

# Application of MGF Artificial Intelligent for Abnormal Detection for saving lives

For nomination of KE Award 2023

Team: Dr. Wilton Fok

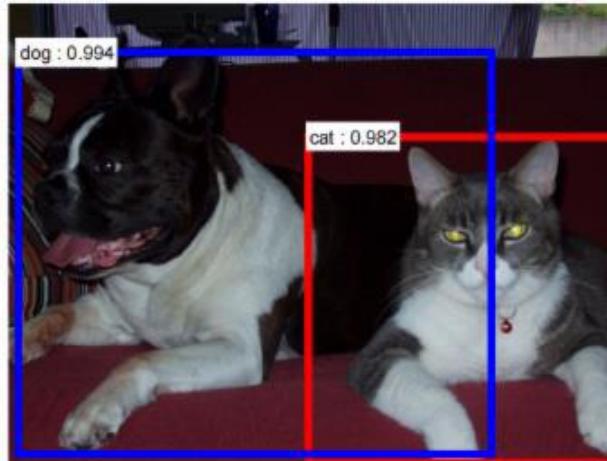
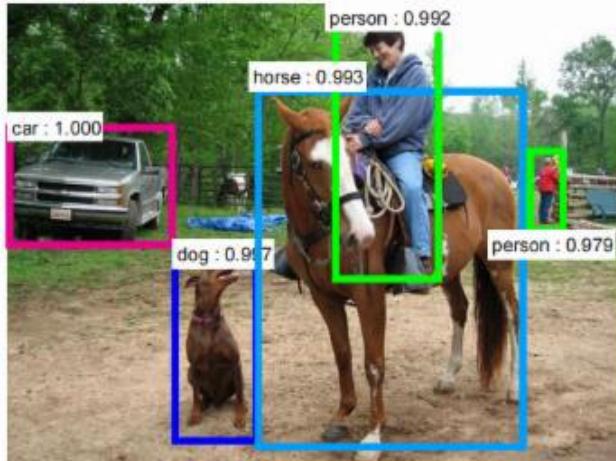
Dr. YC Wu, Dr. XJ Qi, Carol Chen,  
Cody Ng, Daniel Zhang, Paul Liu

