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Research and Innovation center of Princess of Naradhiwas Univers <research_pnu@hotmail.com> to me

The article that the expert sent back to the 1st amendment

Dear: Mr.Apri Siswanto

Research article on

Fingerprint Template Protection In Smart Home Environment Based On Chaotic Encryption

Professional Considered the article As per attachment 1 and 2

please Submit the completed research article in the system <http://conference.pnu.ac>.

[National Research and Innovation - conference.pnu.ac.th](http://conference.pnu.ac.th)

Innovation and Creativity Network 2019,The conference takes place on 16-18 June 2019 at Princess of Naradhiwas University.Princess of Naradhiwas University (PNU) sees the importance of organizing an international conference which can generate several benefits for academics, researchers, and all participants, particularly for PNU which conference.pnu.ac.th

within **15 May 2019** to proceed.



Poster Presentation Evaluation Form
National and International Conference 2019
“Network, Innovation and creative 2019”
16th – 18th June 2019
Princess of Naradhiwas University

Product/Research Title : Fingerprint Template Protection In Smart Home Environment Based On Chaotic Encryption

Group : iMIT SIC 2019

Presentation type : Science, Technology and Engineering

Part 1 Opinion of the evaluator (Mark / into the blanks)

- Accept
- Accept with corrections
- Reject

Part 2 Rating and suggestion of an evaluator

| | Items | Maximun Score | Score | Suggession (If available) |
|---|--|---------------|-------|---------------------------|
| 1 | Interesting topic | 10 | 9 | |
| 2 | Research problem clearly stated | 10 | 9 | |
| 3 | Clear and concise objective | 10 | 8 | |
| 4 | Method easily interpreted | 10 | 8 | |
| 5 | Conclusion to point, corresponding to problem | 10 | 8 | |
| 6 | Concise, logically discussion and supporting documents | 10 | 7 | |
| 7 | Clearly and appropriate pattern and details | 10 | 7 | |
| 8 | Academic value | 20 | 18 | |

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|---|------------|-----|--|--|
| 9 | References | 10 | | |
| | Total | 100 | | |

Part 3 Summary of Essence Comments and Suggestions (Mark / into the blanks , suggestion, please specify)

- Suggestions have already provided in the article
- Detailed suggestions are as follows;

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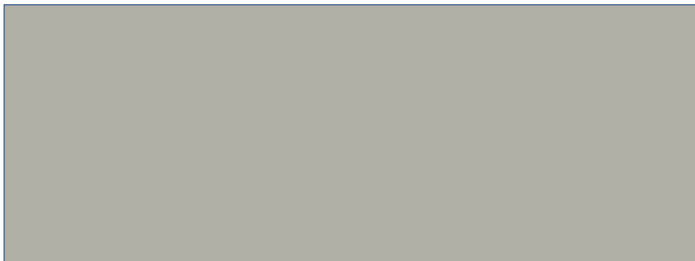
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Fingerprint Template Protection In Smart Home Environment Based On Chaotic Encryption

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.

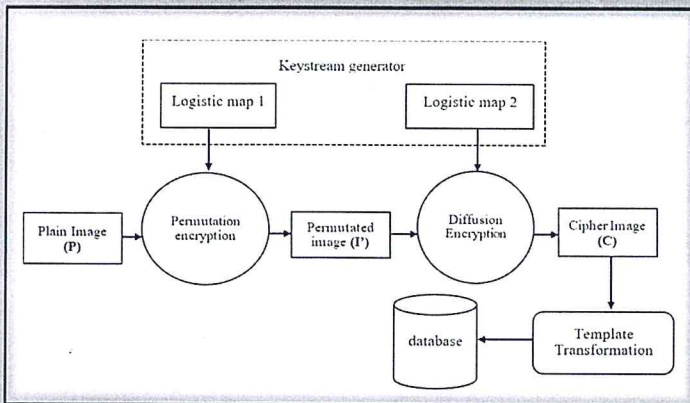


Figure 1. FTP Scheme proposed

PROPOSED EMBEDDED HARDWARE SYSTEM

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

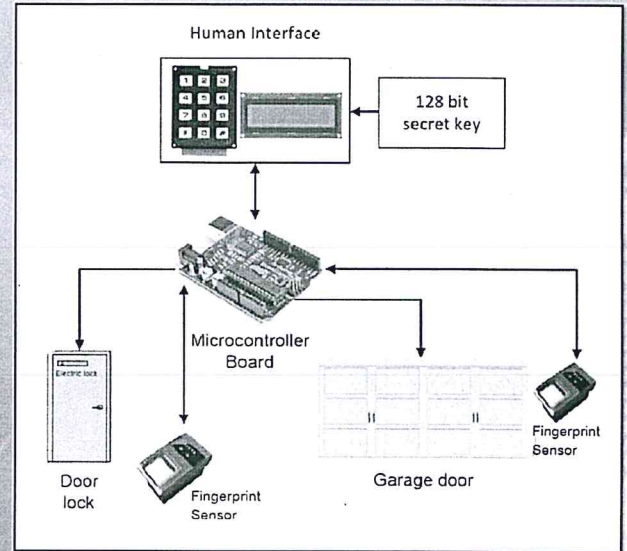


Figure 2. Embedded authentication system

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.

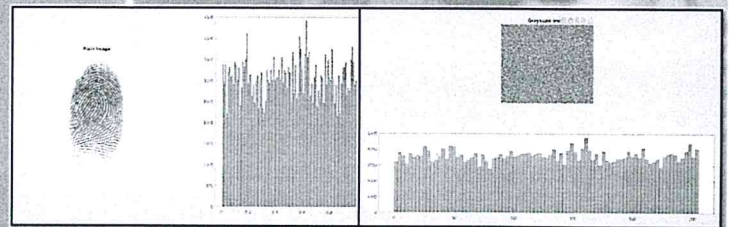


Figure 3a. Plain Image

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



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| 8 | Academic value | 20 | 16 | |
| 9 | References | 10 | 8 | |

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|--|-------|-----|----|--|
| | Total | 100 | 82 | |
|--|-------|-----|----|--|

Part 3 Summary of Essence Comments and Suggestions (Mark / into the blanks , suggestion, please specify)

Suggestions have already provided in the article

Detailed suggestions are as follows;

o It is not clear how to evaluate the system.....
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