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BIOMETRIC AUTHENTICATION SYSTEM USING MULTI-AGENT TECHNOLOGY IN BORDER CONTROL

Susara S Thenuwara

179418B

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Degree of Master of Science in Artificial Intelligence

Department of Computational Mathematics

University of Moratuwa

Sri Lanka

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A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Artificial Intelligence

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Declaration

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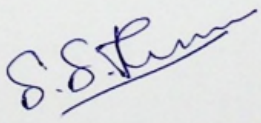
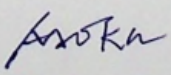
Signature of Student:  Date: 28/01/2020

The above candidate has carried out research for the Master's Dissertation under my supervision.

Name of Supervisor

Prof. A.S. Karunananda

Signature of Supervisor:  Date: 28/07/20

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Abstract

In today's world security is the most important aspect. Border criminals, frauds, unauthorized immigrants are burning issues in Sri Lanka within the last few years due to the lack of proper identification system i.e. duplicate passports, fake identity, etc. Therefore, the efficiency and accuracy of the traditional authentication system are not good enough to overcome this disaster. Furthermore, cryptanalysis and brute force attacks are dramatically strong with uncontrolled demanding of computational power. In fact, the efficiency and accuracy of the authentication are not enough to cater the future authentication systems by comparing traditional user authentication techniques. Therefore, Biometrics is the ideal solution for authentication as it has advantages over conventional systems. Second, it's not important to recall a biometric and it can't easily be lost. It makes the client much smoother. In addition, it is not easy to stolen or loan a biometric to a relative.

Biometrics can provide greater security and comfort than traditional methods of human identification. Even if we don't want to replace a conventional method with a biometric one, we are certainly future consumers of these systems, which will even be mandatory for new passport models. Therefore, it is important to be familiar with biometric security engineering possibilities. The most common way for people to perform biometric authentication maybe facial recognition. Face recognition can be based on single images, multiple still images or video sequences. Although most of the efforts have been traditionally dedicated to the former, the latest is rising, probably due to the lowering of prices in devices for image and video acquisition. The system was designed using the technology of multi-agents and it has two phases biometric capturing phase at VISA granting process and biometric recognition phase at border points. The product's longevity is maintained through the use of biometric and nonbiometric techniques. This solution has been implemented as a multi-agent program with a hybrid approach that identification of faces and validation of fingerprint. The system has been tested in a border protection environment which is a more time-critical real-world application and notices the 87% accuracy in the recognition phase. The proposed system evaluated with traditional border management software and time calculated for each participant. Those participants have given informed consent participation at the evaluation.

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