Inspiration Station – Problem Generation

Problem Generation Walkabout (March 13, 2019)

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| · Better building layouts, and reorganization  · Ventilation systems for exhaust  · AI/Driverless boats  · Pavement cracking in winter  · Cheaper ways for sound blocking  · Parking lots  · Black ice removal  · Railway crossings  · Assistance for the blind  · Ticketless bus systems  · Security at train stations  · Blue text/light  · Cut off air for fire  · Heavy bags | · Sprinkler damage  · Quick prototyping  · Poor ventilation  · Different charging angles for solar panels  · Air supply  · Autonomous vehicles/boats/submarines  · Autonomous crashes  · Stuff falling off  · Electrocution on power lines  · Geese shit (soln: iRobot cleaner with sensor)  · Slippery roads  · Assistance for the blind  · Frozen stairs  · Preventing bikes from being stolen. |

Problem Generation at Williams (March 13, 2019)

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| * Constant monitoring of vitals for old aged, homeless   + Solution: Wristband that measures vitals that gives alert when vitals are not normal   + These vitals are: Heart rate, Oxygen, Blood pressure,Temperature   + Possibly also has Fall detection   + Potential obstacles     - Recognizing exercising/walking patterns     - Waterproof   <https://the-ria.ca/researcher/jen-boger-phd/>  <https://uwaterloo.ca/systems-design-engineering/profile/jboger>  <https://globalnews.ca/news/5082756/woman-dies-new-brunswick-emergency-room/>  She is a professor in the SYDE dept and can mentor our group since her research centres around enhancing the health, safety, well-being, and independence of older adults and people with disabilities.  <https://uwaterloo.ca/scholar/chaas/home>  This professor in Civil Engineering does the exact same kind of research but related to construction workers. Anurag worked with him for one of his coop terms. |

GM Canada Capstone Design Seed Fund

6 teams get $2500 each

1:1 mentorship (tech + business)

Present to GM at the end

Problem Statement:

How can we make the autonomous experience more inclusive and accessible?

April 30th proposal submission

June - proposal decision

Idea selected on:

Innovation

Safety

Feasibility

Customer centric (fits the customers needs)

Integration

Expandability

* Forgetting where car is parked
* Noisy roommates
* Noise canceling bubble
* Warehouse surveillance
  + Solution: Drones that patrol the facility
* Theft
* Solution: Items are mapped by camera and it recognizes heat signatures of people
* Heavy bags
  + Solution: Devices that use inertia to reduce strain on shoulders and back
* Kidnapping/Monitoring of children and babies (Where’s my baby?) lol
* Further additions:
* Distracted/Drunk Driving
  + Solution: app that doesn’t let you operate anything like Facebook, Twitter, Messenger while driving
* Non-invasive Glucometers
* Refugees’ integration into mainstream Canadian society
* Car freezing rain shield
* Number of people on each floor that request the elevator, prioritizes floors with more people
* Efficient Waste Management solutions
* Overspending while shopping (Note: this doesn’t necessarily have to be shopping, it can be while visiting a holiday destination too. The key problem here is overspending)
  + One out of many solutions: device that gives you alerts after you reach a certain target for the day(eg $50)
  + Can use AI to study shopping trends and give reports at the end of a shopping session if the customer overspent or not and by how much. How much have they overspent in total till date.
* Certain sections of the house are warmer than others
  + Solution: iRobot with a fan on top, temp sensing
* Cars get stuck in slush during winters
* Foul smell remover
  + Solution: iRobot with a perfume spray on top
* Food Wastage
* <http://www.cykf.net/Liveatc/Police&audio.php>

<https://www.broadcastify.com/listen/ctid/4327>

Live WRPS/OPP/Fire department feed.

Alternatively, we can build our own antenna for reception of the audio stream instead of using a 3rd party.

Process the audio streams and issue notifications to news channel correspondents when something important/interesting happens. Forward same notification to uber drivers, cab drivers, news journalists. Can serve as a real time traffic assistant or real time news producer.

