



# Research and Development of Tracking and Arresting Criminal Systems Using Artificial Intelligence Technology

Muang Chonburi Police Station

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# Outline

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- Problem Statement
- Environment Settings
- Methodology
- Results, Outputs, Impacts
- Conclusion

# Problem Statement

**“Old Solution: Security Staffs  
watch the CCTV and people”**



Example of CCTV Control Room at Chiang Mai

**“More than 15,000 CCTV cameras in  
Three Southern Border Provinces.”**

# Problem Statement

## Big Data Storage



Source: <https://www.tcgdigital.com/big-data-advanced-analytics/>

# Problem Statement

Welcome to Datacrime  
<http://www.datacrime-cti.com/>



ระบบฐานข้อมูลบุคคลกลุ่มเสี่ยง ก.จ.จังหวัดชลบุรี

**Chanthaburi Police**  
**Database:** Collecting  
data on target groups  
of people and vehicles



# Problem Statement

## Database of at-risk people

ค้นหาข้อมูลบุคคลกลุ่มเสี่ยง

ค้นหาด้วยคำสำคัญ (Keyword)

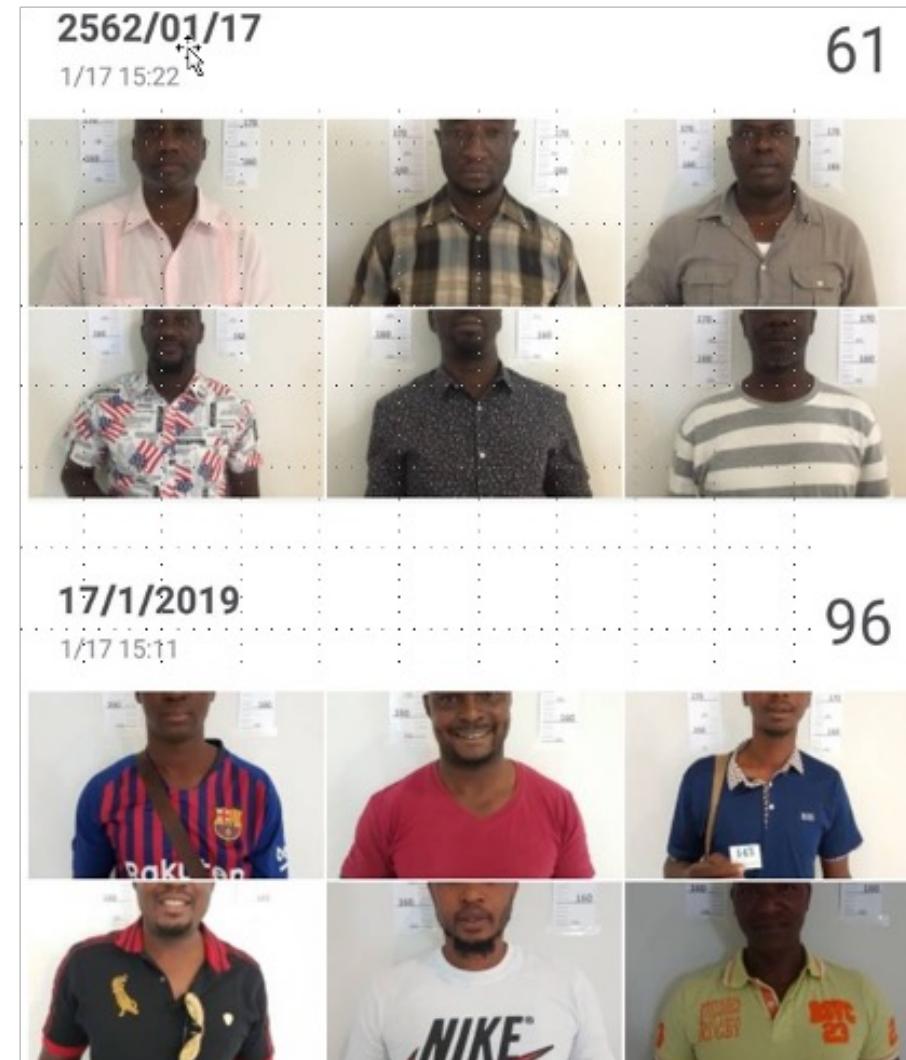
ประเภทข้อมูล 1:  
 ชื่อ  
 พิมพ์คำที่ต้องการค้นหา

ชนิดของการเชื่อมคำ 1:

ประเภทข้อมูล 2:  
 นามสกุล  
 พิมพ์คำที่ต้องการค้นหา

ก่อนหน้า    ถัดไป    เรียนร้อย

ชื่อ  
 นามสกุล  
 คำนำหน้าชื่อ  
 ชื่อเล่น



# Problem Statement

## A database of offender-risk vehicles

ค้นหาข้อมูลบุคคลกลุ่มเสี่ยง

ค้นหาด้วยคำสำคัญ (Keyword)

ประมวลผล 1:

ชื่อ

พิมพ์คำที่ต้องการค้นหา

ชนิดของการเชื่อมคำ 1:

ประมวลผล 2:

ก่อนหน้า    ถัดไป    เรียบร้อย

ข้อหา/พฤติกรรมที่เกี่ยวข้อง

ประเภทยานพาหนะ

ยี่ห้อ รุ่น และสียานพาหนะ

ป้ายทะเบียน

2561/11/08 #1 N  
2018/11/8



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# Objectives

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1. To enhance police officers' proficiency in using AI for crime data analysis in Thailand via smart phone, leveraging data collection and investigation of crime data process.
  

