Proceedings of the International Conference on Industrial Engineering and Operations Management

Publisher: IEOM Society International, USA DOI: 10.46254/AP07.20260285
Published: March 25, 2026

AI-Automated School Bag Car

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Abstract

The average weight of a school bag for children is 4.3 kg. Excessive weight not only restricts physical movement but also discourages students with shorter commutes from walking or cycling to school, which decreases their physical activity and negatively impacts their physical and mental health. Additionally, parents may experience financial burdens due to the considerable costs associated with spinal corrections and medical expenses. This A.I.-Automated School Bag Car includes key features and functions. First, it has the ability to allocate and transfer resources based on "gravity and time. Second, the product embodies principles of environmental protection, economy, health, and STEAM (Science, Technology, Engineering, Artificial Intelligence, and Mathematics).Two major innovations in resource reallocation are as follows. First, Gravity Transfer Capability. The weight of the school bag should be shifted to the drone's payload, alleviating the physical burden on primary school students. This design promotes normal bone development and enhances sleep quality. Benefits: This concept aims to reduce the risk of scoliosis and the physical strain on schoolchildren, allowing their limbs to move more freely and encouraging them to choose walking or cycling for short distances to school. Second, Time Shifting Capability. School bag deliveries typically occur during morning rush hours. Our STEM product can shift these deliveries to off-peak hours, such as late at night, thereby reducing traffic congestion, lowering carbon emissions, and improving the overall quality of life for schoolchildren. By encouraging children to minimize their transportation use, we not only contribute to environmental sustainability but also alleviate traffic congestion and reduce transportation costs for parents. Additionally, road infrastructure usage is significantly lower at night. Utilizing autonomous vehicles for school bag deliveries during these hours not only maximizes the use of public roads but also creates space for their operation, achieving a dual benefit. The invention of the student schoolbag car integrates multiple STEM concepts. Here is an overview of the key components:

Robotics and Automation: The autonomous robot uses robotics principles, including cameras, sensors, and GPS for navigation and obstacle detection. Software Development: The backpack delivery system requires programming the navigation of the driving robot, including pathfinding and decision-making when encountering obstacles. The backpack collection points also need to be coded so that backpacks are only handed over to the delivery robot when

the system recognizes them. Additionally, each backpack needs a tag that can be scanned when placed at the collection point to ensure the system knows which backpack is to be delivered to which school. AI Machine Learning: AI enables the backpack delivery robot to learn from driving data received from cameras and sensors. Through machine learning, they can make decisions based on past experience and adapt to different driving and traffic conditions.

Mechanical Engineering: Designing the robot involves creating a structure that can safely hold backpacks and move across different terrains and at different speeds (such as sidewalks or roads).Furthermore, the collection points need to be able to mechanically hand backpacks to the delivery robot without human assistance.

Electrical Engineering: The robot needs a power source (likely a battery) to function properly. Its battery can be recharged. However, if the robot is efficient enough, sustainable energy sources (such as solar power) should be considered.

Keywords
Artificial intelligence, Automation, Medical burden, Resource reallocation (Time and gravity).

Biographies
Mr. Ma, Tsz Kit is a middle school student who has received several STEM awards, including a silver prize and a certificate of merit, in both Hong Kong and Malaysia. His projects primarily focus on robotics and include innovations such as school door signals, alarms, AI space station design, and crop rotation systems.

Mr. Lam, Lap Jip is a STEM teacher in Hong Kong, where he teaches young students through innovative teaching and hands-on learning experiences. He holds a Master of Science degree in Integrated Product Design from Delft University of Technology in the Netherlands, a program renowned for its emphasis on creativity and engineering principles. Before his current role, Lam served as a Research Assistant at the Hong Kong Polytechnic University, where he contributed to various research projects in product development and design. His academic and professional journey reflects a commitment to fostering creativity in science and technology.

Mrs. Cheung Mei Yin holds a Master of Science degree in Financial Management & Control from Aston University, UK.