

二零二三年香港學生科學比賽

延伸摘要範本 (發明品)

(字數上限：2,500 字, 頁數上限：3 頁)

隊伍號碼：SAPE072

作品名稱：天台偵測警報器

參賽類別：發明品

就我們所知，坊間 有/沒有* 類似的作品；(如有) 相關產品連結如下：

有。但未必符合我們學校需要。價錢也比較貴。

我們的作品所作出的改良 / 其不同之處為：

由我們學生製作，並會把資料傳回校務處。

**請刪去不適用。本比賽重視作品的原創性，學生須於開始研究或發明前作足夠的文獻搜索以確保自己的作品具一定獨特性並列出相關參考資料。*

I. 前言

由於消防理由，當發生火警時，天台需用作逃生，故此不能上鎖。

但如果天台不上鎖，學生如果上了天台，有可能會發生危險。

因此，學校校務處需要知道是否有人闖入天台，以關注學生安全。所以，我們要做一個放在天台的人物偵測警報器

II. 目標

當有任何人經過或通往學校天台時，將會被我們的紅外線感認器感認到。

當裝置感認到有人闖入天台時，裝置的鏡頭所拍下的影像(前後 20 秒)將會傳送至校務處，校務處職員從影片了解情況後，便可決定是否需要進一步行動。

III. 研究方法

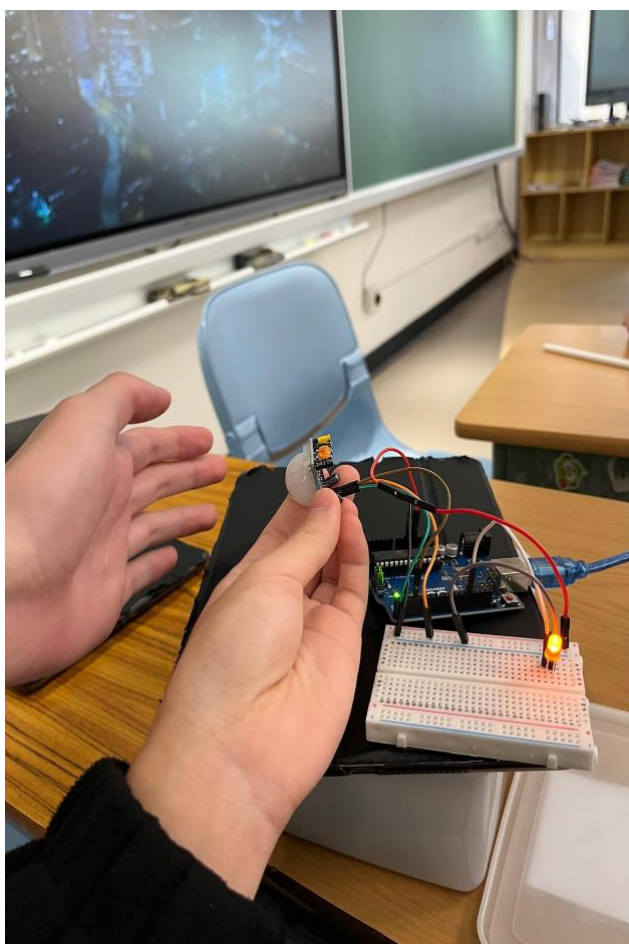
- 概述採用的方案，例如設備、材料、測試及相關的實驗
- 以科學理論支持所選用的實踐方法

