Chapter 11
Role of Multi-Agents System in Creation of Collaborative Environments within Mental Health Domain

Maja Hadzic
Curtin University of Technology, Australia

Darshan S. Dillon
Curtin University of Technology, Australia

ABSTRACT

Mental illness is becoming one of the major problems of our society. The World Health Organization predicted that depression would be the world’s leading cause of disability by 2020. The exact causes of many mental illnesses are still unknown, mainly due to the complex nature of mental health. In this paper, the authors propose a multi-agent system designed to assist in effective and efficient management, retrieval and analysis of mental health information. They utilize the TICSA approach to define different agent Types, their Intelligence, Collaboration paths, address Security problems and Assemble individual agents. They use UML 2.1 Sequence and Composite diagrams to model social and goal-driven nature of the multi-agent system. The proposed multi-agent system has the potential to provide and expose the knowledge that will increase our understanding and control over mental health and help in development of effective prevention and intervention strategies.

INTRODUCTION

Mental illness is becoming one of the major problems of our society. The World Health Organization predicted that depression would be the world’s leading cause of disability by 2020 (Lopez & Murray, 1998). The number of mentally ill people is increasing globally each year. This introduces major costs in economic and human terms, to the individual communities and the nation in general, both in rural and urban areas. The recognition that many mental illnesses may not become chronic if treated early has led to an increase in research in the last 20 years.
Role of Multi-Agents System in Creation of Collaborative Environments

Research into mental health has increased and resulted in a wide range of information and publications covering different aspects of mental health and addressing a variety of problems. A huge body of information is available within the mental health domain. This information is dispersed over various information sources which are heterogeneous in structure and content. As the research continues, new papers or journals are frequently published and added to various databases. Portions of this data may be related, overlap or semi-complementary with one another. No tool exists which helps us identify these kinds of relationships, overlaps, complementarities and redundancies.

Retrieving specific information is very difficult with current search engines as they look for the specific string of letters within the text rather than its meaning. In a search for “genetic causes of bipolar disorder”, Google provides 95,500 hits which are a large assortment of well meaning general information sites with few interspersed evidence-based resources. Medline Plus (http://medlineplus.gov/) retrieves 53 articles including all information about bipolar disorder plus information on other mental illnesses. A large number of articles is outside the domain of interest and is on the topic of heart defects, eye and vision research, multiple sclerosis, Huntington’s disease, psoriasis etc. PubMed (http://www.ncbi.nlm.nih.gov/pubmed) gives a list of 1,946 articles. The user needs to select the relevant articles as some of the retrieved articles are on other illnesses such as schizophrenia, autism and obesity. Moreover, the user needs to read each article individually and establish the links between the selected articles manually. We need to take a systematic approach to making use of the available information that cannot reach its full value unless it is systematically analysed and linked with other available information from the same domain.

Wilczynski et al. (2006): “General practitioners, mental health practitioners, and researchers wishing to retrieve the best current research evidence in the content area of mental health may have a difficult time when searching large electronic databases such as MEDLINE. When MEDLINE is searched unaided, key articles are often missed while retrieving many articles that are irrelevant to the search.” Wilczynski et al. (2006) developed search strategies that can help discriminate the literature with mental health content from articles that do not have mental health content. Our research ideas go beyond this. We go a step further and apply data mining algorithms on mental health data. We propose the design of a multi-agents system that will give a consistent format to all mental health information. This will bring the mental health information under one umbrella and enable us to organize this information in a systematic way. This will allow automatic data analysis techniques such as data mining to effectively use mental health data, reveal data patterns hidden within the large body of the mental health data, and expose the knowledge that will help medical practitioners develop better prevention and intervention strategies.

LITERATURE REVIEW

Complexity of the Mental Health

The increase in mental health research has resulted in increase of information but the exact causes of many mental illnesses remain unclear. However, it has been proven that mental illness is a causal factor in many chronic conditions such as diabetes, hypertension, HIV/AIDS resulting in higher cost to the health system (Horvitz-Lennon et al. 2006).

As mental illness is still a grey area of medical research, and the exact causes of mental illness are unclear, precise treatment strategies cannot be developed at this stage. Doctors are often forced to prescribe medication which may provide temporal relief but in reality mask the real issue and often result in side effects that will make the patient’s
Related Content

Simulating Normative Agents
[www.igi-global.com/article/simulating-normative-agents/39031?camid=4v1a](www.igi-global.com/article/simulating-normative-agents/39031?camid=4v1a)

Towards a New Approach for Controlling the Reorganization Process of Multi-Agent Systems

Designing a Foundation for Mobile Agents in Peer-to-Peer Networks
[www.igi-global.com/chapter/designing-foundation-mobile-agents-peer/5175?camid=4v1a](www.igi-global.com/chapter/designing-foundation-mobile-agents-peer/5175?camid=4v1a)

Introducing AI and IA into a Non Computer Science Graduate Programme
Ioanna Stamatopoulou, Maria Fasli and Petros Kefalas (2011). *Multi-Agent Systems for Education and Interactive Entertainment: Design, Use and Experience* (pp. 89-100).
[www.igi-global.com/chapter/introducing-into-non-computer-science/50396?camid=4v1a](www.igi-global.com/chapter/introducing-into-non-computer-science/50396?camid=4v1a)