Université Abderrahmane Mira de Bejaia
Faculté des Sciences Exactes
Département d'Informatique

A qui de droit

Monsieur,

Suite à votre courriel d'en date du 15 janvier 2018, je vous prie de trouver dans ce document un résumé sur les résultats essentiels de mon stage qui s'est déroulé du 17 au 31 mai 2017 au laboratoire Heudiasyc (Compiègne, France) :

« Finalisation de rédaction de deux articles de recherche qui sont soumis pour publication et définition de nouvelles pistes pour coopération. »

Mes salutations les plus distinguées.

Dr OMAR Mawloud

Université Abderrahmane Mira de Bejaia
Faculté des Sciences Exactes
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Rapport de Stage du Dr OMAR Mawloud

Lab. Heudiasyc, Université de Technologie de Compiègne (du 17/05/2017 au 31/05/2017)

Au cours de mon séjour scientifique dans l'équipe RO (Réseaux et Optimisation) dirigée par le Prof. A. Bouabdallah, j'ai finalisé deux travaux de recherche que j'ai soumis pour publication :

○ **Automatic removal of ocular artifacts in EEG signals for driver drowsiness detection: A survey**

Résumé : Nowadays, there are many causes of daily traffic accidents, one of them is the loss of concentration while driving due to drowsiness, followed by sleep while driving. Sleeping means the nap; no more than a few seconds, but it is enough to create a traffic accident, in which the driver and the clashes may lose their lives. In this context, there is a host and considerable research efforts made in designing driver monitoring systems with the aim to reduce the vehicular accidents posing a challenging issue for the society. Several drowsiness detection techniques have been proposed in the literature, including artificial neural network, images processing, and physiological measurements techniques. Among the proposed solutions, the electroencephalographic (EEG) measurement is one of the reliable techniques. Nevertheless, the neuronal signals can be easily contaminated by many artifact types arising from cardiac (ECG), muscles (EMG), and ocular activities (EOG). From these physiological artifacts, ocular activities are one of the most eminent over other noise sources. In this paper, we provide a comprehensive survey, which covers the vast existing techniques of removing ocular artifacts from EEG recordings for driver's drowsiness detection systems. We propose a novel taxonomy of solutions and we compare them with respect to relevant criteria.

Soumis à la revue « Journal of Network and Computer Applications »

○ **Secure and efficient ECG-based authentication scheme for medical body area sensor networks**

Résumé : In Medical Body Area Sensor Networks (MBASNs), the body medical sensors are deployed on or in the patient's body and communicate using wireless interfaces. This mode of communication makes the network more vulnerable to attacks. An intruder can encrust in the network and eavesdrops, injects or replays medical data. The sensors must be able to exchange secure medical information of the patient. The security mechanisms based on biometric features allow hiding and generating keys to be shared among the sensors. In this paper, we propose an electrocardiogram-based authentication scheme for MBASNs, in which we develop a new mechanism of biometric features extraction. This mechanism extracts with a high precision the electrocardiogram-based features and achieves better the efficiency of authentication among the sensors. Through the security analysis, we demonstrate the robustness of our scheme against the attacks. Moreover, we demonstrate the reliability of our solution in terms of communication overhead and processing time with comparison to the concurrent schemes.

Soumis à la revue « International Journal of Smart-Health »

Durant ce séjour, nous avons également :

- identifié de nouvelles pistes de recherche prometteuses sur l'usage des signaux neurologiques dans les applications de transport, notamment avec les réseaux véhiculaires hautement dynamiques ;
- défini un plan de travail à long terme sur cette thématique qui va faire l'objet d'une thèse codirigée par le Pr BOUABDALLAH Abdelmadjid et le Dr OMAR Mawloud ;
- discuté des possibilités de montage de projets de collaborations communs.

Compiègne, le 31/05/2017

Dr OMAR Mawloud