OFAUMP: Ontology-based Framework for Adaptable User and Multimedia Presentations

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ABSTRACT

The application of Semantic Web technology brings an unprecedented opportunity and a challenge to Multimedia Web-based Information Systems (MWIS) [6]. This paper presents an ontology-based framework (OFAUMP), focusing on the coupling of the dynamic presentation model and user model that are the main components of MWIS, in the environment of the Semantic Web. In OFAUMP, Private ontology (i.e. user profile), transferred between user terminal devices and a special server, is automatically constructed for each user and shared by web sites/applications in order to realize user adaptation. We optimize Geurts [3] approach to automatically and intelligently generate multimedia presentation with the redefined domain, discourse and media knowledge. To combine the two models mentioned above, a new ontology is introduced, where usable resource for each kind of user and user’s route are described. This framework achieves the aims of dynamically selecting and presenting the multimedia data according to user profile in the Semantic Web.

KEYWORDS: ontology, dynamic generation, multimedia, user profile, adaptation

1. INTRODUCTION

The advent of the Web, at the beginning of the Nineties, leaded to a revolution making it possible to differently consider diffusion and processing of information. Originally, implementation of the Web resulted from works around the concept of hypertext and it took the principles of non-linear organization of informational contents lodged in distant machines and accessible by multiple ways of navigation.

With the technological projections in the field of the networks and the vertiginous increase in the capacities of calculation of computers, a number of media types (image, audio, and video) come to be added to textual data and constitute now the informational content of most of Web-based Information Systems. From a conceptual point of view, such a Multimedia Web-based Information System (MWIS) is generally organized around the following axes: a data model, a functional model, a presentation model and a user model [7]. The data model offers a representation of the informative content that is managed by the system. The functional model generally describes the content management activities (selection, creation, modification, deletion, etc). The presentation model defines the way that the informative content appears in web pages and how to navigate inside and between those pages. The user model aims at representing the needs and characteristics of the system’s users. This model is required in order to build a system able to adapt itself to the diversity of its possible users. Such diversity among users can be observed at several levels: they can have different interests, knowledge levels, backgrounds, preferences in terms of presentation and can also use access devices having different characteristics. In this context, presentation features have also to be studied from an adaptation point of view to really provide each user with a MWIS whose set of dimensions is adapted to her/him.

Data, functional, presentation and user model are not four isolated parts in a MWIS. On the contrary, the design of MWIS is an inherently knowledge-driven process. It requires sufficient knowledge about the data of domains to be able to convey the essential semantic relations for selecting and managing data. It requires knowledge about how to effectively order, group and prioritize this information and about media design for presentation. Finally, it requires knowledge about user’s needs or interests. Unfortunately, deploying professional designers to design MWIS is only feasible if the underlying data, semantics and target audience are relatively homogeneous. The variety of data sources and semantic relations, combined with a variety of output devices and different user profiles, quickly leads to a combinatorial explosion that forces content providers into a one-size-fits-all approach that ignores the different knowledge sources sketched above. Clearly, some form of automation is needed, and this automated process will need to take these knowledge sources into account.

In this work, we mainly focus on the coupling of the presentation model together with a user model in order to personalize the generated presentation according to each user’s profile. Our objective is to propose an “Ontology-based Framework for Adaptable User and Multimedia Presentations
(OFAUMP)*, which is an ontology-based framework for making web sites/applications adaptable to user profile and for intelligently generating multimedia presentations. The approaches adopted by OFAUMP: 1) Automatic construction of the Private ontology (i.e. user profile) for each user and sharing these ontologies by web sites/applications. This method solves the problems of the cost and multiple required similar procedures, which plagues the conventional system. 2) Automatic and intelligent generation of multimedia presentations with optimized Geurts approach that concentrates on improving the presentation of the retrieval results with redefined domain, discourse and design knowledge. 3) Resource and Route ontology that combines the two models mentioned above is introduced.

This paper is organized as follows. The section 2 briefly presents the related works. The section 3 describes the OFAUMP framework which is the core of this paper. A scenario is given in section 4 in order to illustrate our approach based on an example of e-learning domain. The section 5 concludes this paper.

2. RELATED WORK

In the last few years, some research and development have been directed towards user profile and intelligent multimedia presentations. There are already examples of successful prototype systems and also applications in these two areas. We review respectively the related works in this section.

