NTE1 : ESR 07

Development and evaluation of future collection and logistics system for eco-designed plastics

Namrata Mhaddolkar

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie grant agreement No. 859885.

Agenda

1. Context of my research
2. Goal of my research
3. Methodology
4. Challenges foreseen
5. Expected outcome of my research

Context of my research- Journey of waste

en.mevatec.cz

Context of my research- Journey of waste

Plastic waste production by consumer

ARA System

Waste collection

theconversation.com

Waste processing & recycling facilities

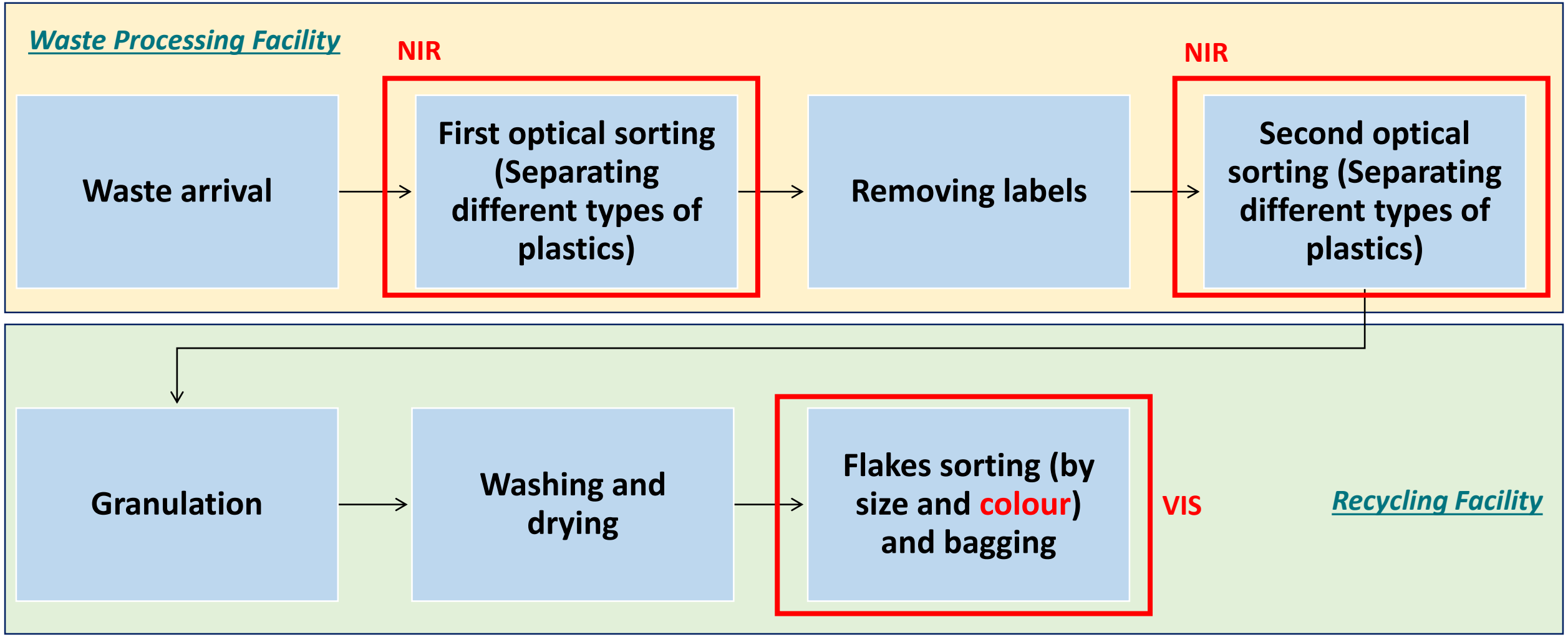
youtube.com

Industry using recycled materials

istockphoto.com

Incineration or co-incineration

Context of my research- Waste processing and recycling facility



Source: biffa.co.uk

Goal of my research-
ESR 07 Objective

1. Investigate the dependence between collection system and sorting technology focused on sensor-based sorting and material impurities.

2. Develop new source separation concepts and to evaluate their impact on logistics and sorting efficiency.

Goal of my research-
My Role

Existing infrastructure for sorting the conventional plastic waste

Bioplastics – arguably future of plastic

- To check whether we can use the existing infrastructure to sort bioplastics from lightweight packaging waste
- Identify the challenges and opportunities involved

Image Source: upsciasexams.com

Methodology- The Sorter

1. NIR
   - Identifies the material based on the absorption or reflectance of light by the material
2. VIS
   - Identifies the material based on the colour of the material

