International Journal of Academic Information Systems Research (IJAISR)
ISSN: 2643-9026
Vol. 7 Issue 1, January - 2023, Pages: 11-17

Overview: PHP and MySQL Features for Creating Modern Web Projects

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Abstract: *In this paper, overview of PHP and MySQL features for creating modern Web-projects is carried out. The issues of PHP wide distribution are considered. If we generalize, popularity of PHP lies in its economy, scalability, simplicity, compatibility. A review of PHP programming popular areas implementation is carried out. Also in work are considered three top PHP frameworks. The paper discusses in detail mechanisms of processes of users authentication and personalization, since this is important and relevant for modern commercial Web-projects. The properties of PHP are analyzed.*

Keywords—overview; PHP; MySQL; Web-project; framework

1. INTRODUCTION

To date, Internet is integral part of human life, because functioning of modern both organizational and organizational-technical objects that are used in various spheres of human activity lead to increase in information [1], [2]. In this case, various methods and algorithms can be used [3]-[14]. Since it is possible to create Web application in almost any field, therefore, every year number of resources with constantly updated information in different areas is growing in avalanche [15], [16].

There are number of programming languages and technologies for Web-development, which is updated annually, while some developments are released under brand of technical corporations, and there are those that are created for experimental purposes.

For Web development, both client-side and server-side,following languages exist: CSS/HTML, PHP, SQL, JavaScript, Perl, Python, Ruby.

The most widely used are CSS/HTML and JavaScript, although there are group of Web programmers who prefer PHP programming language without paying attention to its many competitors.

The process of creating Web projects usually consists of two stages: Web design and Web programming, although there is no clear boundary between them.

When developing Web-projects, such feature as static or dynamic project is taken into account [17], [18].

A static project is unchanged for all users visiting it. Pages on static Web site remain unchanged despite any clicks or further navigation that user performs.

Dynamic project – can be changed for each user who visits it. Such Web-project is more responsive to actions of user. This is more functional Web site that becomes even more interactive depending on user and what he needs from Web site.

For dynamic Web projects, MySQL is actively used.

MySQL is widely used database management system (DBMS), which is used in online environment.

Without databases, writing logic of Web project and saving user data is impossible, so topic is relevant, and use of PHP to create dynamic projects is supported by most hosting providers since it is one of most popular tools.

2. RELATED WORK

Currently, PHP is supported by vast majority of hosting providers, which makes it almost main language with which you can develop any Web project, therefore, there is lot of work in this area.

Online guiding framework based on multimedia and PHP under influence of new Coronavirus is studied in [19]. The authors proposed efficient model designed to evaluate performance, and fuzzy clustering with mining analytics platform is jointly proposed for analysis.

The use of PHP and MySQL in education is discussed in [20]. The authors reviewed process of developing and deploying student forums using PHP and MySQL technologies. The forum uses Web-technologies and allows you to access messages in same way as on Web page – by clicking on hyperlink.

Application of PHP and MySQL in field of catering in [21]. Information system, which is created on basis of PHP and CSS, MySQL as connection to database [21]. Information system for Sat Nusapersada, which is food supplier. It is business management information system in PT canteen. Sat Nusapersada on Web site using waterfall SDLC method, which aims to assist employees in ordering food, is one of goals in creating this system.

Application of PHP and MySQL in field of business [22]. The result of study is e-commerce website that was designed to be used to improve business processes managed by Givaro Petshop.

The application of PHP and MySQL in field of medicine [23], which describes Web-visualization of medical data and exchange of information for use in distributed diagnostics. Web visualization is implemented thanks to networked collaborative software platform. By imaging, authors mean displaying medical data in high quality and in real time in modern Web browsers via Internet and interactively examining medical data. The Apache HTTP Web server, MySQL database, HTML5 and PHP server scripting language were used to develop software platform.

Thus, PHP is quite relevant in any sphere of human life, as evidenced by works aimed at study of language.

In [24] approach to detecting vulnerabilities in PHP source code. Such study takes place using hybrid technique that combines closed recurrence units and graph convolutional networks to detect SQLi, XSS and OSCI.

Vulnerabilities that use both syntactic and semantic information.

Evolution of Web and developing Web application; Web application frameworks in [25].

3. Brief Analysis of PHP Features

The most popular and time-tested languages for creating Web-projects: HTML / CSS, JavaScript, Python, PHP.

PHP is simple language that has huge capabilities and is constantly evolving.

One of languages for developing Web-projects is PHP, which is scripting programming language [17].