2.1. User profile

Cookie is simply an HTTP header that consists of a string that gets entered into the memory of a browser [11]. This string contains the domain, path, lifetime, and value of a variable that a website sets. If the lifetime of this variable is longer than the time the user spends at that site, then this string is saved to file for future reference. Cookies are used to personalize information, help with on-line sales/services or simply for the purposes of tracking popular links or demographics. Of course cookies can have meaningful usage but they are often opposed by privacy concerns.

In latest mobile phones exist profiling to help to adjust phone settings to match situation on hand. For example in Nokia phone model 8310 [8] user has profiles for customizing ringing tones in different situation (general, silent, meeting, outdoor and pager). User can define user groups from numbers stored for them to adjust ringing tones accordingly. Phone also has timed profiles, so profile can be changed automatically after user defined time has passed.

The first ideas of using ontologies for learner modeling have been reported by [12]. [13] also argues for the use of ontologies for reusable and “scrutable” student models. More recently the idea of using sharable data structures containing user’s features and preferences are proposed in order to enable personalized interactions with different devices to the user’s benefit. For this purpose, a user modeling mark-up language for ubiquitous computing built on XML technology has been proposed as a platform for communication by [10].

2.2. Methods and tools for multimedia presentations

Geurts approach concentrates on improving the presentation of the retrieval results. This approach uses ontological domain knowledge to select and organize the content relevant to the topic the user is interested in. Explicit discourse and narrative knowledge allows selection of appropriate presentation genres and creation of narrative structures, which are used for conveying these domain relations. In addition knowledge of graphic design and media characteristics is essential to transform abstract presentation structures in real multimedia presentations. Geurts approach uses domain and discourse knowledge to transform a semantic graph into a structured progression and than users discourse and design knowledge to transform this into a multimedia presentation. This approach has focused on effectively conveying the relevant domain semantics and being generally applicable.

Celentano et al [4] provided a schema modeling for automatic generation of multimedia presentations. Their schema for multimedia reports is based on the XML representations. This schema describes the spatial and temporal layer of the multimedia objects. A visual authoring system is incorporated to provide the presentation template. The model is used to support content independent structure processing. For this purpose the XML-based schema keeps multimedia data and structural information separated from spatio-temporal information.

The STAMP model [5] allows the specification of generic presentations at the conceptual level that will be automatically adapted at generation time to both the quantity and the nature of information. Assuming that the size and the nature of the elements of information provided by a data source is not known a priori, STAMP proposes templates which describe the spatial, temporal, navigational structuration of multimedia presentations whose content varies.

The WebML project [1] aims at designing MWIS delivering intensive data. The presentation model of WebML proposes several structures for the presentation of a dynamic content obtained by
querying a database. This approach facilitates the description of adaptable presentations using different presentation units to deliver the same content to users who have different characteristics. WebML proposes graphical notations to describe the organization of the units inside the web pages and the links between them, but the other characteristics of the final presentation require to entirely specify the XSL style sheets to apply.

3. OFAUMP FRAMEWORK

Figure 1 shows the architecture of OFAUMP. The user browses web sites or uses the web applications using a user interface (browser) on terminal devices such as PCs, PDAs, cellular phones, etc. Web sites/applications built on OFAUMP use the Private ontology to enable a user adaptation. While the user is browsing the web site or using the application, a Private ontology is automatically constructed based on the interaction between the user and the web site/application. The constructed Private ontology is shared by web sites/applications.

![Figure 1: Overview of OFAUMP framework](image)

For realizing the purpose of sharing Private ontology, each user must have only one Private ontology, not many ontologies. In addition, Private Ontology server connected to the web must hold all users’ Private ontologies. When user logs on or logs off web sites/applications, the Private ontology will be transferred between Private Ontology server and user’s terminal device.

There is another server named Public Ontology server in the OFAUMP framework. Just as its name implies, Public Ontology server includes four kinds of ontologies concerning each user of system. Domain, Discourse, Design and Resource and Route ontology. The latter are created respectively by experts of domain, discourse and design, are used to intelligently generate multimedia presentations. Each web site/application should build a Resource and Route ontology by creators of the web site/application in order to combine presentation model and user model.

3.1. User adaptation

3.1.1. Private ontology

In OFAUMP framework, a user profile is represented by Private ontology. A Private ontology is defined as a classified tree written in OWL [14] proposed for Semantic Web [15][16], which consists of an explicit part provided by user through User Data Editor (UDE) and an implicit part maintained by Intelligent SerVice (ISV). UDE and ISV are the most important components of Private Ontology Manager (POM) described in the next section. Figure 2 illustrates a possible Private ontology architecture.

