

An Educational Service Platform using Collective Intelligence and Presence of Web 2.0

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Abstract

Web 2.0 has become the face next generation Web among the business world and research community. Web 2.0 is instant superficial gratification of people. On the other hand, Semantic Web is deep, meaningful and lasting relationship with data. So, it is difficult to apply the Semantic Web to the real world. In this paper, a platform for educational services using the Semantic Web and Web 2.0 is proposed. The proposed platform is based mix of the Semantic Web and Web 2.0, so it is useful to apply in the real world applications. Two services are presented, one is a semantic email system and the other is a cyber study space. The cyber study space adjusted each student is presented. The study environment is called iStudySpace that has personal scheduler, study status plan table, personalized search engine and several gadgets. Finally characteristics and limitations of the Semantic Web and Web 2.0, the organization and components of the platform, evaluation of iStudySpace are shown.

Key Words : Web 2.0, Semantic Web, Educational Service, Mashup, Collective Intelligence

1. INTRODUCTION

Berners-Lee proposed a next version of the World Wide Web which is reading, querying and integrating by machine. In the Scientific American article he called it Semantic Web. The Semantic Web is extension of the current web which information is given well-defined meaning, better enabling computers and people to work in cooperation. Semantic Web is deep, meaningful and lasting relationship with data. So, it is difficult to apply the Semantic Web to the real world [1].

But significant effort, the Semantic Web has yet to achieve significant applications and results. On the other hand, the Web 2.0 has become the face next generation Web among the business world and research community [2, 3]. Web 2.0 is instant superficial gratification of people. Web 2.0 is indifferent to technology and just wants to give power to the people, quickly and efficiently for superficial things like sharing files, opinions and photos. In recent, combination of the Semantic Web and Web 2.0 has raised. The Web 2.0 community has begun to interpolate properties of the Semantic Web

into Web 2.0 application.

In this paper, a platform for educational services using the Semantic Web and Web 2.0 is proposed. The proposed platform is based mix of the Semantic Web and Web 2.0, so it is useful to apply in the real world applications. Two services are presented, one is a semantic email system and the other is a cyber study space. The cyber study space adjusted each student is presented. The study environment is called iStudySpace that has personal scheduler, study status plan table, personalized search engine and several gadgets. Finally characteristics and limitations of the Semantic Web and Web 2.0, the organization and components of the platform, evaluation of iStudySpace are shown.

2. PRELIMINARY WORKS

The Semantic Web is a mesh of information linked up in such a way as to be easily processed by machines, on a global scale. You can think of it as being an efficient way of representing data on the World Wide Web, or as a globally linked database.

The Semantic Web was thought up by Tim Berners-Lee. There is a dedicated team of people at the World Wide Web consortium (W3C) working to improve, extend and standardize the system, and

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many languages, publications, tools and so on have already been developed [8].

The Semantic Web is about two things. It is about common formats for integration and combination of data drawn from diverse sources, where on the original Web mainly concentrated on the interchange of documents. It is also about language for recording how the data relates to real world objects. That allows a person, or a machine, to start off in one database, and then move through an unending set of databases which are connected not by wires but by being about the same thing [9].

Web 2.0 is the network as platform, spanning all connected devices; Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an “architecture of participation,” and going beyond the page metaphor of Web 1.0 to deliver rich user experiences [10].

Our aim is to combination the gap between the Semantic Web and Web 2.0 technologies. Since both technologies work on network like data structures, analysis methods from different fields of research could form a link between those technologies. Techniques can be, but are not limited to, social network analysis, graph analysis, machine learning or data mining methods. By bringing together researchers from different fields, we aim to achieve this goal [11].

3. ORGANIZATION OF SEMANTIC WEB 2.0 EDUCATIONAL SERVICE PLATFORM

3.1 Organization of the Platform

A platform for educational services using the Semantic Web/Web 2.0 is called PESWEB 2.0. The PESWEB 2.0 is consists of Semantic Annotation, Semantic Mashup, Semantic Blogging and Semantic Trackback depicted by Fig. 1. These components are mixed Web 2.0 into the Semantic Web.

3.2 Components of the PESWEB 2.0 Platform

- Semantic Annotation

Annotation in Web 2.0 is the ability to associate a simple keyword or a set of keywords with resource

such as blog or photograph. The benefit of doing this is that interface can allow browsing by tag. Also the tags can be used in a tag cloud. A tag cloud is a list of all the tags in the current person’s blog.

