ECE 1778:
Creative Applications for Mobile Devices

Lecture 5

October 14, 2016

(Let's sit in first 4 rows again, please)

Today

1. Fierce Mobile
2. Logistics
3. Project Management and Execution
4. Group Interaction
5. Proposal Presentations Next Week
6. Peer Review of Proposals
7. Proposal Pre-Discussions

Fierce Mobile

Fierce Newsletters – Wireless, Health, Tech

- There is a family of newsletters/websites in the mobile world, that keep you apprised on sometimes interesting things:
- Fierce Tech Exec – mobile technology news
  - http://www.fiercetechexec.com
- Fierce Wireless – cellular industry & handsets
  - http://www.fiercewireless.com
- Fierce Mobile Health
  - http://www.fiercemobilehealthcare.com

- To Join – see 'Subscribe' link at bottom; many others
- Recent Examples ..

From FierceHealthCare October 6, 2016

FierceHealthcare
A FierceMarkets Publication

Mobile

Wearables unlikely to increase physical activity

by *Dan Bowman* | Oct 6, 2016 12:44pm

Just weeks after researchers called into question the **effectiveness of wearable activity trackers to help users lose weight**, a new study claims that such tools are unlikely to help even increase activity.

For the **study**, published this week in *The Lancet Diabetes & Endocrinology*, researchers from the Duke-NUS Medical School in Singapore recruited 800 individuals, equipping roughly 600 with Fitbit Zip trackers; 201 were assigned to a control group and 203 to a Fitbit only group, while 197 were told to use the tracker and promised a weekly cash reward for activity for six months. The remaining 199 were told to use the tracker and were promised a weekly reward for six months for activity that would go to charity. Activity was measured at the end of the intervention at six months and again at 12 months.

From FierceHealthcare, Oct 10, 2016

FierceHealthcare
A FierceMarkets Publication

Mobile

Zika focus of Arizona crowdsourcing smartphone app research

A new University of Arizona crowdsourcing app aims to detect, track and prevent spread of the Zika virus.

Developed by health researchers in the College of Public Health and UA Bio Computing Facility, the Kidenga smartphone app, available on Android and iOS, allows users report mosquito activity on a weekly basis, as well as disease symptoms. It also provides users educational information, **according to** the school.

A crowdsourcing approach enlisting citizens is being used as controlling the disease has proven challenging; it requires both grassroots initiatives, as well as government-supported efforts, researchers say.

"If enough people use the app, it may be able to detect ZIP codes that appear to have an uptick of suspicious symptoms," says Kacey Ernst, an infectious disease epidemiologist with the College of Public Health. "This early alert is critical to reduce or prevent further spread of the virus," she stated, adding "with more information, we hope that more people will join the fight to control these mosquitoes."

The app's data can be shared among users in Arizona, Florida and Texas. More than 20,000 U.S. citizens have contracted Zika via a mosquito bite or sexual relations, according to the university.

As *FierceHealthcare* reported last April, most exposed American have some information regarding Zika's link to birth defects, but **misinformation persists regarding testing and vaccination**.

Going forward, the research teams hope to expand user access in more states, specifically those with a higher risk of Zika, for wider reporting on Aedes aegypti, the mosquito that transmits the disease.

Logistics

Assignments

- S3 and P3 due next week
  - Except S3 part 1 is due Today
- S4 and P4 will be available soon, not due until Nov 4
  - Discussed next week
- S2 and P2 are finished being graded
  - Generally quite well done; P2 was hard!
  - If you received a failing grade on P2, or did not finish it, please talk to me today after the lecture is over
  - S2 quite well done!

