2019 CA Water Data Science Symposium – AI for Trash Reduction

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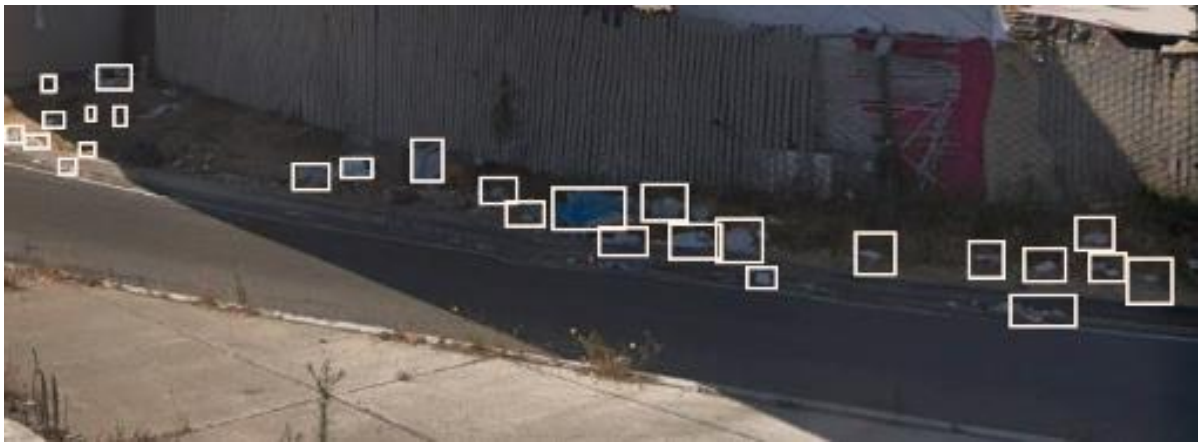

Problem Statement: Public litter has large environmental, sustainability and livability impact in California. It requires substantial resources and exposes workers to pick up litter on highways and local streets. As a result, this project proposes to address these challenges by identifying and monitoring high trash areas more efficiently with automated image analysis.

Solution: A computer vision model for automating litter detection, streaming the trash level visual assessment (OVTA) process and improving field data collection analysis.

Prototype: **Computer Vision Model** - Image recognition model trained with Google Street View images.

Citations: The prototype below was created using the following technologies:

1. Microsoft Custom Vision
2. Microsoft Cognitive Services
3. Google Street View

Next Steps: The following tasks will be necessary to continue development:

1. Desktop Data Collection – Compile representative images for model training.
2. Image Labels – Label images for model training.
3. Development – Train and test model; initial results will be used to refine the model for deployment.
4. Deployment - Once model has achieved sufficient accuracy, then deploy it for decision making and analysis.

Adoption: Similar technologies are already implemented by academia and industry:

1. Keep America Beautiful (KAB) - Commissioned a litter detection model and open sourced their results.
2. San Jose State University (SJSU) – Study to streamline routine street cleaning with the City of San Jose.
3. SF Estuary Institute (SFEI) - Collecting aerial imagery with drones (UAV) and analyzing imagery with AI.

Benefits: Automated litter detection will have the following benefits:

1. Save Resources - Automate identification of high trash areas and deploy cleanup crews to address them.
2. Minimize Worker Exposure - Minimize routine maintenance and inspection while exposed to live traffic.
3. Continuous Monitoring - Continuous monitoring of high trash areas and identification of new ones.
4. Continuous Improvement - Model may refined and improved over time.
5. Reduce Litter - Ultimately, image analysis should help reduce litter.