# Limitation of existing technologies

目前的分類技術

Current technology for classification

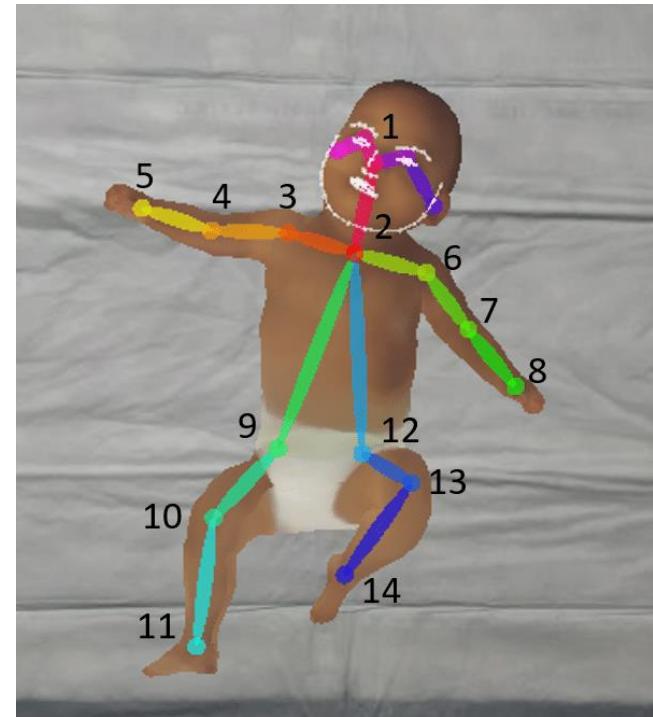
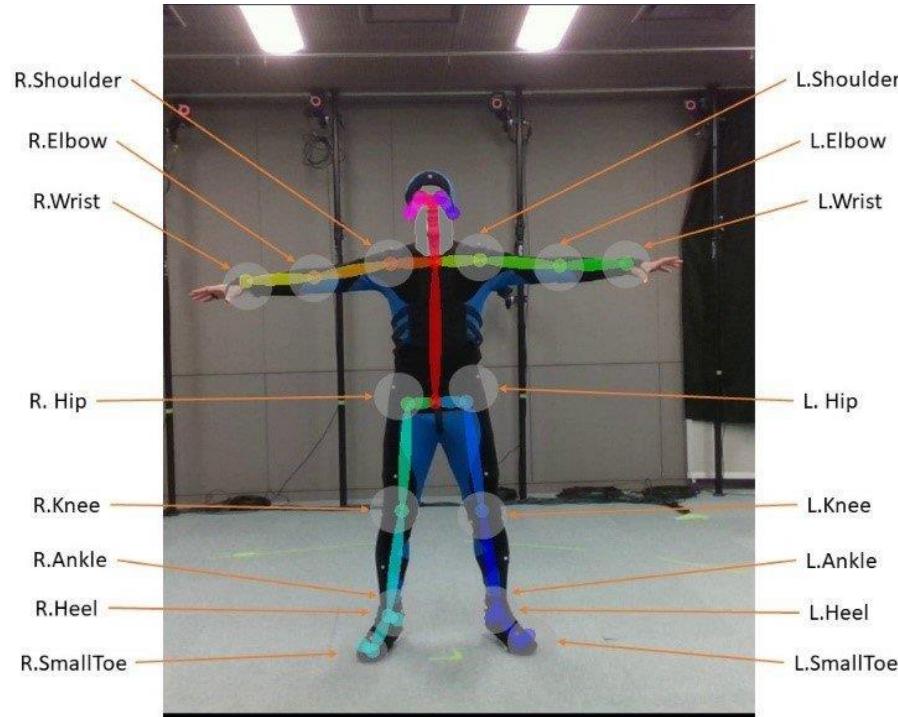
- 以目標為標準 Object based
- 靜態圖片 Static image
- 無骨架檢測 No skeleton detection
- 普通彩色相機 Normal colour camera



# 創新技術一：骨骼檢測

## Innovation 1: Skeleton Detection

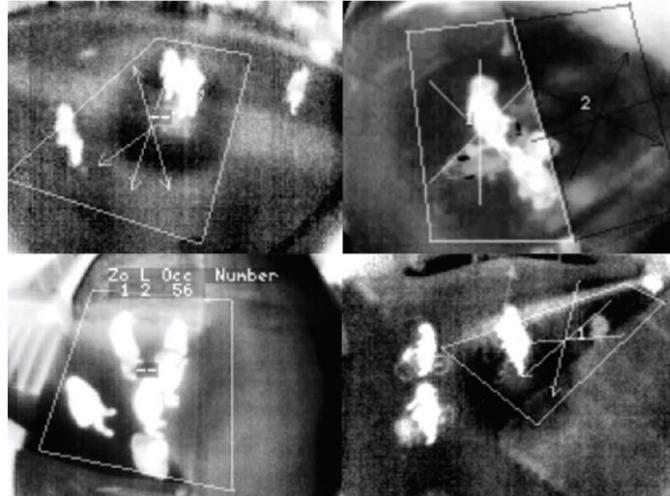
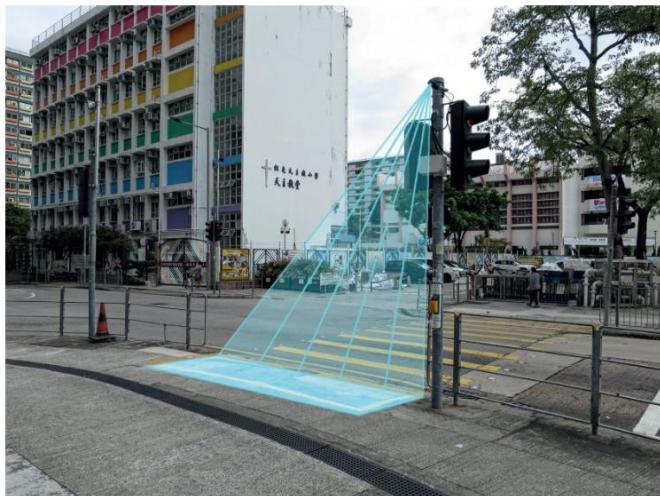
- 使用人工智能檢測人體骨骼的關節點
- Use AI to detect they key points of a human skeleton