Project Time Line

Project Stages 16f

1. **Forming Groups**
2. **Project Approval-in-Principle**
3. **Project Proposal/Plan**
   - Document Due Yesterday, some extensions
4. **Proposal & Plan Presentations**
   - October 20 & 21
   - **NOTE EXTRA LECTURE Thursday Oct 20, 6-8pm, SF 1101**
   - I'll buy dinner – pizza – let me know of food preferences.
5. **Lecture on User Experience & Presentations October 28**
6. **Spiral 2 & Spiral 4 Presentations**
   - 2: November 4/11 4: November 18/25
7. **Final Presentations**
   - Weeks of December 2/9
8. **Final Report Due December 14th**

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Project Management and Execution

Your Project Plans

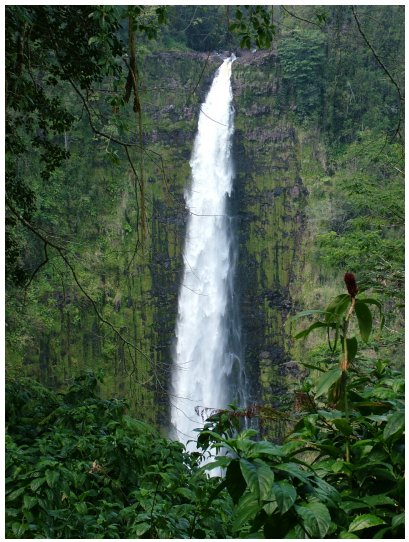
- Will have given you a well-defined final goal
- Should also have broken up work up into pieces
  - The block diagrams required in proposal

Soon: Start Executing! How?

Focus: Spiral/Agile/Incremental Method

- Get smallest part of Project working as soon as possible.
  - Exercise it, revise it, and build on it
  - Use your common sense to see if it is working, and if your goals need to be adjusted
- After today's discussions, you should work to identify what this first working useful version should be

Waterfall vs. Spiral Methods of Development



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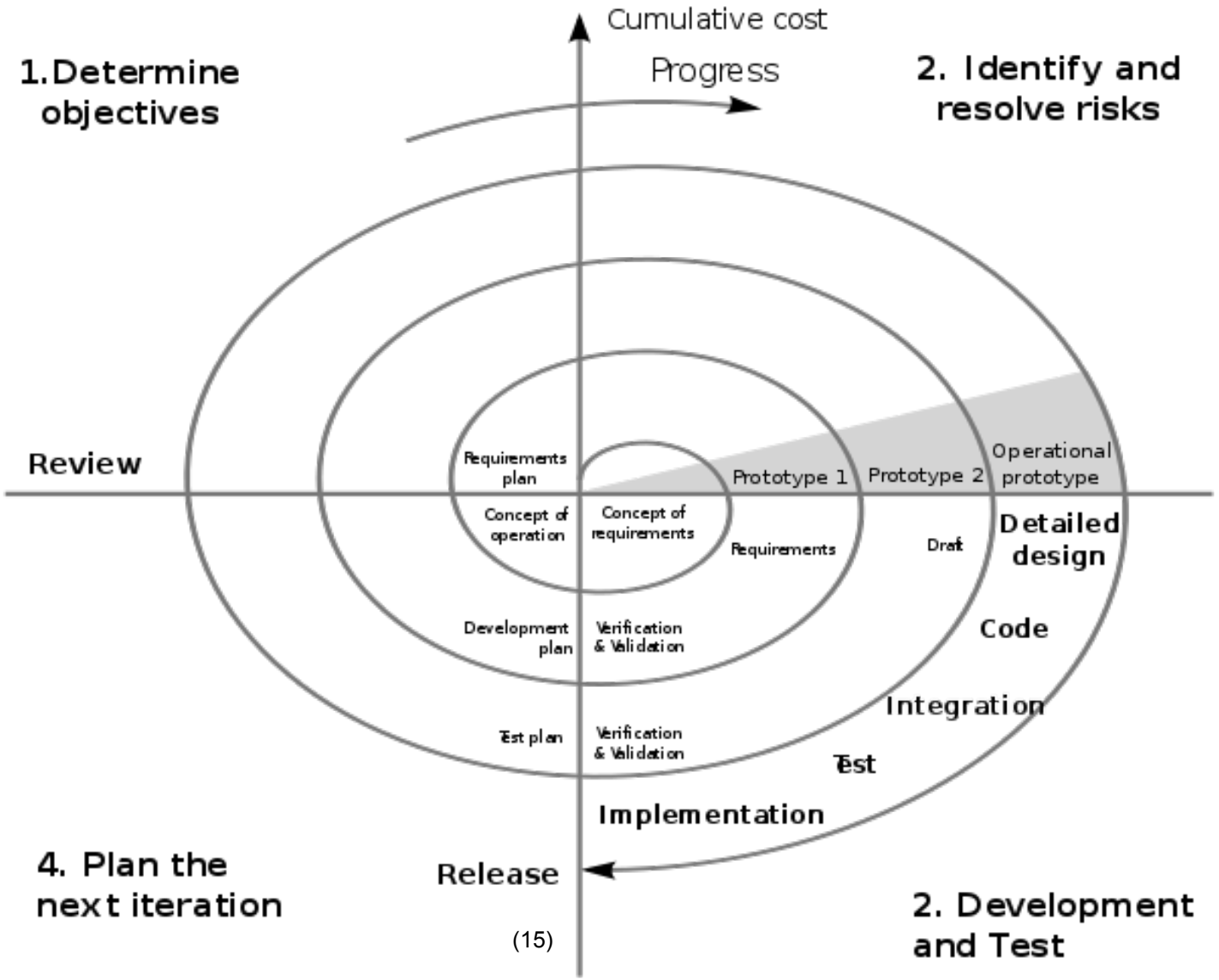
- Waterfall means plan everything out, documenting carefully, then build
- But software really needs to be exercised to see how well it works -> Spiral
- Particularly true for user interface oriented software
  - but essentially true in all projects!

