

Hong Kong Student Science Project Competition 2023

Template of Extended Abstract (Invention)

(Word Limit: 1,600 words, Pages: 3 pages only)

Team Number: JAPE149

Project Title: Windows, Shut down!

Project Type: Invention

*To our best knowledge, there are / are no * similar works in the market; (if there are,) related product links are as below:*

--

The enhancement our project made / the difference with related products are:

--

**Please delete if not applicable. The competition values the originality of works. Students must do enough literature research to ensure that their works are unique and list relevant reference materials before starting research or invention.*

I. Background

- Provide background information as to learn about the audience for whom the project is addressing
- Provide highlights of **literature review** and/or related technologies or devices, with the support of pertinent and reliable references
- Provide an overview of work, create a point of view as to define the needs and insights of the audience and mention the **research or technology gap the project is trying to fill**

Window is a crucial component of modern homes, providing natural light, ventilation, protection and aesthetic appeal. Nonetheless, they can also pose several safety hazards associated with falls, gas poisoning (CO/CO₂), etc. In addition to physical safety, home windows can also have important implications for overall comfort and satisfaction of occupants. By applying advanced window functions, occupants can create healthier and more sustainable living environments. In our project, we will examine the contributing factors and preventive measures about issues related to home windows.

II. Objectives

- State the **aim(s)** of project
 - ensure the health and safety of users
 - i) prevent inhaling excess CO and CO₂
 - ii) avoid children and pets falling from windows
 - iii) close windows automatically when detected water drips
 - more automatic and convenient window

III. Methodology

- Briefly describe the **approaches** used e.g. use of equipment, materials, tests and experiments
- Explain the selected implementation strategies with the **scientific theory**

Uses of Husky lens

Husky lens is an AI machine vision sensor, in particular, object tracking will be used in our project. Once the Husky lens learns the shape of an object, it would be able to recognize and track it whenever it appears near the vision sensor.

CO detector

A CO detector is a device that helps detect the carbon monoxide concentration in a space. The window will be triggered to close automatically when the CO concentration indoors is too high.

Water Sensor

Water sensing is applied in our invention. Connected with a water sensor, whenever it senses the dripping water from air conditioners or rainwater etc, the programme will be triggered to close the windows.

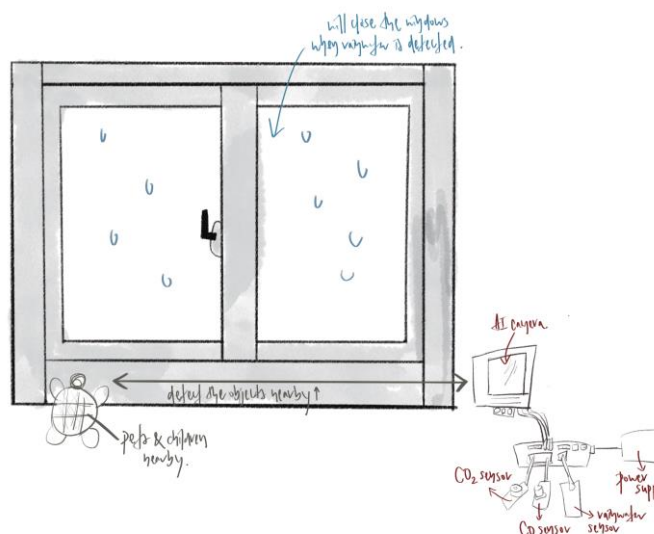
CO2 sensor

The CO2 sensor in this model helps to detect CO2 levels entering and inside the house. Windows open automatically in case of excess CO2.

IV. Design of Invention

- Describe the **design** and the **principle** of invention (e.g. The ideation of the projects, the prototypes or creative solution as far as applicable)
- Provide sketches / drawings / photos of the invention

AI cameras, CO sensors, CO2 sensors and water sensors are installed in our invention.



V. Application / Market Need

- Explain the area of **application** and function of invention
- Indicate the market need and impact of invention
- Discuss **limitation** and compare with existing related works (if any)

Create a safer environment for those who have pets and babies.

Ensure good air circulation for various customers but particularly for elderly and those who always go on a trip(they are less aware of it).

VI. If your team will compete the Sustainable Development Award, please indicate the specific sustainable development goal the project is related to, and provide justification for competing for this award. (Word limit: 300 words)**VII. If your team will compete the Social Innovation Award, please list the target group or social issue the project focuses on, and provide justification for competing for this award. (Word limit: 300 words)****VIII. Conclusion**

- Make a **data-driven** conclusion of the project and the way forward of the invention process
- Justify if the proposed project meets the objective(s)

Our invention creates a safe environment for users by deterring them (pets or children) from climbing over the windows and guaranteeing concentration of CO and CO₂. Besides, with the automatic functioning of our invention, it greatly enhance convenience of our lives like closing window when there is heavy rain

□ Our project is developed based on previous project and the enhancement is below: