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Classification of plastics using infrared spectroscopy

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Abstract:

Plastics are used in thousands of products that add comfort, convenience, and safety to our everyday lives, due to their short lifetime, it is not surprising that they account for large amounts of waste that is generated. This increases the urgency and importance of plastic recycling. For efficient recycling we need efficient sorting. Difficulties in applying manual separation techniques led to the modification of several automated methods. In this project, an automated system is developed for the identification and separation of plastic types, based on near infrared reflectance spectroscopy.

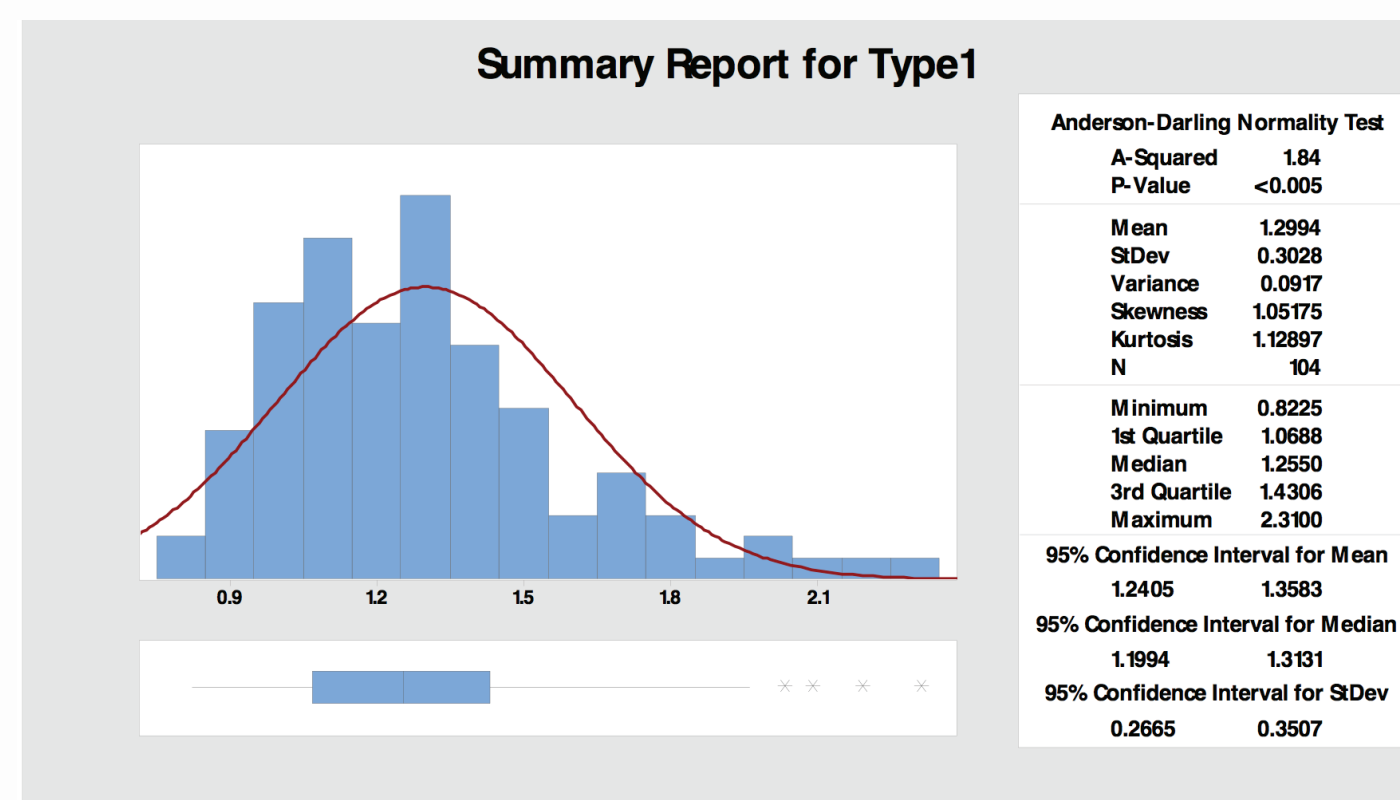
Objectives:

- To identify the type of plastics using NIR spectroscopy.
- To be able to classify and sort plastics automatically after identifying its type.