## 創新技術2：使用熱攝像機以保護隱私

### Innovation 2: Work on Thermal Camera to protect privacy

- 運輸處正使用此技術
    - 檢測人類的影像以控制行人交通信號燈流量
  - 限制：只能檢測到行人的數量
- Existing technology using in Transport Department
    - To detect human-like object for the control of pedestrian traffic light flow
  - Limitation: Can only detect the number of pedestrian

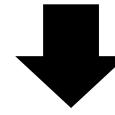
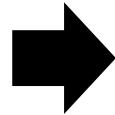


Source:  
[https://www.td.gov.hk/en/transport\\_in\\_hong\\_kong/pedestrians/pedestrian\\_crossing\\_facilities/pilot\\_real\\_time\\_adaptive\\_traffic\\_signal\\_system/index.html](https://www.td.gov.hk/en/transport_in_hong_kong/pedestrians/pedestrian_crossing_facilities/pilot_real_time_adaptive_traffic_signal_system/index.html)

# 創新技術2：使用熱攝像機

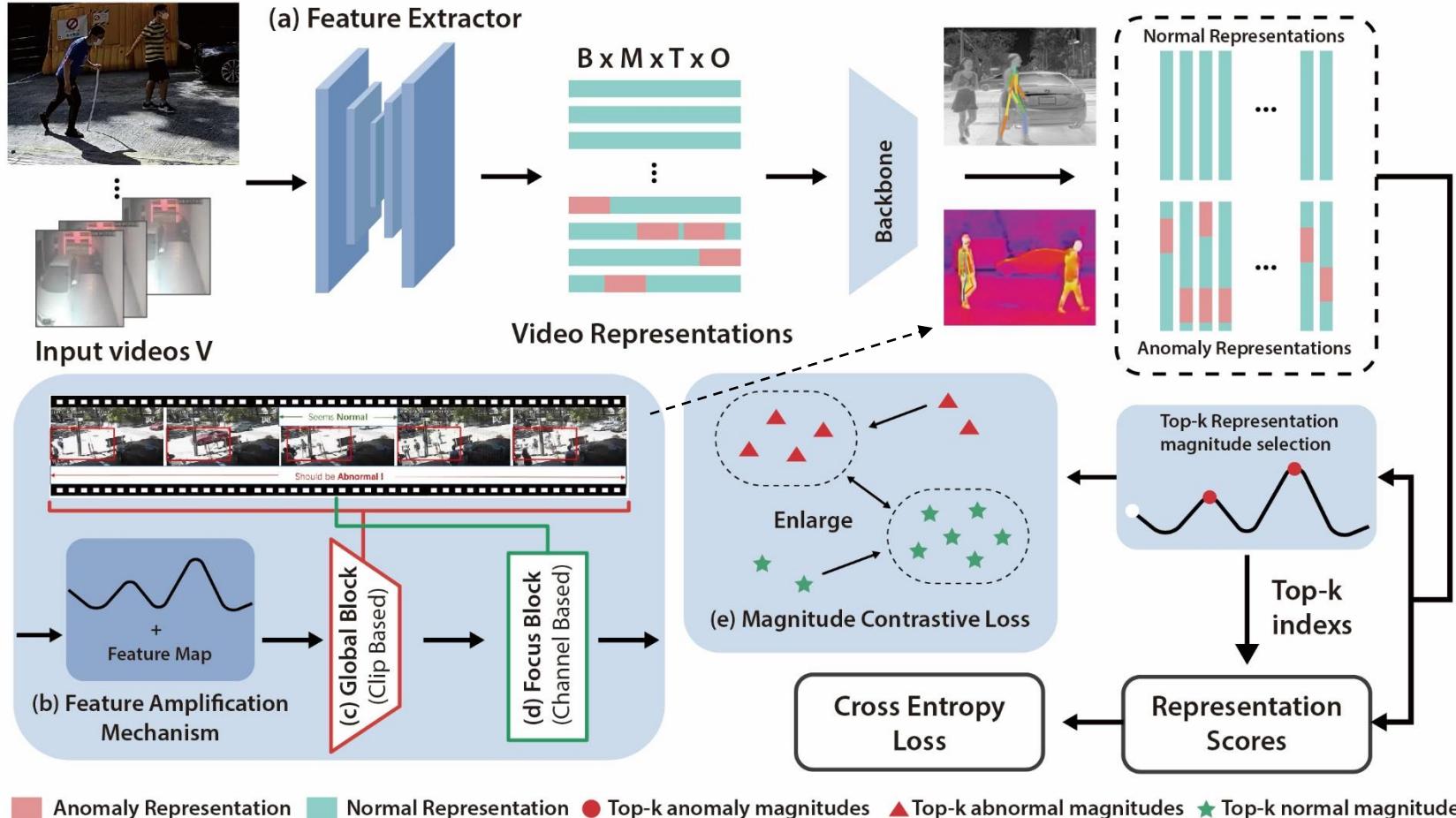
## Innovation 2: Work on Thermal Camera

- 我們的創新：
  - 可以檢測行人的骨骼，並分析是否老年人，肢體殘疾還是輪椅人士
- 平衡安全性和隱私
- Our innovation:
  - Can detect the skeleton of pedestrians and determine if they are elderly, disable or on wheel chair
- Balance Safety and Privacy



# Underpinning Research

## 創新技術3：大幅度瀏覽和網絡聚焦 Innovation 3: Magnitude Glance and Focus Network



- 單張圖片（幀）信息量有限  
A single picture (frame) has limited information



- 逐幀分析可以告訴我們更多信息
- Multiple frames analysis could tell us more



# Summary of the Impacts

**Our technologies are deployed in the society to save lives!**

- 安全
  - 溺水檢測
  - 兒童住宿
  - 殘障人士廁所
  - 行人和道路交通
- Safety
  - Drowning Detection
  - Children Home
  - Disable Toilet
  - Pedestrian and road traffic

# 遇溺意外 Drowning

The image consists of three separate news snippets arranged in a collage format:

- Top Left Snippet:** A photograph of a swimming pool area with palm trees and a "Deep Water Zone" sign. The headline reads: "君臨天下遇溺慘劇細節曝光" (Details of the tragic drowning accident at King Lam天下). Below it, the main text states: "兩女童懂游水有家人陪同 事發時兩名當值救生員 未聞呼救聲" (Two young girls who know how to swim were accompanied by family. At the time of the incident, two lifeguards on duty did not hear the cry for help). A blue "O1 News" logo is in the top left corner. A white button with a hand icon and the text "點擊睇片" (Click to watch) is in the bottom right.
- Top Right Snippet:** A photograph showing several people, including what appears to be a drowning victim and rescue personnel, near a body of water.
- Bottom Snippet:** An aerial view of a swimming complex with multiple pools. The headline reads: "與泳客相撞 沉水底15分鐘 七旬婦裁定死於意外" (Collided with a swimmer, sank for 15 minutes, 70-year-old woman ruled to have died from the accident).

# 溺水異常檢測

## Abnormal detection for Drowning Detection



- 已使用在
  - 民生書院
  - 由創新及科技基金之公營機構試用計劃資助，將在2023–24配置在公共場所中



- Deployed in
  - Munsang College
  - Supported by the ITC Public Sector Trial Scheme to deploy for public in 2023-24



創 新 科 技 委  
Innovation and  
Technology Commission

# Deployment in LCSD Public swimming pool

- Deployment in LCSD Kwun Tong swimming Pool
- Time to market:
  - Can cope with the demand on drowning detection and ease the pressure of safe guard
  - While address the privacy concern.
- Appreciated by the Secretary of Innovation Technology and Industry Bureau