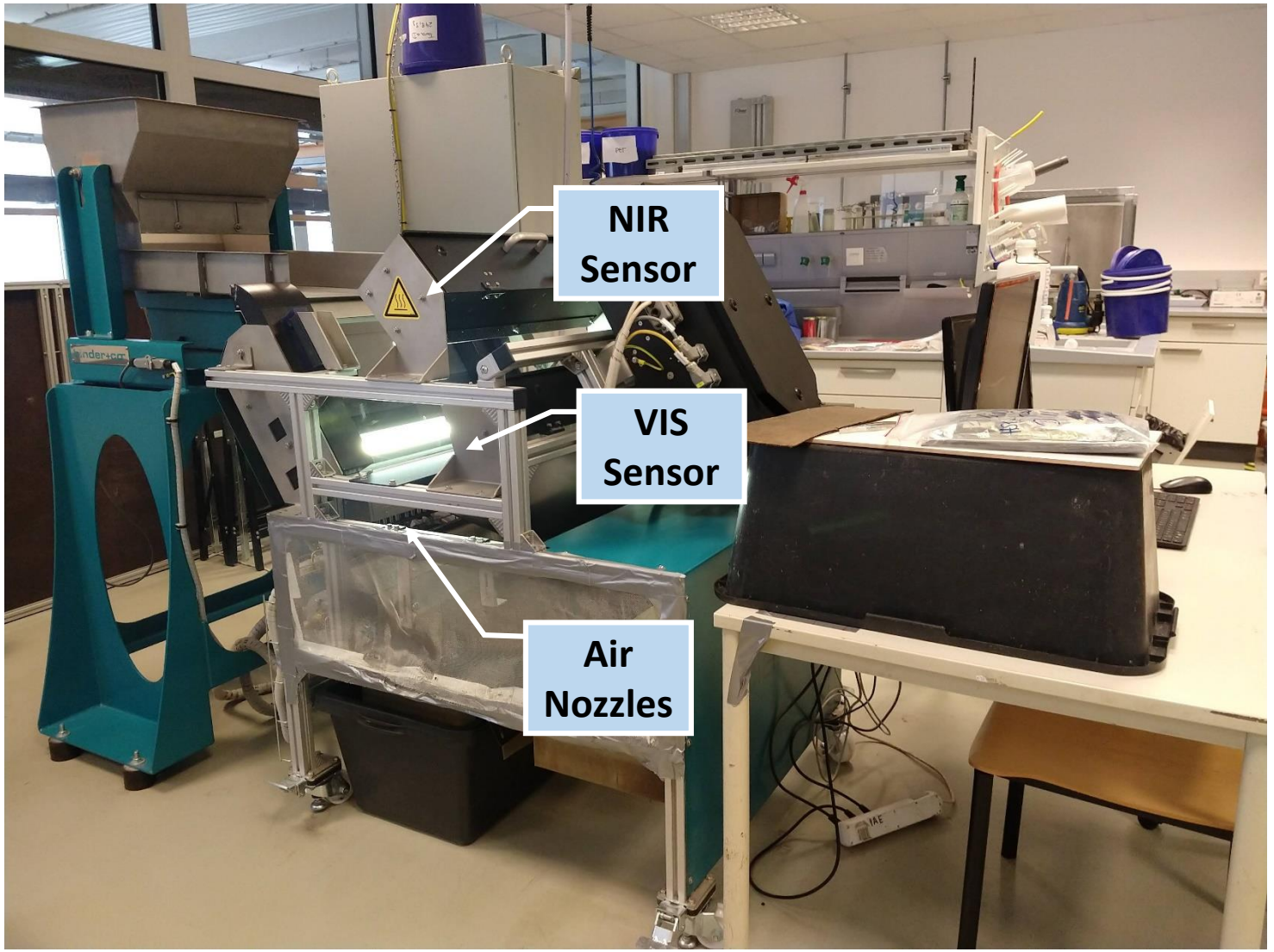
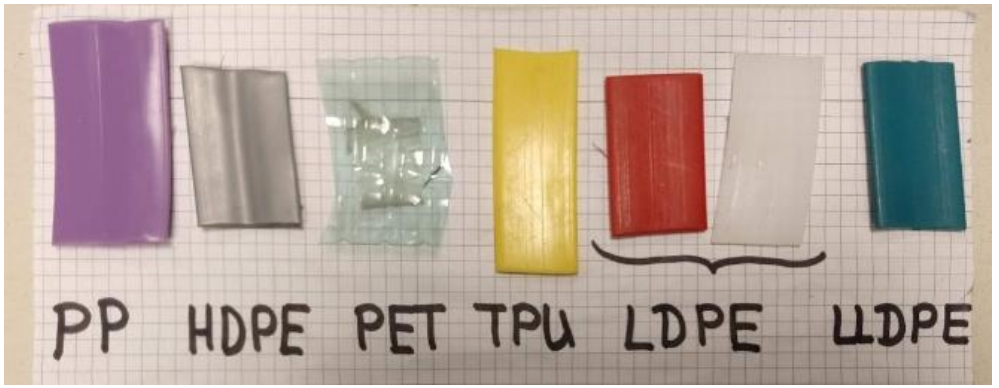


Image Source: Self

Methodology-
Major steps for operating the Sorter (NIR and VIS)

