

LOW BUDGET COLLABORATIVE ENVIRONMENT FOR DESIGNERS

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Abstract: *There are many tools which facilitate group work of designers. In order to organize designing process it is possible to use noncommercial tools. The paper presents examples of software configuration of collaborative environment in designers' group work with the use of noncommercial programs. The usefulness of these programs in designing process has been evaluated. The way of adaptation of that environment for specific designing works for teaching computer aided designing or for specific requirements of a given designing unit has been showed.*

1. INTRODUCTION

Effective organization of a designing process carried by means of CAD tools can only be achieved when computer tools, which aid this organization, are used. These tools are offered by producers of CAD systems or companies cooperating with them [4], [7], [10], [13]. They are commercial tools and are professionally dedicated to the whole CAD system or more commonly, enabling cooperation with any CAD system. However, there is a possibility of setting up environment aiding group work from noncommercial tools [14] without the necessity of their purchase. Moreover, there is a possibility of adopting this environment for specific designing purposes [2], [6] carried in a given designing office. Then it is necessary to analyze the needs of a designing group and the scope of the system. Among the tools used for that purpose the ones based on Linux operation system and PHP scripts [1], [3], [5], [9] and data bases accessible for the operation system seem to be advantageous. Further on an example of such a system has been given. The environment is being tested and will serve in teaching computer techniques for computer aided designing and designing collaborative work within the frame of students' scientific association as well as classes on that topic. The suggested solution can be also used in creating a virtual designing office for commercial purposes.

2. FUNCTIONS OF COLLABORATIVE ENVIRONMENTS FOR DESIGNERS

Systems which aid distance group work enable first of all easy management of projects in Internet/intranet at the same time facilitating the process of design creation and assuring the possibilities of synchronic and asynchronous communication. At the same time they guarantee organizational and communication needs within the project and assure possibilities of undertaking virtual enterprise of designing office character. The following functions specify the tasks of the analyzed systems:

- The access control
- Users' management
- Communication
- Design data management

A few of such systems have been functionally analyzed for the sake of proper choice of computer support of collaborative design work of students. Three commonly used systems have undergone more detailed analysis in distributed designers' groups, namely:

- Pro/COLLABORATE [13],
- BSCW [10],
- PHProjekt [14].

Table 1. presents comparison of differences in operation of particular systems where particular functions and features of the analyzed systems are juxtaposed

Table 1. *Juxtaposition of functions and system features*

function, features/name	fea-	Pro/COLLABORATE	BSCW	PHPprojekt
Access control		Y	Y	Y
Users' management		Y	Y	Y
Data management		Y	Y	Y
Chat		N	N	Y
Discussion forum		Y	Y	Y
E-mail		Y	Y	Y
FAQ		N	N	After adding scripts
Tools of group work		Y	Y	Y
Data exchange		P2P	client-server	client-server
System technology		Java	Python	PHP, Java script, HTML

3. ASSUMPTIONS AND FUNCTIONS OF A DESIGNED COLLABORATIVE WORK MANAGEMENT SYSTEM

3.1. Assumptions and aim of system operation

The aim of Internet system operation [6] is to aid activities of a distributed group of students of the Department of Fundamentals of Machine Design involved in designing process within the classes of 'Computer Aided Designing - CAD' and CAD students' scientific association. The elaborated system allows easy and effective data management, simple communication and control over designing progress which will form the knowledge base about the designing process creation. It has been assumed that the system will allow Internet/intranet collaboration and will use free of charge and generally available software operating on the basis of Open Source rules and GNU GPL license.

3.1. Functional requirements

The system which aids the operation of a distributed designing office should be modern and meet the requirements of a designing team [2], [8]. What is more, it ought to be very functional and easy to maintenance. Apart from standard requirements connected with design management the system must fulfill specific requirements for distance learning. The detail requirements have been presented below:

- People using the Internet/intranet system should be divided into different categories of given authorization:

- The users (students of a given authorization assigned to given designing groups can communicate with the environment within their own designing group)
- Project supervisors (people with authorization allowing users' management and management of system contents - Faculty members)
- Administrators (suitably chosen people who supervise the system of distributed office - a specific example of an administrator is 'a root' who has all the possible authorization).

