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DOMAIN SPECIFIC LEARNING FOR NEW BORN BABIES: A SURVEY

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Abstract - Biometric recognition can be used for the identification of new born babies. It avoids the swapping, abduction, incorrect identification and accurate census. There are different techniques employed for the identification of new born. The technologies such as RFID bracelets foot prints and palm prints are used for the identification of new born.

Key Words: *Biometric recognition, swapping, RFID bracelets*

1. INTRODUCTION

Automatic recognition of new borns is one of the challenging problems with various applications. Because, face of new born may change day by day. The unique nature and behaviour of newborn babies leads to interesting challenges towards a newborn biometric system. Considering the non-intrusive nature of face biometrics, this research explores the possibility of using face recognition for determining the identity of newborns. It had some constraints such as reliability, immense security measures, time consuming and cost effective. The current technologies such as RFID bracelets, palm and foot prints are used for the identification of new borns. Some of the hospitals reported that the babies are transferred too and away from the mother. The delivery of new born to wrong parents is another social issue. In developing countries swapping and abduction are the major problems. The medical science techniques such as DNA, HLA are costly but time consuming. The rapid availability of DNA technology has been enabled faster. So it can be effectively utilizing DNA for biometrics. In Some countries these techniques may not be available .So the institutions such as hospitals, neonatal cares can adopt a biometric system for new born babies.

2. Related Work

One of the most common techniques used for identification of new borns is the use of RFID bracelets [2].After the birth the bracelets are tag on baby's hands or legs. But this technique has not been able to provide enough level of security for new born. So foot prints can be used. Shepard *et al*. [1] proposed that the foot prints are collected from various new borns and stored along with their mothers finger print. That way it is expected that any identity doubt about baby or his or her mother can verify. Due to illegal problems the use of foot prints identification is not possible in the majority cases.

In paper [4] proposed that the face and soft biometric can be used for the recognition system. In the proposed system, the biometric recognition system is divided into two subsystems face and soft biometric. The soft biometric identifiers such as height, weight, gender, and blood-group can be very useful in new born recognition. The promising tools such as face and soft biometric data can be useful for the identification of new born. The two subsystems are the primary biometric system which consists of face. The secondary biometric system consists of soft biometric behaviours like height, weight, gender and blood-group. For the secondary biometric system the output is prior probability corresponding to the test user. The Bayesian integration can be calculated using matching probability of the user, the given primary biometric and biometric future vector. So the soft biometric characteristics are not as permanent and reliable. The traditional biometric identifiers provide some information about the identity of the newborn. So it leads to higher accuracy in establishing the user identity.

The Daniel Weingaertner *et al.* [10] proposed that using palm prints the new born biometric identification can done. They developed a sensor consisting of a 8 megapixels digital camera attached to a rectangular optical glass prism, capable to generate images of approximately 1400*d pi* with a capture area of 35*mm*×45*mm*. The working principle of the sensor is the same as other existing optical fingerprint sensors, based on the total reflection characteristic of a prism. When a palm or sole is placed on top of the prism's inclined surface, light is absorbed by the ridges touching the prism, yielding dark points on the image, while at the valleys light is reflected into the camera. This method provides high contrast images, and the main advantage of the developed sensor is its high resolution.

This paper [1] proposed that an algorithm for quickly adapting a pre-trained cascade of classifiers using a small number of labelled positive instances from a different yet similar data domain. This experiment consists of images of human babies and human like characters from movies. Cascade classifiers consist of m stages. The stages are used in a sequential manner. This cascade consists of two phases: rejection and validation of true positives. The first phase is designed to perform easy rejection and the complexity of subsequent stages increases. It quickly discards the easy-to-reject .In the second phase, the stage classifiers are very detailed and typically use several hundred features. These classifiers capture most of the structure in a face. It can be considered similar to a descriptive model of face appearances. The next step is training new stage classifiers. It uses the variant of AdaBoost learning algorithm .It is employed to train the individual stage classifiers from the few training examples from the target domain. The second step of the rejection phase is composed of an ordered set of stage classifiers. If any one of the stage classifiers rejects a given image patch, then the patch is immediately discarded, otherwise it is evaluated by the next stage classifier.

It proposes the novel patch based LBPs and computing similarity with background samples. There are two types of descriptors are three-patch LBP and four-patch LBP. The three patch codes are computed by comparing the values in the three patches and produce a code bit. That code is assigned to each pixel. The image is divided into non overlapping regions. A histogram is constructed from the frequency of each binary code. Each of these histograms is normalized to unit length, their values truncated at 0.2, and then once again normalized to unit length. An image is represented by these histograms concatenated to a single vector. The four patches LBP computed by, comparing the values in the centre symmetric patches in the inner and outer ring which is away from the circle. Then computing one shot and two shot similarities. The one shot similarity measured from two discriminative models. The similarity index is measured from class I and A as a class of negative samples. Similarly the similarity index measured from class J and A as a set of negative samples. The OSS is the average of these two values. The two shot similarity is computed from a single model. Taking I and J as set of positive samples and A as a set of negative samples. It can be evaluated on multi label classification tasks.

3. CONCLUSIONS

The new born recognition and face recognition can be performed using different techniques effectively. RFID bracelets, foot prints and palm prints are used for identifying new borns. Technique such as adapting cascade classifiers, soft biometric (blood, weight and so on), and using descriptors are used for face recognition .In the case of palm prints it uses a high resolution optical sensor and provides better result than RFID and foot prints. Adapting a cascade of classifiers to be performed in a similar domain classification for which only a few positive samples are available. In this approach it detects faces of human babies and human-like characters from movies. The descriptor-based approach to face recognition represents each face image as a vector of descriptors that is independent of other images.

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