Boehm's Spiral Model



Agile Software Manifesto

Agile Software Values: Choose

- **Individuals and interactions** over processes and tools
- **Working software** over comprehensive documentation
- **Customer collaboration** over contract negotiation
- **Responding to change** over following a plan

- while there is value in the items on the right, we value the items on the left more
  - From http://en.wikipedia.org/wiki/Agile_software_development

Spiral Method of Development

- To emphasize how important this is, the next key milestone in the course, is **Spiral 2**
- **Spiral 1** is what you get plan to get working end of week - October 28
  - You should describe what this will be in your proposal/plan presentation next week – functionality and features achieved; you're not presenting this.
- **Spiral 2** is what you get working by Friday Nov 4
  - The complete set of (additional to Spiral 1) features and functions
  - You **are** presenting this!

Week	Date	What
1	Oct 28	Spiral 1
2	Nov 4	**Spiral 2**
3	Nov 11	Spiral 3
4	Nov 18	**Spiral 4**
5	Nov 25	Spiral 5
6	Dec 2	**Final Demo**
7	Dec 9	

You'll Present Spiral 2 on November 4

- November 4 is four weeks from now, a long time
  - You'll want the Spiral 1 working well before!
  - You should think now what your Spiral 1 is going to be
  - You will include your projections/plan for Spiral 1 and Spiral 2 in the plan you **present** next week

Key Coming Steps in Project

1. **Identify a Spiral 1 and Spiral 2**
   - Take your block diagrams, and break down into tasks
   - Those tasks will tell help you decide what to shoot for in Spiral 1 and Spiral 2
   - Be prepared, of course, to adjust goals as you go along

2. Define the tasks that need to happen
   - Estimate how long they will take
   - If too long, re-do goals
   - Estimation is difficult; have to try; failure OK; can ask for help
   - Assign Tasks to Each Team Member

Project Execution

- You're in a team, and you need to find an effective way to coordinate the team's work

- Agree
  - Who is doing what
  - When work will be done
  - Explicitly, in writing of a group email

- Have weekly or more frequent meeting; every 3 days?
  - If not in person, use Skype video or phone

Rule 1 for Effective teams:

- Make commitments,
  - check on commitments (task execution) each meeting
- Don't be unpleasant or nasty if commitment's not met, work together
  - However, don't 'look away' from it – face it and make a plan
  - Figure out if commitment was too ambitious
  - Re-work goals/commitments to be done next
- Do have expectation that contributions of each team member are equal

What About Disagreements?