PHP has become widespread because:

- It is compatible with all major operating systems;

- high processing speed;

- support at any time,

- Easy to edit/add/delete according to need;

- Distribution of the output code with its license.

Often, frameworks are often used to write original program code more efficiently and quickly, since Web applications have a complex structure.

Frameworks facilitate scalability and long-term maintenance while adhering to development standards and keeping code organized.

One of most powerful PHP frameworks with small size is CodeIgniter, which is designed for those who have simple but elegant toolkit for creating full-featured various Web projects. Let's analyze this framework (Table 1).

Table 1: Advantages and disadvantages of PHP framework CodeIgniter

Name	*Advantages*	*Disadvantages*
CodeIgniter	- open source; - simple interface; - does not require large amount of resources; - page generation speed; - has no restrictive coding rules; - high performance of framework; - large number of standard libraries and classes; - it requires zero configuration for users to start with; - is free.	- weak caching system; - no registry pattern; - there is no emphasis on code support; - components are loaded and procedures are performed only on demand, not globally.

CodeIgniter is in demand because of its convenience and speed. CodeIgniter has built-in caching system. Uses MVC controller approach [26], [27].

Next, consider CakePHP – framework is one of most preferred frameworks by developers as it is characterized by simplicity of testing and debugging any application after its development, which helps in identifying errors and fixing them. CakePHP can be used by small and enterprise enterprises to create Web projects (Table 2).

Table 2: Advantages and disadvantages of PHP framework CakePHP

Name	*Advantages*	*Disadvantages*
CakePH	- open source; - simple interface; - high compatibility; - free use for development; - minimization of project assembly time from scratch; - has simple caching operations; - no pre-configuration is required;	- one-way routing compared to other frameworks; - there are difficulties in development and implementation; - document support for Cake PHP is not that supportive; - need to update default routes in

	- it requires zero configuration for users to start with; - is free.	CakePHP, which is complex task in PHP.

CakePHP is in demand because of its speed and also helps to separate business logic from data layer and presentation layer. CakePH supports MVC model [27], [28].

Another popular framework is Symfony. This framework was chosen for analysis because it has already been considered with small size, and now symfony consists of set of reusable PHP components and codes that are mainly used for large-scale Web projects. Often developers choose it. Symfony, as well as above systems are distinguished by reliability and simplification of processes at high level. Symfony has established itself as foundation for Web services. It contains reusable PHP libraries and components. Symfony greatly simplifies integration with JS frameworks, which is also significant in development. Symfon supports significant number of databases: Oracle, Microsoft SQL Server, My SQL, etc.

Let's analyze this framework (Table 3).

Table 3: Advantages and disadvantages of PHP framework Symfony

Name	***Advantages***	***Disadvantages***
Symfony	- open source; - flexible routing of URIs; - opportunities for scaling and expanding functionality; - high flexibility of adjustment; - high performance of framework; - allows you to use many plugins for any additional task; - Symfony uses its own Doctrine; - availability of integration with most services and CMS; - is free.	- parsing files is very difficult to handle; - bit complicated security mechanism; - somewhat difficult to learn compared to other frameworks; - documentation sometimes lacks explanation, especially when it comes to package outline of its creators.

So, Symfony is often used to develop large-scale Web applications, not small-scale ones. Symfony as well as two frameworks discussed above work with good old Model-View-Controller [29], [30].

Implementing and learning PHP is always bit of chore.

The PHP language is used to create such projects as: Digg, Facebook, Flickr, Wikipedia, WordPress, Yahoo and YouTube (Fig. 1), which are world-famous and have long been stably used in life of modern society, so PHP language is considered one of advanced languages for Web-programming.

Open access is most attractive feature of PHP for developers.

PHP can also be considered in terms of applications:

- social networks (for example, Digg, Facebook);

- Ecommerce (for example, Etsy, OpenCart, Magento, Prestashop);

- Blog, CMS (for example, Tumblr, WordPress);

- Others – this group includes information directories (such as Wikipedia), search engines (Baidu, Yahoo); Fotolia, Canva, etc.

Figure 1: Examples of projects implemented on basis of PHP

In Fig. 2 lists applications of PHP.

