

2020-09-23

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Project Introduction Vlog

Team member introductions

We are URStreamSight, and these are our envisioned roles as of right now

Ray: Primarily API / UI development. Trello management.

My name is Avery, I'll be working primarily on machine learning and our image classifier for recycling. I'll also be working on managing our Github, our CI/CD and documentation pipeline. I'll also take meeting minutes as well.

Hi, my name is Noah. I will be primarily working on machine learning development as well as the image filtering algorithm that we need to develop. I am also going to manage our project milestone and timeline documentation.

Although we have assigned roles, our intentions are that everyone will participate in all processes of this project

We will start with our project background & business needs and opportunities...

Here, your team should discuss information that will help the viewer (SSE faculty and the general public) understand the context and background history regarding your team's project. This discussion should assume that viewers are not well-versed (knowledgeable) regarding the background of the project or project area. You should also try to dive into the business need (if any) or opportunity/innovation that your team's project idea will introduce into the world

Citizens around Canada are confused regarding what proper recycling is. This costs millions of dollars in processing fees and lost revenues. By providing a method of measuring contamination from households, municipalities can begin targeting the issue at its source and begin providing individuals with contextual feedback to improve their recycling habits.

We want to develop a tool that operates within waste collection vehicles that could classify recyclables and non-recyclables on a bin by bin basis. By understanding how much non-recyclables were present in a bin, the quality of the recycling can be quantified. This data can then be used to:

- analyze trends in recycling quality over districts, neighbourhoods, households etc.
- identify neighborhoods and households that consistently struggle with quality and provide them with feedback
- calculate recycling fees dynamically based on quantity and quality, rather than a static charge, thereby promoting consumers to produce less waste and to recycle appropriately

A computer and camera system installed within a waste collection vehicle will act as an input to capture image data. Our API will remove low-quality photos from each bin's image dataset and store the remainder. The API will store the images to a remote storage host, such as Amazon S3. The images stored will then be processed by a classification model. The model will identify the items present in the image and then using machine learning will classify them as recyclable or not. We can then sum the quantity of recyclable and non-recyclable material present and compute a score. A front-end UI will take the scores and relate them to bins and their geographical location. Therefore, we can provide municipalities a visual representation of the quality of recycling and where it is originating from.

We are working on this project for many reasons...

Before we start creating something, we need to know why we are creating. We create for many reasons, such as:

- *To solve a problem (This is the engineer's bread and butter)*
- *Show someone our thinking*
- *Express our ideas, feelings, or interpretations*
- *Interpret information in a new way*
- *Etc.*

So think about and discuss your team's reason to create?

We want to create a tool that simplifies the management of recycling waste. Currently, waste management is overwhelmed by the sheer amount of recycling and its level of contamination. Not only is it difficult to quickly process this vast amount of recycling, the difficulty level is exacerbated by the contaminants that make processing the recycling hazardous or completely impossible. Our tool may not only make recycling management feasible, it could also make recycling a profitable industry and promote change towards a greener future.

As a team, our personal reason for doing this project is to attempt to create a system that will help the environment. StreamSight and Prairie Robotics work to create more efficient and effective recycling and waste management programs. Working on this project will help further advancements and work towards creating a more sustainable recycling practice. We are passionate about the environment and helping to improve our waste management strategies is exciting. Our team was also interested in this project specifically for the partnership with Prairie Robotics. Despite our individual interest in producing less waste, the knowledge from Sam and the rest of the Prairie Robotics team, as well as their potential support for costs and networking, all draw us towards a collaborative project.

Next I will discuss the Impact we intend to have...

Sometimes we can start with the impact we want to create - how will our project and the work we do on our project change our current reality, and how will we achieve this new reality, e.g. learning new tech, using class notes from Tim's classes...haha, etc.)? This helps us think more broadly while we are creating. To help discuss your project's impact, [fill in the details] and discuss the following statement in your vlog

When we are done [our current reality] will now be [our new reality] so we think we need to [action step]

We are hoping that municipalities will be able to more closely monitor the recycling generated by households and communities and take steps to enforce good recycling habits. Municipalities will need to learn new technology to interact with our app, and curious household individuals will also need to familiarize themselves with our new technology, as well as researching more efficient ways of recycling. Overall, citizens and local governments in municipalities will have a recycling program that allows for a pay-per-use system rather than a flat monthly fee for recycling.

Who...

*In terms of our audience, or who we are creating for
When we know who we are creating for, our audience, our work is more meaningful, relevant and appropriate. So think about and discuss:*

- *Who is your audience?*
- *Whose opinion matters?*
- *Who do you want to reach with your work?*
- *Also, know/discuss where your audience is?*
 - *In the same room, city, province, across the globe?*
 - *Where do they get their information? (paper, digital, opinion, peer-reviewed, etc.)*

We are developing our solution for municipality governments (particularly in Saskatchewan and western Canada), for communities, and for Prairie Robotics. We want consumers to more easily recycle effectively, and lower their recycling fees if they do. We want municipalities to have the ability to reduce their processing fees, give them space to bring in new industry, and serve their community better. We want Prairie Robotics to be able to take this tool and integrate it with their existing suite of technologies, thereby providing the most useful and complete service possible to Saskatchewan municipalities.

Our goals and how we achieve them are heavily influenced by the guidance of Prairie Robotics. Their company is the connection that we have to municipalities and industry experts regarding recycling management. We are learning from their extensive research so that we may create a product that benefits all of our audience.

Finally we will talk about what constraints our team envisions...

Think about and discuss what type of constraints your team envisions, e.g. knowledge, technology, access to customers, etc? Constraints are important to know as they enable us to push ourselves to think even more creatively To inspire better thinking, we have to become more resourceful and work within limitations - what are the envisioned constraints and limitations?

There are some constraints that we have identified as a team. A large one is the accessibility of a dataset to use to train and test the machine learning classifier we hope to create. This will potentially limit the accuracy or delay the training of a model.

Another constraint we have identified is the mapping of bins or relating the data to a location. Since bin location varies from house to house, this is potentially hard to map to a specific house or location. Creating a system or UI to relate bin data to a location could be limited by the quality of location data we receive.

Next, time is a constraint that will be a major factor we have to consider. With other classes, projects, and commitments, the amount of time that we can put into the project will be limited. Lining up times to work and organizing asynchronous work with projects could limit the output or add unexpected delays.

The accuracy of the model is another constraint. How accurate of a model will we need in order to confidently charge people without risk? Our knowledge of Machine Learning is still introductory at the starting point of this project as well, so we will need time to learn new techniques that will allow us to develop a suitable model for industry use.

Thank you for listening to our project introduction vlog, we are excited to begin work on this project.