![Figure 2: A possible Private ontology architecture](image)

Though the explicit part of Private ontology (shown at the left of figure 2) is a very small part and contains a few information, it remains an important element. User’s private information requested by web site/application is entered through the UDE, and added by the UDE into explicit part of Private ontology when user first registers in the web site/application. Once logging on again in the same web site/application or even in another different one, the user will get his/her own Private ontology back by matching the user’s information of logging on to the content of the explicit part.

The implicit part of Private ontology (shown at the right of figure 2) involves three parts: Desirable Resource, User Route and Presentation. The Desirable Resource describes the characteristics of user’s favorite resource. We record user’s preferred trace in User Route so that the user can keep on driving himself on his preferred route from the end point last time. Finally, Presentation defines user’s wished output medium for displaying generated dynamically multimedia presentation.

The implicit part of Private ontology is automatically constructed based on interactions between user and web site/application by SIV. For example, when a
user studies a lesson in an e-learning web site and passes the final exam, it is reasonable to consider that the user has knowledge of that course. On such situation, the resource on the lesson is added to the appropriate category of the implicit part. If necessary, a new category is made or the implicit part is reconstructed.

The Private ontology contains resources and its categories. The resource requires a history. This resource has previously been presented to the user who has acquired knowledge about it. Each category has restrictions. The restriction is represented by an attribute. Because each user acquires different knowledge about a resource, each user has own Private ontology.

Sharing user ontologies and automatic construction of ontologies resolve some problems of conventional adaptive systems, for example, differences in the adaptive precision between systems, or requiring users to answer questionnaire. However, there is another problem concerning the consistency of Private ontologies and users’ privacy.

The Private ontology is constructed by adding resources to ontology. This requires node adding/deleting manipulations, therefore Document Object Model (DOM) [17] is adopted, which is an application programming interface (API) for valid HTML and well-formed XML documents, such as appendChild(), removeChild(), etc. However, if individual web sites are free to construct Private ontologies using these manipulations, inconsistency can occur in ontologies. To maintain the consistency of Private ontologies, web sites are not permitted to carry out node adding/deleting manipulations directly. They are just permitted to determine when a resource should be added to a Private ontology. To select a resource using Private ontologies, node referring manipulations such as getNodeName(), getParentNode(), etc. of DOM, are needed. The problem is that these manipulations might invade user privacy because they specify resources or categories in the Private ontology. Therefore, to maintain user privacy, web sites are not permitted to carry out node referring manipulations.

To resolve the problems of consistency and privacy, the direct action such as the construction and the use of the Private ontology is performed by POM, is not performed by web sites/applications. Each web site/application can decide when and which action is done, but not how to do it. According to the decision made by the system, the POM decides how to achieve each action and actually performs it.

3.1.2. Private ontology manager (POM)

The Private ontology manager POM located in the terminal devices of user consists of two domain components: UDE and ISV which almost achieve all the tasks of POM. Figure 3 shows the architecture of POM.

The user data editor UDE is a specialized ontology editor for the explicit part of Private ontology. The UDE enables the user to enter user data but also to visualize them, revise them and update them afterwards. The definition of the Private ontology captures rich metadata about the user profile including characteristics such as user ID, password, email, address, etc.

![Figure 3: The architecture of Private Ontology Manager](image)

The intelligent services SIV have two main roles in the system: 1) to automatically update and maintain the implicit part of Private ontology on the basis of interaction between user and web site/application. The SIV supervise user’s activities at all time and marks down the appropriate information into the implicit part. 2) To select the appropriate resources to user’s needs through using Private ontology and Resource and Route ontology. The SIV queries user’s usable resources through the Resource and Route ontology and then filtrates these resources through the Private ontology in order to gain user’s desirable resource.

3.1.3. Private ontology server (POS)

The Private Ontology server POS is another main component of the OFAUMP framework. The POS stores Private ontologies while users are not accessing a web site. When a user starts to access a web site on OFAUMP, the POS sends the user’s ontology to the POM. The POM uses it to select appropriate resource. Then, when the user finishes accessing the web site, the ontology is returned to the POS for storage. Thus, the same Private ontology is shared and used to select resources.
To materialize the functions mentioned above, the POS must have some characteristics as follows. First consider the nature of user profile information. Because it constitutes personal data, it needs to be treated rather differently from other parts of an MWIS: it is subject to far tighter requirements for security of the information. For systems to move out of the laboratory, it will have to meet legal requirements such as the European Community Directive on Data Protection. It is in the spirit of such legislation that users be able to access and control their own data. A server makes sense for the provision of the required security at the same time as ensuring user access and control [2].