# 保護兒童安全

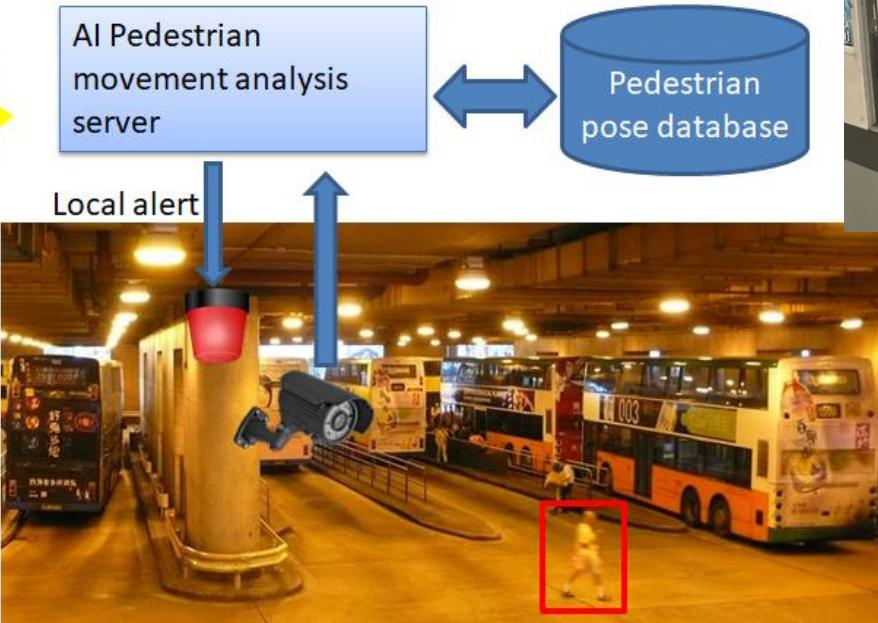
## Protection of Children Safety

- 已應用在:
  - 匡智兒童宿舍
  - 香港保護兒童協會
- Applications:
  - Hong Chi Children Home
  - HK Society for the Protection of Children