Basic functions fulfilled by the system should enable the following operations:

- Uploading, downloading and deleting files in any format on the server
- Monitoring the progress of designing works
- Giving authorities in order to protect selected documents
- Adding new users (including new administrators and users who supervise the project)
- Creating designing groups
- Authorization and control of authorization of the members of designing team
- Communication by means of such mechanisms as chat, forum, e-mail and FAQ
- Searching for documents on the server by means of inner search features
- Change of the interface of a language system (personalization of settings)
- Safety of assets and work
- Access to software enabling visualization of designing data which have been made available within the system operation

4. SYSTEM IMPLEMENTATION

Final system implementation has been made on the basis of PHPprojekt system [6], [14]. A set of software indispensable for the correct operation of the system aiding the work of distributed designing office included the following installations:

- Operation system - Linux PLD 1.0,
- WWW Server - Apache 1.3.27,
- Interpreter of a script language PHP4 - Interpreter PHP 4.2.3-10,
- Data base - MySQL 3.23.58,
- Mail server - Sendmail version 8.12.10,config V10/Berkeley,
- FTP Server - module proftpd-standalone-1.2.5-5,
- Auxiliary application for distance group work - PHPprojekt version 4.1.2.

Specification of system operation aiding the distributed designing office where it is planned to imple-

ment forms of designs' management for the subject Computer Aided Designing - CAD and Students' Scientific Association, requires adjusting PHPProjekt applications to earlier assumptions by means of the following steps:

- Adoption of user's interface for the specification of the implemented subject,
- Addition of FAQ module (by means of ready made script)
- Deleting tab modules which are not connected with the context of the classes
- Adding the module which stores visualization software installation files and thus enables visualization of designing documentation

Additionally for administrative purposes of a server Webmin 1.140 [15] software has been used.

The whole set has been installed and launched on a computer of archaic architecture: hard disc 1 GB, Pentium 150 MHz processor and operation memory 64 MB.

In spite of so little power of the computer the system works and is currently being tested for a small designing groups. In the future however, it should be transferred to other platform especially for implementing designing works for a greater number of designers (students) and requiring greater capacity of a computer and discs resources.

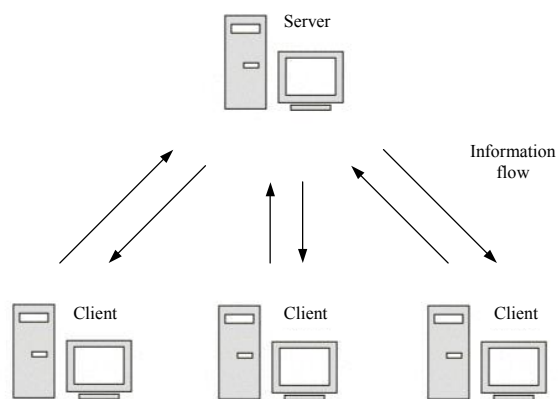


Fig.1. Framework of designing system architecture

The framework of a system aiding distributed designing office is presented on Fig. 1 which is a typical example of a net architecture of 'client-server' type. The role of a client is played by a user who uses only the Internet browser which gives the access to all the possible system resources e.g. files, news of the e-mail stored on the server, where all the software necessary for the correct operation of the system have been installed. The accepted way of documentation storage allows data collection in files system (in one catalogue) limiting the information sent to the data base to a name and short description. The only exceptions here are the files stored on an anonymous FTP server.

The elaborated Internet/intranet system allows implementation of methods of distance learning of Computer Aided Designing - CAD. The users can use the above mentioned system during the classes, studying both synchronically and asynchronously, and making use of the existing mechanisms of communication and group work which facilitate the teaching process.

Moreover, application of the method of distance learning allowed carrying classes in a manner of virtual class which is characterized by high efficiency and quality of the classes as well as independence from location of particular members of a given designing group.

