TEAM
020

Eco-Friendly Recycling using Intelligent Additive Manufacturing

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THE PLASTIC WASTE PROBLEM

3D printing produces large amounts of waste from failed prints and supports. This increases cost and contributes to plastic pollution, especially with low PET recycling rates.

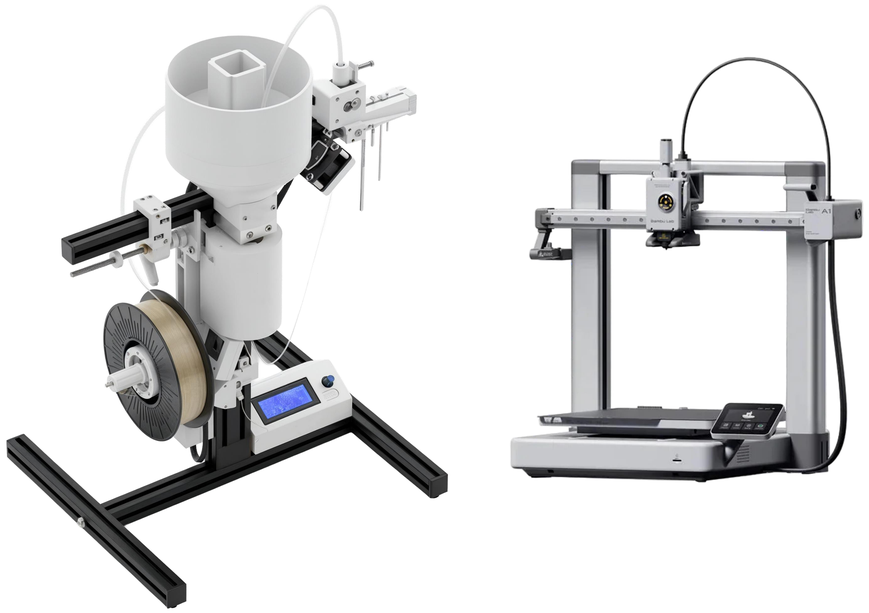
OUR SOLUTION

Our compact automated system that turns PET waste into new filament. It integrates shredding, melting, cooling, and spooling with smart controls and AI monitoring for easy, sustainable 3D printing.

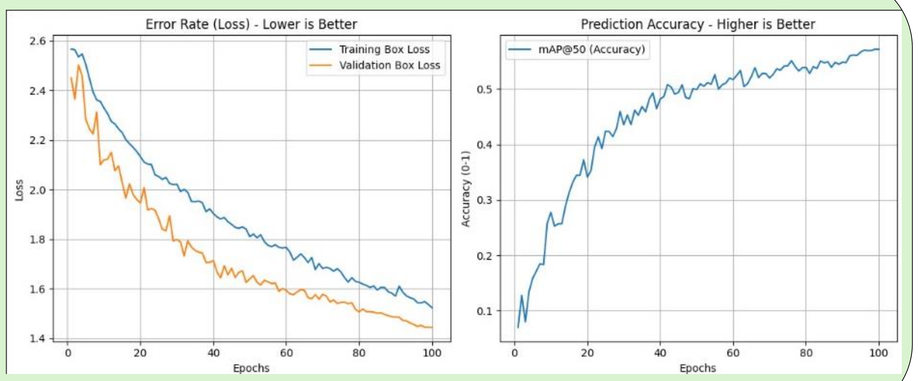
Constraints

- The recycling module must effectively remove at least **10%** of contaminants from plastic waste.
- The AI system must support multiple languages to ensure broad accessibility for users.
- The recycling unit should be energy efficient and compact.
- Comply with industry safety and performance standards.

System Overview & 3D Model



AI Test



THERMAL PROCESSING

Shredded plastic bottles is melted, cooled, and reformed into filament.

MATERIAL ENHANCEMENT

2.5% Wt. Charcoal Additive improves thermal stability, raises molecular weight, for recycled PET filament.

MANUFACRING PROCESSING

PET flakes melt inside a heated screw extruder, then are pushed through a precision die to form uniform 1.75 mm filament.

Specifications

- AI model recognition accuracy ≥ 90%
- Shredded size 6 × 6 mm
- additive concentration 1–5 wt%, particle size ≤ 50 µm, uniformly dispersed
- System weight ≤ 65 kg
- Recycled filament tolerance ± 0.05 mm diameter
- Power consumption ≤ 1500 W average
- Build volume ≥ 300 × 300 × 400 mm
- Real-time monitoring resolution 1080p camera, >= 60% detection accuracy