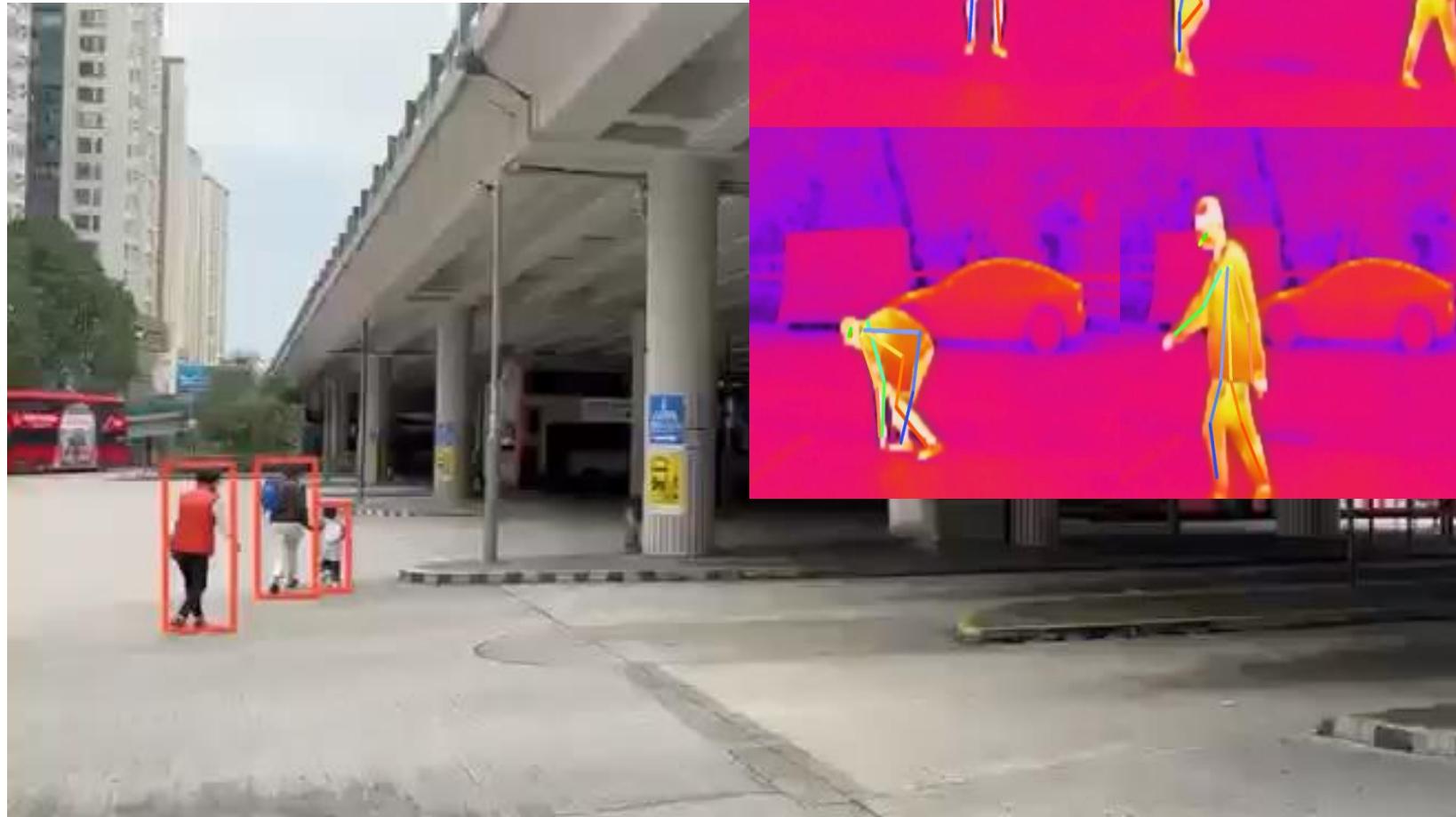


# Trial in KMB bus terminal through the \$5M Smart Traffic Fund project