- You're in a team, you're likely to have disagreements
- If this is your first project experience of this kind, this can be stressful

- **Resolution of disagreements is a crucial skill**
  - Take this as a opportunity to learn how to do it

Issues and Relationships

- There are often two things going on when there is conflict or disagreement:

1. Specific issues that give rise to a problem
   - Factual/strategic differences of opinion

2. Relationship between people
   - Trust, respect

Modified from: http://www.execstrategies.com/Facilitator/ConflictResolutionStrategies.htm

Relationship Focus

- Trust is at the root of all good relationships
  - Personal and professional
  - Must establish common goals and work towards them together
  - Trust is created when everyone believes that everyone else has the same goals

1. Maintain a fair, respectful communication style
   - with careful listening
2. Expect and accept another's right to disagree
3. Realize the value of disagreement
   - it can lead to something better

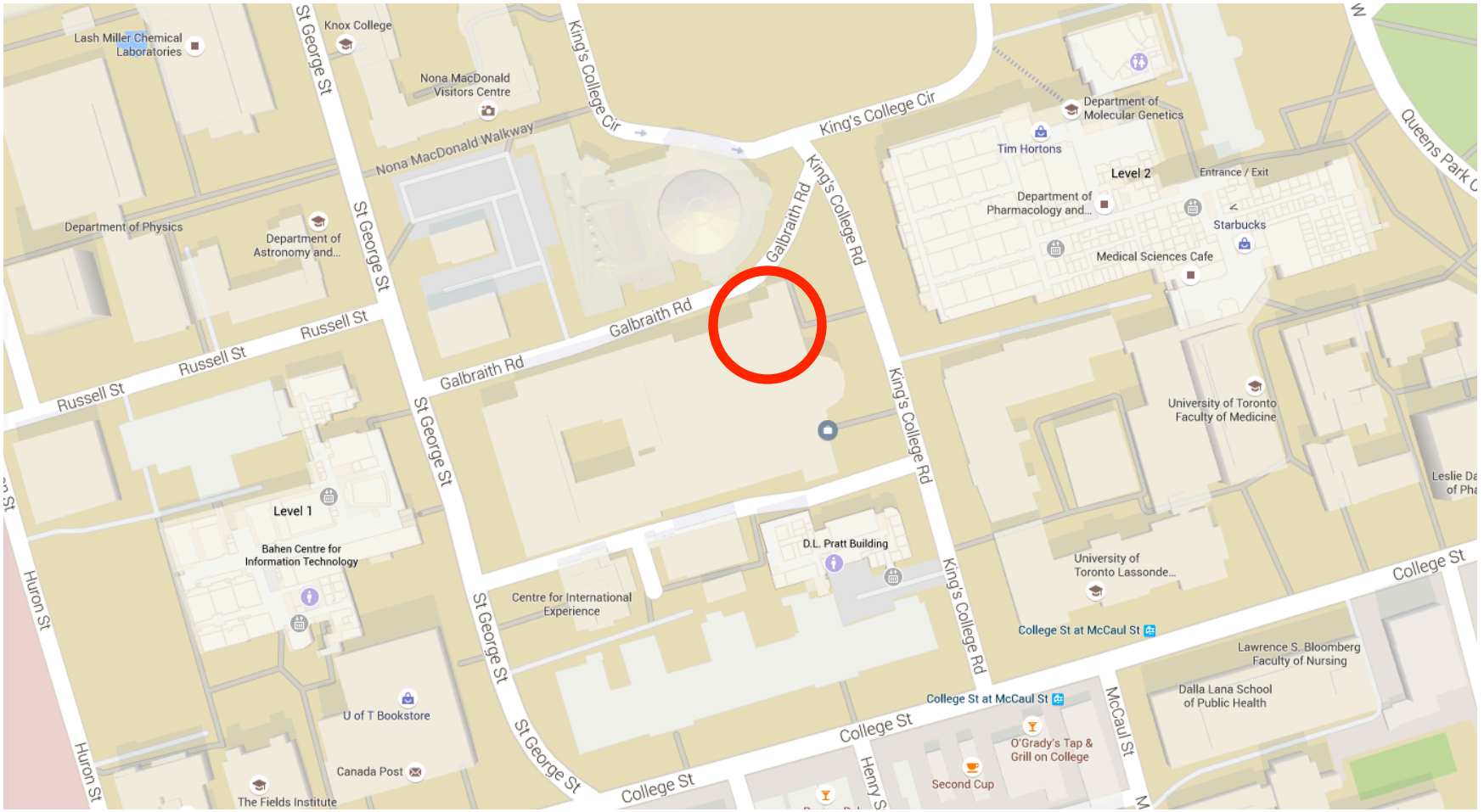
Proposal/Plan Presentations

Next Week in **2** Classes:

Thursday October 20th 6-8pm (SF 1101)

Friday October 21st, 10am-12 (Usual)

Location of SF 1101 (Sandford Fleming)



Plan Presentations on Oct 20 and 21

- Formal Presentation
  - Using PowerPoint (preferred), Keynote, PDF or OpenOffice
- Extra lecture on October 20, 6-8pm, SF 1101
- You will have to attend both lectures, because you'll either be presenting, or doing a **peer review**
  - Unless you expressed a **hard** constraint to me, that you cannot attend one of these

- Send the presentation to me by email by **Thursday, October 21st at 5pm**
  - Jonathan.Rose@ece.utoronto.ca

Time Limit

- **6 Minute Time Limit**
  - I will start timer that makes annoying sound when done, and expect you to be finished within 10 seconds after that.
  - **Omit needless words**
- Five Minutes for Questions/Discussions

Proposal/Plan Presentation Contents

- **Should be the essence of the written Proposal/Plan :**
- **Please be sure to follow this outline**

1. Goal (What & Why)
2. Mock-ups (pictures) of What User Will See
3. Top-level Block Diagram of Code briefly explained
4. Statement of Risks/Issues
5. **Spiral 1 and 2 targets -> Different from written**
6. Specialist Statement
   - 1 minute, for Specialist to say what their contribution will be

Notes on Time Limit & Clarity

- Time Limit is both serious and important
  - To this course and your ability to communicate going forward

- How many slides can there be in 6 minutes?
- How much can go on a slide?
- Are pictures good things in presentations?
- Do you start with the details or the big picture?
- What place does jargon have in a short presentation?
  - What is Jargon?

How Do You Know if Presentation is Good?

- Practice it, standing up, in front of:
  - First, no-one
  - Then, a few others
  - Not too much, though, either, as it shouldn't sound memorized

- **Time it**
  - if too long, cut it
  - Get to the point quicker

- Gulak's law: "You can describe anything to anyone in any amount of time"
  - Just have to pick the right level of abstraction

How Do You Know if Presentation is Good?

In Practice:

- Listen to what you are saying
- Does it make sense **listening with the ears of the audience?**

Who is Your Audience?

- A mixture of technically-literate and people with expertise in some another area [different from your own!]
- Make sure the lay people know **what** you're doing - the goal
- OK to go somewhat technical after that, but don't assume we're all expert in every sub-field of ECE and CS

Peer Review

New this Year

Class Presentations

- A key part of what happens in this course is the contribution you make to other's projects

- You will do many presentations in this class
  - Indeed, one side-effect of this project course is some real practice in giving high-quality, concise & clear communication
  - Most presentations will be 5-6 minutes in length
  - Must be geared so that most people in the class will understand

Peer Review

- Want everyone to come, listen & provide useful input
- Expectation that you'll listen and provide thoughtful feedback and suggestions to other's presentations

In Addition

- For each of Proposal, Spiral 1, and Spiral 2 you'll be asked to write a review for one other group; these will be graded
- Means you'll need to be here for every lecture, not just when you're presenting.

Assignment of Group to Review

- On Wednesday October 19, I will send you an email telling you which group you will review. It will not be on the day that you are presenting.

Peer Review for Proposal

Short answer questions, Due Monday October 24th @6pm.

- Late penalty -0.5 marks for every hour late

Briefly answer these four questions

1. State the goal of the project in your own words
2. Which parts of the proposal did you understand, and what parts could be more clear? Why?
3. What was the best thing about the proposal?
4. What one thing could be improved the most?

Selected Proposal Discussions

Discussion

- Would like to review the proposals submitted this week, and engage in a discussion
  - To help all of you with your planning & execution

- Be prepared to stand up, and describe your proposal
  - What & Why
    - Describe the idea, and its motivation
  - Thoughts on a Spiral 1 and 2

Current Project Names

YouVote
Correctly
ExerciseGame
Trip Story (Adventure)
Cognitive Game
Ups and Downs
Music Measure
HIIT It!
Habit Buddy
IntelliWork
Patio
STAGE
UofTHealth

Trip Story

What:

- The aim of this project is to create a Rebus Story (picture story) app that allows children to form a personalized story by answering a series of questions. These questions are designed to be engaging and test the user's (children age: 4+) creativity while also providing positive feedback.

