

Note: this is a joint project with MAE.

## **Automated Organic Waste Processing and Recycling of PLA Compostable Plastic**

California has set ambitious goals to divert organic waste from landfills and is requiring businesses and communities to separate these materials. Success has been mixed so far and organics loads are being delivered with high rates of contamination. Many organics processors are seeing the cost of decontaminating these deliveries outstrip their tipping fees, increasing the cost of organics processing to a point that is non competitive with traditional waste tipping. New materials, like compostable plastics including PLA are also becoming more commonplace but many are either ending up in recycling streams where they are confused with traditional plastics or are going to organics processors that either begrudgingly accept them or treat them as contaminants. Cheaper, more accurate and faster contamination removal from organic waste streams can improve organics recycling cost competitiveness, effectiveness and the long term success of these programs. PLA recycling is also in it's infancy and presents a good opportunity for creating a new and more localized recycling infrastructure. Waste Busters has been working toward these goals and has a good deal of experience processing waste streams, studying the composition of waste streams and finding solutions to these challenges.

To reduce the cost and improve the speed and accuracy of organics processing while incorporating PLA recycling, we are looking into automation of the process. Our goal is the automation of the process by: developing and incorporating a computer vision system into a sort line to identify materials on a belt as either organic/suitable for composting, non-organic or PLA resin use our pick and place robot or array of such robots to pick contaminants and/or PLA from the belt, leaving only material suitable for composting

process and recycle PLA onsite including wash, grind/chip and extrude a filament for use in 3D printing, possibly incorporating existing technology like the filabot

Design requirements include

Fast identification of discrete items in mixed materials moving on a belt into organic/non organic/PLA

Resin type ID, using NearIR or spectroscopy at high speeds (large commercial optical sorters already perform this task but are not suited well for organics or existing sort lines)

Integrate and control our existing ROS-based pick and place robot:

<https://www.youtube.com/watch?v=CaKFR33dGak>

Ability to present and summarize data including: contamination rate on a belt during a set time (% non-organic), pick rates, % of contamination removed vs unable to be removed.

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