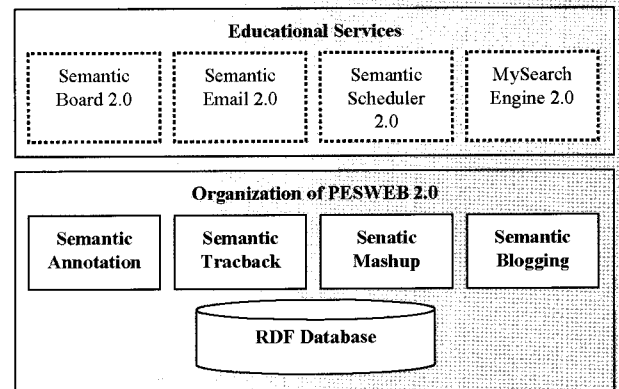


Fig. 1. The platform for educational services using the Semantic Web/Web 2.0 and sample services

Semantic Tag is itself is backed up by an RDF database. Therefore a tag is linked to the related content. This is better than a simple tag browsing as the semantics are backed up with semantic tag database. For example, someone want to search “beef steak”, and this infer from the relevant food semantic tag base, the one can find the tag “beef”, “meat” and “meat food”. This means that someone who searches on non-vegetarian cuisine will find this item.

- Semantic Trackback

Trackback is that one blog entry can reference another, and automatically have this reference placed on both blog entries. Trackback is one of three types of Linkbacks, methods for Web authors to request notification when somebody links to one of their documents. This enables authors to keep track of who is linking to, or referring to their articles [4]. This is useful to bloggers, so they can find out easily who is blogging binary link. The Web does not have a mechanism itself to permit the creation of binary links, and regular hyperlinks on the Web are unary links.

The idea of a Semantic Trackback is that the link enables carry knowledge and meaning with the link instead of simply creating a binary link between two pages. The meaning of a link is meta data such as a vote for the linked pages [2].

- Semantic Mashup

The term mashup used to refer solely to the musical form of combining two or more tracks. But more recently the term mashup has been adopted by the software community to refer to the blending of different software programs. But whatever is being referenced there is some disagreement about what term should be used.

Some major strides are being made, mainly as part of what is being hailed as Web 2.0. Software mashups now combine such things as weather info, maps, webcams, population figures, restaurants and, in fact, any kind of application with an open API that can be pulled together with another on a different website. The potential for Software mashups is staggering and very exciting [5].

The opportunity for the Semantic Web to connect with a Web 2.0 service like Google Local to support a kind of intelligent/compound queries becomes readily apparent. And restaurants publish RDF versions of their menus. These can be associated with food knowledge base/ontology.

- Semantic Blogging

Blogging is a highly popular and effective approach to information sharing. We then assert that certain ideas taken from the semantic web research program can enrich and extend the blogging paradigm. We describe what we mean by semantic blogging, and why this approach is beneficial. Our approach involves attaching semantics, or meaning, to web markup (metadata). To understand this process, it is helpful to consider an everyday example. English speakers tend to attach semantics to the word “cat”, whereas the Viennese equivalent “katze” might simply be seen as an sequence of letters; an opaque symbol. The semantic web defines standards for attaching meaning to symbols in a way that computers can process. The symbols are mapped to concepts and relationships, which are formally described using an ontology. Using these principles, we are building blogging tools which associate symbols with appropriate concepts, and which use this understanding to provide enhanced services. This is what we mean by semantic blogging [6, 7].

3.1 Educational Services

We propose four educational services such as Semantic Board 2.0, Semantic Email 2.0, Semantic Scheduler 2.0 and Semantic MySearch Engine 2.0.

- Semantic Board 2.0

Web board is essential component on the Web site to communicate among netizen. But, according to increasing data of web board, searching one’s own interesting data became difficult and time consuming job. Semantic Board 2.0 is a personalized web board based on RSS (Really Simple Syndication). The basic idea comes from the view concept of relational database theory. Every user has one’s own virtual Web board which is subset of entire board. They also can maintain his own board and receive their interesting renewal data through RSS.

The proposed Semantic Board 2.0 has following functions

- Selective subscription
- Periodic subscription by RSS
- Board history management
- Easy data reuse (because of XML representation)

- Semantic Email 2.0

While the Web is certainly rich information space in which we spend significant amounts of time, many of us spend even more time on email. Adding some semantics to email has potential for increasing productivity and saving time. In fact, we often use email for tasks that are data collection, checking reply and data analysis. Existing email is not set up to handle these tasks effectively. It is tedious, time-consuming and error-prone [16, 17].

Semantic Email 2.0 has automated reply (answer) facility using tagging. It analyzes request email’s tags, accumulate relevant data from database or Semantic Board 2.0. And the system replies integrated relevant data to requester automatically [18, 19, 20, 21].