Why:

- This App will help children enhance their early literacy experiences. It facilitates listening, develops speech and reading in a fun way which keep them engaged. Thus making children self- learners and encouraging them to be independent creative thinkers.

Habit Buddy

What:

- The goal of our app is to aid in the motivation of starting and maintaining a healthy habit, in this case walking. The app will do this by matching people who would like to start at the same level/ schedule this is done through an intake assessment, finding their best fit. Along with the buddy, there will be behaviour shaping tips and recommendations. This would be embedded in the schedule the user chooses in the assessment. After a certain amount of progress, there will be reminders to increase the frequency of the user's original schedule (giving that they start with a digestible schedule to start with). Performance and progress will also be displayed in the schedule and charts, as well as history summary. There will be a user profile, a main screen or menu, which will act as a hub, and messaging between habit group and buddy (one public, the other private). There are other features to assist in a pleasing user experience and, although we are just using walking as a habit for this prototype, Habit Buddy can expand to as many healthy habits imaginable.

Why:

- I find, and I am sure there is research to back me up, that we are more accountable to others than to ourselves; and having a buddy who wants to start the same healthy habit as you, presumably, motivates you to not only start a healthy habit, but to sustain it. A buddy also provides sharing, connection and support: things that are devoid and lacking in regular, habit apps.

Stage

What:

- The overarching goal of Stage is to help audiences connect to classical music using mobile technology.
- In order to begin this shift we will create a mobile app that gives musicians an opportunity to demonstrate their ability, compete with each other and share the results of that competition with audiences.
- This app rates the musical performance of its users by recording and analyzing their version of professional level pieces. This app rates pro-level musicians based on five criteria: rhythm, intonation, technique, musicality and quality of sound (*).
- Users can share and compare with each other, invite others to compete and share their results on social media.
- This app can become a strong marketing tool for the performers, an interactive educational tool for music educators, and a fun way for new audiences to discover local musicians.

Why: missing

Hit It! (What)

- HIIT It! is an application that facilitates high intensity interval training (HIIT) on a stationary bike. Users will select songs from their own music libraries and HIIT It! will rhythmically enhance the song's pre-existing beats to facilitate alternating high and low intensity bouts of exercise. The enhanced rhythm will be double the speed during the high intensity sections than in the low intensity sections. A TI sensor tag strapped to the user's ankle will detect their pedal rate and provide feedback to the user post-workout.

Hit It! (Why)

- After stroke, patients lose the ability to perform previously learned movements. Motor relearning is a priority of the rehabilitation team because restored movement is necessary for patients' return to daily functioning. Research by Roig et al. [1] shows that exercise immediately following motor learning can enhance retention of the learned movements. Stork et al. [2] found that asynchronous music listening during HIIT may enhance performance and perceived enjoyment of this aversive exercise protocol. It is possible that synchronous music listening during HIIT can facilitate improved efficiency of movements further enhancing HIIT performance [3]. Finally, research by Alter et al. [4] in cardiovascular patients showed greater adherence to exercise when patients were provided with playlists that had subtle rhythmic enhancements to their self-selected music. Ongoing research is examining the effects of synchronous music listening during HIIT and its effects on motor learning. The previous research suggests that music during HIIT can make HIIT more pleasant and enhance adherence to exercising which would benefit both clinical and healthy populations. Our application can be used by both healthy and clinical populations to improve their fitness and enhance their lives.

Patio

What:

- The goal of our App (Patio) is to make preparing and filing a first patent application faster, cheaper, and less complex.

Why:

- Generally, most patent systems give patent rights to the inventor who files a patent application first. So it is critical to file as early as possible. However, complexity and costs of obtaining a professionally-prepared patent application can prevent many inventors from filing their first patent application as early as they might have otherwise. In addition, many inventors who try to prepare their own patent application make fundamental mistakes that can seriously jeopardize their ability to obtain patent rights. By lowering the cost and complexity barriers to filing, and by reducing the possibility of serious mistakes, Patio seeks to make the patent system more accessible and allows more inventors to file as early as possible.