Input for teaching the machine



Creating a recipe

- basically, teaching the sorter the material

Sorting the waste

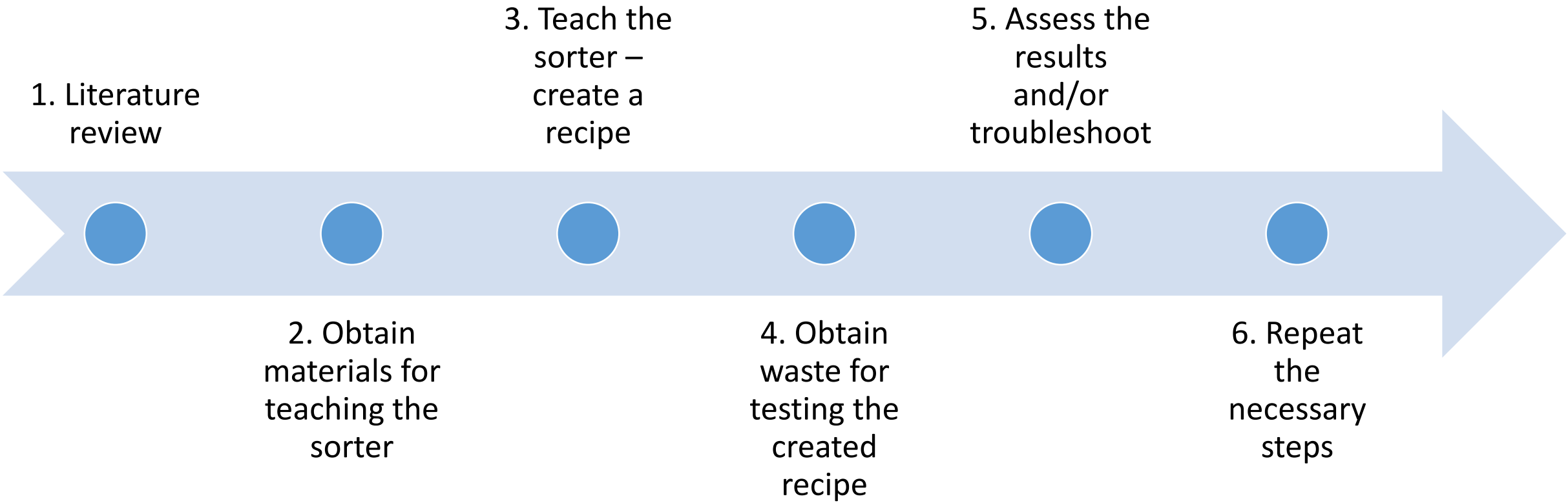
- after teaching the sorter, the waste is introduced and the created recipe is tested

Input for testing the machine

- **The sorter can function with both the NIR and VIS sensors active**
- **This can help us sort a particular material of particular colour; for example, HDPE of black colour.**

Methodology - my Plan

Try to cover the maximum possible bioplastics (and/or other ecodesigned plastics?) available in market



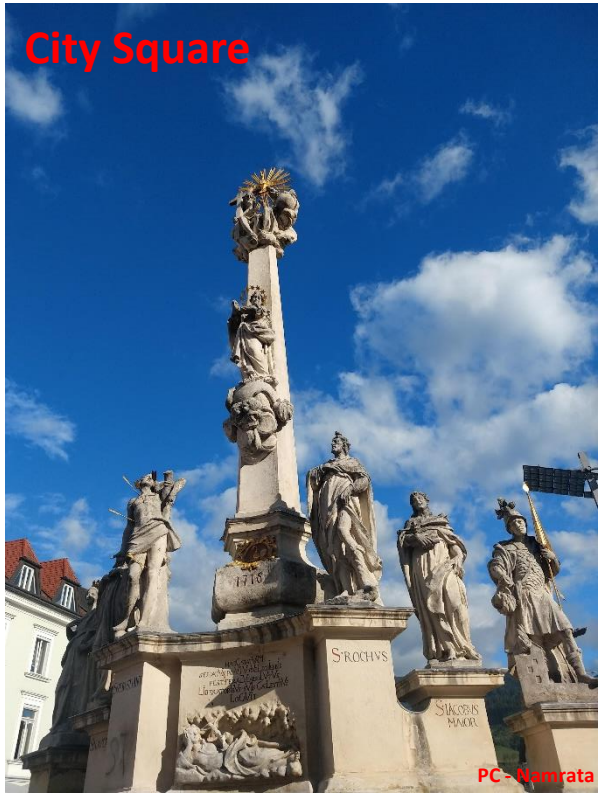
Challenges foreseen

- Sorter will work if we have pure material to teach it and then test it.

- Challenge:
  1. Structuring the vast variety of bioplastic into categories to cover maximum types of bioplastics
  2. Some bioplastics may have similar spectrum as to the conventional plastics – another test to be involved?
  3. Availability of “pure material” for teaching (creating recipe)
  4. Availability of “waste material” for testing the created recipe (creating waste samples from pure material)

Expected outcome of my results

Challenges and opportunities involved in using the existing sensor based sorting infrastructure to sort bioplastics (and/or other ecodesigned plastics?)



Vielen Dank!

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie grant agreement No. 859885.

Have a good day! ☺