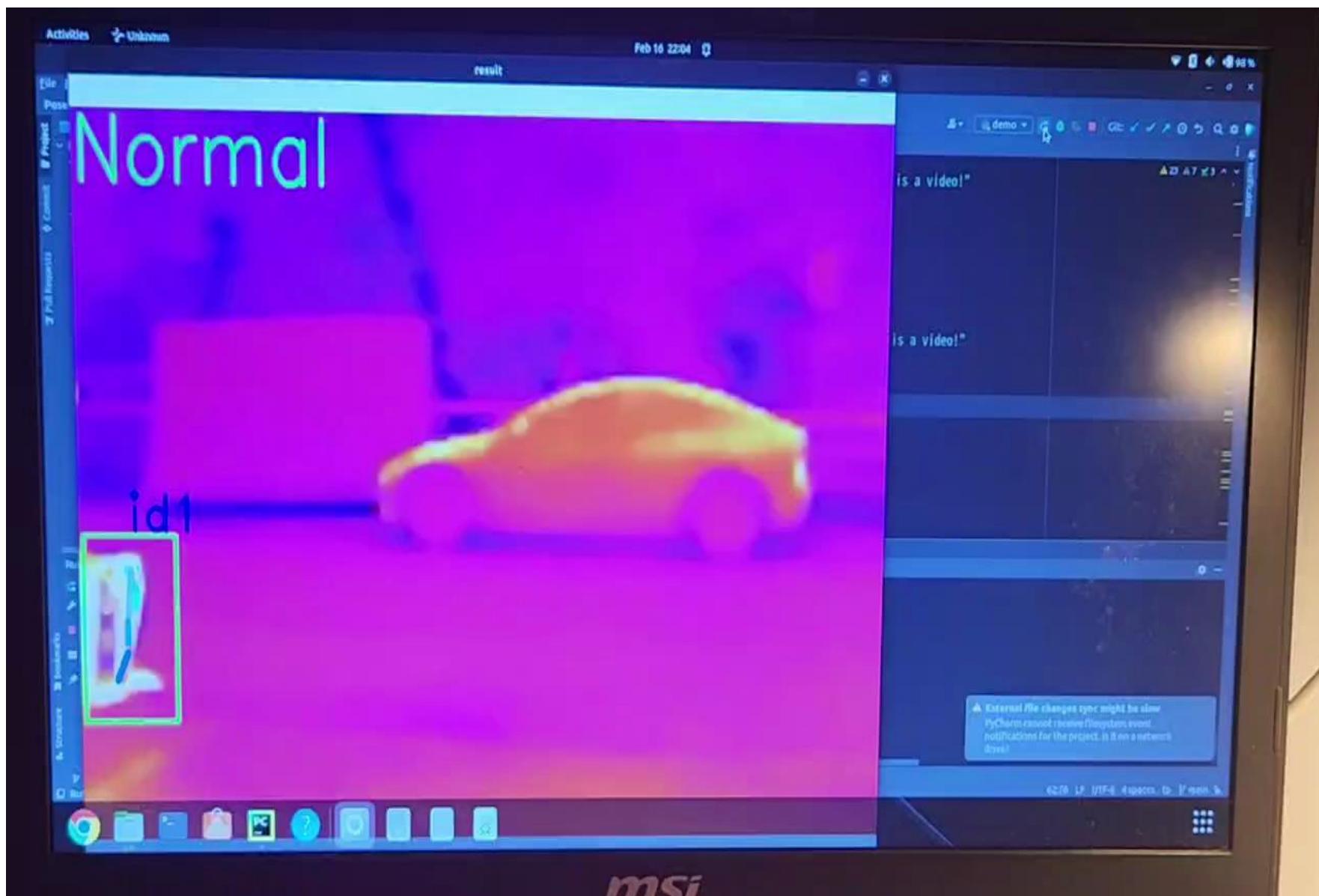
Wireless signal to alert bus driver that pedestrian is in a risky area in the bus terminal



