The treatment of obsessive compulsive disorder psychology essay

Abstract-Internet of Things (IoT) is the network that connects everything with internet, through various types of information sensor devices, such as RFID, microwave sensor, global positioning system and laser scanner. The purpose of the IoT is to create an environment in which the basic information from any one of the networked autonomous actors can be efficiently shared with others in real-time. These factors cooperate to assist the treatment of many psychopaths including obsessive-compulsive disorder (OCD) patients. OCD is represented by a diverse group of symptoms that include intrusive thoughts, rituals, preoccupations, and compulsions. In this study, a strategy is applied to improve the behavior of the patients and also to help the therapists by the use of Internet of things technology. Therefore, intelligent things connected to the Internet get the information from the patients and send it to the database of the treatment center immediately. Furthermore, things warn the patients in the case of being overused.

Keywords- Internet of Things; Obsessive-Compulsive Disorder; Smart Objects;

Introduction

During the recent years mobile devices have been embraced by everyone, thus creating a huge market that is expected to evolve even more in the years to come. One of the many fields of their application is the medical domain [1], as they are considered to be a great means of improving provided healthcare. An increasing number of healthcare professionals utilize applications that enable remote monitoring or healthcare management. Moreover, many consumers already take advantage of m-health applications to improve and assist their own health [2].

The oncoming development will integrate the existing individual applications, equipment and expertise in the field of medical informatics under the ” umbrella” of Internet of Things (IoTs) [3]. The basic idea of this concept is the ability of many objects around us to interact and cooperate with each other in order to achieve common goals [4] towards pervasive healthcare.

Internet of Things (IoT) is an integrated part of Future Internet and could be defined as a dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual “ things” have identities, physical attributes, and virtual personalities and use intelligent interfaces, and are seamlessly integrated into the information network [5].

The semantic origin of the expression is composed by two words and concepts: “ Internet” and “ Thing”, where “ Internet” can be defined as “ The world-wide network of interconnected computer networks, based on a standard communication protocol, the Internet suite (TCP/IP)”, while “ Thing” is “ an object not precisely identifiable” Therefore, semantically, “ Internet of Things” means “ a world-wide network of interconnected objects uniquely addressable, based on standard communication protocols”[6].

The obsessions and compulsions that characterize obsessive-compulsive disorder (OCD) greatly interfere with life and trap the individual in a cycle of distressing, anxiety-provoking thoughts and behaviors. The symptoms of OCD are time-consuming, irrational, and distracting, and the individual may desperately wish to stop them. You can imagine how distressing it is for people whose thoughts are filled with concerns about contamination (e. g.,

germs), doubts (e. g., leaving the gas on), or aggression (e. g., fear of harming another person). The most common compulsions involve the repetition of a specific behavior, such as washing and cleaning, counting, putting items in order, checking, or requesting assurance.[7]

Obsessive-compulsive disorder tends to begin either before age 10 or else in late adolescence/early adulthood [8]. It has been described in children as young as age 2 [9]. Early onset is more common among men; later onset is more frequent among women and is often linked with cleaning compulsions [10]. OCD is a chronic disorder-a 40-year follow-up study of people hospitalized for OCD in the 1950s showed that only 20 percent had recovered completely [11].

Internet of Things

The concept of the Internet of Things (IoT) is to make every single ‘ network enabled’ object in the world network connected, and represents a vision in which the Internet extends into the real world embracing everyday objects [12]. The term ‘ Internet of Things’ was popularized by the work of the Auto-ID Center at the Massachusetts Institute of Technology (MIT), which in 1999 started to design and propagate across-company radio frequency identification (RFID) infrastructure [13]. Internet of Things breaks traditional thinking mode, connects physical infrastructure with IT infrastructure, and lets all the things connect with the network. It makes us step into future “ Ubiquitous Society” from “ Electronic Society” of mobile transceivers and internet [14].

As shown in figure 1, Perspective of “ Things” leads to the International Telecommunication Union (ITU) definition of the IoT: “ from anytime, anyplace connectivity for anyone, we will now have connectivity for anything” [15]. In [16], the European Commission gives a similar definition. It relates to “ things having identities and virtual personalities operating in smart spaces using intelligent interfaces to connect and communicate within social, environmental, and user contexts”.

