs), and again for the HPV-positive women in the clinic)
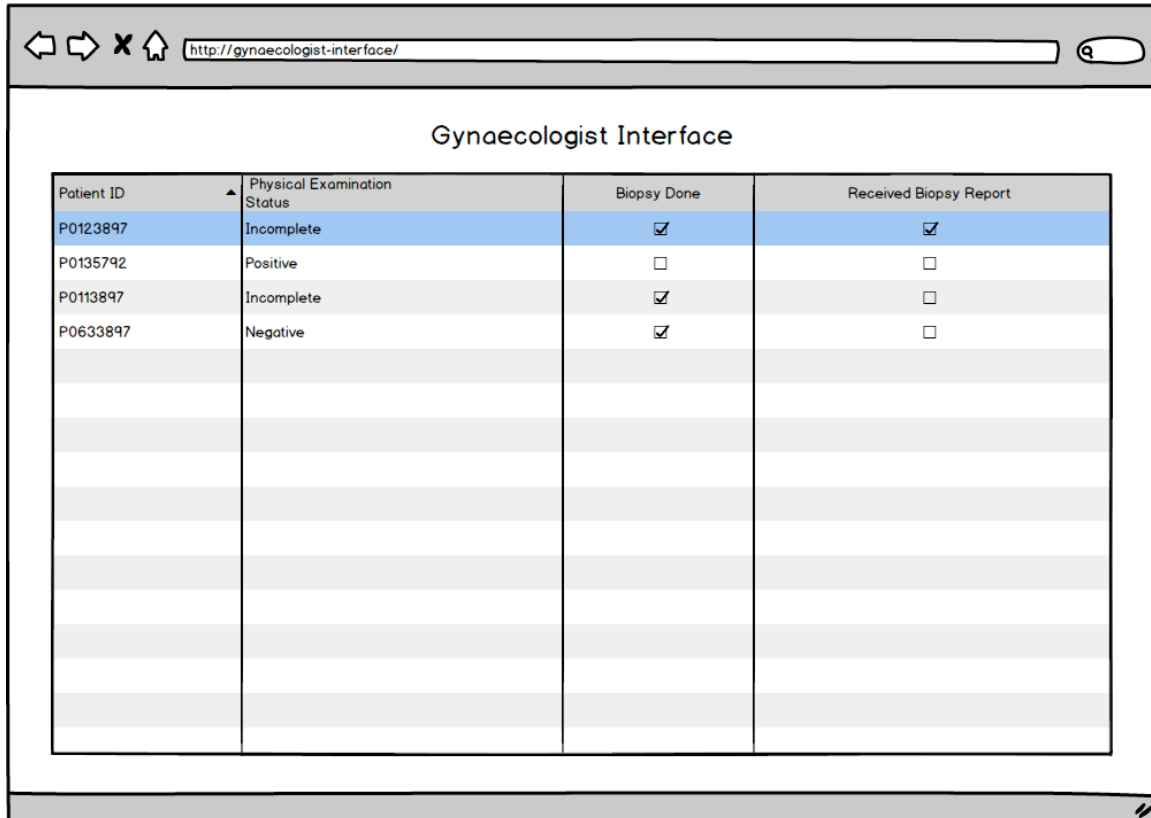-

Clinical Nurse Interface

`http://clinical-nurse-interface/`

Patient ID ▲	Sample ID ▲	Biomarker Result	Patient Informed	Patient Seen	Physical Examination Status	Biomarker Sample Taken	Questionnaire Done
P0134543	S3291	Positive	☑	☑	Done (Positive)	Done (Positive)	☑
P0234543	S3221	Negative	☑	☐	Done (Negative)	Done (Positive)	☐
P0534543	S3261	Pending	☐	☐	Not Done	Not done	☐
P0136543	S3691	Positive	☑	☐	Done (Negative)	Not Done	☑
P0137543	S1291	Pending	☐	☐	Not Done	Done (Positive)	☑
P0133453	S3771	Negative	☑	☑	Done (Negative)	Done (Negative)	☑

Gynecologist Interface

- List of positive biomarker or the positive nurse-examination patients
- physical examination (incomplete, positive, negative)
- check whether biopsy is done (yes, no)
- check whether s/he receives the biopsy report
-

Gynaecologist Interface

Patient ID ▲	Physical Examination Status	Biopsy Done	Received Biopsy Report
P0123897	Incomplete	☑	☑
P0135792	Positive	☐	☐
P0113897	Incomplete	☑	☐
P0633897	Negative	☑	☐

In addition to these interfaces, there should also be a common sign up /login page (the landing page) for all the stakeholders. On this page, there will be username, password fields and a forget password link. There should also be a registration page in which a person can register him/herself as a different stakeholder.