Three recipients can select three conditions (attendance/absence/other) in Fig. 2 automatic reply statistic function. Then sender of the email can get statistics for meeting attendance [15].

Fig. 3 automatic reply function gives <Query> tag for question email. If recipients receive this type of email, they look at tags in the tag-list and select proper tags. Then the email mailing system searches FAQ DB that has typical types of question, selects similar question and reply it to the recipients.

- Semantic Scheduler 2.0

Personal scheduler might be updated by human manually. Connectivity of the Web can be updated scheduler automatically by email or Web board. To do this scheduler has to read the connected Web site contents.

Semantic Scheduler 2.0 is automated updating scheduler by Semantic Email 2.0 or Semantic Board 2.0. This is enabled by RSS, trackback or syndication technologies.

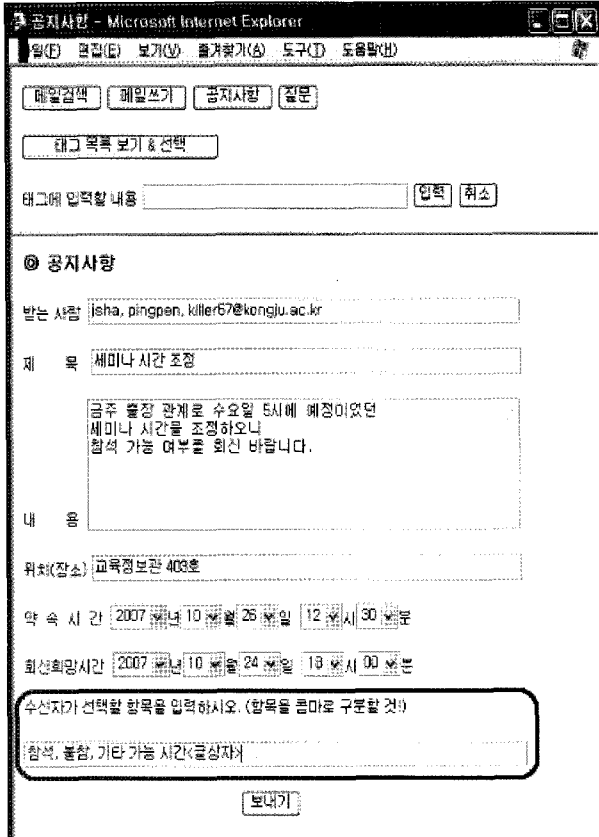


Fig. 2. Automatic reply statistic function

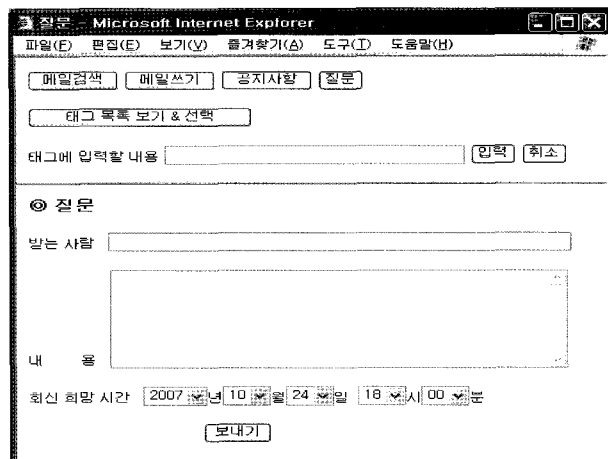


Fig. 3. Automatic reply function

• Semantic MySearch Engine 2.0

Google, Yahoo and Naver are very popular search engine these days. Web users also like to search combined these several search engines and to list ranked results of one's own view. Semantic

MySearch Engine 2.0 is a meta search engine that use Open API of the Web platform and mashup technology.

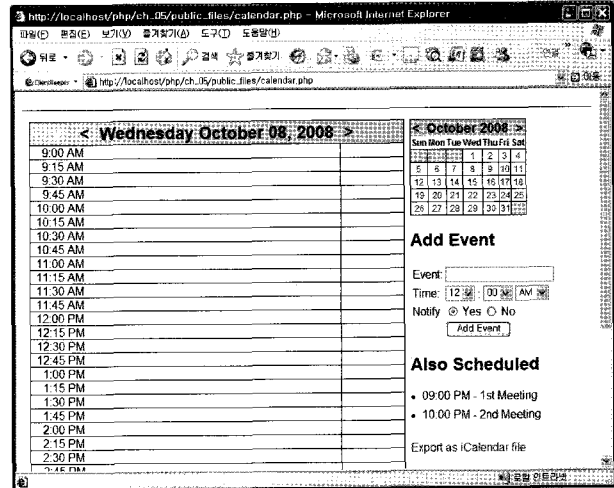


Fig. 4. Personal scheduler interface example

4. PERSONALIZED EDUCATIONAL SPACE

4.1 Features

A cyber study space adjusted each student is presented. The study environment is called iStudySpace that has personal scheduler, study status plan table, personalized search engine and several gadgets. Following Fig. 5 is the iStudySpace interface example.

