Chapter 46

New Models for ICT-Based Medical Diagnosis

Calin Ciufudean
Stefan cel Mare University, Romania

Otilia Ciufudean
ARENI Medical Center, Romania

Constantin Filote
Stefan cel Mare University, Romania

ABSTRACT

This chapter is focused on evaluation of the links between physiology of human body and human emotional states in order to help specialists to perform a correct diagnosis correlated to patient’s expectations and emotional states, as denoted here “the Trust Diagnosis” (TD). The approach in these techniques is different from the previous ones. Instead of observing and classifying the people’s responses to external stimuli or internal emotional factors, the authors are interested in developing a mechanism that appropriately describes the doctor-patient interaction via emotional states caused by disease and/or by doctor’s examination, and that can lead to a TD. The authors intend to develop this approach in two stages: the first stage is focused on emotion models expressed in a qualitative formalism capable to link analytic tools to emotion expressions and deliver significant information for both laboratory analysis methods and doctors’ diagnoses. The second stage is focused on the improvement of the automated medical diagnosis based on biological feature selection and classification, as biological features represent patterns of important information.

INTRODUCTION

The medical diagnosis is nowadays confronted with new and often unexpected challenges that provoke a large range of emotional responses. Since no two responses are alike, a variety of emotional behaviors are encountered among patients and therefore medical personnel have to face both medical diagnosis as well as patient’s trust. When these two antagonists desiderate is met, the chances for patient’s healing grow. Our work deals with this issue and proposes a new model...
New Models for ICT-Based Medical Diagnosis

based on qualitative formalism for the interaction physician – patient as we focused on evaluation of the links between physiology of human body and human emotional states. Thus, we help specialists to perform a correct diagnosis correlated to patient’s expectations and emotional states in order to obtain a so called Trust Diagnosis (TD).

In order to increase the medical diagnosis accuracy, emotion bio-signals are intensely analyzed using invasive and non invasive techniques. The significance of these measurements related to patient’s pathology, as well as doctor’s interpretation, are still on progress as emotion bio-signals measurement is a hard task that may involve wired or wireless sensors which limit the patients’ movements and stress them.

Medical diagnosis can be improved if the pattern is comprised by most of the significant biological features. In our study, common sequence measures were employed to determine the saliency of a wide range of applications in the area of medicine, computational biology, as well as string editing, pattern recognition and genetics etc. We assume that an important common sequence salience measure is to find the Longest Common Subsequence (LCS) for a set of \( n \) sequences. In order to perform this hard task, we use discrete event formalism, respectively Petri nets, and we propose an algorithm for reducing the size of the digraphs. An interesting application to the ECG signals will demonstrate that salient input features effectively aid the diagnosis process.

In order to increase the medical diagnosis accuracy, emotion bio-signals are intensely analyzed using invasive and non invasive techniques. The significance of these measurements related to patient’s pathology, as well as doctor’s interpretation, are still on progress as emotion bio-signals measurement is a hard task that may involve wired or wireless sensors that limit the patients’ movement and stress them (Johnes & Pevzner, 2004; Koller & Raidl, 2002; Baeza & Gonnet, 1992; Gusfield, 1997). Our work is focused on evaluation of the links between physiology of human body and human emotional states, in order to help specialists to perform a correct diagnosis correlated to patient’s expectations and emotional states, as we denoted here “the trust diagnose” (TD). Our approaches in these techniques are different from the previous ones. Instead of observing and classifying the people’s responses to external stimuli or internal emotional factors, we are interested in developing a mechanism that appropriately describes the interaction doctor – patient via emotional states caused by disease and/or by doctor’s examination, and that can lead to a TD.

We intend to develop this approach in two stages, as follows: The first stage described here is focused on emotion models expressed in a qualitative formalism capable to link analytic (e.g. algebraic) tools to emotion expressions and to deliver significant information for both laboratory analysis methods and doctors’ diagnose. The second stage briefly described in section 5 will be developed in further works and intends to give a mechanism that ensures a real-time classification of bio-signals that express emotions and relate it to medical markers in order to obtain a TD. Concerning emotion classification, there are several related works, such as (Smith & Waterman, 1983), (Agawarl et al., 1998), (Guler & Guler, 2003), (Figure 1. Russell’s arousal/valence circumplex)
18 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the product’s webpage:

www.igi-global.com/chapter/new-models-ict-based-medical/78060?camid=4v1


www.igi-global.com/e-resources/library-recommendation/?id=1

Related Content

The User Driven Learning Environment
www.igi-global.com/chapter/user-driven-learning-environment/49256?camid=4v1a

Learning Medicine: A Personal View
www.igi-global.com/chapter/learning-medicine-personal-view/49253?camid=4v1a

Sarah’s Choice: Breast Cancer and Mammogram Screening Decisions
www.igi-global.com/article/sarah-choice-breast-cancer-mammogram/76684?camid=4v1a

E-patients Empower Healthcare: Discovery of Adverse Events in Online Communities
www.igi-global.com/chapter/patients-empower-healthcare/46680?camid=4v1a