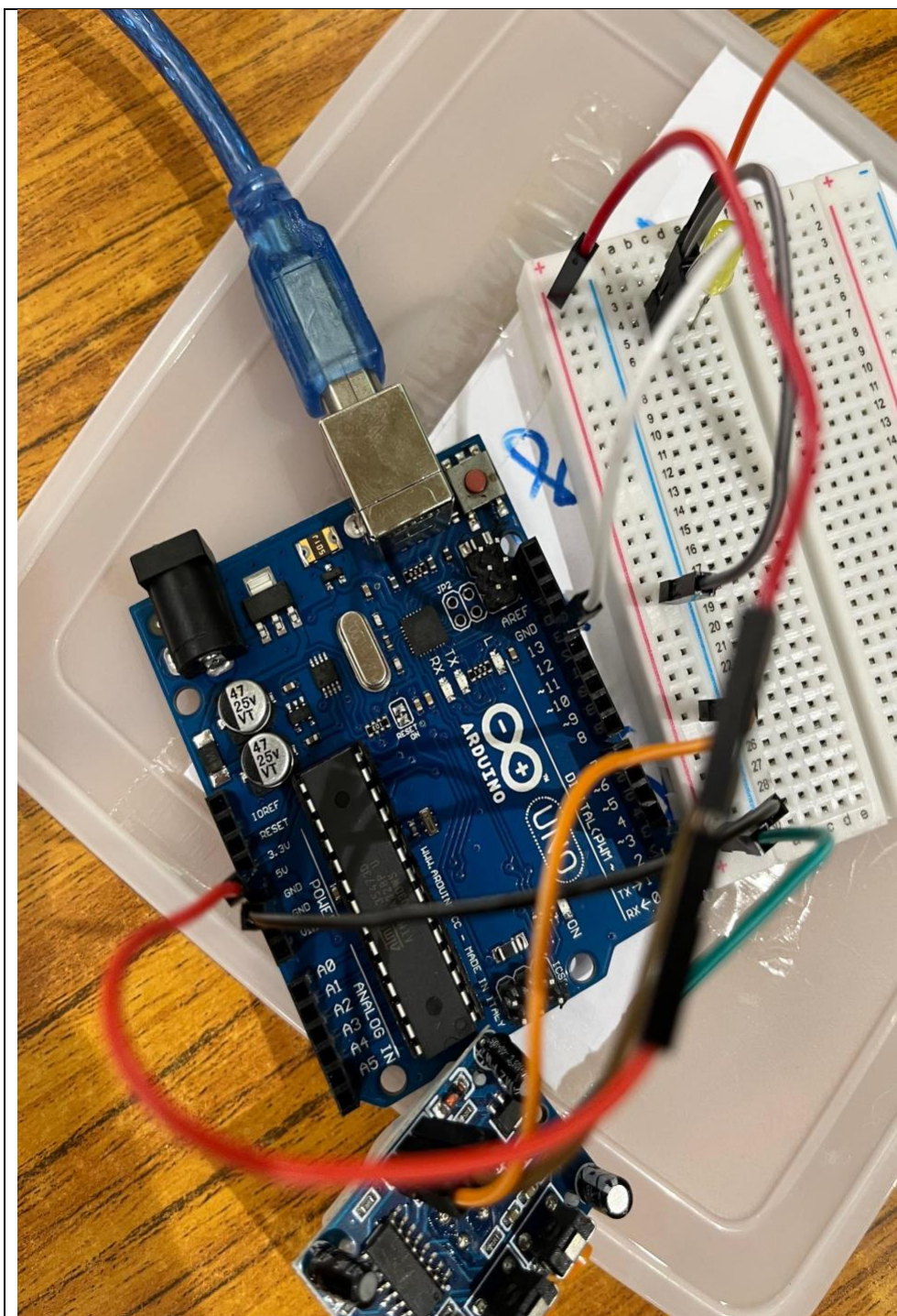
運用 Arduino UNO 底版、紅外線感應器同鏡頭接駁埋一齊，並透過喺天台嘅實地考察，判斷應該喺邊個位置放置呢個感應器，以及感應器是否能夠正常運作。

