

An Advanced Door Lock Security System using Palmtop Recognition System

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ABSTRACT

Biometric technology is used to identify a person based on his/her physical behavioral characteristics. One of the extensive uses of biometric technology is a fingerprint recognition system. The technology has broad use mainly for its easiness, reliability and accuracy in human identification process. This paper presents work done on minutiae based palmtop recognition system for automatic door open and locking system. Here, the palmtop recognition system works by taking an image of the person, partitioning it, processing it and finally verifying the person. This system provides input for an electric circuit. The circuitry system consists of two unique states; door open and door lock. The whole system basically uses extensive Image processing for minutiae based palmtop recognition. Thus reducing the probability of error in human recognition and solves maximum problems of fingerprint recognition. This paper shows a better solution for recognizing people, which helps to solve security related problems in human life.

Keywords

Biometric recognition, Fingerprint recognition, Minutiae extraction, Palmtop recognition.

1. INTRODUCTION

Biometric systems work with behavioral and physiological biometric data for identifying or verifying a person [1, 2]. Signature, gait, speech and keystroke are behavioral biometric parameters [3]. However, these parameters changes with the change of age, environment, accident, etc. On the other hand physiological characteristics such as face, fingerprint, palm print, iris remain unchanged for the full lifetime of a person [4]. The biometric system works in mainly two modes: - one is verification mode, another is identification mode [5]. Different biometric applications decide basically in which mode they will work. The verification mode works with the validation process of a person's identity by comparing captured biometric data with a ready-made template [6]. On the other hand, identification mode works by recognizing process of a person's identity by performing matches against multiple finger biometric templates [7]. Fingerprints are widely used in daily life for more than 100 years due to its feasibility, distinctiveness, permanence, accuracy, reliability and acceptability [8]. The fingerprint is a pattern of ridges, furrows and minutiae [9]. A good quality fingerprint contains 25 to 80 minutiae depending on sensor resolution, finger placement on the sensor, the quality of the input device, etc. [10]. The false minutiae are the false ridge breaks due to over

linking. It is difficult to extract reliably minutiae from poor quality fingerprint impressions. This may arise from very dry fingers [11] and fingers mutilate by scars, scratches due to accidents, injuries [12]. Very often sensors are not clear because of environments dust, heat and so on. As for this quality, the image becomes very distorted and it becomes hard to find the features of fingerprint at that time. This is the main reason, due to which extract features and identify the person becomes hard. Again, there is a probability of error identification of people during the time of fingerprint recognition system's execution period because of two quite same fingerprints and fractioned or damped fingerprint [13]. Again, the old person's fingerprint is not clear all the time [14]. These are some of the many factors for which it becomes hard to identify people accurately. Again, for identification system some percentage of errors are overlooked which sometimes cause an error at time of differentiating between two people's single fingerprint. For these reasons, if the inputs are given into the electronic circuits of the room or building entrance door, it doesn't work properly and becomes complicated [15].

The accuracy of feature extraction and recognition of a palmtop, means the fingers and some other portion of a palm print, depends fully on the quality of the input fingerprint image. Direct binarization [16] using standard technique renders images for the extraction of fine and subtle features such as the minutiae points. For this reason, it is necessary to improve the quality of ridge structures of palmtop images. Also need to maintain their integrity and retain the connectivity of the ridges. As the distance between minutiae is normalized [17] by the ridge frequency at each minutiae, the distance variation by nonlinear deformation is minimized. The performance of palmtop recognition highly depends on the preprocessing steps, where various ways to extract and represent distinguishable features among classed can be applied [18]. The main purpose of palmtop recognition is to facilitate the management of large palmtop databases and to speed up the process of palmtop matching. As the database of palmtop increased, manual identification became monotonous and automated methods became more widespread.

This paper proposes a new method to recognize the palmtop of a person based on minutiae. The palmtop is divided into various portions and then the recognition process is applied on every portion of it. For this reason, the error rate decreases than the existing works. Again, this paper depicts its real life application by showing a design methodology of secured door lock system based on the results of palmtop recognition.