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Research Article

Ntelligent Software Engineering System Analysis and Design

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Abstract

Intelligent software engineering is a new development direction in software engineering. With the continuous exploration in the field of intelligent software engineering, many enterprises need to develop a learning system for intelligent software engineering to meet the needs of knowledge learning, communication, and assessment in this new field of intelligent software engineering. This paper combines the learning system with the Internet, develops the intelligent software engineering learning system by using the web page development technology of the Internet and cooperating with the relevant learning materials of intelligent software engineering, and goes deep into the actual needs of enterprise users. This system includes four major modules: information management, data management, exam management, and forum management. The system realizes the orderly and long-term preservation of various information and materials in intelligent software engineering; Learners can use this system to learn intelligent software engineering knowledge and share experiences anytime and anywhere, and management can also use this system to manage the learning progress and content of employees. The developed system can enhance the convenience and timeliness of enterprise employees in learning knowledge related to intelligent software engineering, and provide a communication and assessment system, thereby meeting the needs of enterprise employees in the field of intelligent software engineering learning, communication and assessment.

Keywords

Intelligent Software Engineering, Knowledge Management, Online Learning System

1. Introduction

With the continuous exploration of the field of software engineering, various interdisciplinary fields have emerged one after another [1, 2]. At the same time, as artificial intelligence continues to be deeply applied in various fields, it has also been applied in software engineering development processes such as testing and security protection. The interdisciplinary intelligent software engineering generated by artificial intelligence and software engineering has gradually become a focus of attention. With the continuous application of intelligent software engineering in the field of software development, Internet companies have gradually attached importance to the learning of employees in intelligent software engineering, and realizing an online learning platform for knowledge related to intelligent software engineering has also become a very valuable research topic [3, 4].

At present, with the continuous application and promotion of online learning in China, many online learning platforms have emerged on the Internet, and Internet companies are also

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developing their own online learning platforms, so there are certain experiences and precedents to follow in the involvement of online learning systems [5]. For example, the currently commonly used mooc and spoc platforms in colleges and universities use web-based online learning systems, which can provide users with three-dimensional teaching materials through the Internet and meet differentiated learning needs [6]. The main principle is an identity based online learning system that can provide different services according to the different identities of logged in users, facilitating the management of learning status, and utilizing online resources to provide diverse learning choices. In addition, the system can directly set up the exam process through the backend to guide users to continuously learn and consolidate their knowledge [7].

From the perspective of online learning system administrators, the system can provide an overview of learners' learning status and exam progress, and provides a one-stop operation portal for learning resource management. Administrators only need a website to complete the traditional teaching, viewing, and grading processes required [8, 9].

From the perspective of learners in online learning systems, the system can provide users with 24-hour uninterrupted learning services available anywhere, allowing them to view and download learning materials anytime, anywhere. In addition, the system provides one-stop functions such as exams, information queries, and communication on the website, making it convenient for users to have a learning experience [10, 11].

However, due to the large amount of data support involved in online learning systems, although their principles and manifestations are very similar, they cannot be interconnected. Moreover, specific analysis of requirements is required for different usage scenarios [12, 13]. Therefore, this article will analyze the actual usage situation required by the company to cultivate employees, and analyze specific needs from multiple aspects, so that the system can meet its practical use and provide a solid foundation for the sustainable development of the project [14].

The main content of this article is the design and implementation of an intelligent software engineering learning system based on web development. By collecting learning materials related to intelligent software engineering and drawing on the functional design and development of existing online learning systems, we can find the most suitable functional and module design for the company's employee training needs, in order to achieve simple operational goals for all needs.

2. Related Theories and Technical Support

This chapter provides a detailed description of the theories, architecture, techniques, and methods used in this development, in order to introduce the basic technical solutions and construction structure of the project.

