

Avery Cameron, Noah Rowbotham, Raymond Knorr | Software Systems Engineering

What is StreamSight?

We developed a web application for municipalities that tracks contamination in household recycling.

Videos are captured from the bin of recycling trucks and processed through a waste classifier to determine whether the recycling is contaminated.

With our software, municipalities can provide directed education and regulations to improve recycling quality at the source.

Why StreamSight?

Contaminated recycling generates fines for municipalities which increases costs for households. If the recycling is clean, recycling can instead provide revenue.

We have a 3 Pillar approach:

- 1) Education: The first step to fixing behavior is to raise awareness
- 2) Regulatory Compliance: The use of fines or loss of service to improve behavior
- 3) Iteration: Analyzing results of these two approaches to determine best method or combination

Architecture

Images are collected from recycling vehicles. Then contaminants are identified. Finally, results are stored and displayed to municipality users on our website.

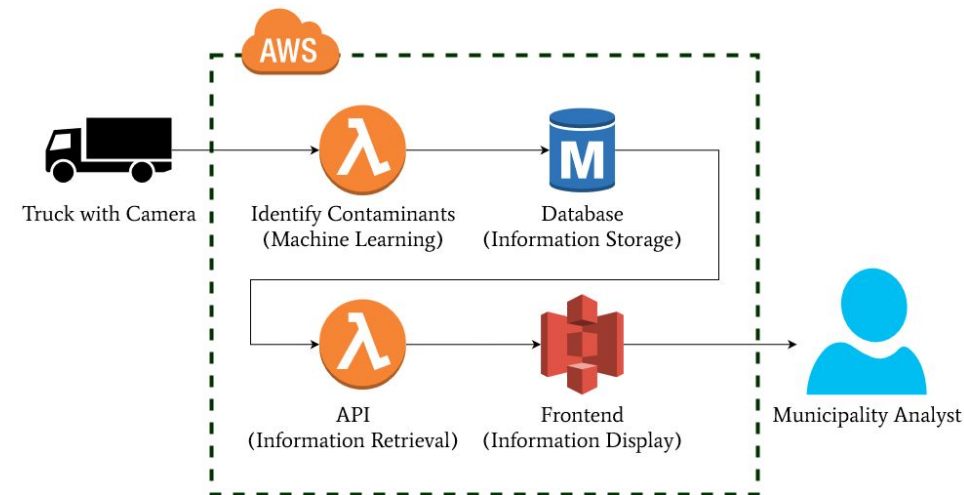


Figure 1: Overall Project Architecture

Results & Conclusion

Our classification model was relatively accurate with .45 mAP. It tends to over-classify. Figure 2 shows it classifies a garbage bag and styrofoam incorrectly. Although, it does correctly classify the cup. Our model will improve with more consumer data to use for training.



Figure 2: Contaminant Classification

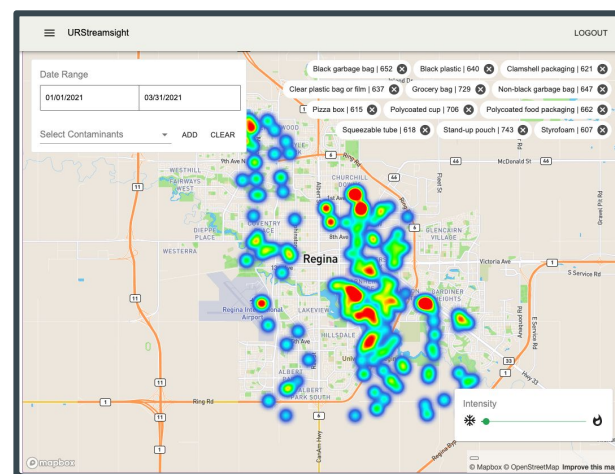


Figure 3: Contamination Heatmap

Our frontend displays contamination data to the users. Shown in Figure 3, the heatmap provides data to municipality analysts on which neighbourhoods have high levels of contamination. The contaminants can be sorted to help provide targeted education. There are other metrics and graphs used to provide high-level data to the municipality.

Future Work

- Automatic Mailing Feature
- Realtime Warnings for Vehicle Operators
- Improve Contaminant Classifying Accuracy
- Mobile App for Residential Users

Literature Cited:

- Farr, A. (2020, October). Peel Curbside and Multi Residential Enforcement Programs to Reduce Blue Box Contamination. From: <https://bit.ly/3rUI2jf>
- Schaub-Szabo, S. (2017, September). Airdrie Residential Waste Audit. From <https://bit.ly/3dAWIEM>

Acknowledgements

University of Regina
Prairie Robotics
Dr. Timothy Maciag
Dr. Mohamed El-Darieby
George Daoud

Contact Information:

Avery: cameroav@uregina.ca
Noah: rowbothn@uregina.ca
Raymond: knorr20r@uregina.ca
GitHub: <https://github.com/URStreamSight/>

