Chapter 8
Dotted Raster–Stereography

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ABSTRACT

Raster-stereography is a 3D surface topography technique that provides height and curvature information of the subject. This is a non-contact, non-invasive, and radiation-free technique that is mostly used to analyze the back shape of a human body. The most practical aspect of raster-stereography is ease in its apparatus setup and reduced exposure to x-rays. Another very important and effective application is to identify the human faces that can be used in security domain. The problem of breaking lines was observed while traversing the distorted raster pattern on the human body. These breaks in raster pattern increased significantly when projected on the face. Computationally, it becomes difficult to extract all valid curvatures of the human face. This problem was resolved using a modified dotted raster, and the noise effect was reduced substantially. The dotted raster technique proved that it is by far the best option when compared with the conventional line grid.

INTRODUCTION

The new era has heralded several developments in technology; technological determinism has improved as well as complicated the human life. Among several challenges encountered by society security ranks as the first and foremost in present world. Every nation is facing the nuisance and security threat one way or another, from criminal activities to group initiated terrorism indiscipline is reigning supreme from Asia to Americas. In such a world providing security is of utmost significance. In this regard knowledge-based or token-based security systems are well suited to protect a system. To date several systems are

implemented that use the conventional method of User ID and Password for protection. Few examples include On-line banking, E-mail system and ATM etc. the issue associated with such systems is that they can fail in advent of hacking or stolen card. Fraudulent users can easily predict short length passwords. If we encourage the user to implement long passwords then memorization becomes a daunting task. Such systems are considered as insecure therefore are less recommended. We can identify any person in several ways Signatures, Identity card, retinal recognition, voice recognition, hand geometry and face recognition techniques. A lot of work is being done in biometric technology. Through biometrics unique characteristics of a human being can be recognized. Biometric covers physiological (direct measurement of any part of human body, finger scan, body scan, facial recognition, retina, hand scan etc) as well as behavioral (based on direct measurements derived from an action, voice scan, signature scan, gait characteristics, project hostile intent are the common examples as described in Figure 1.

Face recognition has proven itself during the past few years. It is considered as most significant application of image analysis. There might be two reasons for this trend one is its broad spectrum application in law enforcement and commercial applications and second could be the potential of this technology to play a pivotal role in near future. The concept of human face recognition using machines poses a challenge that attracts researchers from several disciplines like neural networks, computer vision, and computer graphics image processing and pattern recognition. Most face recognition systems are not excellent when it comes to reliability of identification like using cosmetic operation and face mask. All these systems have significance due to following reasons: all the biometric systems require some action on part of the user for example, user placing hand on finger recognition machine, one also has to stand firm or in anatomical position to be captured correctly by the camera for retina recognition. However, face should be picked up from a distance irrespective of specific position. The algorithm can recognize face using partial facial features extracted from poorly captured photographs; this procedure is for surveillance and security projects. There are other shortcomings to biometric systems this includes damage to the epidermis tissue in case of hand and finger recognition (like bruise or any other abrasion's). Iris and retina recognition requires expensive setup and is dependent on the movement of the face. The voice recognition is vulnerable to background noise, fluctuations in phone line and tape recordings. If we talk about signatures they can be copied or forged so we need to focus on how to detect the pressure exerted on the pen while producing the signatures. In contrast to all these techniques face recognition is possible using couple of in expensive camera and in a fixed position. Efficient recognition algorithm can compensate for noise, scale and illumination. Face recognition is now a very demanding area in research, in this process the captured face is compared with known face image in the database, identification is a tedious task because of light conditions, pose, ageing factor and capture quality, this is an active field

Figure 1. Biometric system
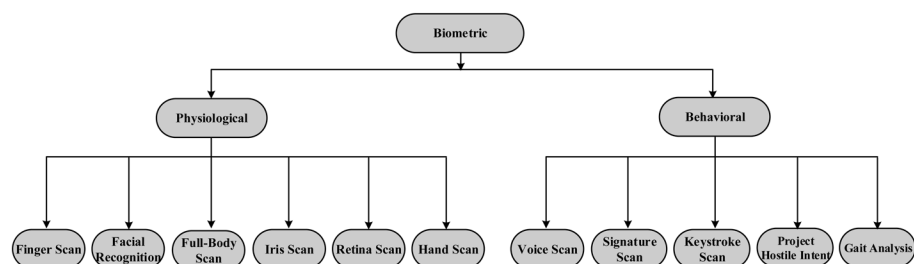
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