An Approach of a Decision Support and Home Monitoring System for Patients with Neurological Disorders using Internet of Things Concepts

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Abstract: -The Internet of Things and information and CommunicationTechnologies applied in development of health care systems have reached an evolutionary process. This paper presentsthe development of an integrated intelligent system for Parkinson's disease Screening.The Decision Support and Home Monitoring System aredesigned to assist and support physicians in diagnosis, home monitoring, medical treatment, medical prescriptions, rehabilitation and progress of his patients with Parkinson's disease. The system will be extended in future research for other Neurological Disorders.This paper has an interdisciplinary character and includes areas such as e-Health, Internet of Things, Information and Communication Technologyand Artificial Intelligence with their application in medical domain.

Key-Words: -Health Monitoring, ExpertSystem, Internet of Things, Neurological Disorders, sensors, Artificial Intelligence.

1 Introduction

Worldwide, one billion people are affected by neurological disorders, including 50 million who have epilepsy and 24 million with Alzheimer disease and other neurological diseases [1]. Many neurological disorders affect aperson's functioning resulting in disabilitiesor limited activities.

According to Parkinson disease Foundation [2], in the USA,nearly one million people are living with Parkinson's disease. This disease occurs in approximately 100-250 cases per 100.000 people. In Europe, approximately 1.2 million people with Parkinson's disease have been reported [2].Although there is presently no cureand the cause is still unknown, there are treatment options to manage its symptoms including medication and surgery.Worldwide, it is estimated that four to six million people suffer from the Parkinson's disease and in the USAcomplications from Parkinson's disease are the 14th leading cause of death [3].

Early diagnosis of Neurological Disorders, such as Alzheimer, epilepsy, Parkinson's disease, and other dementias that influence the lives of patients, their families and society, helps them to have a better and healthier life.

As a health-care strategy, screening and rehabilitation of people suffering of neurological disorders aims to achieve optimal functioning, autonomy and self-caring in the interaction with the larger physical, social and economic environments.

The research in the field of information and communication technology has led to the development of a large series of new tools and intelligent devices that can be used inthe field of health services.As the computer-based patient monitoring systemexpands to support medical activities and at-distance monitoring, doctors/medical experts/medical assistantsmust interact with computer systems and use specialized applications in order to assure a better quality of healthservices [4].

Health care applications facilitate exchange of information between doctors and patients or between institutions, reduce costs, extend the scope and reach of medical facilities, and enhance the quality of services.

The new medical devicesare equipped with sensors, actuators, RFID tags, microcontrollers, mobile-communication devices, nano-pumps and more, in order to allow patients, doctors, or other medical specialists to make health monitoring, diagnosis and treatment more personalized, timely and convenient, while also lowering costs of health services.

In this paper we propose a system for monitoring, screening and rehabilitation of patients with Parkinson's disease or other Neurological Disorders, because there is still no reliable screening test for PD early identification.