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  2. To boost public confidence in crime prevention through the systematic use of intelligent CCTV technology for crime monitoring and evidence recording.
  

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  3. To implement AI-driven technology to alert police of suspicious individuals or vehicles via mobile devices connected to a central server.
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# Problem Statement

## A solution for system design of crime prevention

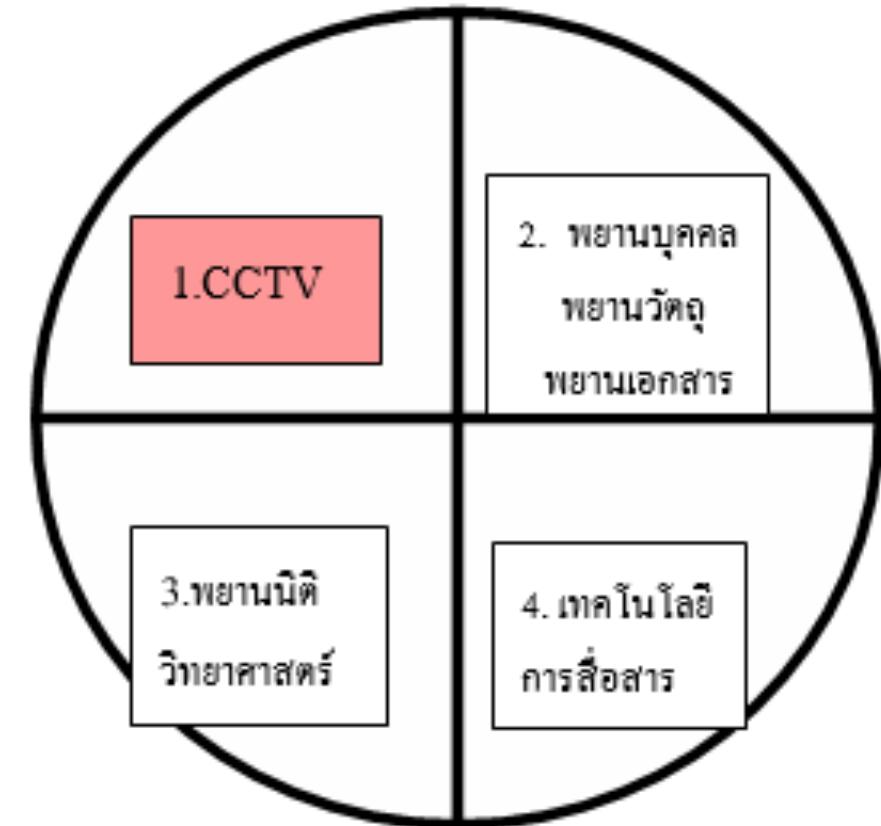


# Problem Statement

## Knowledge of Modern Investigations

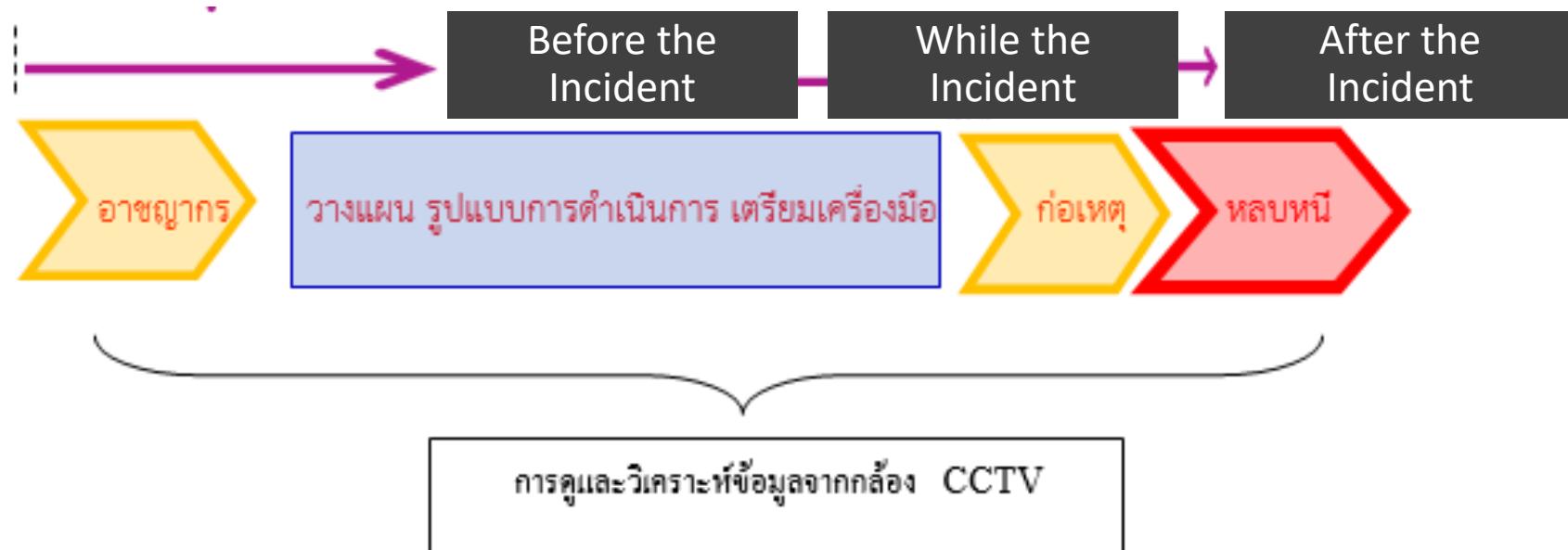
Currently, police officers use investigative knowledge to locate and apprehend criminals, forming the foundation for evidence collection and criminal pursuit. There are 4 elements:

1. CCTV
2. Witnesses, Material Witnesses, Documentary Witnesses
3. Forensic Evidence
4. Communication Technology



## Problem Statement

The sequence of events and attributes of criminals are:



SMART CITY – Enhancing quality of life through innovative support.



CCTV camera locations in Chonburi city:

1. Chon Rat Amrung intersection - 4 cameras.
2. Chalerm Thai intersection - 6 cameras.

# Environment Settings

## Camera Installation

### 1. Chon Rat Amrung intersection - 4 cameras.



# Environment Settings

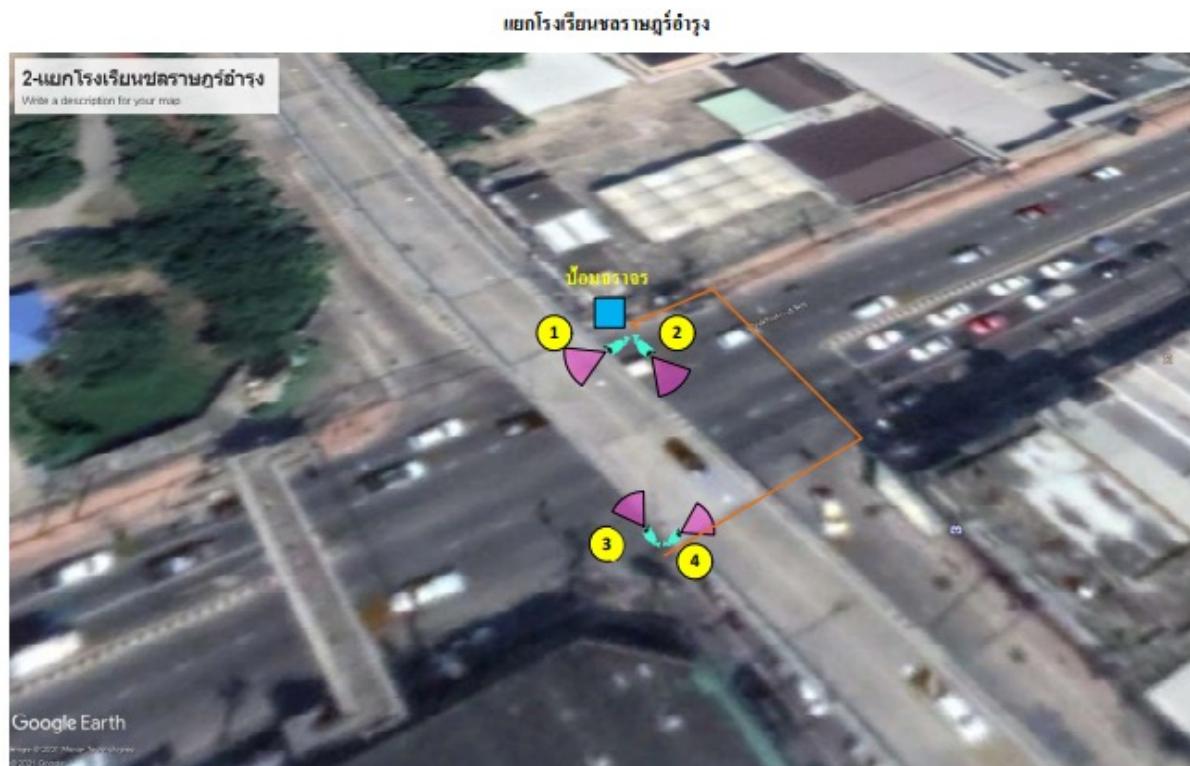
## Camera Installation

### 2. Chalerm Thai intersection - 6 cameras.

