

# 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: Cyclometer**

**Project Type: Invention**

*To our best knowledge, there are\* similar works in the market; (if there are, ) related product links are as below:*

<https://www.instructables.com/Arduino-Bike-Speedometer/>

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

**We implemented a sound warning system**

*\*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**

In recent years, more and more citizens are riding bicycles on the road, resulting in an increasing number of accidents. With bicycle lanes not available in several areas, people tend to take to the road to have an opportunity to cycle. Reports show that around 41,000 cyclists die each year due to speeding of the bicycle, where often riders crash into large vehicles or may have even been hit by them. In order to reduce accidents caused by speeding, we hope to design a device to detect the speed of the bicycle and warn the cyclist through the different frequency of sound when the bicycle is speeding, so as to avoid accidents.

## II. Objectives

- State the **aim(s)** of project

Design a device to warn cyclists when they are speeding

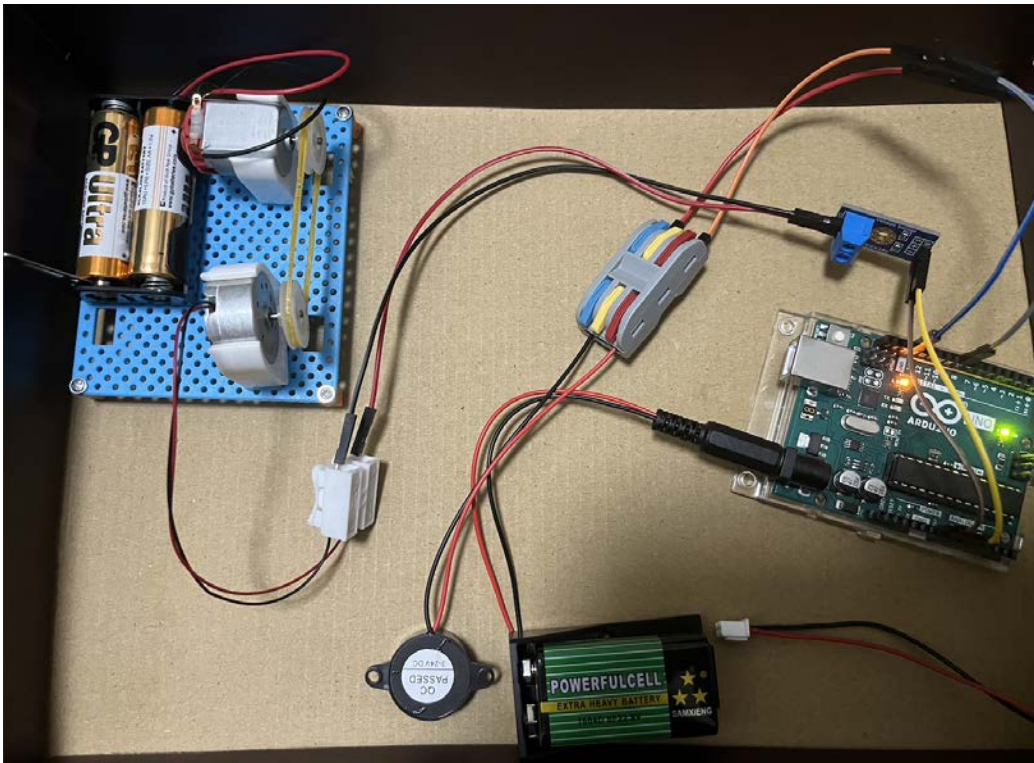
## III. Methodology

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

When the bike moves, it generates electrical energy, which is then transferred into a voltage sensor, then the data collected is transmitted to an arduino board. When the cyclist is speeding, it triggers the system and different frequencies of sound are produced according to the voltage detected.

#### 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



The gadget on the top left hand corner is a simulation of a moving bike and is powered by two 2V batteries. It is then connected to a voltage sensor which detects the voltage generated by the bike simulator. Then the data is transmitted to the arduino board. Then different sound frequencies are produced according to the voltage input.

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## 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)

By adding out devices to bikes, it can decrease the accident rate caused by speeding as the warning system will be triggered when the bicycle exceeds the suggested speed. However, it might be a little bit difficult for some of the users to identify the difference in sound frequency.

VI. 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)

Our aim is to reduce the accidents caused by cyclists speeding, hence we developed a warning device that monitors the speed of the bike and warns the cyclist when the speed is too fast.

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## VII. 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)

In conclusion, our device was able to carry out the function as we anticipated. When the voltage generated by the bike simulation reaches the set limit, the warning alarm goes off accordingly.

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

A sound warning system is implemented into our device