# Pedestrian safety in bus terminal



# Real-time abnormal detection



# Knowledge to be Exchanged & Engagement Process

- InnoCarnival in the HK Science and Technology Park, Oct 2022
- SociTech Symposium organised by HK Council of Social Service in Cyberport, Dec 2022
- Geneva Invention Show 2023



# Knowledge to be Exchanged & Engagement Process

- TVB Innovation and Technology program
- Media event organised by CPAO and TTO after the Geneva Invention
- Media interviews
  - Mingpao, Tai Kung, Phoenix TV, TVB, 01 media, Economic Times
  - RTHK Radio 3



鳳凰秀 影響有影響力的人 [打開看看](#)

## 港大團隊總監：利用鏡頭實時分析人體動作

14小時前

港大團隊研AI偵測監察

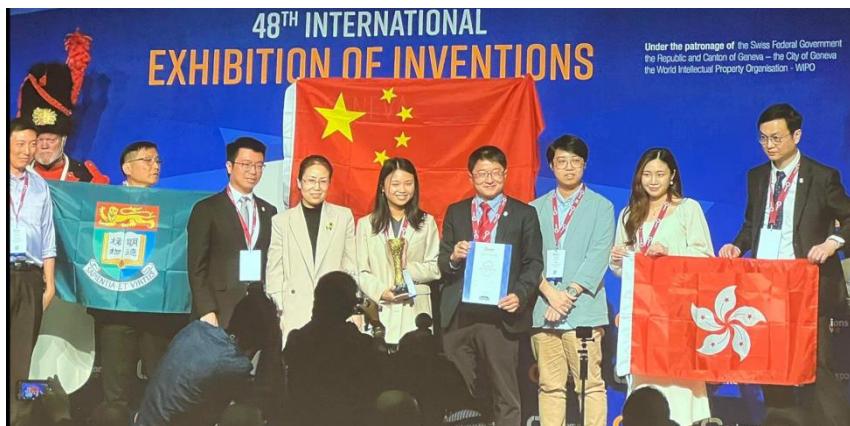
港大團隊總監：利用鏡頭實時分析人體動作

5月14日

HONG KONG 香港傳真

# Details of the Impact Achieved

- Timely address the needs of safety whenever incident happened
- Published in top international Journal: Association of Advance Artificial Intelligence 2023 in Washington
- Two Grand Awards and a Gold Award in the Geneva Invention 2023
  - Innovation CAI Award (China Delegation)
  - Prize of the Delegation of Malaysia
- HK Information and communication Technology Award 2021



創新CAI獎（中國代表團）  
Innovation CAI Award (China Delegation)



馬來西亞代表團獎  
Prize of the Delegation of Malaysia