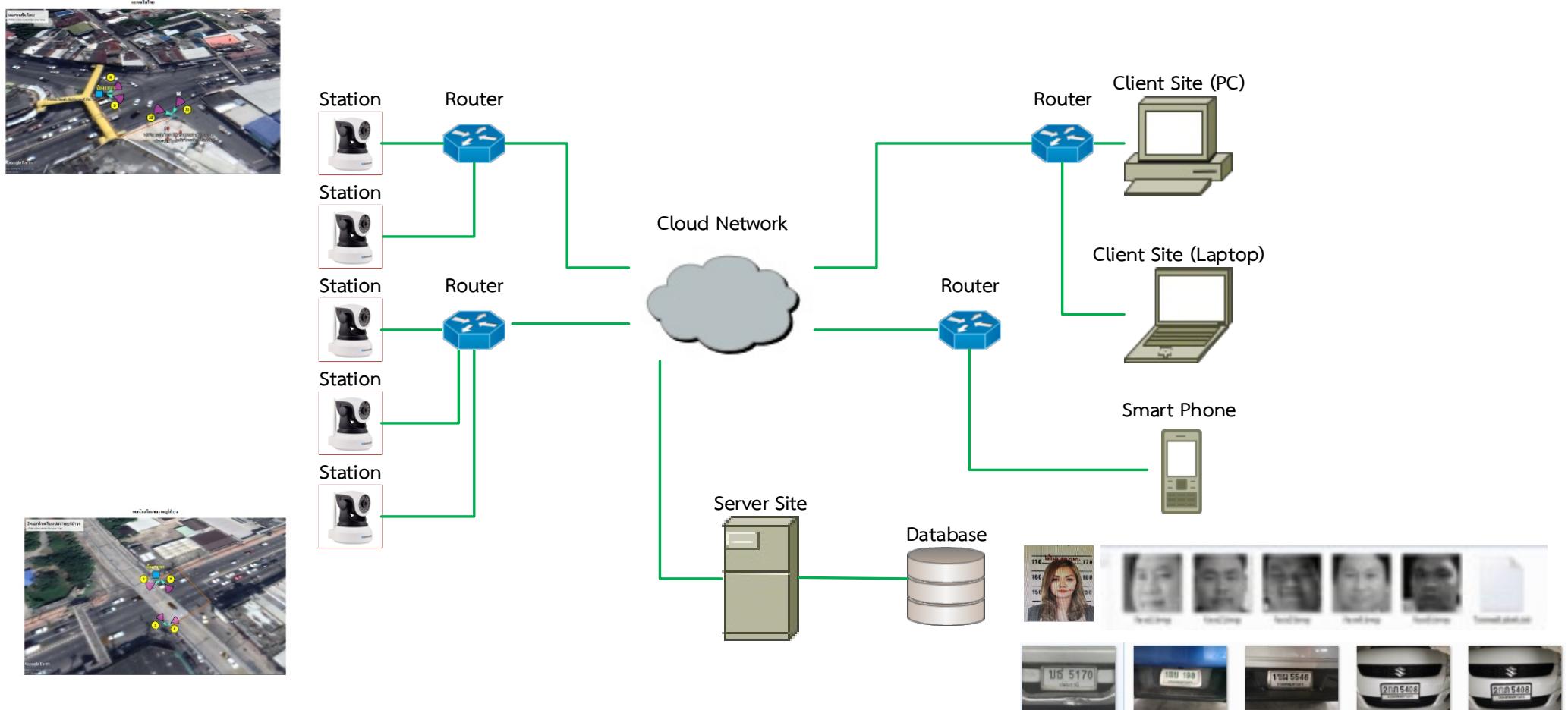


# Environment Settings

## Camera Installation Location



## System Operation Overview



System Operation Overview Research and Development of Tracking and Arresting Criminal Systems  
Using Artificial Intelligence Technology