• Collaborative Filtering Technology

Collaborative filtering calculates similarity degree based on similar user's evaluation data. When a student studies some topics, the one can get information and comments about the topic using collective intelligence.

• Gadget

Gadget consists of information gadget, application gadget and utility gadget. The information gadget receives information through web browser such as weather information, news update and school notification.

• Presence

iStudySpace uses presence online characteristic and direct connection of Web. Presence online characteristic means to communicate each other constantly like instant messenger.

If one studies a certain chapter of Social Studies, connected students are shown right-bottom side of the iStudySpace in Fig. 2. So the student can communicate the topic of the Social Studies or can make a question to the connected students.

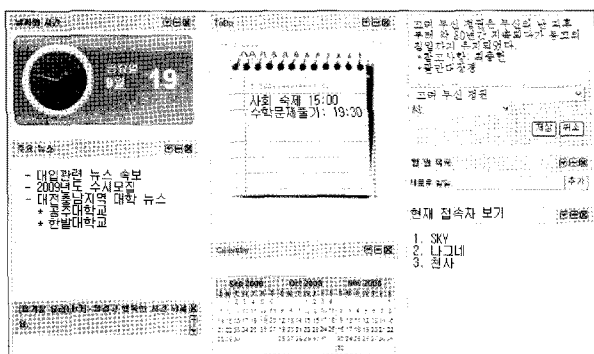


Fig. 5. iStudySpace interface example: study environment tool using collective intelligence and presence of Web 2.0

• Personalized Services

iStudySpace informs personalized schedule and learning information and news. It uses RSS, Mashup and Open API to support personalized and customized educational services such as studying status as study time and study bookmark.

4.2 Evaluation

We establish a hypothesis that iStudySpace gives students self-initiative studying ability. They can use personalized scheduler, learning information and communicate each other constantly like instant messenger. These facilities give students to learn for themselves.

We are going to divide two groups of K university freshman students. One group G1 studies existing method and the other group G2 has experience with iStudySpace. After one semester has gone, the learning achievement and the learning satisfaction are surveyed of two groups G1 and G2. If G2 has higher score than G1, iStudySpace takes effect on students self-initiative studying.

5. CONCLUSIONS

Semantic Web is an extension of the current web which information is given well-defined meaning, better enabling computers and people to work in cooperation. So, it is reading, querying and integrating by machine. But it is difficult to apply the Semantic

Web to the real world because it is deep, meaningful and lasting relationship with data. In spite of significant effort, the Semantic Web has yet to achieve significant applications and results. On the other hand, Web 2.0 has become the face next generation Web on the business world. Web 2.0 is instant superficial gratification of people. Web 2.0 is indifferent to technology and just wants to give power to the people, quickly and efficiently for superficial things like sharing files, opinions and photos. In recent, combination of the Semantic Web and Web 2.0 has raised. The Web 2.0 community has begun to interpolate properties of the Semantic Web into Web 2.0 application.

In this paper, a platform for educational services using the Semantic Web/Web 2.0, so called PESWEB 2.0, is proposed. The PESWEB 2.0 is consists of Semantic Annotation, Semantic Mashup, Semantic Blogging and Semantic Trackback , which are mixed Web 2.0 into the Semantic Web. The proposed platform is based combination of the Semantic Web and Web 2.0, so it is useful to apply in the real world applications. Educational services using the Semantic Web/ Web 2.0 such as Semantic Board 2.0, Semantic Email 2.0, Semantic Scheduler 2.0 and MySearch Engine 2.0, and the organization and components of the platform are presented.

Also, two services are presented, one is a semantic email system and the other is a cyber study space. The semantic email system has automatic reply function, automatic reply statistics function. Email sender does not check meeting attendance or absence of members. The cyber study space adjusted each student is presented. The study environment is called iStudySpace that has personal scheduler, study status plan table, personalized search engine and several gadgets. Finally characteristics and limitations of the Semantic Web and Web 2.0, the organization and components of the platform, evaluation of iStudySpace are shown.

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