Team Copy-Waste - Project Bazaar 2

Team Member (Re)introductions

- Nolan - Machine Learning Lead
- Will - Back-End Services Lead
- Rishabh - Front-End Services Lead

Vision:

Our project has two objectives; reduce risks to the public, waste management employees and facilities and reduce the cost to municipalities and waste management companies caused by rare and severe contaminants in recycling waste collection.

Mission

We strive to achieve our vision by automating the detection of severe and rare contaminants in the recycling stream

Business Need

Our business need, to reiterate, is to reduce risk and cost to municipalities and waste management employees. As recycling rates increase, contamination and risk becomes a growing concern.

Current Status: Green

Individual Contributions (Jan 25, 2022 - Mar 1, 2022):
Will:

- Worked on properly exporting annotations after running our copy-paste algorithm
- Began refactoring our code base to adhere to Python style guide
- Updated older documentation as well as completed some unfinished documentation

Rishabh:

- Conducted User Testing
- Re-transforming objects based on flags which were raised if an edge case occurred
- Connecting transformed annotations to exporting functionality
- Updated older documentation and completed any additional ones that were required

Nolan:

- Worked on polygon mask conversions
- Added variable flags for edge case scenarios
- Started integrating copy paste modules into dataset pipeline
- Pair Programming with teammates.

Project issues / changes

Identified and developed flags for two edge case scenarios:

- Polygon bisection - when overlapping objects result in a polygon being split into two objects
- polygon inside polygon - when an object is placed within the boundaries of another object; resulting in a multi-polygon segmentation

Both of these conditions are undesirable at this time, so we adjusted our schedule to implement these changes

Bin Tip Detector

The bin detector has been successfully deployed to our Industry Partner's production environment. Management of the product has been transferred to our Industry Partner and any future development will be implemented by their development team.

Simple Copy-Paste

We are currently integrating and testing all modules for the dataset augmentation pipeline as the prototype is scaled up for full scale production. The following objectives were completed during this development period:

- Testing Edge Case Flags
- Exporting an Augmentation File
- Image mask layering and clipping
- Multi Object Placement

Waste Management Dashboard

We conducted User Testing with our industry partner to identify their experience while utilizing the application. Some interesting points raised in these conversations include:

- Explicitly stating why information is coloured with green, yellow, and red
- Adding Legends to the Map displayed on the collection day pages
- Users are interested in seeing contamination rates across the neighbourhoods on the map. This could be showcased using a range of colour, where rates are high the colour should be darker.

Next up

Team

- Meetings planned with our Advisors and with Prairie Robotics
- Code Review session with our industry partner

Nolan

- Finish copy-paste module integration
- Produce Augmentated Dataset at scale.

- Begin training contaminant Mask R CNN model
- Code Reviews

Rishabh

- Implement changes as discussed on the dashboard
- Assist with any issues that arise when producing a large-scale augmented dataset

Will

- Assure that the audited dataset is working with our updated method to be able to create an actual dataset
- Fix segmentation errors when exporting

Team Reflection

- **Does the team feel "on track"? (reiterate the above colour status)**
    - We believe we are still on track as the copy-paste pipeline is ready to produce a dataset that will allow us to train a detection model
- **What progress does the team particularly feel good (great) about?**
    - Our progress on Copy Paste continues to be extremely encouraging and we are excited about scaling up and training a detection model
- **What barriers (if any) does the team feel is a current impediment to success?**
    - Identifying the frequency of edge case occurrences, as it has a direct impact on how the model will perform
- **What help (if any) does the team require to move positively forward?**
    - Moving forward we need to keep having regular meetings with our industry partner to guide us.
- **What questions or concerns does the team have (if any)?**
    - No concerns at this time