Advances in Fingerprint Analysis

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ABSTRACT

This article is an overview of a current research based on fingerprint analysis. In this paper we highlighted the studies of fingerprint analysis. This paper is a brief review in the conceptual and structure of fingerprint recognition. The basic fingerprint analysis consists of four stages: firstly, the sensor which is used for enrolment & recognition to capture the biometric data. Secondly, the pre-processing stage which is used to remove unwanted data and increase the clarity of ridge structure by using enhancement technique. Thirdly, feature extraction stage which takes the input from the output of the pre-processing stage to extract the fingerprint features. Fourthly, the matching stage is to compare the acquired feature with the template in the database. Finally, the database which stores the features for the matching stags. The aim of this paper is to review various recently work on fingerprint analysis and explain fingerprint recognition stages step by step and give summaries of fingerprint databases with characteristics.

Keywords:- Fingerprint, Pre-processing, Feature extraction, Matching databases.

INTRODUCTION

More than a century has passed since Bertillon first conceived and then industriously practiced the thought of using body measurements for solving crimes. even as his idea was gaining popularity, it faded into relative obscurity by a way more significant and practical discovery of the individuality of the human fingerprints. Soon after this discovery, many major enforcement departments embraced the thought of first "booking" the fingerprints of criminals, so that their records are readily available and later using leftover fingerprint smudges (latents), they could determine the identity of criminals. These agencies sponsored a rigorous study of fingerprints, developed scientific methods for visual matching of fingerprints and powerful programs/cultures for training fingerprint experts, and applied the art of fingerprint identification for nailing down the perpetrators.

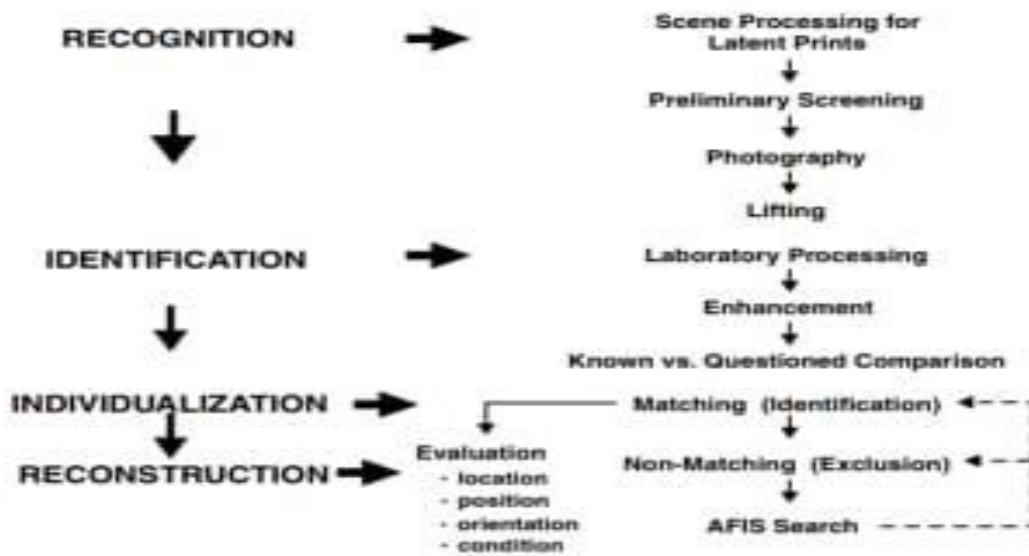## ADVANCES IN FINGERPRINT ANALYSIS

The ingenious methods improvised to increase the efficiency of the manual method of fingerprint indexing and search, the ever growing demands on manual fingerprint identification quickly became overwhelming. The manual method of fingerprint indexing resulted during a highly skewed distribution of fingerprints into bins (types): most fingerprints fell into a few of bins and this resulted in search inefficiencies. Fingerprint training procedures were time-intensive and slow. Further, demands imposed by painstaking attention needed to visually match the fingerprints of varied qualities, tedium of monotonic nature of the work, and increasing workloads because of a far better demand on fingerprint identification services, all prompted the enforcement agencies to initiate research into acquiring fingerprints through electronic medium and automatic fingerprint identification supported the digital representation of the fingerprints. These efforts have led to development of automatic/semi-automatic fingerprint identification systems (AFIS) over the past few decades.

While enforcement agencies were the earliest adopters of the fingerprint identification technology, more recently, increasing identity fraud has created a growing need for biometric technology for positive person identification in a number of non-forensic applications. is that this person authorized to enter this facility? is that this individual entitled to access the privileged information? is that the given service being administered exclusively to the enrolled users? Answers to questions like these are valuable to business and government organizations. Since biometric identifiers cannot be easily misplaced, forged, or shared, they are considered more reliable for private identification than traditional token or knowledge based methods. The objectives of biometric identification are user convenience (e.g., money withdrawal without ATM card and PIN), better security (e.g., difficult to forge access), and better efficiency (e.g., lower overhead for computer password maintenance). Tremendous success of the fingerprint based identification technology in enforcement applications, decreasing cost of the fingerprint sensing devices, increasing availability of cheap computing power, and growing identity fraud/theft have all ushered in an era of fingerprint-based person identification applications in commercial, civilian, and financial domains.

Our objective is to present current state-of-the-art in fingerprint sensing and identification technology and to supply some insights into the strengths and limitations of the automation in matching fingerprints. there's a well-liked misconception within the pattern recognition and image processing academic community that automatic fingerprint verification may be a fully solved problem since it had been one of the primary applications of machine pattern recognition almost fifty years ago.

On the contrary, fingerprint verification remains a challenging and important pattern recognition problem. Here, we'll focus only on the core technology underlying fingerprint verification instead of the small print of the commercial systems.

In particular, we'll discuss on fingerprint sensing, representation, classification, and matching. With the rise within the number of economic systems for fingerprint-based verification, proper evaluation protocols are needed. The first fingerprint verification competition was an honest start in establishing such protocols. so as to enhance the verification performance, methods for integrating multiple matchers, multiple biometrics and misaiming of multiple templates are being investigated. As fingerprints (biometrics) get increasingly embedded into various systems (e.g., cellular phones), it becomes increasingly important to research the impact of biometrics on the general integrity of the system and its social acceptability. we'll also summarize a number of the security/privacy research issues associated with fingerprint (biometrics) authentication systems. a variety of fingerprint related research is cited below to supply the audience some useful pointers for his or her further exploration of this subject

RESULT

The outcomes of these advances will be:

- Better analysis of fingerprint verification
- User Convenience
- Better Security
- Better efficiency

CONCLUSION

This paper consists of advances in fingerprint analyses and how they are affecting the lives of many people. Fingerprint is used for crime detection for over 100 years and it is the major part of crime solving and apart from this this technology in also growing in our normal lives.

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