

Poster: A descriptive security alert through the outlier analysis of multi-sensor data

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Abstract

It is possible to generate alerts for outliers from each sensor data, but this only tells part of the current situation [1]. In this paper, we propose a security alert that can describe the context and meaning in more detail through a composite analysis of multi-sensor data. Multi-sensor data collected from IoT network is provided to analyze the reason for an abnormality. That is, a people's movement or action, or the environmental change accompanied by people's behavior, or just an environmental change. The reason contributes to the classification of the current status: whether it is a security issue or a safety issue. By utilizing multiple sensor data, it is possible to contribute to daily living safety and security with a more detailed approach.

ACKNOWLEDGMENT

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REFERENCES

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- [2] M. Landauer, F. Skopik, M. Wurzenberger, A. Rauber, *Dealing with Security Alert Flooding: Using Machine Learning for Domain-independent Alert Aggregation*, ACM Transactions on Privacy and Security, Vol. 25, Issue 3, No. 18, 2022, pp. 1-36.



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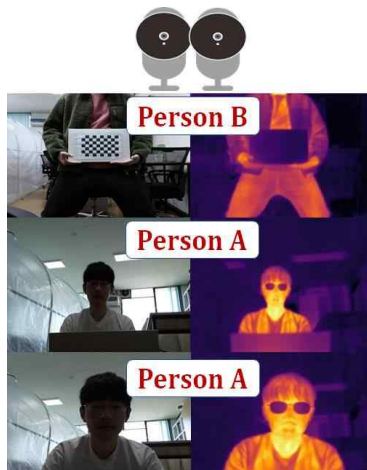
Abstract

In this paper, we propose a security alert that can describe the context and meaning in more detail through a composite analysis of multi-sensor data. Multi-sensor data collected on an IoT network is provided to analyze the reason why an anomaly occurred. That is, people's movements or behaviors, or environmental changes accompanied by people's behavior, or just environmental changes.

Motivation and Objective

- While alarm system features and prices vary from provider to provider, they generally have the following interior and exterior monitoring options to select from:
 - A wired or wireless central control panel
 - Motion sensors and exterior lighting
 - Door and window sensors so you are alerted if anyone is entering your home
 - Wired and wireless surveillance cameras inside and outside the home
 - Fire and environmental sensors for smoke, natural gas and carbon monoxide
 - Water sensors for flooding and freeze sensors for cold weather
 - Signage that will act as an additional deterrent to intruders
- It is possible to generate an alert for the outlier of each sensor data, but this only informs a part of the current situation.
- In this paper, we propose a method to describe the context and meaning of security alarm in more detail by a composite analysis of multi-sensor data.

Multi-sensors for Security Alert

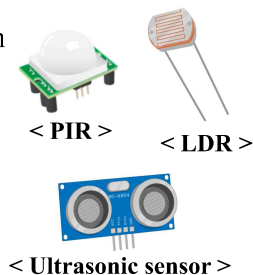


<A pair of thermal image camera and real image camera>

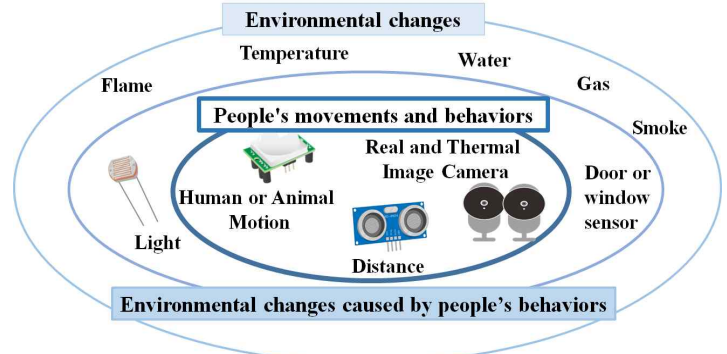
- FLIR's thermal imaging camera Lepton 3.5
- Raspberry Pi Camera Module 8MP

<Real and Thermal image pairs>

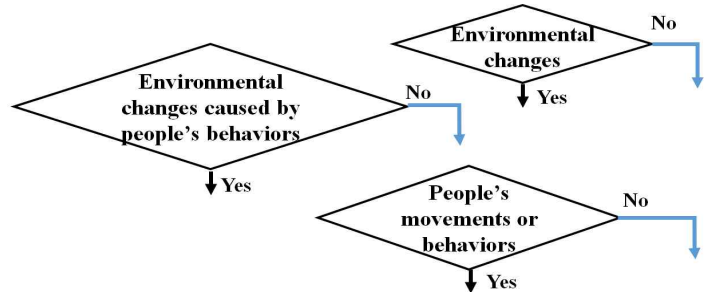
- Door and window sensors
- PIR sensor (human or animal motion detector)
- LDR (Light sensor)
- Ultrasonic sensor (distance sensor)
- Temperature sensor
- Smoke detect sensor
- Water sensor
- Gas sensor



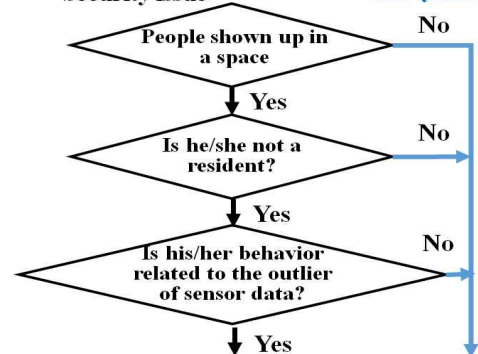
Composite Analysis of Multi-sensor data



< Multi-sensor data classification to analyze the cause of outliers >



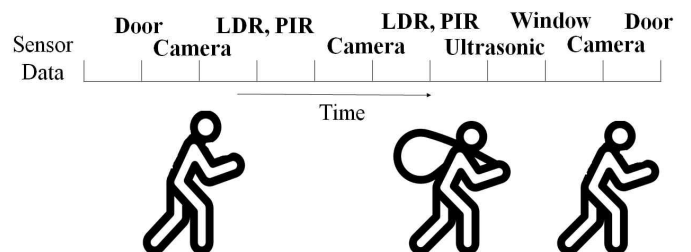
<An intentional accident: Security issue> <An unintentional accident: Safety issue>



< Decision units for the outlier analysis >

- Classification of security issue and safety issue about an outlier of sensor data
- Tracking the cause of the outlier through composite analysis by combining the decision units, and notifying of it with the cause by security alert.

A Descriptive Security Alert



<A descriptive security alert through the outlier analysis using multi-sensor data>