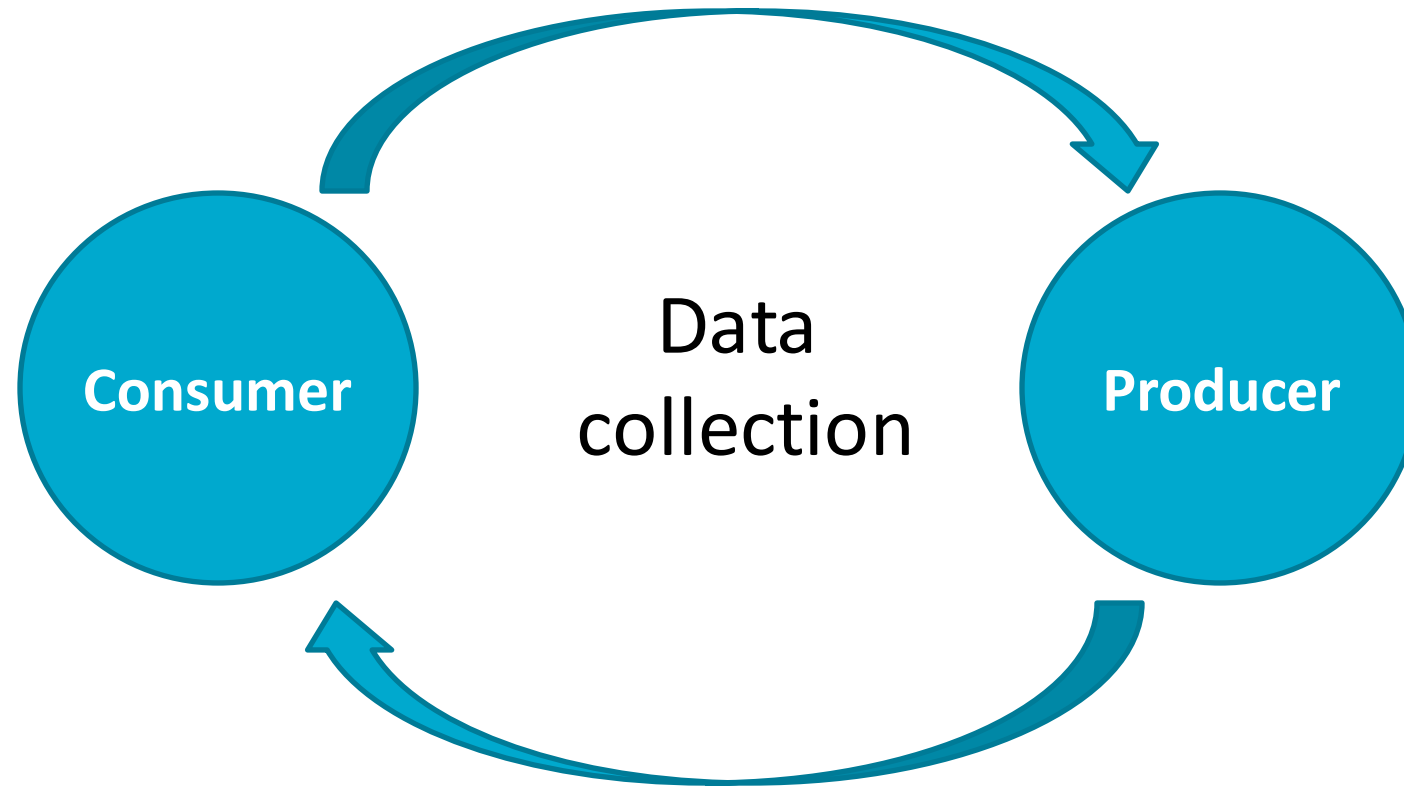




# Smart Bin: Engaging the Consumer and the Producer

Wei Ni (CSIRO) | [wei.ni@csiro.au](mailto:wei.ni@csiro.au)