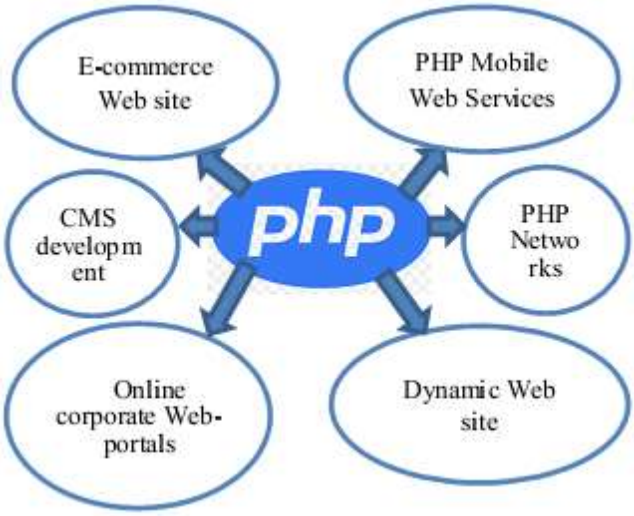

Figure 2: PHP Applications

Let's analyze some of PHP language properties (Table 4).

Table 4: PHP Language Properties

Properties	***PHP***
Open Source	+
Cross-platform	+ (Windows, Unix and Linux, MacOS)
Scalability	Good
Hosting	It is supported by almost all hosters. As rule, hosting service packages provide PHP support at no additional cost.
Addition to other languages	+
HTML Integration	Simple
MySQL support	Native
Web Services Support	Integrated
Server Support	+ (including Apache, Microsoft IIS, Netshkape, Iplanet, Caudium, Sieves and Tornadoes)
Database support	+ Oracle, MySQL, MongoDB, PostgreSQL

Sometimes PHP is called hypertext preprocessor when there is direct interaction of PHP with standard markup language of HTML Web projects.

PHP supports MySQL, Oracle and MS Access.

Thus, language is quite convenient for client.

4. Features of MySQL

Development of Web-projects includes:

- Frontend development – external interface part is created in programming languages HTML, CSS, JavaScript, Ajax.

- Backend development – creation of internal part, that is, invisible to client structure (database, server, business logic).

There is not single serious Web project that would not use database, although there are always exceptions – advertising or information pages. Such Web-projects do not provide for performance of any actions on part of user, except for familiarization with product.

There are cases when interaction with users is necessary, for example, during creation of online store, here connection of database is main stage, since without it writing logic of site and saving user data is impossible.

To create database, there are database management systems (DBMS), and there are many of them, as well as programming languages.

In this study, MySQL is chosen because it is quite popular among most Web programmers. Such popularity is due to fact that MySQL allows you to conveniently and quickly search for necessary records and implement data manipulation: add and delete data, sort, in addition, provides simple and reliable security system while providing free license (Fig. 3).

MySQL Database Server is multi-platform open source database platform.

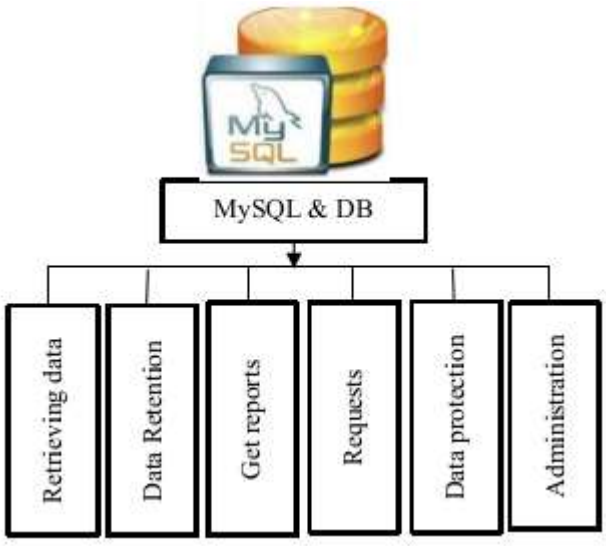

Figure 3: Basic MySQL Functions

The well-known Facebook, Yahoo, YouTube, and many other large Web sites also use MySQL to store data.

A combination of PHP and MySQL tools is quite effective. For example, you can solve issues of identifying Web user,

since information that browser can provide is simply not enough.

Therefore, process of user identification is authentication. The primary purpose of authentication is to allow or deny access to certain resources.

Example of user authentication (login) and password. Authentication can also be used for another purpose, for example, for personalization – that is, if it is desirable to know real name of visitor, email addresses, phone number, etc. The authentication process includes following steps:

1. If user seeks to get to closed parts of site, he sees form with an offer to enter login and password.

2. The form is sent, and received data is compared with real login and password of existing (registered) user.

3. If these data coincide, it is considered that user is authenticated and accesses previously closed part of site.

4. When page is reopened, user is not obliged to re-enter password if he has done so earlier during this session.

5. Saving personal data of users is implemented by creating databases by means of MySQL.

After registration and authentication of user, it will be possible to track interests of users and display recommended content for them (personalization) [31], [32].