# Methodology

The process of tracking by detection

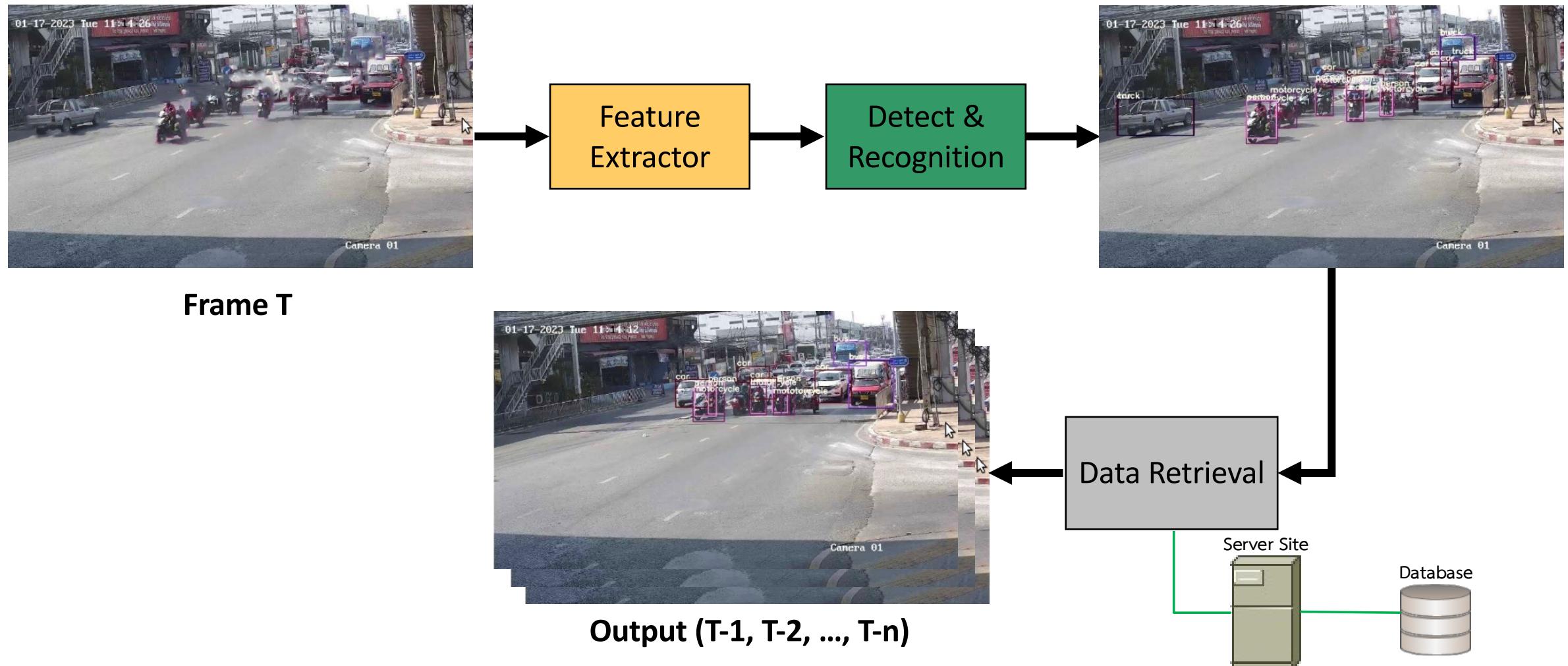


Illustration of the detection, tracking, and recognition procedure

# System results

## The visual results of system



Examples of results of system

# System results

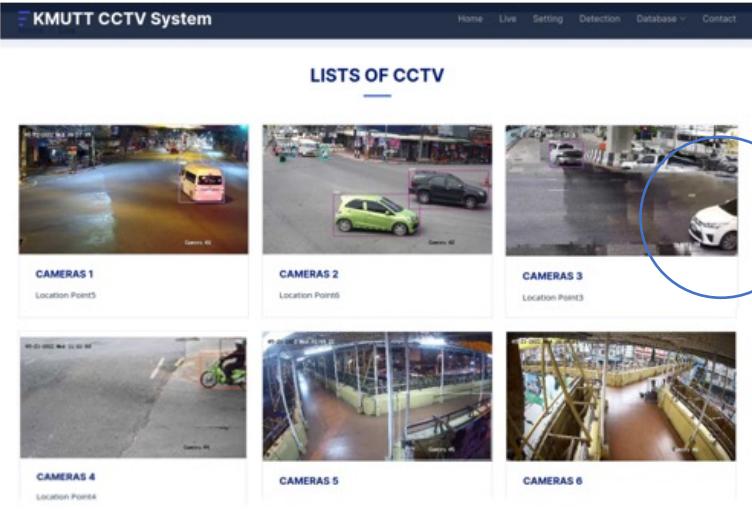
## The visual results of system



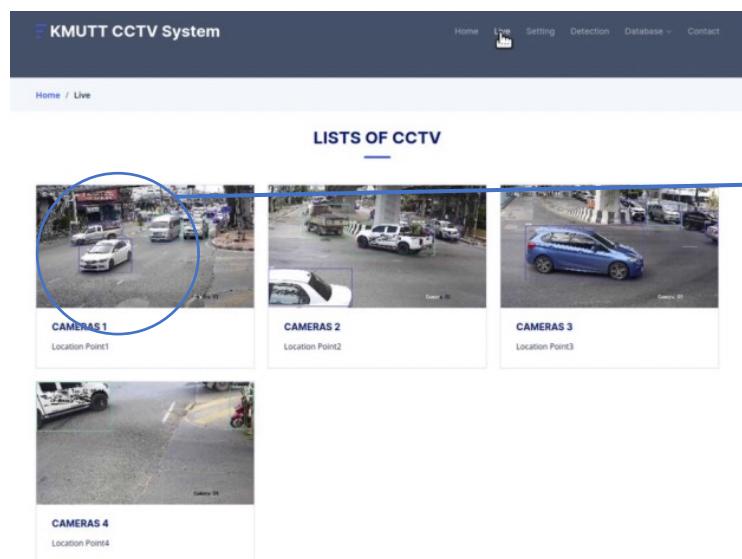
Examples of results of system

# System outputs

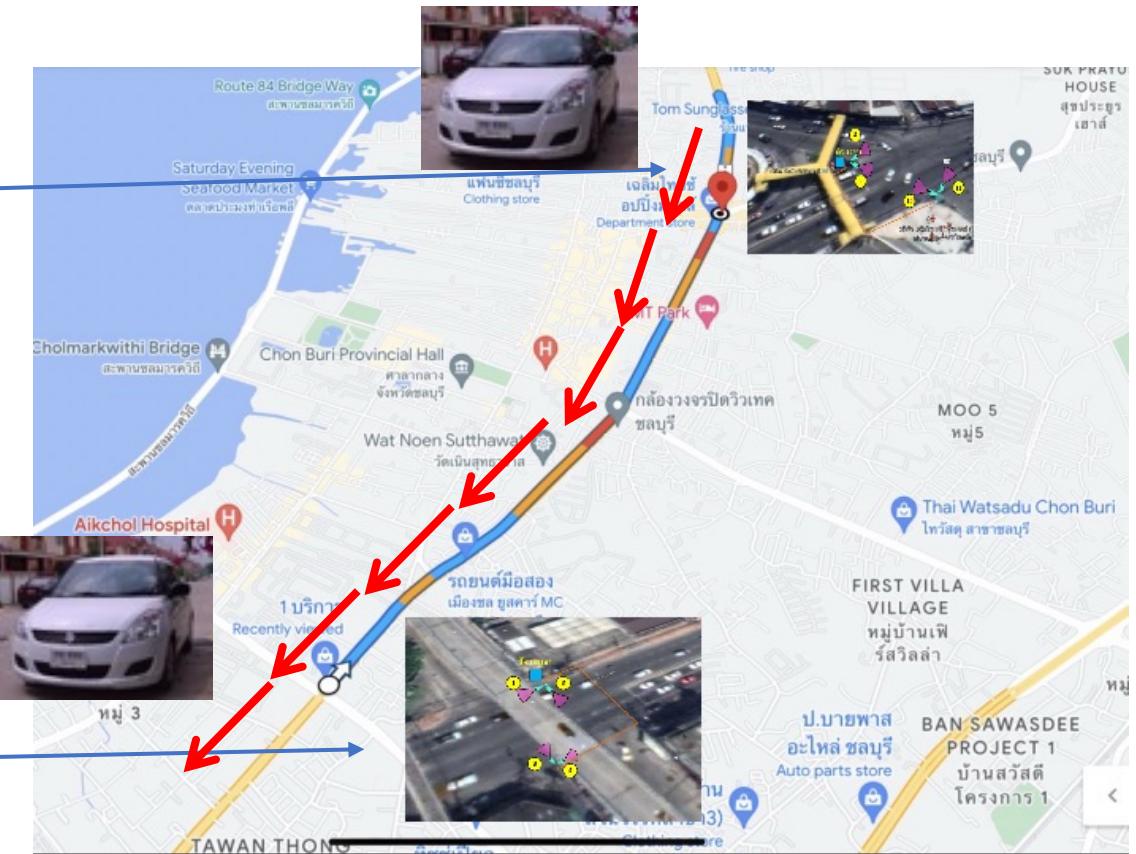
## Criminal Arrest Tracking System



2. แยกเฉลิมทราย



1. แยกชลบุรีอัมรรุง



# System outputs

## System Operation: Add Face

KMUTT CCTV System

Home Live Setting Detection Database Contact

Home / Face

### Add Face

Select a category  
Select a category ...

Create New Category

Select a name  
Select a name ...

Create New Name

National ID

Province

Image  
Browse... No files selected.

Upload Face Go Back



# System outputs

## System Operation: Add Vehicle

Home / Face

Search

Faces Categories

ALL

- Citizen
- Criminal
- Civil Servant

Add Face



Category: Citizen Name: Sovann

Category: Criminal Name: Animal

Category: Civil Servant Name: Bird

KMUTT CCTV System

Home Live Setting Detection Database Contact

Home / Vehicle

### Add Vehicle

Select a category

Select a category ...

Create New Category

Select a name

Select a name ...