Authorization process which is accomplished at the beginning of the system allows carrying verification of people who want to get access to data made available in the distributed designing office. System interface is based on a form of multitab window. 'Calendar' pane presented on Fig. 2 plays the informative role about the planning of the deadline and it is available for all the users.

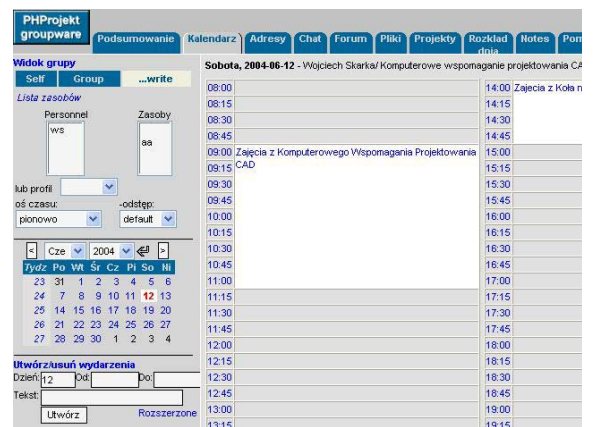


Fig.2. Agenda presenting an exemplary schedule

In the tab 'Tasks', presented on Fig.3, there are guidelines for a particular tasks which are individually assigned for every user or a designing group. They have been prepared by a person supervising the project.

Tytuł	Data	Termin	Status	progress	P. K
Wykonać projekt manipulatora	2004-06-12	2004-06-12	accepted	0%	0
Wykonać referat dotyczący cieniowania Phonga	2004-06-12	2004-06-12	oczekujący	0%	5
Opracować koncepcje sprzęgła sztywnego	2004-06-12	2004-06-12	oczekujący	0%	9

Fig.3. Tasks to perform

Designing data which is made available within the system is placed in the tab 'Files' presented on Fig. 4. The possibilities of giving suitable authorization to particular files allow effective information exchange (teaching materials) between selected students who are engaged in the designing process. The files can be stored as references to other pages

or documents stored in catalogues generated by a user.

Nazwa	Data	Byte	Kategoria
[-] CATIA projekty	2004-06-12 14:57	D	
szablon dla elaboratu01.zip	2004-06-12 14:50	5,13 k	
[-] Odnosniki do stron internetowych	2004-06-12 15:42	D	
Informacje na temat publikacji CAD	2004-06-12 15:44	L	
Kursy CAD	2004-06-12 15:47	L	
magazyn 3D	2004-06-12 15:49	L	
[-] Pliki CATIA	2004-06-12 15:03	D	
Lab4a.zip	2004-06-12 15:03	6,41 M	
[-] przycisk.zip	2004-06-12 14:53	1,05 M	
[-] Prywatne materiały	2004-06-12 15:40	D	
[-] Przykładowe projekty CAD	2004-06-12 15:48	D	
Instrukcja 1.doc	2004-06-12 15:16	35,53 k	

Razem: 12 obiekty, 7 M Byte

Fig.4. Files' management tab

Synchronic and asynchronous communication mechanisms available in the system form the base of classes operation in a distributed group of students and at the same time they allow carrying on-line lectures or talks with a supervisor as well as other members of particular designing groups. Moreover, there are also other communication mechanisms available such as: forum, help panel and FAQ.

3. CONCLUSIONS

Despite the fact that commercial systems which support collaborative work in designing process prevail, the noncommercial tools seem to form an interesting alternative. The set of tools presented in the paper allows effective management of projects and in some cases the features of the presented environment are comparable with commercial programs. The environment can be easily adopted to specific requirements and it is based on tested and common information technologies. Currently, the environment is being tested and it is planned to be used for project management within the operation of CAD students' scientific association and designing classes on computer aided designing. It will be possible to carry more complex project mutually by students and further on, to carry designing works in any place, at the same time being one of the elements of distance learning. It is also probable to cooperate in students' projects at university or between universities. The suggested environment can be also used to form professional virtual companies of designing character. Integration of possibilities of sharing designing knowledge in the system would improve the system functionality greatly [7], [8].

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