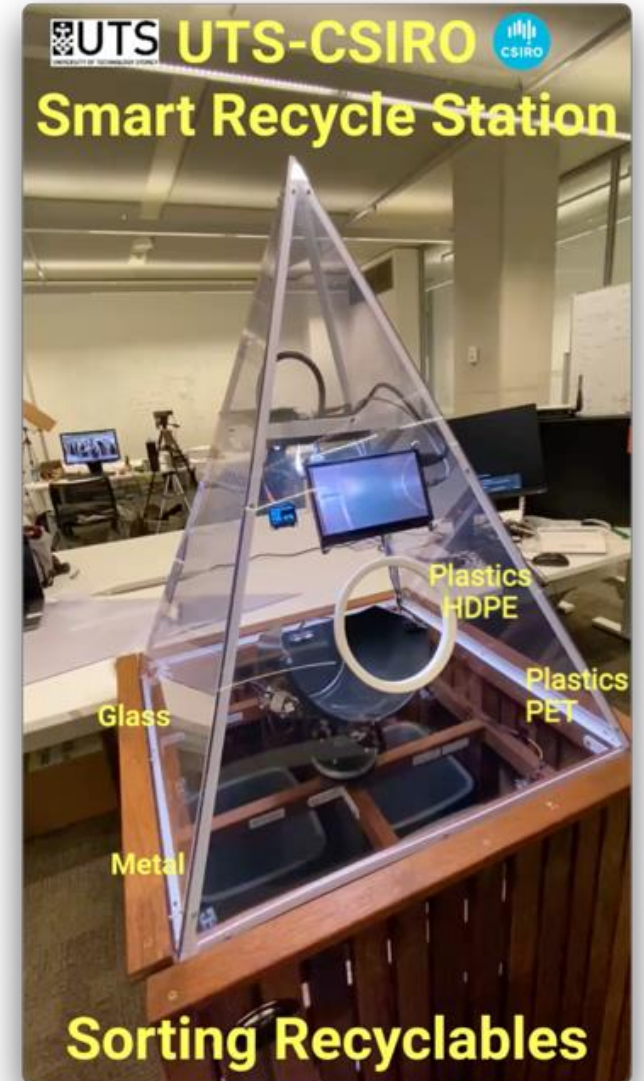
# Feedback Loop for Circular Economy



# Smart Bin and Data Management Platform



- On-spot sorting of Metal, Glass, and Plastic bottles
- Plastic bottles are further classified into PET, HDPE





## Smart Bin

- System Integration
  - Motion control, metal and weight detector
  - AI/CV-based plastic classification
- On-spot sorting
  - Metal, glass, PET and HDPE
- Smart Bin Platform