Backend

We provide you with a data dictionary so that you can set up your database accordingly. Some sample data is also provided in an excel file for you to look at.

Note: community worker and nurse should be able to work off-line and be able to sync from community worker to nurse tablet (tablet, App-based). All other roles could be browser based (desktop)

Note: the project requirements come from a real charity project proposed by Dr. Hermann (hermann.bussmann@gmail.com) from Germany. You may email him if you have any questions regarding the interface requirement. If your project is well done, it may be selected to be used in the field, and this will be a tremendous honor and something you can put in your CV when you look for a job. In addition, prizes will be provided for the top 3 teams.

Repository Setup

By this point all of you should already be having a private account in GitHub with cs3249uidevelopment@gmail.com already added as a collaborator. Every group should decide upon a group name and nominate a group member, who will host the code on his/her GitHub account. Each member should be responsible for different parts of the development and push their code to the main repository when it is ready. The team is encouraged to figure out a collaboration process so that less bugs will be generated during this process.

While uploading the code, please follow this naming convention for your repository:

                                              <Group Name>_CS3249_Project   _   _

(Please note any improper naming convention followed will result in deduction of marks)
In a simple text le write down the Group Name and the names of all members in the group along with their respective Student IDs (as given on the Student Matric Card). Indicate the group member that hosts the code with an asterisk (*) beside his/her name.

Remember to commit your code regularly to this repository.

Documentation

For this project, you will need to submit the documentation as a .pdf file. You should include:

Documentation on system planning, design, implementation and testing (include helpful diagrams to explain your system).

The structure of your project folder - include brief descriptions of all main files and folders.
Instructions for setting up the project.

Team Contribution - Clearly list each project member's contribution towards the project. This will be checked for authenticity during your final presentation for the project.

Implementation strategy

We suggest the following implementation strategy. First understand the requirements of the project, discuss with your team members and design your own high level mock-ups of each of the interfaces and their required functionalities. Then you can run through all the steps in order and document your process for each step.

Step 1: Break the UI into a Component Hierarchy

Just as "Thinking in React" describes, draw boxes around every component and sub-components in your mock-up and give them names (label the boxes). We want to see this for every view in your documentation. Explain your data models and corresponding UI components. Illustrate the component hierarchy in which you arranged the components.

Step 2: Build a static version in React

Implement a library of reusable components that render your data model.

Step 3: Identify the minimal (but complete) representation of UI State

Look at your data and figure out which one(s) is/are state(s). Document your process.

Step 4: Identify what your single immutable state in Redux should be comprised of and figure out the actions that need to be performed on it

Identify which action modifies which slice of the single immutable state. Document the process.

Step 5: Identify data flow and interactions amongst React components

Distinguish the dumb presentation components from the containers that interfaces between the dumb components and the Redux store.

Testing your application

You need to write unit tests for the add / remove and edit features in the household interface, where you can either add a new member to the household or remove / modify an existing member. Also, briefly discuss in your documentation, the rationale behind your unit tests and instructions on how these tests need to be run.

Presentation

You will be having the project presentation on April 20, 2017. For this you need to prepare an 8-minute presentation followed by an 8-minute Q&A. The exact time and venue of the presentation would be updated to you later. The things you would want to keep in mind -

Demo your application. Make sure you have the demo set up and ready to go during the course of your presentation.

In the 8 minutes you get for your demo, you need to show all the features. If you waste time setting things up, the wasted time will not be compensated for.

Right after your 8-minute presentation, you will be having a Question and Answer session for 8 minutes. You'll need to answer questions on your work division amongst individuals in your group, system design, implementation and testing.

Every group has their presentation for 16 minutes (8 + 8 min).

Submitting the project

Apart from the saving your progress on a regular basis on GitHub as discussed in Section 2, you also need to upload the final contents to IVLE. The group leader should upload the finished product. Please keep in mind -

All deliverables should be archived into a .zip file with the same naming convention mentioned in Section 2.

In the .zip folder, you need to have a .zip of your project folder and also the documentation.
The last date for submission is April 19, 2017, 23:59 Hours.

Supplementary Documents List

You can submit any of the design documents such as the mockup of the interface design as supplementary document in IVLE.