Another important problem is that it takes considerable time and effort to build up a detailed user model. When user first comes to an MWIS, they either have to accept a generic interface initially or they have to provide information about themselves. A server should enable the reuse of the private ontology across web sites/applications. In particular, suppose the user explores one adaptive hypermedia to do some substantial activity such as learning how to program in C. When he/she moves to another adaptive hypermedia system that teaches Java, it would be useful for that system to be primed with the user model that has already been built up.

Figure 4 shows the way that a POS can support reuse of the Private ontology over a series of web sites/applications. This illustrates two main ideas that we now describe: a generic transfer module that enable the user to take or store their own Private ontology; and the views which are the conceptual, high level elements shared between the server and each web site/application.

A Generic Transfer Module of POS enables transferring the Private ontology between user’s terminal device and POS. It might include an interface to identify the user who takes the Private ontology and to check up the validity of the Private ontology when user lays it back. The figure 4 shows the user interacting with the Generic Transfer Interface, in turn, interacting with the POS.

The important element of figure 4 is the views of the Private ontology available to each web site/application. For example, the leftmost application in the figure 4 might need just few components of the user model. The POS allows the definition of a view that defines just these components. Another application or web site will typically use a different view. The application writer would define those parts of the user model needed by their application and these would be defined in views established for that application.

3.2. Intelligent multimedia presentations

Presentation model is concerned with appearance of information chunks to a user. It is a new abstraction on top of the data model. Traditionally, the presentation model allows describing a presentation according to the three dimensions. The spatial dimension addresses the description of the spatial organization of the presentation components. The temporal dimension defines the presentation scenario. The navigational dimension describes the navigational links which can be activated by the user during the presentation. These three dimensions are generally described in every work which aims at formalizing multimedia presentation. However, little project can personalize data and presentation for each user, at the same time convey the relevant domain semantics.

The evolution of the Semantic Web technology provides a brand-new method for adaptable data and presentation. The Geurts approach described in the section 2.2 is an effective ontology-driven presentation model. It concentrates on improving the presentation of the retrieval results with explicit domain, discourse and media knowledge for conveying the underlying semantics information. However, 1) the Geurts approach didn’t consider user’s data adaptation. Generally large numbers of retrieval results can’t satisfy the request of each user, even though there is explicit semantics between them. 2) though the Geurts approach introduces un Discourse ontology for offering the genre of the presentation, this just adapts the presentation on the basis of theme, don’t adapt on the basis of user, that is, the different user who queries the same theme will receive the same presentation on the screen. Therefore, a method is necessary for optimizing the Geurts approach.

To solve the two problems described above, we will redefine the Domain ontology, Discourse ontology and Design ontology that are the main components in the Geurts approach. Furthermore, we introduce ontology, named Resource and Route ontology,
which will cooperate with the Geurts approach and the Private ontology described in the section 3.1 in order to realize our aims.

3.2.1. Redefinition of the Domain, Discourse and Design ontology

Domain ontologies are valuable in the presentation generation process, because effective presentations are those that succeed in conveying the relevant domain semantics to the user. The Geurts approach uses ontological domain knowledge to select and organize the content relevant to the topic the user is interested in. At the present time, building Domain ontology is laborious and time consuming. Moreover there is not a one-size-fit-all Domain ontology for all the domains. In order to return sufficient knowledge to the user who queries the theme concerned two or many domain such as medicine information system and geography information system, we have to employ multiple Domain ontologies.

Fortunately, Web Ontology Language (OWL) provides a owl:imports statement (an example shown at the figure 5 as (1)) for combining these different Domain ontologies. owl:imports statement references another OWL ontology containing definitions, whose meaning is considered to be part of the meaning of the importing ontology. Each reference consists of a URI specifying from where the ontology is to be imported. Syntactically, owl:imports is a property with the class owl:Ontology as its domain and range. The owl:imports statements are transitive, that is, if ontology A imports B, and B imports C, then A imports both B and C. This statement gives us a possibility able to obtain all the relevant data on a theme.

