International Congress of Information and Communication Technology (ICICT 2017)

Research on Web services-based Extenics Aided Innovation System

Siwei Yan, Rui Fan*,Yuefeng Chen, Duo Wang, Chongwen Huang, Jin Xie, Mengbin Chen, Mingyong Zheng

Software School, Guangdong Ocean University, Zhanjiang, China
* Corresponding author: fanrui@gdou.edu.cn Tel: +86-13828258036.

Abstract

Researches in the Computer Aided Innovation System based on Extenics are very few, and we have developed the Web service-based Extenics aided innovation system according to the Extenics innovation process, meanwhile, we introduce the specific detail of the hierarchical structure as well as the design and deployment of Web services supporting this system. At last, we give a case to show how to guide innovative personnel to deduce their innovative thoughts on the contradiction of the problem.

Keywords: Extenics Aided Innovation System; Extenics; Web services; Hierarchical Structure.

1. Introduction

With the continuous development of society, people pay more and more attention to the cultivation of inventive ability. These innovation activities are complicated and irregular. However, 2500 years ago, a six-year-old child in China called Cao Cong had found a scientific idea to weigh an elephant. Nowadays, these correlative groundbreaking ideas are developed into a new academic content known as Extenics[1]. The Extenics innovation process of Extenics is used to aid innovative personnel to unfold the innovative activities in a certain law. Meanwhile, it plays a guiding role in recognizing the contradiction and the innovation deduction is capable of weakening or even eliminating the contradiction.

According to the research of computer aided innovation system, there are many research results, but there are always applications in computer aided innovation based on TRIZ[2] technology or other innovative methods, for example, Hüsig and Kohn have studied the relationship between TRIZ and Web2.0[3] and then many types of researches of aided innovation system have achieved lots of results in China[4-8], but corresponding research on Extenics is very few.

Our research team[9] tries to realize the Extenics elements of the service entity as well as the individual innovation and intelligent components, meanwhile, innovative intelligent group network[10] and also the research of adaptive Extenics system with the formal method[11].

Therefore, with the deployment of the web service cluster which includes innovation services based on Extenics, we build a computer aided innovation system based on Extenics as a terminal carrier so that the ordinary people can expediently use this system to gather innovation thoughts, transformation, contradiction evaluation and so on.

2. Extenics innovation Process

The basic law of Extenics innovation is regarded as four aspects such as model, extension, change as well as selection. Model is constructed by the definition of problem and problem decomposition, accompanying by maintaining the information of core questions, which is determined as the key problem; Extension emphasizes multi-angle and multi-direction analysis with the conditions and goals elements under the core question while expanding and deriving from the Extenics innovative process; Besides, change is a crucial process that makes sure the solutions' formation when there are one or several new elements which have an ability of weakening and even digesting the contradiction of problems mentioned above the Model. Finally, after conducting many transformations, the selection ought to, utilizing varied methods for superiority evaluation, give an optimal evaluation among multiple solutions (see Fig.1 which shows, in a nutshell, interaction among dissimilar stages narrated above).
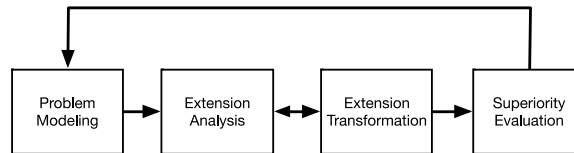

Fig. 1 Extenics Innovation process

3. Extenics Aided Innovation System

The design of Extenics aided innovation system is based on the Extenics innovation process, and it will assist innovative personnel putting Extenics innovative methods in practice so as to deduct innovative contradiction resolution thoughts. But the complex Extenics process is required to request a few significant Web services and frequent control interaction. So, it is necessary that a flexible and extendable hierarchical structure is required in this system with the capability of adapting from the alternation of new or improper services during the Extenics innovation process.

3.1. Hierarchical structure and its implementation

As you have seen in the Fig.2, the structure of the aided innovation system is divided into four layers such as the display layer, which claims suitable and friendly human-computer interaction interface, the control layer combined with others layers, the logic layer for providing innovative deduction logic as well as control logic in database or display, and then the database layer, which aims to access and synchronize reasoning information.