Figure 1: Dimensions of Internet of Things [17]

The concept of ‘ things’ in the network infrastructure refers to any real or virtual participating actors such as real world objects, human beings, virtual data and intelligent software agents. The purpose of the IoT is to create an environment in which the basic information from any one of the networked autonomous actors can be efficiently shared with others in real-time. With more powerful and efficient data collection and sharing ability, such a vision is possible and capable of supporting sophisticated decision support systems by providing services in a more accurate, detailed and intelligent manner. While workflows (descriptions of tasks to be performed, constraints on the tasks including resources needed, and relationships between the tasks) can be static in many applications (e. g. manufacturing), the constantly changing environment and requirements during an emergency requires an ability to dynamically alter the workflow in a rapid and correct way [18].

Application

The IoT is a multi-disciplinary concept that involves research in the fields of hardware, near-field communication, networking, data fusion and decision

making. Implementation of the IoT concept into the real world is through the integration of several enabling technologies belonging to these fields. We categorize these enabling technologies in terms of the levels of their competencies [19]:

Technology level: technologies for connecting real or virtual smart objects within the information infrastructure under strong energy and environmental constraints, i. e. individual wireless sensing capabilities;

Communication and networking level: technologies for providing the massive secure, dynamic and flexible communication networking;

Intelligence level: technologies for providing data fusion and service discovery where data collected by individual smart ‘ network enabled’ objects such as RFID and wireless sensors are used by distributed users.

Smart Objects

At the single component level, the IoT will be based on the notion of ” smart objects”, or, simply, ” things”, which will complement the existing entities in the Internet domain (hosts, terminals, routers, etc.). We define smart objects (or things) as entities that[20]:

Have a physical embodiment and a set of associated physical features (e. g., size, shape, etc.).

Have a minimal set of communication functionalities, such as the ability to be discovered and to accept incoming messages and reply to them.

Possess a unique identifier.

Are associated to at least one name and one address. The name is a human-readable description of the object and can be used for reasoning purposes. The address is a machine-readable string that can be used to communicate to the object.

Possess some basic computing capabilities. This can range from the ability to match an incoming message to a given footprint (as in passive RFIDs) to the ability of performing rather complex computations, including service discovery and network management tasks.

May possess means to sense physical phenomena (e. g., temperature, light, electromagnetic radiation level) or to trigger actions having an effect on the physical reality (actuators).

Although RFID has been around for more than a half century, it is only in recent years that this technology has been gaining significant momentum due to the convergence of lower cost and increased capabilities of RFID tags. Currently, RFID is emerging as an important technology for revolutionizing a wide range of applications, including supply chain management, retail, aircraft maintenance, anti-counterfeiting, baggage handling, and healthcare. It also heralds the emergence of inexpensive and highly effective pervasive computers that will have dramatic impacts on individuals, organizations, and societies. Many organizations are planning or have already exploited RFID in their main operations to take advantage of the potential of more automation, efficient business processes, and inventory visibility. For example, recent news shows that Wal-Mart has reduced out-of-stocks by 30 percent on

average after launching its RFID program. Many predictions agree that RFID will be worth billions of dollars in new investments [21].

Obsessive-compulsive disorder

Obsessive-compulsive disorder (OCD) is represented by a diverse group of symptoms that include intrusive thoughts, rituals, preoccupations, and compulsions. These recurrent obsessions or compulsions cause severe distress to the person. The obsessions or compulsions are time-consuming and interfere significantly with the person’s normal routine, occupational functioning, usual social activities, or relationships. A patient with OCD may have an obsession, a compulsion, or both. [22]

DSM-IV-TR Diagnostic Criteria for Obsessive-Compulsive Disorder [23]:

Either obsessions or compulsions: Obsessions as defined by (a), (b), (c), and (d):

recurrent and persistent thoughts, impulses, or images that are experienced, at some time during the disturbance, as intrusive and inappropriate and that cause marked anxiety or distress

the thoughts, impulses, or images are not simply excessive worries about real-life problems

the person attempts to ignore or suppress such thoughts, impulses, or images, or to neutralize them with some other thought or action

the person recognizes that the obsessional thoughts, impulses, or images are a product of his or her own mind (not imposed from without as in thought insertion)

Compulsions as defined by (a) and (b):

repetitive behaviors (e. g., hand washing, ordering, checking) or mental acts (e. g., praying, counting, repeating words silently) that the person feels driven to perform in response to an obsession, or according to rules that must be applied rigidly.

the behaviors or mental acts are aimed at preventing or reducing distress or preventing some dreaded event or situation; however, these behaviors or mental acts either are not connected in a realistic way with what they are designed to neutralize or prevent or are clearly excessive

At some point during the course of the disorder, the person has recognized that the obsessions or compulsions are excessive or unreasonable.