The domain knowledge is used by the presentation generation process through the Discourse ontology, which provides three main parts: the Genre class and its subclasses, defining the different genres a presentation can have, e.g. the genre CV and Biography while presenting a artist; the Narrative Unit class and its subclasses, defining the building blocks for each genre, e.g. artist’s private life and his career; and the Actant class defining the characters of the presentation [9]. A particular genre and its narrative units, as user route, form the structure of the presentation, that is, the user have to follow the track defined by the creator of Discourse ontology. In order to offer the user the maximal liberty, we must define the user route as many as possible without any constraints.

```xml
<owl:Ontology rdf:about=""/>
<owl:versionInfo>...
</owl:versionInfo>
<rdfs:comment>An example v. 1.0</rdfs:comment>
```

Figure 5: Two examples in OWL

Design ontology, consisting of knowledge of graphic design and media characteristics, is essential to transform abstract presentation structures in real multimedia presentations. Design knowledge determines how the semantics and presentation structure are expressed in the multimedia presentation. As described above, the full-scale Design ontology is defined in order to meet all needs of the user.

Through the redefinition of these three ontologies, you can find out a rule that we provide the maximal possibility to each user on the retrieval results, user route and mediums. In the next section, we will present how to adapt the multimedia presentation at the first time according to the user by the Resource and Route ontology.

3.2.2. The first adaptation by the Resource and Route ontology

The Resource and Route ontology is designed and implemented by the creator of web site/application, that is, each web site/application has a Resource and Route ontology. Just as its name implies, the Resource and Route ontology, shown at the figure 6, consists of two parts: Usable Resource and User Route.

In the Usable Resource, we describe all characteristics of the resource that can be applied by the users of this web site/application. This resource is a subclass of the resource of domains, that is, the Resource and Route ontology only gathers the resource that concerns their own user and filtrates the irrelevant, redundant and illegal resource. In this way, the resource transferred to the end user is more legible and customized.
The part of User Route defines the possible routes of each role (i.e. teacher, student or administrator), that is, each role has the possibility to navigate across what he/she wants to go and he/she is admitted to go. This method gives the user the biggest space in the web site/application according to identity of the user. Certainly the User Route is a subclass of the Discourse domain.

Because the web sites/applications generally permit all kinds of mediums, we have not added the design knowledge into the Resource and Route ontology.

The Resource and Route ontology clearly defines the resource and the route that can be applied by the user of web site/application. This resource and route have sufficient quantity and semantics in order to be chosen by user.

3.2.3. The second adaptation by the Private ontology

After the first adaption through the Resource and Route ontology, the user has had all the resources and route able to be selected. However, each user might have his own preference on the use of resource and the choice of route. This process is guided by the Private ontology which contains the user’ information and the user’s preference collected automatically by POM in the course of interaction between user and web site/application. The Private ontology is presented in the section 3.1.1.

The User Route, the Desirable Resource and Presentation of the Private ontology defining user’s preferred knowledge correspond respectively to Domain, Discourse and Design ontology. Moreover, the knowledge of these three parts is respectively subclass of the Resource and Route ontology and the three ontologies of the Geurts approach. The relations between the ontologies are shown at the figure 7.

Figure 6: A possible Resource and Route ontology architecture

Figure 7: The relations between ontologies

To represent user’s preferred information in the Private ontology, we propose a simple Weight System. This Weight System enables the creator of the Resource and Route ontology to give each resources or categories a weight. When the user’s POM has decided which resources or categories are preferred by user, the weight of these resources or categories will be added in the Private ontology. An example shown at the figure 5 as (2) ontology. An example shown at the figure 5 as (2) ontology. An example shown at the figure 5 as (2) declares that all information about course Pervasive Information System have a hasWeight property that must have at least one value that is equal to 3.4.

4. EXAMPLE SCENARIO

In the section 3, we have explained in detail the purpose and the functions of the OFAUMP framework such as the user model that is dynamically built and shared for user adaptation, the presentation model as which the optimized Geurts approach is used in order to automatically materialize multimedia presentations and, finally, the Resource and Route ontology as a bridge to couple the user model and the presentation model together.

Theoretically, the OFAUMP framework has completely achieved the aim mentioned at the beginning. In this section, we present a working example about a student user who follows some courses in an e-learning web site in order to practically attest to the capability of our framework.