Correctly (What)

- Our app is geared toward helping users to acquire a new language quickly and accurately. Acquiring a new language is based on developing four skills reading, writing, speaking and listening. Our app will focus on the speaking aspect of language acquisition. It'll help the users to record their voices match their pronunciation and provide feedbacks whether their pronunciation is correct or not.

Correctly (Why)

- Canada is the first country to adopt multiculturalism as an official policy. Canada affirmed the value and dignity of all Canadian citizens regardless of their racial or ethnic origins, their language, or their religious affiliation. However, English and French languages are Canada's official languages. Millions of newcomers land in Canada every year, coming from different countries and speaking different languages. This app will help users to learn how to pronounce new words in order to facilitate socialization and perform their daily tasks. Furthermore,technology is an ideal place to help teachers working with learners, and learners working independently, to take valuable steps that makes their language development possible. ….Many of different aspects of language can be practiced with the use of self-study materials. ….Pronunciation is one of those things that only teachers in classroom can correct. Even Friends will usually let pronunciation mistakes slide for the sake of keeping their friendship. Trying to find ways for people to do meaningful spoken language practice outside of a classroom can be very challenging, especially for parents and students. The proposed app is to facilitate language learners to practice their pronunciation, and provide them with feedbacks.

Ups and Downs

What:

- “Ups and Downs” aims to make identifying mood changes easier and more accurate by using objective sensor data to approximate user’s mood. Based on mood changes over time, the application will recommend interventions to help users recover from a down state. If mood changes match certain patterns such as Seasonal Affective Disorder or Bipolar Disorder, the application can refer the user to see a physician.

Why:

- Many people tend to experience “ups” and “downs” in their overall mood. While changes in mood can be normal, they are labeled as mood disorders if they persist for longer periods of time or occur with greater intensity. The Public Health Agency of Canada estimates that 1 in 8 Canadians show symptoms of mood disorders [1]. According to the Mood Disorders Society of Canada (MDSC), an average person with a mood disorder will see 3-4 doctors and take 8 years to be correctly diagnosed [2]. Additionally, people aged 18-25 are most likely to suffer from a mood disorder and the least likely to get help.
- One challenge in managing these mood changes, regardless of if "normal" or associated with a disorder, is identifying changes in mood and diagnosing them as normal or related to a disorder. Current methods rely heavily on self-diagnosis, which is unreliable especially since one of the first signs of a depressive state is doubting one’s judgment. Keeping a mood journal can be helpful in making a diagnosis, but requires continuous effort from the patient and also depend on patient's’ ability to assess themselves. In fact, MDSC recommends asking someone if they have noticed changes in your behaviour recently.

Intelliwork (What)

- The goal of the app, IntelliWork, is to assist plant operators to inspect production processes in a more systematic and efficient way. The app will provide a guideline that standardizes unscheduled inspection processes. It will also provide functionalities that help operators to identify, communicate, and document incidents during inspections.

Intelliwork (Why)

- Chemical manufacturing plants are complex systems where process disturbances are inevitable. Operators play a critical role in mitigating risks. Assisting them to identify symptoms of equipment in distress conditions and to take actions to minimize those impacts, is essential to improving and sustaining asset reliability.
- Unscheduled inspections are part of the due diligence process that operators undertake voluntarily to check on physical equipment. Based on the interview with operators at a toner production plant, 80-90% of process abnormalities are identified during unscheduled inspections. However, this type of inspection tends to be hit-and-miss, and it is executed with a high degree of variability. Thus, it should be treated with caution.
- Currently, operators conduct unscheduled inspections irregularly without having formal procedures that tell them what, how, and when to inspect. The lack of guidelines poses high mental workload on operators. If an abnormal symptom is identified, operators report the incident and request assistance verbally via radio. However, verbal communication is not effective in describing equipment conditions as compared to using photos and videos. In addition, all documentations on the incident are completed manually after incidents are detected. Not only are hand-written reports prone to human errors, the manual processes are also labour intensive and time-consuming. The unstructured inspection process poses high execution variability, exposing the system to potential hazards of catastrophic consequences.