PROJECT SHOWCASE: CAN AI HELP US SORT WASTE?

What happens when artificial intelligence meets recycling?

In this edition, we are showcasing one of the practical learning activities developed for the AI-SAVES@ProjectHub: the AI Waste Classifier – LED-Based Material Recognition for Sustainable Education, created by Politeknika Txorierri. project-

The project gives VET students the opportunity to build a simple AI system that can recognise different recyclable materials using computer vision.

HOW DOES IT WORK?

Students collect real images of paper, plastic and metal and use them to train their own image-classification model with Teachable Machine.

The model is then deployed on a Raspberry Pi connected to a camera.

When the system recognises an object, an LED indicates the category:
🟢 Green → Paper
🟡 Yellow → Plastic
🔴 Red → Metal

At the same time, the camera feed displays the material detected by the AI model on screen. project-

It is a simple idea, but one that lets students see the whole AI process in action: collect data, train a model, deploy it and connect its predictions to a physical output.

FROM AI THEORY TO A WORKING PROTOTYPE

The activity is designed as an approximately 20-hour learning project.

Students move through the complete development process: creating their dataset, training and testing the model, setting up the Raspberry Pi and LEDs, integrating the AI model, calibrating the system and presenting their final results.

The project uses accessible technologies including:
Raspberry Pi • Camera • Python • OpenCV • TensorFlow Lite • Teachable Machine • LEDs

This makes it particularly suitable for VET learners who want to experiment with AI without needing advanced robotics experience

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WHAT DO STUDENTS LEARN?

The project combines technical learning with a sustainability challenge.
Students learn how to:

- train an image-classification model;
- deploy AI on a Raspberry Pi;
- connect computer-vision results with physical outputs;
- test and improve the accuracy of an AI system;
- think about how technology can support recycling and environmental responsibility.

The activity also encourages experimentation and critical thinking around the use of accessible AI technologies.

TRY IT YOURSELF

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