

## Chapter 12

# A Survey on Different Digital Authentication Systems Using Fuzzy Logic

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### ABSTRACT

*The communication through wireless medium is very popular to the developed society. More specifically, the use of the internet as well as the use of social networking sites is increasing. Therefore, information security is an important factor during wireless communication. Three major components of it are confidentiality, integrity, and availability of information among authorized users. Integrity level is maintained through various digital authentication schemes. Fuzzy logic is an important soft computing tool that increases the digital watermarking system in various ways. In this chapter, different popular and high secured watermarking schemes using fuzzy logic are analyzed with their mathematical and experimental efficiency. A comparative analysis is developed here with corresponding different parameters.*

### INTRODUCTION

Information security is a big issue in present decade during wireless communication. Actually, it is communication of privacy among authorized users. The major wings of information security are confidentiality, integrity and availability of data. According to the architecture of wireless communication, it can be realized that the internet channel, through which important and secured information are exchanged among authorized users, is not well secured from unauthorized access. So, to protect the important data from unauthorized users, i.e. to maintain the basic ingredients of information security, various approaches are developed gradually. Cryptography is the most basic approach of information security. In this particular methodology, secret message is altered to another text using a particular algorithm, i.e. encryption algo-

DOI: 10.4018/978-1-5225-3004-6.ch012

rithm with corresponding secret keys. This changed text is sent to receiver end. Then actual message is extracted from the changed text by using the decryption technique of corresponding encryption algorithm and predefined secret keys. In this approach, secret key maintains the security from unauthorized users. But the disadvantage of the scheme is the survival of communication is realized by unauthorized users. To take away this problem, next approach steganography is developed. In this methodology, secret message is embedded in a cover file, such as- image, video/audio etc. This embedded cover file is sent through wireless medium to the receiver end. Receiver extracts this secret message from the embedded file. But unauthenticated users can't realize the existence of communication. In both of cryptography and steganography, only confidentiality and availability of information are maintained among authenticated users. But integrity level is not considered in these two popular and important particular methodologies. In other words, if any unauthorized user changes the information during communication, that can't be realized at the receiver end using the approaches cryptography and steganography only. So, to increase integrity level, digital authentication, more specifically digital watermarking approach is developed. The important side of this approach is if the information is distorted by some middle hacker(s) that can be realized at the receiver end. So, here the concentration is only on digital watermarking.

Fuzzy logic is an important soft computing tool and it has major application area in optimization. But, the fuzzy rule bases are used also in the issue of digital watermarking and acts efficiently to increase integrity level. In this chapter, some popular as well as secured digital watermarking schemes using fuzzy logic are described in comparative manner. Also, efficiency of fuzzy in this particular field is analyzed. In the next section, some related survey works are described. Then the proposed discussion is developed in comparative way. Some experimental results are also shown here to observe the efficiency of the schemes. At last, a conclusion is drawn followed by future trends of proposed work.

## **BACKGROUND**

In 2014, a survey on various digital image authentication schemes was held by Reshma Vartak & Smita Deshmukh (July 2014). In this survey, the requirements of image authentication are analyzed. More specifically, some specific types of authentication, like strict authentication, content based authentication etc. are described according to classification of various wireless security approaches. The important as well as good side of this survey is the proper categorization of the authentication schemes. But the drawback of this contribution is that no experimental analysis is developed here. An excellent survey was developed by Adil Haouzia et al (August 2007). This is very much important survey from various aspects, such as- categorization, explanation of each scheme with proper mathematical analysis, experimentation on the basis of various parameters. But the efficiency of the schemes was not developed through different numerical value based experiment. Also, here all the techniques with various dependencies are considered, but importance of soft computing is not defined here. To develop the importance of soft computing, a survey on various digital watermarking techniques was developed by Sharbani Bhattacharya in 2014 (November 2014). In that particular survey, digital watermarking techniques are categorized into seven different parts. The classified factors are type of documents, robustness, application areas of watermarking, visibility, different approaches of watermarking, original image availability to extract watermarks and the task after watermark extraction. After that, each category is divided into different sub-categories. The basic objective of this paper is efficiency analysis of security and digital forensics of the watermarking approaches. Actually, in this paper, an overall categorization of digital watermark-

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