* Identify doctored videos/fake news
* Pet geotagging application. Study trends and alert when something is wrong, eg: pet lurking at some random location, (Where’s mah dawg?)
* List of rooms on campus that currently don’t have any classes going on in them so that I can study there. [More like a Software Eng. project]
  + Solution: App that recommends a room that is currently free and the closest to me.
* Problems while learning a new language
* Make TV screen on which some show or news broadcasting is going on easily understandable for deaf or blind people.
* CRA/IRS/Chinese/Furnace scam calls
  + Solution: Use ML/AI to detect if a particular call is a scam call or not and waste the scammer’s time by engaging them in the call, then blocks the number automatically.
  + Let the person pick up the call, use audio processing to determine if the person is getting scammed or not and alert them through a notification. This will be very useful for old age people living alone. We can also notify a trusted contact of this old age person who would have the ability to listen to this call and cut it from their phone, thus preventing the old person from being scammed. We can also embed LED (for the deaf) and/or piezo speakers (for the blind) into the phone so that it can go off if a scam call is detected. Target would be elderly people.
  + <https://arxiv.org/pdf/1804.02566.pdf> - A Machine Learning Approach To Prevent Malicious Calls Over Telephony Networks
  + <https://www.linkedin.com/pulse/real-time-call-fraud-detection-machine-learning-vijay-gaur>
  + <https://www.blackhat.com/docs/us-16/materials/us-16-Marzuoli-Call-Me-Gathering-Threat-Intelligence-On-Telephony-Scams-To-Detect-Fraud.pdf>
* MP for your area finds it hard to connect with individuals from their region.
* Be able to see cars/objects in your blindspot without having to turn back - Kinda dangerous - lots of legal obligations if we screw up.
* Make it simple for the blind to cross the road/navigate through a busy city
* Detect skin cancer/melanoma in its early stages by using ML/AI/NN to compare someone’s current skin images with images of affected skins.
  + This can be used for any kind of skin cancer such as breast cancer.
* People using disabled/accessible parking spots through their relative’s permits even though they are perfectly fit and fine.
  + Use ML/AI to study a person, identify his age and walking style and see what percentage the machine things he might be physically disabled. Report the results to law enforcement authorities. Can put a notice saying “this area is under video surveillance to give people an advanced warning”. However, issue here is not all disabilities are easily noticeable and detectable.
* Can’t find fish while fishing
  + Attach a low-cost portable waterproof device to the edge of the fishing rod that informs the user about the presence of an area where fish might be present (not sure if environmentally viable) [Sonar fish finders exist although they are very expensive]
* Amazon/FedEx courier/packet robbery from house door by unknown miscreants. Take revenge and report them to authorities.
* No platform where people can display information about their garage sale and what all items they are interested in selling. People realize there is a garage sale at a particular house only when they hear someone talking or they drive by the house. Yet, no one knows what all items are there in the garage sale for what cost. This application might be useful for thrift store owners.
  + An application that displays nearest garage sales to your house and also the pictures, text information about various items to be sold in it. People should also be able to bid for the item online and reserve it for some amount of time if they win it. If the person orders it from far away, give the seller an option to ship the item to them. Keep 20% of the highest bid as our commission and give the remaining 80% to the seller.
* Babysitter cannot keep track of so many babies all at once.
  + Solution that helps the babysitter track the progress of each baby in terms of food consumption, play level, tiredness level, health level, emergency contact of their parents at the touch of a fingertip. Each baby will have an RFID that can map to the babysitter’s mobile to get live and accurate data.
* An app that informs customers of a restaurant which all items they currently have in stock. For example, a specific Tim Hortons bagel isn’t available at all Tim Hortons. App displays which Tim Hortons nearby has that bagel available and in how much quantity.
* **What elective(s) do I pick next term?**
  + **Study the person’s characteristics and suggest some courses to them based on their overall personality.**
* **Smart Garbage Collection Bin:**

**Place the trash you want to dispose in front of a sensor, the sensor then takes a photograph of the trash, analyzes it using AI and opens or lights up the respective container for that specific type of trash. For example, if its a plastic drink container then it will open the 2nd garbage bin or if all are already open then it will light up in a distinct color such as RED here. Particularly useful for blind and disabled old people who are in malls.**



Timeline

Optimistic Timeline: At the end of 3B, we have a problem and solutions identified

Pessimistic Timeline: At the end of 3B, we just have a problem