## Senior Project Innovation

**Invention title:** IRS (Independent Recycling Sorter) **Team No.** 09

**Instructor Name:** Mr. E. Paterno

**Instructor Approval:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Date:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Student Signature:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Date:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Student Name:** Jonathan Wong

**Student Signature:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Date:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* **Problem to be addressed:**

Recycling is a major tool in the proper disposal of used products, and is pertinent in new efforts to protect the environment. However, recycling bins are often very disorganized and can become a problem to recycle items efficiently if they are not sorted by material. Even if recycling bins are labeled, garbage can sometimes be thrown in, lowering the efficiency of the recycling system.

* **Innovation description:**

The IRS is able to solve this problem of organization by detecting the type of the recyclable material (e.g. cartons, bottles, cans) and sorting the item accordingly upon its entry into a specific bin. It categorizes the types of material recycled using the Google Cloud Vision API, which recognizes the shape characteristics of the object to determine precisely what recyclable material is inserted. Upon detection and recognition, the object is sent along to the appropriate bin.

* **Innovation features:**
* Allows for users to efficiently recycle
  + Users don’t have to manually sort, and recycling plants save time and money from having to sort themselves
* Conveyor belts move the recyclables efficiently to the correct recycling bin
* Prevents users from placing objects if WiFi is down
* Sends rejected items into a specific, separated bin
* **Innovation operation:**

When a user places an object into the IRS, the camera first takes a picture, which is then sent to the Google Cloud Vision API. If the object is recognized as a recyclable material, it will be sent through conveyor belts to the appropriate bin. If the object cannot be identified as one of these objects, it will be considered a rejected, non-recyclable material, and placed outside the IRS in a separate container. In addition, when the Wi-Fi is down, the IRS will not accept any inputs.

* **Required technologies:**
* Google Cloud Vision API for object identification
* Arduino or Raspberry Pi (to get the data from the camera, send it to the API using WiFi)
* Conveyor belts to move the items into each specific bin via motors
* Small Camera
* **Proposed customers:**
* Agencies involved with recycling- to be defined

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**Instructor Initials: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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