Environmental Research, Technology Demonstration and Conference Project

ECF Project:	ECF 2021-120
Project Title:	GPS-assisted smart robot with self-exploration ability for litter pick-up and sorting on curved hillsides
Principal Investigator:	Dr Chu Kar Hang Henry, Department of Mechanical Engineering, The Hong Kong Polytechnic University
Total Approved Grant:	$499,400
Duration:	1/7/2022 to 31/12/2023
Project Status/Remarks:	On-going
Project Scope:	Robots have been serving us in many sectors to improve the quality of our lives. In particular, robots can help to handle unpleasant and dangerous tasks. Nevertheless, majority of commercial robots mainly focus on applications for indoor use with large market sizes, opening a gap in some less explored areas. This project aims to develop a first-of-a-kind litter picking robot and its supporting system, which can help to maintain and restore the cleanliness of country parks, shorelines, and other public spaces in Hong Kong. The robot will be capable of navigating on uneven surfaces and curved hillsides, which are typical in Hong Kong. A vacuum-based flexible tool will be used to help pick up litter at hard-to-reach areas. A deep learning algorithm will be implemented to classify and sort the type of litter as picked up by the robot. A litter monitoring system will be set up to keep track of litter reported by the public, and the robot will be deployed for service based on the GPS information. The success of this project will lead to the development of a monitoring and robot deployment system to work alongside with cleaning workers to reduce their workload and the risk of injury, while preserving the natural scenery and environment in Hong Kong.
Summary of the Findings/Outcomes:	To be available upon completion of the project