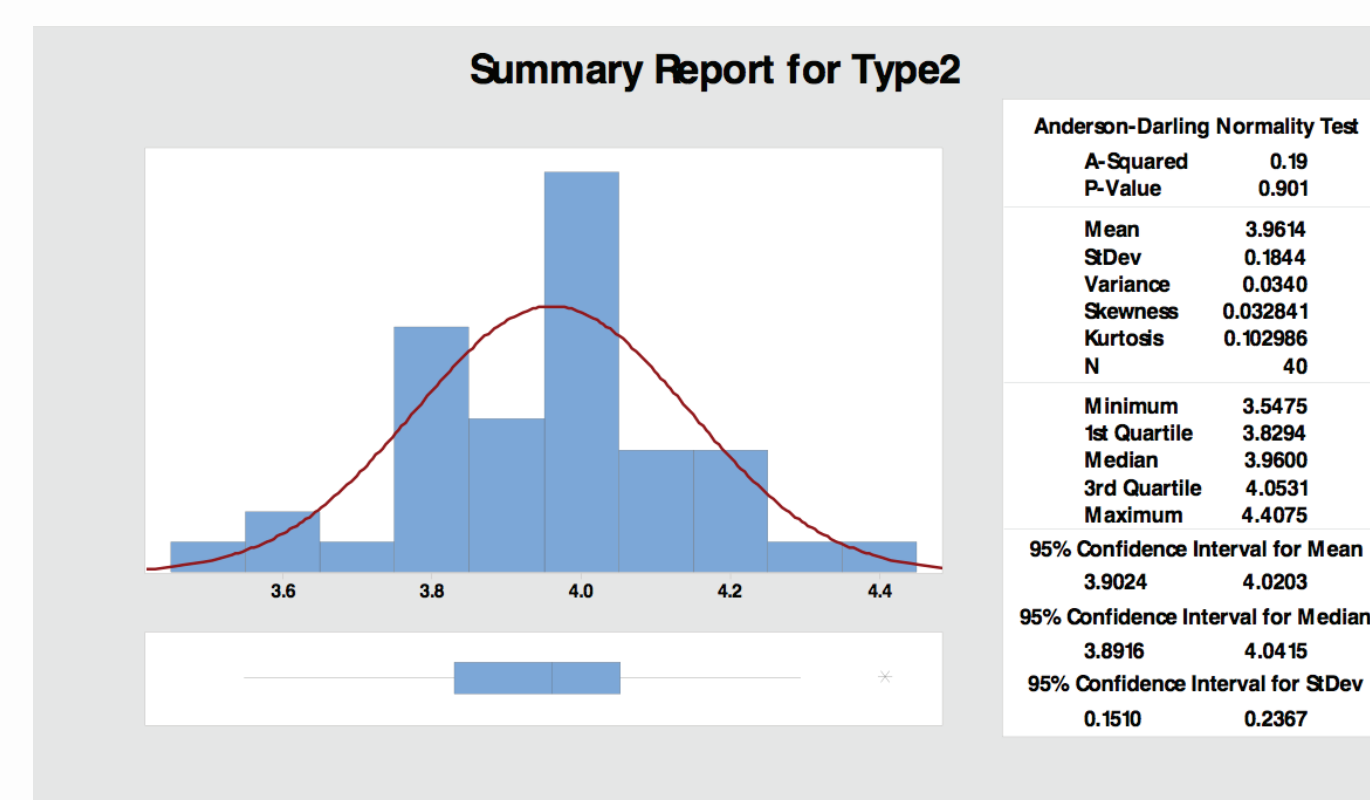
Methodology

1. Identify the plastic type using IR Tx and Rx
2. Plastic piece reaches its own container and cuts the laser beam
3. The right valve operates and places the plastic piece in its container

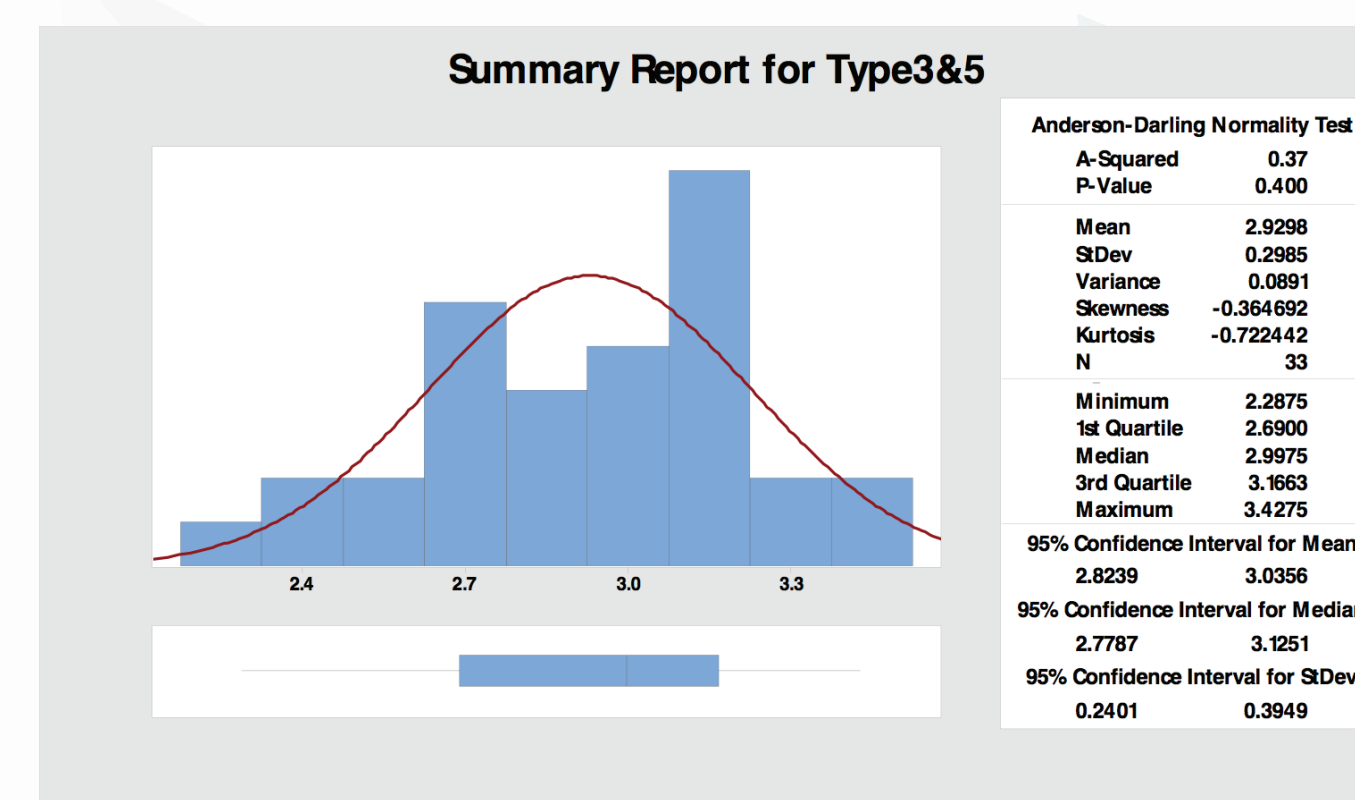
Descriptive analysis:



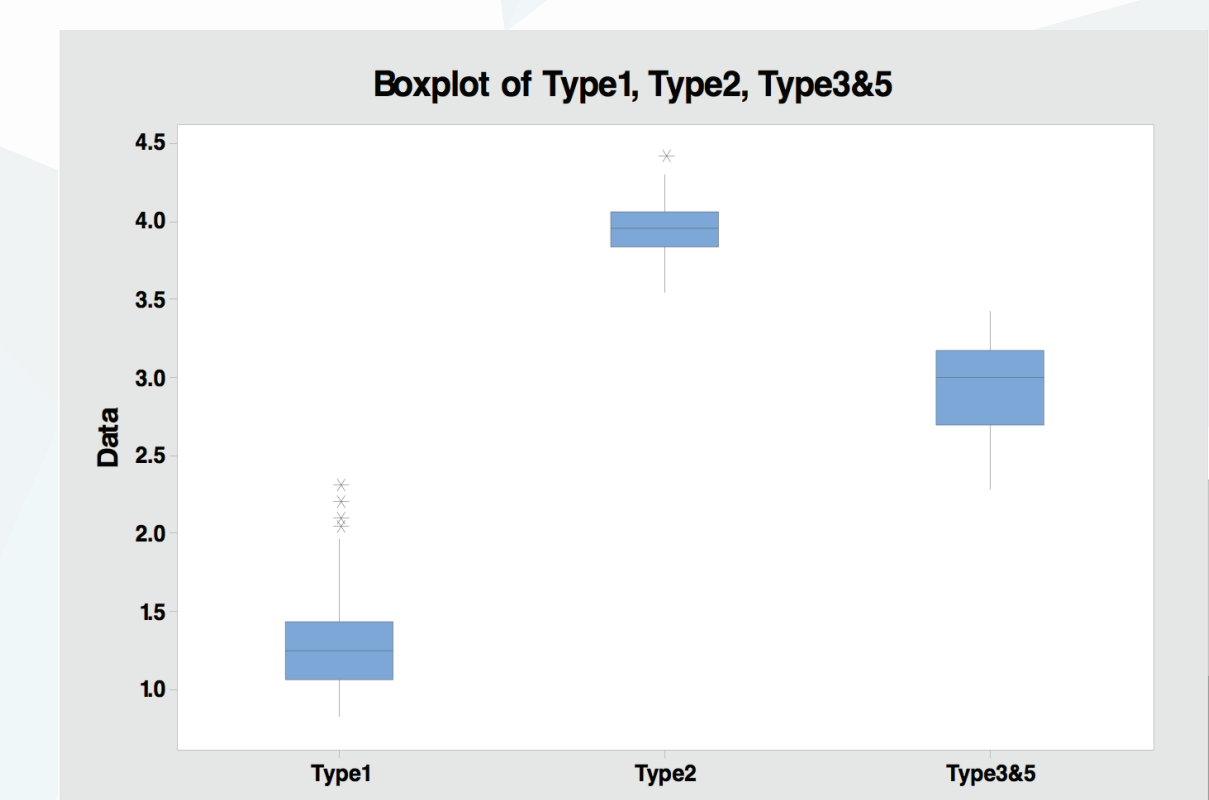
Type 1 (PETE)



Type 2 (HDPE)



Type 3 & 5 (PVC & PP)



Boxplot of the 3 types

Conclusion

It's clear that each type has its own specifications. This made use able to sort plastics automatically after identifying each type using NIR spectroscopy.

