No. MOE 0587/1794

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Narathiwat Province 96000
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13 May 2019

Dear Apri Siswanto

Subject: Acceptance letter for Poster Presentation

Greeting from Princess of Naradhiwas University (PNU)

Thank you for submitting your abstract/full paper for presentation at The 3rd international Malaysia-Indonesia-Thailand Symposium on Innovation and Creativity (3rd iMIT SIC 2019) which will be held on 17 June 2019 at Princess of Naradhiwas University (PNU).

Herewith, the committee of 3rd iMIT SIC 2019 is happy to inform you that your paper entitled Fingerprint Template Protection In Smart Home Environment Based On Chaotic Encryption has been reviewed and accepted for poster presentation.

On behalf of the committee, we would like to congratulate you/your team and cordially invite you to join the conference between 16-18 June 2019.

Your kind attention and availabilities are very much appreciated. We look forwards to seeing you at the conference soon.

Yours Sincerely,

Assist. Prof. Dr. Rossukon Sangmanee
President of Princess of Naradhiwas University

Fingerprint Template Protection In Smart Home Environment Based On Chaotic Encryption

ABSTRACT

Fingerprint authentication system (FAS) can protect home security and residents' privacy. Although it is seen as unique and hard to forge, existing FAS are still exposed to security attacks, due to encrypted fingerprint information, so that communications line can be attacked or an identity can be stolen because the template is stored in the database. There is a need for protection commonly known as Fingerprint Template Protection (FTP). This research proposes a scheme for protecting fingerprint template in smart home environment based on non invertible transform and chaos encryption. To evaluate the proposed FTP scheme, this study used histogram analysis. All results of the analysis is applicable in real-world critical applications.

OBJECTIVE

- Design an enhanced chaos-based encryption algorithm and template transformation procedure suitable for an FTP scheme.
- Design an FTP scheme for smart home environment.

PROPOSED FTP SCHEME

There are two general stages in designing chaos-based encryption, i.e. permutation and diffusion. A permutation is to shuffle the positions of a pixel fingerprint image, while substitution changes the pixel value. Two chaotic map functions are used. The first logistic map is used to randomize the arrangement of pixels, while the second logistic map used to change pixel values from the randomized image. For detail see figure 1.

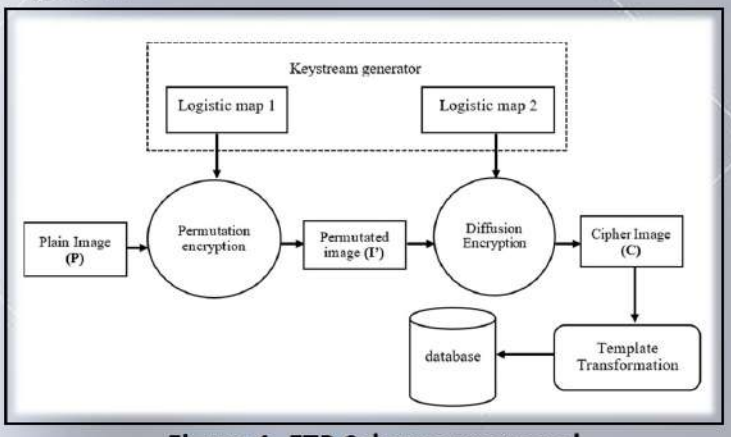

Figure 1. FTP Scheme proposed

PROPOSED EMBEDDED HARDWARE SYSTEM

Proposed embedded systems based on hardware module 32 bit microcontroller, fingerprint sensor, and human interface.

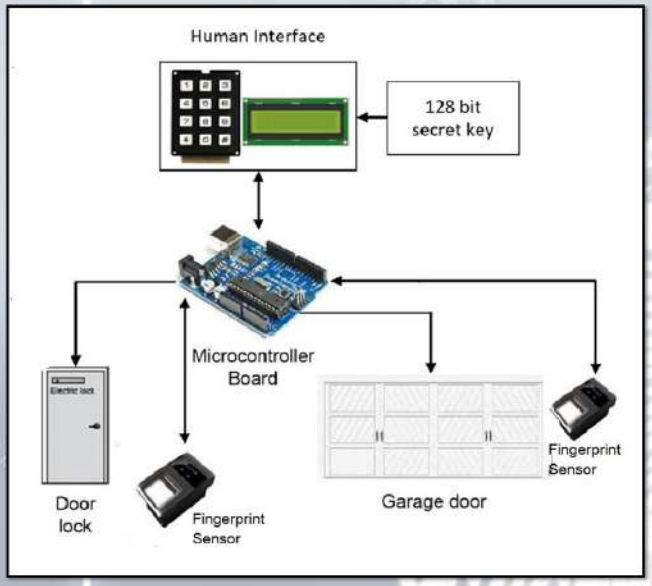

Figure 2. Embedded authentication system

RESULT

Based on histogram analysis, the pixels in the cipher-image fingerprint should have uniform distribution or indicate by a histogram that looks flat. Figure 3 (a) shows a plain fingerprint histogram and Figure 3 (b) is the cipher-image histogram. Histogram cipher-images look flat and different from plain-image histograms.

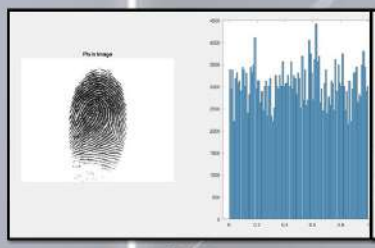

Figure 3a. Plain Image

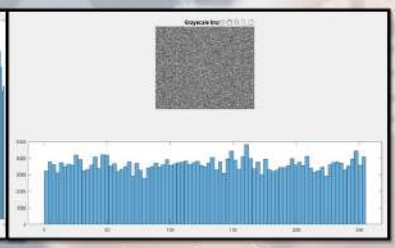

Figure 3b. Cipher Image

BENEFITS AND COMMERCIALIZATION

FTP design is useful for securing fingerprint templates from impostor attacks in smart home environments

Benefits

- Security data in line transmission in smart home environment
- Personal fingerprint protection

Commercialization

- smart home environment
- smart office

Apri Siswanto

Dr. Norliza Katuk

Prof. Ku Ruhana Ku-Mahamud

The 3rd International Malaysia-Indonesia-Thailand Symposium on Innovation and Creativity 2019 (IMIT SIC 2019)

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