The study found that there are many ways to personalize content. This aspect depends on policy of Web projects. One of most common is principle of "similarity of interests". The essence of method is to find other users who viewed same page as this user, and invites latter to visit rest of pages viewed by these users. The implementation of this method is possible thanks to use of queries and MySQL, during which users with similar interests are identified.

As another example of using database, let's briefly consider method that is based on experience of past purchases – user is offered items (product names) with similar theme. The latter can also be implemented using database that will contain corresponding tables with products and their categories.

So, two methods considered often correlate with each other and are found everywhere on Web.

Consider reason for use of databases in e-business, for example, for online stores, in addition to ways to offer their goods, there is need to implement interactive mechanism for placing order. In Web programming, such mechanism is called "shopping cart". The essence of mechanism is possibility of adding individual items during revision of catalog, after which buyer pays store using certain payment system.

If we consider process of implementing "basket of buyers", then following elements are necessary:

1. Database of products that will be sold in online store.

2. Interactive catalog of products by categories.

3. Shopping cart, which allows you to track goods that buyer is going to buy.

4. A settlement scenario that processes payment and delivery items.

5. Administration interface, which allows you to edit catalog (Fig. 4).

One example of using PHP and MySQL is process of developing PHP and MySQL-based mailing list manager. Here system allows administrator to create several mailing lists and send newsletters separately. Users will also be able to subscribe to any mailing lists that are offered by Web applications.

After analyzing development process, let's highlight that to create mailing list manager, you need:

- have ready base of subscribers to Web-site;

- create database of lists and newsletters;

- implement sending messages to e-mails using HTML-classes. In this case, database for this mechanism should store following information:

- lists that are available for mailing;

- users of system and their preferences;

- record lists to which users have subscribed;

- record about sent letters to e-mail;

- images, as it is necessary to be able to send letters that consist of several files: text, HTML-code and set of images [33].

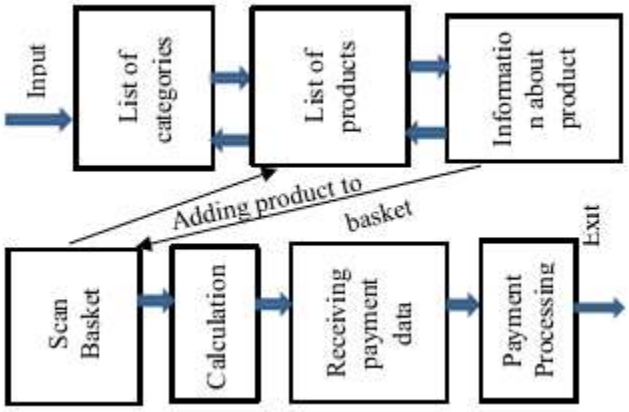

Figure 4: Logic of electronic basket on part of user

The bulk of such project is stored in single index.php file, to which additional files are attached, in which additional functions are attached, that database.

An open source software environment, PHP (personal homepage), scripting language and MySQL database offer

alternative, efficient and cost-effective solution for creating data-driven, dynamic and personalized Web applications [20].

5. Conclusion

In this paper, overview of PHP and MySQL features for creating modern Web-projects is carried out. The issues of wide distribution of PHP are considered, it is determined that due to dynamic nature of PHP, changes can be implemented at any stage of development without loss of time, which is relevant today.

If we generalize, popularity of PHP lies in its economy, scalability, simplicity, compatibility.

A review of popular areas of PHP programming implementation was conducted – start-ups, advertising and media agencies, as well as small software development companies.

The paper also considers three top PHP frameworks: PHP frameworks with small size – CodeIgniter and CakePHP, as well as Symfony, which is often used for development as large-scale Web applications. It has been determined that modern Web-frameworks advertise yak MVC-frameworks. Their common features include: open source, simple interface and free.

As result of study, it was determined that PHP programming language is powerful tool for implementing any complex Web project.

PHP has not lost its popularity and at same time MySQL database management system allows you to create flexible and deep system for working with user data.

The paper discusses in detail mechanisms of processes of users authentication and personalization, since this is important and relevant for modern commercial Web-projects.

Also, examples of modern technologies of Web-projects interactivity were studied, as well as logic of their work, basic requirements for their creation and development aspects that are characteristic of PHP programming language were considered. The properties of PHP and basic functions of MySQL are analyzed.

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