Note: This does not apply to children.

The obsessions or compulsions cause marked distress, are time-consuming (take more than 1 hour a day), or significantly interfere with the person's normal routine, occupational (or academic) functioning, or usual social activities or relationships.

Etiology of Obsessive-Compulsive Disorder

Neurobiological Factors: Hyperactive Regions of the Brain It has been noted for decades that OCD symptoms are relatively common among people with certain neurological disorders, such as Huntington's chorea [24]. Brain-imaging studies indicate that three closely related areas of the brain are unusually active in people with OCD (see Figure 5. 2, p. 131): the orbitofrontal cortex (an area of the frontal lobe located just above the eyes), the caudate nucleus (part of the basal ganglia), and the anterior cingulate (cingulate gyrus) [25].

Behavioral Factors in Compulsions: Behavioral models consider compulsions to be operantly conditioned responses. That is, compulsions are reinforced because they reduce anxiety [26]. For example, compulsive hand washing would provide immediate relief from the anxiety associated with obsessions about germs. Similarly, checking the stove may provide immediate relief from the anxiety associated with the thought that the house will catch fire. Consistent with this view, after compulsive behavior, self-reported anxiety and even psychophysiological arousal drop [27].

Cognitive Factors in OCD: At least 80 percent of people experience brief intrusive thoughts from time to time a terrible song or image gets stuck in your head [28]. A different model focuses on cognitive factors and obsessions. This model suggests that people with OCD may try harder to suppress their obsessions than other people and, in doing so, may actually make the situation worse. Several researchers have shown that people with OCD tend to believe that thinking about something can make it more likely to occur [29]. People with OCD are also likely to describe especially deep feelings of responsibility for what occurs [30]. As a consequence of these two factors, they are more likely to attempt thought suppression [31].

Psychological Treatment of Obsessive-Compulsive Disorder

Behavior Therapy: Although few head-to-head comparisons have been made, behavior therapy is as effective as pharmacotherapies in OCD, and some data indicate that the beneficial effects are longer lasting with behavior therapy. Many clinicians, therefore, consider behavior therapy the treatment of choice for OCD. Behavior therapy can be conducted in both outpatient and inpatient settings. The principal behavioral approaches in OCD are exposure and response prevention. Desensitization, thought stopping, flooding, implosion therapy, and aversive conditioning have also been used in patients with OCD. In behavior therapy, patients must be truly committed to improvement.[22]

Cognitive Therapy: Cognitive approaches to OCD focus on challenging a person's beliefs about what will happen if they do not engage in rituals [32]. Eventually, to help test such beliefs, these approaches will use exposure. Several studies suggest that cognitive approaches perform as well as exposure and response prevention (ERP) [33].

Pharmacotherapy: Selective serotonin reuptake inhibitors (SSRIs) are effective in the treatment of OCD [34], but a particular class of antidepressants that is closely related to SSRIs, serotonin reuptake inhibitors (SRIs), are also effective in the treatment of OCD [35]. The most commonly prescribed SRI for OCD is clomipramine [36]. In one multisite study, clomipramine led to an approximately 50 percent reduction in symptoms [37].

Technology therapy

Internet of things leads to the intelligence of things. This intelligence means that one thing can play the role of a therapist assist for patients. As it is shown in figure 2, things connected to the Internet at home can take the

information from an ODC patient about the unusual use of things and send it to the database available in the treatment center through the Internet. Moreover, things can warn the patient in the case of being overused.

Figure 2: Internet of Things for Treatment of Obsessive-Compulsive Disorder

Conclusion

Things available at home which are considered as intelligence factors can collaborate and create an intelligent environment. Information is received accurately in this environment. This information includes the information of every person who enters the home or touches the things. In this article, it is attempted to use Internet of things technology in the direction of OCD disease treatment. OCD patients can have repetitive behaviors such as repetitive washing hands or dishes, repetitive cleaning table and chairs, or repetitive extreme symmetrical arranging of things. Using Internet of things technology and environment intelligence, the number of times things are used in a house can be obtained and this information can be made available to the therapist. In addition, things can warn the patient in the case of being used unusually so that the patients can control their condition. Consequently, this technology can be utilized to improve the behavior of the patients and to help the therapists.