Create New Name

Color

Year

License Plate

Image

Browse... No files selected.

Upload Vehicle  Go Back

# System outputs

## System performance

The screenshot shows the KMUTT CCTV System interface. At the top, there's a navigation bar with links for Home, Live, Setting, Detection (which is highlighted), Database, and Contact. Below the navigation is a breadcrumb trail: Home / Detection. On the left, there's a live video feed from Camera 01 showing a street scene with several cars. A purple bounding box highlights a silver car in the foreground. The date and time (12-06-2022, Tue) are displayed in the top-left corner of the video feed. Two buttons are visible: "Select Cameras Position" (blue) and "Confirm" (red). To the right of the video feed, there are two sections: "Face" and "Vehicle". The "Face" section contains two video thumbnail icons, each with fields for Category, Name, National ID, and Province. The "Vehicle" section also contains two video thumbnail icons, with similar fields for Category, Name, Color, Year, License, and Location. Below these sections, a summary of the detected vehicle is provided: Category: Private car, Name: Suzuki, Color: White, Year: 2012, License Plate: 5408, and Location: Chonradsadornumrung.

12-06-2022 Tue 12:00:00 AM

Select Cameras Position Confirm

Home / Detection

Face

Vehicle

Category:  
Name:  
National ID:  
Province:

Category:  
Name:  
National ID:  
Province:

Category:  
Name:  
Color:  
Year:  
License  
Location:

Category: Private car  
Name: Suzuki  
Color: White  
Year: 2012  
License Plate: 5408  
Location: Chonradsadornumrung

Category: Private car  
Name: Suzuki  
Color: White  
Year: 2012  
License Plate: 5408  
Location: Chonradsadornumrung

# System outputs

## System performance

KMUTT CCTV System

Home Live Setting Detection Database Contact

Home / Detection

Select Cameras Position Confirm

12-06-2022 Tue 12:40:39

person person person

Face

Vehicle

Category: citizen  
Name: patiyuth  
National ID: 3801200013724  
Province: Bangkok

Category:  
Name:  
National ID:  
Province:

Category:  
Name:  
Color:  
Year:  
License  
Location:

Category:  
Name:  
Color:  
Year:  
License  
Location:

Category: citizen  
Name: patiyuth  
National ID: 3801200013724  
Province: Bangkok

KMUTT CCTV System

Smart CCTV enables remote monitoring of a home or property, connecting to a device such as a smartphone or tablet even when away from the premises.

Contact Us

CCTV

# System outputs

## System performance

The screenshot shows the KMUTT CCTV System interface. The top navigation bar includes links for Home, Live, Setting, Detection, Database, and Contact. Below the navigation is a breadcrumb trail: Home / Setting. The main content area is titled "Cameras Setting". On the left, there is a form titled "Add Camera" with fields for Username, Password, Ipaddress, Port, Channel, and Location. On the right, there is a table titled "Camera Information" listing four camera entries with columns for ID, Location, Username, IP Address, Port, Channel, and Action (Edit and Delete buttons).

ID	Location	Username	IP Address	Port	Channel	Action
1	Point1	admin	192.168.100.100	554	3	<button>Edit</button> <button>Delete</button>
2	Point2	admin	192.168.100.101	554	3	<button>Edit</button> <button>Delete</button>
3	Point3	admin	192.168.100.102	554	3	<button>Edit</button> <button>Delete</button>
4	Point4	admin	192.168.100.103	554	3	<button>Edit</button> <button>Delete</button>

### Add Camera

Username:

Password:

Ipaddress:

Port:

Channel:

Location:

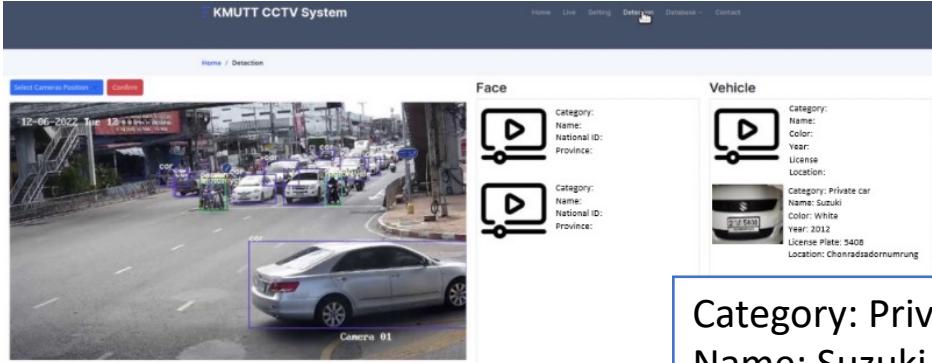
**Add IPcamera**

### Camera Information

ID	Location	Username	IP Address	Port	Channel	Action
1	Point1	admin	192.168.100.100	554	3	<button>Edit</button> <button>Delete</button>
2	Point2	admin	192.168.100.101	554	3	<button>Edit</button> <button>Delete</button>
3	Point3	admin	192.168.100.102	554	3	<button>Edit</button> <button>Delete</button>
4	Point4	admin	192.168.100.103	554	3	<button>Edit</button> <button>Delete</button>