經過一輪嘅測試，我哋決定將於天台大門上方安置感應器，呢個位置對偵測是否有人闖入最可靠。之後透過學校 wi-Fi 將影像嘅實時資料傳送俾校務處。

IV. 發明品的設計

- 描述發明品的設計和原理（例如：描述項目的意念、並舉出原形及不同的創意方案）
- 展示相關草圖、圖畫或照片





V. 相關應用 / 市場需求

- 解釋發明品的相關應用和功能
- 指出市場的需求和該發明品的效益
- 討論有關限制，並就現有相關研究作對比（如有）

除了在學校，不少大廈和公營機構可能都有類似需要。

VI. 如發明品將角逐可持續發展大賞，請列明作品與哪一個可持續發展目標有關，並說明參與競逐此獎項的原因。(字數上限 500 字)

VII. 如發明品將角逐社會創新大賞，請列明作品所針對的目標群組或社會議題，並說明參與競逐此獎項的原因。(字數上限：500 字)

VIII. 結論

- 撰寫以數據為本的結論及有關發明的後續安排
- 證明作品是否達到研發目標
- 感謝閣下閱讀我們的作品介紹。這個天台自動偵測警報器項目是我們團隊在校內安全意識逐漸提高的背景下所開發的。我們希望這個警報器能夠為學校的安全提供一層保障，也能夠為其他學校或機構提供借鏡和參考價值。
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- 在研發的過程中，我們遇到了不少挑戰和困難，但是通過不斷嘗試和嘗試，最終成功地實現了我們的目標。這次經驗讓我們更深入了解了紅外線感應器和數據傳輸技術的應用，也

更加重視了學校安全問題。



- 我們相信，只要有更多人關心學校的安全，透過技術和創新的手段，一定能夠創造更安全的學習環境。我們期待著未來能夠繼續參與和推動這樣的項目，為學校做出更多貢獻。

□ 我們的作品是以之前的比賽作品為題進行了持續研習，有關改良如下：

Hong Kong Student Science Project Competition 2023

Template of Extended Abstract (Invention)
(Word Limit: 1,600 words, Pages: 3 pages only)

Team Number:

Project Title:

Project Type: Invention

*To our best knowledge, there are / are not * similar works in the market; (if there are,) related product links are as below:*

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

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**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**

II. Objectives

- State the **aim(s)** of project
- Through careful monitoring of our webcam controlled by our application, and efficient time management with the help of our timer, we aim to fill your cat's bellies and give them the affection that is absent while you are away.

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**
- With the owner's best interest at heart, we researched the preferred household pet and came to a conclusion that it was cats that were most neglected due to preference over other pets and feline's reputation of having a hostile nature. We brainstormed different ways to help cats and unanimously agreed on creating an attentive cat feeder. With the consideration of the pet's safety and the owner's convenience in mind, we came to design and make the cat feeder you see now.**

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

Though our main goal was to create a cat feeder, we wanted the design to be family friendly and accessible to all ages. The texture of the surface is decided as polypropylene, a smooth non-toxic plastic known to be the main source of many marketable products. Originally, the product was supposed to be a square-shaped machine, however during the final stages of our redesigning, the edges were changed to be round to ensure the safety of owners and pets alike. The color of our product is a pastel pink, pleasing to the eye and a common color among children. The volume of our food containers is an average of (insert v), higher than the average food containers of other cat feeders of (insert v). To top it off, we placed the eyes and whiskers of a cat onto the main head of the product to fit our brand.

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)

Our main focus for this invention are for pet owners who wish to monitor and maintain the health of their pets. Nowadays, the price of few cat feeders that exist in the market have skyrocketed, and though they promise a healthy diet for pets, it is mainly manhandled and unstable. Our Neko Feeder ensures pet owners that, with our webcam and timer, pets can have both nutritious and delicious food at a price that is accommodating to a wide range of customers. Furthermore, owners can install an application that guides them through the Neko Feeder's function with their mobile phones.

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)

The materials used for our product is widely reusable in hopes of future products following our example. For example, polypropylene, which is known to be widely recycled and reused in other materials., including fibers for clothing. This way, not only does our invention aid the current generation, it will not compromise any resources or the environment of the future.

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)

With humanity being in the most peaceful times in our lives and the economy reaching its peak, pets, cats especially, are brought into a domestic environment and easily neglected by busy owners. Our product aims to serve as a necessity for the pets that receive poor treatment due to negligence.

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