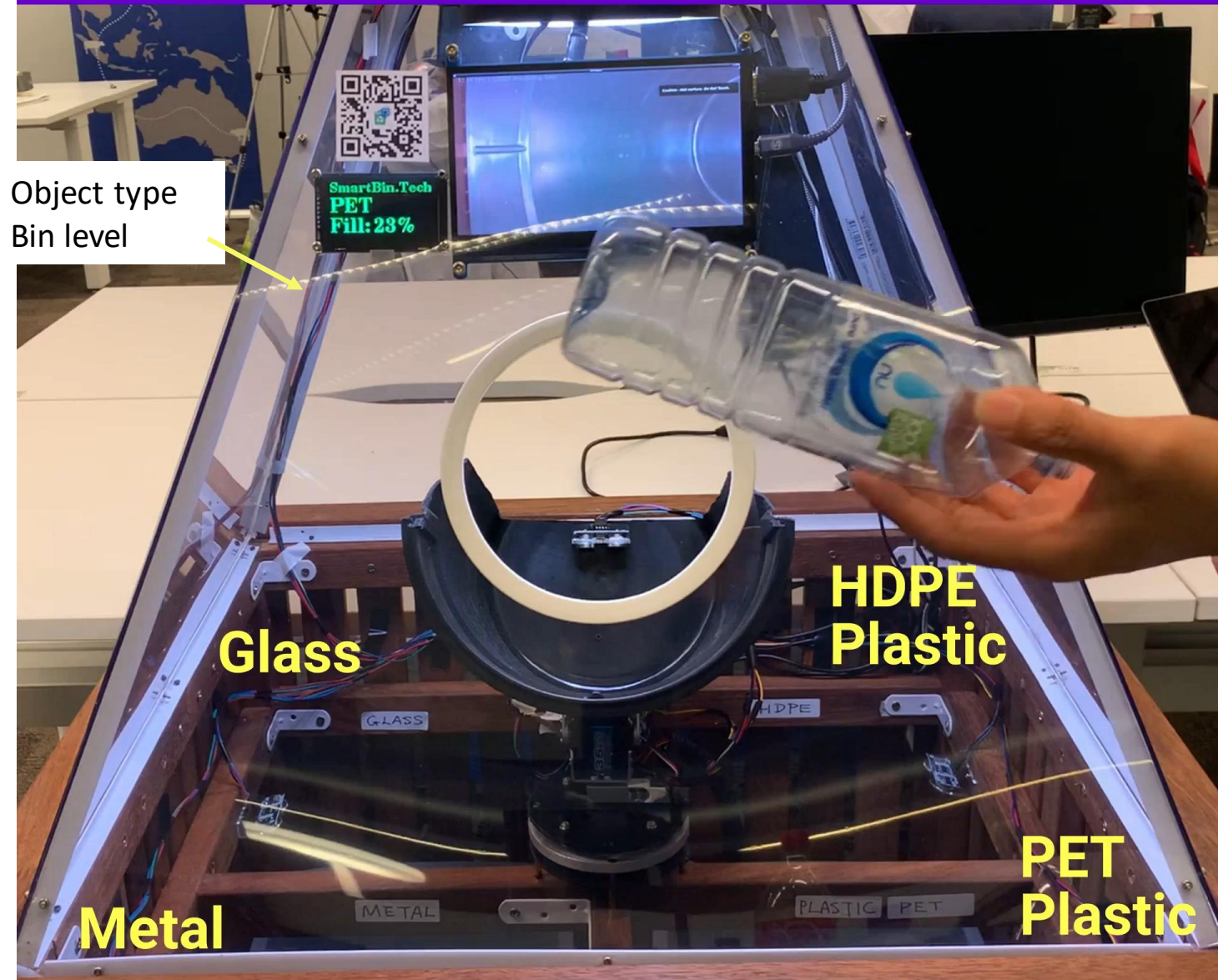
<https://smartbin.tech/>



# SmartBin.Tech



## UTS-CSIRO Ending Plastic Waste





# Plastic Classification with AI



- ✓ Classify PET and HDPE plastics
- ✓ Classify plastics with/without labels
- ✓ Classify bottles beyond the training set
- ✓ Real-time classification on Jetson Nano (FPS>10, 720p video output, 3GB memory usage)



# Data Platform and Website

<https://smartbin.tech/>

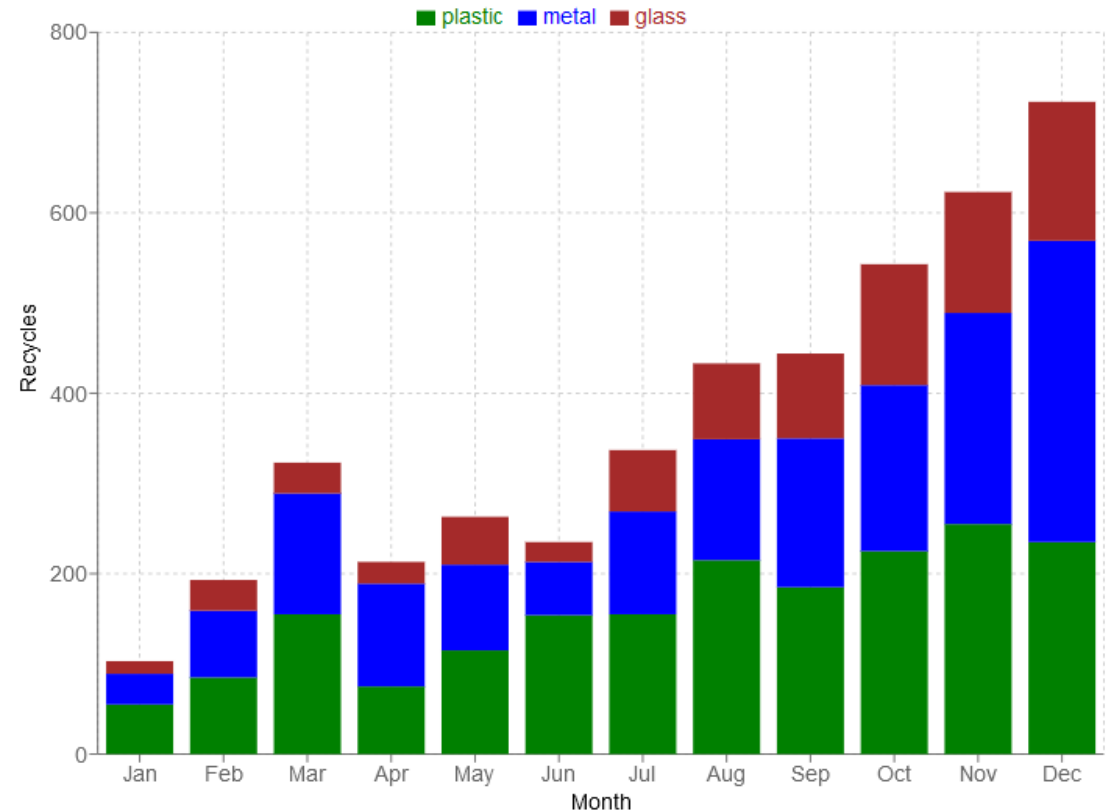
<https://smartbin.tech/user/dashboard>

SmartBin.Tech

Recyclables ▾ About Us

## User Dashboard: Recycle Stats / Reward

| Type          | Number      | Reward          |
|---------------|-------------|-----------------|
| Plastic:      | 1909        | \$190.90        |
| Metal:        | 1675        | \$167.50        |
| Glass:        | 849         | \$84.90         |
| <b>Total:</b> | <b>2397</b> | <b>\$239.70</b> |





# Data Platform and Website

<https://smartbin.tech/>

The screenshot shows the SmartBin.Tech website interface. At the top, there is a navigation bar with links for Tech, Dashboard, BinMap, Recyclables, and About Us. The main content area is titled "Bin Map" and displays a map of Sydney, Australia, with various recycling stations marked. Three pop-up windows provide detailed data for specific stations:

- Station: Central Recycle**
  - Plastic: 132; Fill: 52%;
  - Metal: 23; Fill: 28%;
  - Glass: 48; Fill: 36%;
- Station: UTS Recycle**
  - Plastic: 89; Fill: 15%;
  - Metal: 23; Fill: 28%;
  - Glass: 48; Fill: 36%;
- Station: Woolworth Recycle**
  - Plastic: 285; Fill: 95%;
  - Metal: 23; Fill: 28%;
  - Glass: 48; Fill: 36%;

At the bottom of the map, there is a "Bin Full Alerts" section indicating that the Woolworth Recycle station has a bin fill of over 90%.

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Thank you





# Plastic Classification with AI

Nvidia Jetson Nano

AUD \$150

5W – 10W

CPU: Quad-core A57

GPU: 128-core NVIDIA Maxwell

Memory: 4GB memory

Raspberry Pi Camera Board v2

8-megapixel

Yolo V5 Object Detection Algorithm

Structure: CSPDarknet + PANet + Yolo Layer





# Plastic Classification with AI