# System impacts

## System performance



Category: Private car  
Name: Suzuki  
Color: White  
Year: 2012  
License Plate: 5408  
Location:  
Chonradsadornumrung



Category: citizen  
Name: patiyuth  
National ID:  
3801200013724  
Province: Bangkok

ลักษณะในการทดสอบ	ผลการทดสอบคิดเป็นเปอร์เซ็นต์
1. ผลการทดสอบของระบบการจัดเก็บข้อมูลบุคคลกลุ่มเดี่ยว และ ยานพาหนะต้องส่งสัญญาณไปยังสมาร์ทโฟน Smart phone	96
2. ผลการทดสอบของระบบแจ้งเตือนคำนำร่องรถ และ หมายเลขทะเบียนรถ (License plate)	90
3. ผลการทดสอบของระบบแจ้งเตือนคำนำร่องคนร้าย และ หมายเลขจีบ (Face Recognition)	90

# Extend the System

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Extend the system - Thaworn Khao Kluea Checkpoint Border area  
Chanthaburi (Thailand - Cambodia)



Using a mobile camera to detect the face of the suspected person



Collaborate with the navy – survey the air space of Narathiwat Province



# Narathiwat Airport

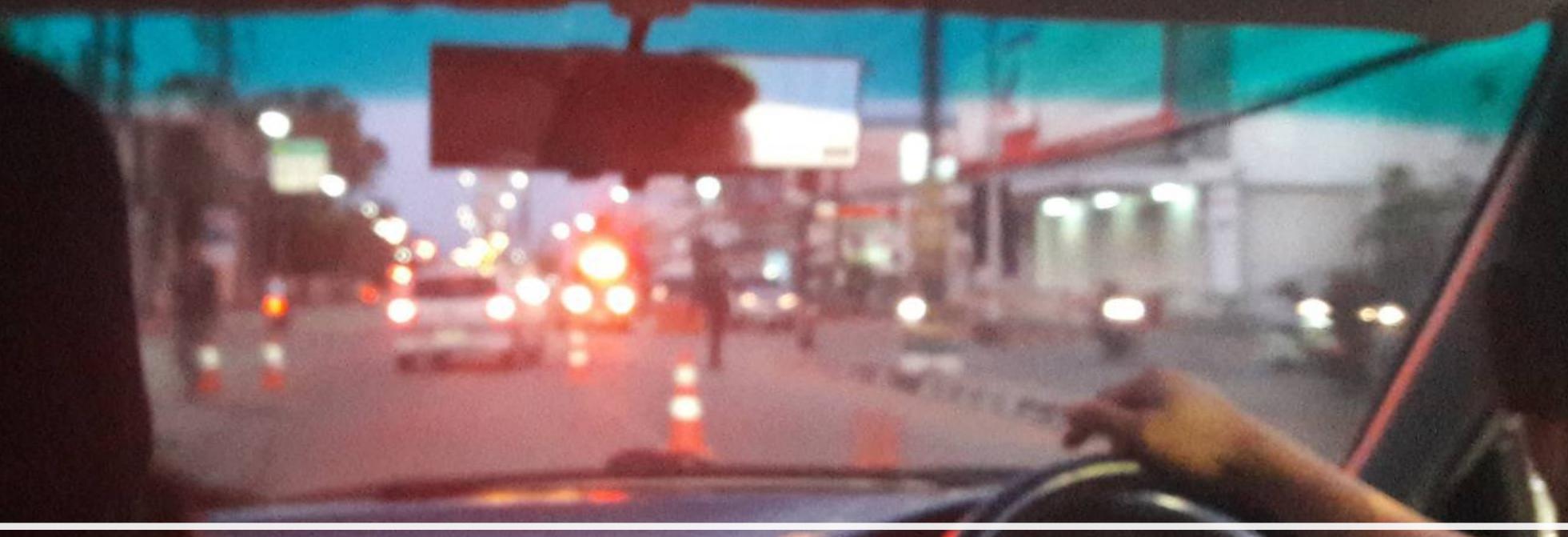


High-angle shot of Narathiwat Province





Joint military and police checkpoint, Narathiwat Province



Joint military and police checkpoint, Narathiwat Province

# Conclusion

- The research focused on utilizing AI technology to augment police efficiency in Thailand.
- The study aimed to enhance law enforcement capabilities and bolster public trust in crime prevention measures.
- By employing AI in crime data analysis through smartphones, leveraging intelligent CCTV technology for crime monitoring, and integrating real-time alerts for suspicious activities to police mobile devices.

# Q&A

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