Proceedings of International Conference on Technology and Social Science 2017
KEYNOTE

Review of development of security camera with privacy protection and, social experiment using the security camera with privacy protection

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Keywords: Security camera, Privacy protection, Safety of school route.

Abstract. We conducted a social experiment using the e-JIKEI Camera to create a model case for a safe and secure school route. In addition, in order to know the opinion about the security cameras, a public opinion survey is performed in the social experiment. The e-JIKEI Camera is security camera that was developed in collaboration with the company for spreading "e-JIKEI Network" which encourages communities to monitor their surroundings with high densely installed camera for preventing crimes. The e-JIKEI Camera has an important feature which is useful for operating under privacy protection concept. The e-JIKEI Camera has the potential to significantly contribute to realizing a safe and secure school route.

1. Introduction

This paper reviews JTSS submitted paper[1]. In recent years, installation of the security cameras to stores, downtowns and public facilities has progressed. And there are many cases that security camera has helped to identify and to arrest the criminals. However, there are some opinions yet that the effect of security camera is doubted. We think that these opinion bases on installed number or density of camera rather than functions of security camera. If product cost and installation cost of the security camera is reduced more, installed number and density of security camera are increased. Then, the effect of security camera will be no doubt. We have proposed "e-JIKEI Network"[2-4] concept which encourages to communities to monitor their surroundings, not inside their homes, with inexpensive security cameras as shown in Fig. 1. We have promoted to install security cameras in residential area by producing software which compose a security camera with cheap computer and cheap web cameras. Additionally, we provided security cameras which are low installation cost and easy to use. However, increase of security camera causes worry about invasion of privacy and danger of arrival of a regimented society. We thought that the problems related to invasion of privacy and arrival of a regimented society can be solved by dividing the owner and viewer of the camera by proper selection and management of the two. We developed a security camera named "e-JIKEI Camera"[5] in order to realize our privacy protection concept.

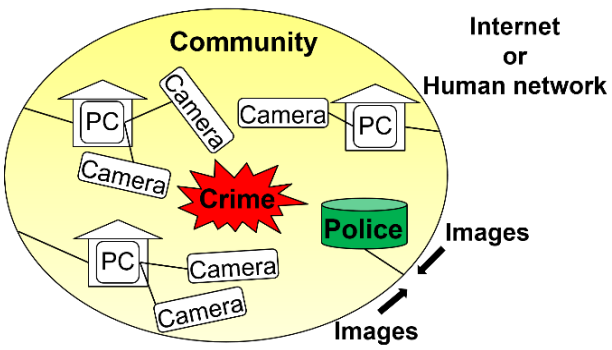


Fig. 1. Overview of the e-JIKEI Network.

2. Security camera with privacy protection

2.1 The e-JIKEI Camera (ejkc-ZB102C)

We developed a new security camera called “e-JIKEI Camera” in collaboration with company for spreading “e-JIKEI Network”. The e-JIKEI Camera has a function for realizing of the privacy protection. In this function, an image taken by the security camera is stored in the built in SD card with encryption. To view the encrypted image, a dedicated viewer software and passwords are required. In addition, there are two types in the passwords.

The first password called “Key A” is provided for the maintenance use. This password is owned mainly to maintenance company and neighborhood association which joins our social experiment. When the encrypted image is decrypted by the dedicated viewer software with the Key A, the image is displayed with a rough mosaic filter. Therefore, they cannot see a clear image. However, it is possible to perform the confirmation of the operation and the field of view. The second password called “Key B” is provided for investigation of crimes. This password is owned mainly by police and city office. Police and city office, can view a clear image by using both Key A and Key B. Therefore, they can utilize the clear image for investigation. Thus, it is possible to divide a person who can and who cannot view a clear image in this way. Therefore, the e-JIKEI Camera can protect privacy of general citizen.

Fig. 2. e-JIKEI Camera(ejkc-ZB102c).

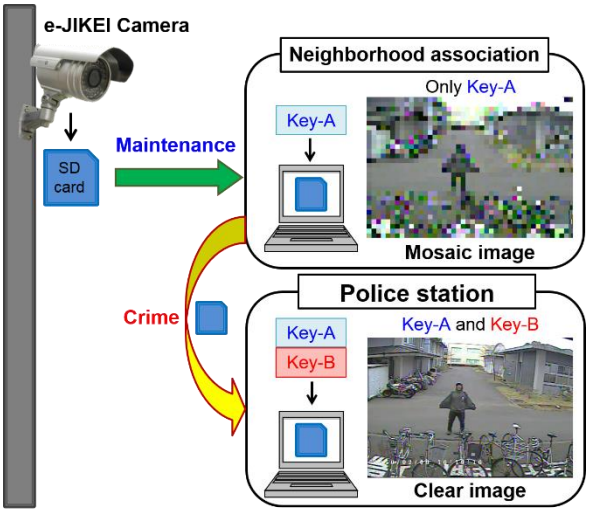


Fig. 3. Operation method of the e-JIKEI

The e-JIKEI Camera includes the following features:

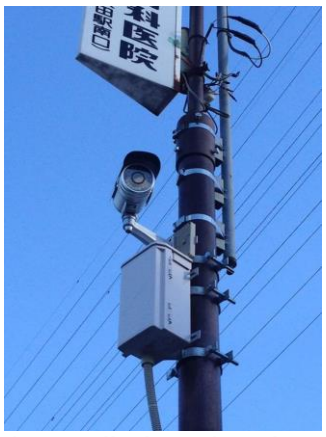
(A) Encrypted image will enable privacy protection by storing the internal SD card.
(B) The image is stored for one week. And image is overwritten from the old image in the order.
(C) The e-JIKEI Camera can take images even at night.
(D) The e-JIKEI Camera can be operated by the power supply at the AC100V. And other wiring is unnecessary.
(E) The e-JIKEI Camera has waterproof function.

2.2 Social experiment

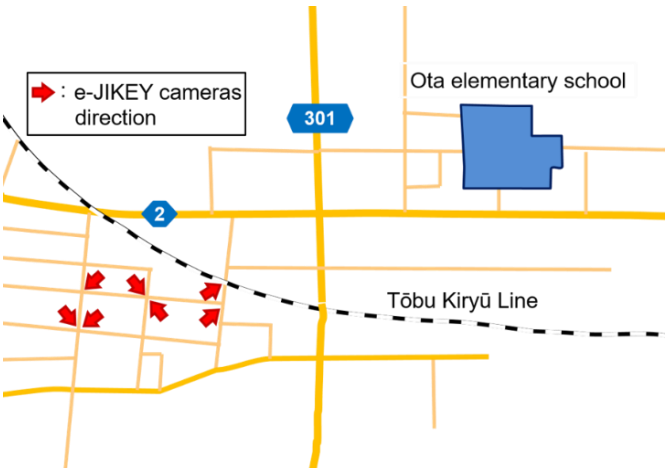
A social experiment started in the Nishihoncho Ota city in Gunma prefecture using 7 units of the e-JIKEI Camera (ejkc-ZB102c) from January 28, 2015. In the Fig. 4 shows the situation of e-JIKEI Camera in the social experiment. The e-JIKEI cameras are installed to monitor the school route, as shown in Fig. 4 (a)-(c). These e-JIKEI Camera have been installed a suitable place on monitoring without blind spot of the social experiment area. Fig. 4 (d) shows the locations and directions of the 7 units e-JIKEI Cameras.

(a) Installation situation (1).

(b) Installation situation (2).



(c) Installation situation (3).



(d) Location of the e-JIKEI Camera.

Fig. 4. Situation of e-JIKEI Camera in social experiment

The purpose of this social experiment is to create a model case of monitoring school route by high density security cameras. In addition to that, we are aiming to raise the safety and security of the community. In this social experiment using the e-JIKEI Camera, we have established the method of handling the Key A and B as follows in order to protect the privacy of general citizen.

(A) Chief of Community Safety Division in Ota police station sets and manages both password Key A and Key B.
(B) Nishihoncho neighborhood association and the maintenance company manage only Key A which is announced from the police station.
(C) Our laboratory does not know any password.

3. Discussion

The social experiment using 7 units security cameras showed that high density and installed security camera can improve safety and security of the school route. The huge number of security cameras are possible to suppress a crime, to find the criminal quickly at the time of crimes and to realize a safe and secure school route. Thus, a school route will become safer place for child, parents and residents. One of the most important barriers to the wide use of security cameras is an invasion

of privacy. In this social experiment, we have used a security camera with a function of privacy protection. We have established the guideline in order to protect the privacy of general citizen. Thus, the problem of invasion of privacy was solved by using the e-JIKEI Camera. If our effort is accepted by every community, then a considerable number of security cameras will be introduced in communities throughout the country and the world. Then, every school route will be monitored by numerous cameras to realize safe and secure route. If a crime occurs, the police will be able to arrest the suspect immediately by using the image of the many security cameras.

4. Conclusion

We conducted a social experiment using the e-JIKEI Camera to create a model case for a safe and secure school route. During the experiment the e-JIKEI Camera operated without problems. We believe that this e-JIKEI Camera can contribute to the realization of a safe and secure community.

Acknowledgements

This study was supported in part by the Grant-in-Aid for Scientific Research (B) 15H02887 (KAKENHI 15H02887).

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