4.1. The first entry of a user into an e-learning web site

First of all, we will present the e-learning web site where our user can attend some distance courses. This e-learning web site contains two axes of information: user identities and disciplines. The user identities include teacher, student, administrator, etc. The disciplines define the classified information shown at the figure 8.
Our user is a student who wants to follow some courses (such as Pervasive Information System (PIS), Visual Information System (VIS), etc.) using a Web browser in an e-learning web site. When the user first comes to this web site, he/she either has to accept a generic interface initially or he/she has to provide information about himself such as name, password, address, etc.

After building private:UserRoute of Private ontology, the Intelligent Service will select suitable resource about the session 2 in order to display it to the student. Firstly, the Intelligent Service queries Resource and Route:UsableResource for all usable resource to the session 2 of course Pervasive Information System. This usable resource being a portion of the resource of the domains can just be applied by the users of this web site. In the next step, the Intelligent Service queries private:DesirableResource for the rules that depict the characteristics of user’s desirable resource in order to filtrate large numbers of undesirable resource. Although private:DesirableResource is empty at present, the Intelligent Service will gather the student’s activity information and add it in private:DesirableResource for next utilization. Finally, the selected resource combined with the associated semantic relations from the domain ontologies is provided for the Geurts approach in the form of RDF graph.

During the student browses pages generated automatically by the Geurts approach for learning the session 2, the related information concerning the Geurts approach is collected and added in private:Presentation by the Intelligent Service, such as the student’s preferred kinds of presentations and preferred output medium.

The student has to take an exam for evaluating the effect of learning after learning the session 2. Once the student successfully pass the exam, it is reasonable to consider that the user has knowledge of the resource that concerns session 2. On such situation, the resource of session 2 is added to private:UserRoute by the Intelligent Service in order to record the track of the user.

When the student ends the learning and logs off the e-learning web site, the Private ontology will be sent to Private Ontology server by the Private Ontology Manager. The Generic Transfer Interface of the Private Ontology server examines the validity of the Private ontology and put it into the Private Ontology server.

4.2. The reentry of the user into the e-learning web site

After a period of time, our user logs on to the e-learning web site again with user ID and password that are transferred by the Private Ontology Manager to the Private Ontology server for identifying the identity of the user. If the result is true, the Private Ontology server will send the user’s Private ontology to the Private Ontology Manager. In this way, our user has had all the information gathered and created the last time, including the point of starting the course, the characteristics of his desirable resource and the

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1 private:UserRoute refers to the UserRoute class of the Private ontology, and Resource and Route:UsableResource to the UsableResource class of the Resource and Route ontology
preferred genre and output medium of the presentation. The e-learning web site will automatically search the related resource and display it to the user on the basis of this information.

In fact, even a single user cannot be considered as a constant unit, because he/she undergoes changes too, sometime even in the same session, e.g. mood changes. Our user can change his browse custom or presentation style in the course of learning. All these changes will be noted in the relevant class of the Private ontology at any moment.

4.3. The entry of the user into another e-learning web site

Our user stands a good chance of coming into another e-learning web site in order to keep on his study. Traditionally, the user has to register all over again. He/she enters his private information, chooses an interested course, takes an evaluation test, decides preferred genre of presentation and output medium, etc.

Under the OFAUMP framework, all the manipulation described above will be left out. What the user needs to do is just to log himself on with the same user ID and password that he/she used in the first e-learning web site, and then, the system will perform the tasks presented in the section 4.2.

5. CONCLUSIONS

In this paper, we have proposed an ontology-based framework, called OFAUMP, which aims at offering solutions to the problems frequently encountered while adapting user and generating intelligently multimedia presentations. This framework especially applies to Multimedia Web-based Information Systems in the environment of the Semantic Web. These systems have to deliver and organize a multimedia content in a presentation according to user’s needs or interests.

To realize user adaptation, we use an approach that is automatic construction of the Private ontology for each user and sharing the Private ontology by web sites/applications. The Private ontology as a user profile represents the user’s knowledge. The ameliorated Geurts approach gives us a possibility to intelligently generate multimedia presentation through the redefined explicit domain, discourse and media knowledge and to convey domain and discourse relations in multimedia presentations. To combine the user model and the presentation model for personalizing the generated presentation according to each user’s profile, Resource and Route ontology is introduced. It contains user’s navigation and usable resources knowledge that enable to optimize and improve user adaptation and intelligent multimedia presentation.

Since the OFAUMP framework is a large project, we have not actually materialized it yet. Moreover there is still other work that must be done, for example to propose a method for implementation of the web site/application on OFAUMP framework, verify its functionality, and to improve the adaptation accuracy and so on.

REFERENCES


