Scopus

Documents

Iskandar Sallehuddin, M.S., Jasni, F., Wahid, A.N.

Development of Low-Cost Sensory System to Sort Recyclable Materials
(2022) *IET Conference Proceedings*, 2022 (10), pp. 114-119.

Dept. of Mechatronics Engineering, Kulliyyah of Engineering, International Islamic University Malaysia, Kuala Lumpur, Malaysia

Abstract
Recycling some waste materials can be one of the great solutions to preserve the earth. However, managing the recycling process is still an issue. One of the issues is related to sorting the waste materials. Many people still fail to place the waste materials according to their respective bins. One way to tackle this issue is to have an automated sorting system. To sort the recycle materials, sensory system is needed. Among the commonly utilized is camera. However, camera detection system usually requires high processing power and high storage. Besides, camera detection system is prone to attract thief as it can be used in many applications. Thus, an alternative sensory system is needed to automatically sort the recycle materials. In this project, the Light Dependent Resistor (LDR)-based sensory system was developed and experiments were performed to investigate the feasibility of the system. These sensors were used to investigate the optical properties of plastic bottles and aluminium cans and consequently develop a classification model to categorize plastic bottles and aluminium cans. The proposed sensory system managed to achieve average of 92.8% in identifying plastic bottles and aluminium cans accordingly. These findings proved that the LDR-based sensory system is feasible to identify some of the recyclable waste materials; plastic bottles and aluminium cans by manipulating its optical properties. © 2022 IET Conference Proceedings. All rights reserved.

Index Keywords
Aluminum, Cameras, Costs, Plastic bottles, Plastic recycling; Aluminum can, Automated sorting systems, Detection system, High processing power, Light-dependent resistors, Low-costs, Recyclable material, Recycle materials, Recycling process, Sensory system; Optical properties

References
- *Global waste generation | Statista*,
  [Online]

- Swanson, R. L., Breslin, V. T., Bortman, M. L., Tyler, N., Roy, N., Simonsen, J.
  (2019) *Recycling technology*,

- Gupta, P. K., Shree, V., Hiremath, L., Rajendran, S., Gupta, P., Hiremath
  (2019) *The Use of Modern Technology in Smart Waste Management and Recycling: Artificial Intelligence and Machine Learning*,
  ed

- Tatzer, P., Wolf, M., Panner, T.
  Industrial application for inline material sorting using hyperspectral imaging in the NIR range
  (2005) *Real-Time Imaging*, 11, pp. 99-107.
  2005/04/01

- Anamalai, M., Ratnadurai, D., Chung, B. L. S.
  Effect of Light to Sort Object that are Transparent, Translucent, and Opaque
  (2018) *Journal of Applied Technology and Innovation*, 2.

- Sugiura, T., Hirabayashi, S., Akaizawa, Y., Yoneda, K., Yonezawa, H.
  Automatic sorting machine for material recycling
  (2000) *Technical Review - Mitsubishi Heavy Industries*, 37.

- Russel, M. M., Chowdhury, M., Shekh, M., Uddin, N., Newaz, A., Mehdi, M.
  (2013) *Development of Automatic Smart Waste Sorter Machine*,

Correspondence Address
Jasni F.; Dept. of Mechatronics Engineering, Malaysia; email: farahiyahjasni@iium.edu.my