2.1. Intelligent Software Engineering

Intelligent software engineering mainly covers two aspects: software engineering empowered by artificial intelligence and software engineering oriented towards artificial intelligence. On the one hand, the rapid development of artificial intelligence represented by deep learning has provided new methods, technologies, and tools for software engineering research, significantly improving the ability to solve traditional software engineering tasks. The software engineering empowered by artificial intelligence generally refers to the application of new artificial intelligence technologies such as evolutionary computing, machine learning, and deep learning to the field of software engineering, solving various typical software engineering tasks around the entire software lifecycle, in order to improve software quality and development efficiency. On the other hand, new software based on artificial intelligence, represented by robots, autonomous driving, drones, facial recognition, etc., has distinct characteristics such as environmental perception, self-learning, non determinism, and swarm intelligence. Traditional software engineering methods and technologies are difficult to directly apply to these new types of software. Software engineering for artificial intelligence mainly studies how to solve a large number of new software engineering tasks that arise during the requirements, design, development, testing, and maintenance stages of this new type of software.

2.2. Online Learning System

Online learning system is a tool that adheres to the principles of simplicity, applicability, and efficiency, and implements a universal, standardized, intelligent, and user-friendly product design concept. It can help enterprises form a learning organization and efficiently and orderly manage employee training. At the same time, it can provide a common learning platform for all employees of the enterprise, which helps to unify the management of their knowledge, concepts, skills, and behaviors, thereby improving overall work efficiency.

2.3. Gin Backend Framework

Gin is a web framework developed in the Go language and is currently one of the popular Go language web frameworks. It runs fast, can perform routing and grouping, supports middleware and JSON verification functions, and has an elegant error handling mechanism, which not only improves program performance but also greatly shortens program development time.

2.4. Vue+ElementUI Front-End Framework

Vue.js is a progressive framework used to build user interfaces. Unlike other large frameworks, Vue is designed to be

applied layer by layer from bottom to top. The Vue core library only focuses on the visualization layer, which is convenient to use and easy to integrate with third-party libraries or existing projects.

ElementUI is a user interface framework designed for Vue, which provides almost all available components for developing front-end interfaces. It does not rely on Vue and is currently a good UI framework for project development in collaboration with Vue. ElementUI follows the language and concepts that users are accustomed to, and all elements and structures need to be consistent with real-life processes and logic, such as design styles, icons and text, element positions, etc. By using interface styles and interactive animation effects, users can clearly perceive their operations, and designing a simple and intuitive operation process allows users to operate freely.

2.5. MySQL Database

MySQL is an open-source relational database system widely used in web development, characterized by reliability, efficiency, and ease of use. It has fast speed, low resource utilization, strong flexibility, and high security, so MySQL is often used as database support in website construction.

2.6. Go Programming Language

The Go language was developed by Robert Griesemer, Rob Pike, and Ken Thompson in 2007 and released in 2009 as a statically strongly typed compiled language. It not only provides direct access to the underlying operating system, but also provides powerful support for network programming and concurrent programming, with various purposes such as network programming, system programming, concurrent programming, distributed programming, etc. Go language is a modification and upgrade of traditional C-like languages, inheriting the performance and security of C language, and has a development speed similar to dynamic languages such as Python. It is also a hybrid language.

3. Requirements Analysis of Intelligent Software Engineering Learning System

The functional requirements of this system are based on existing requirement descriptions and potential information mining such as preliminary interviews, summarizing and summarizing all standardized operational processes and detailed content in the normal learning process. According to the actual identity of the user in the company and the different roles they play on the website, five identities corresponding to different access and operation abilities have been set in the system: super administrator, learning administrator, forum administrator, administrator, and ordinary user. Ordinary users can access interfaces such as data downloads, forum discussions, and exam assessments by accessing web pages, in order to obtain further corresponding services; Administrators, as both employees and managers, can query the personal information and exam results of ordinary users on the basis of their permissions, in order to facilitate the management of their learning situation; Super administrators are responsible for managing the user section, can manage the personal information of other roles, and can appoint and dismiss various administrators; Learning administrators can manage materials and exams, facilitating the management of learning content; Forum administrators can manage user forum discussions to maintain a good forum environment.

3.1. Information Management Function

The personal information management function mainly includes the user's personal information and account content management operations, in order to complete the user's personalized data recording operation, display the differences between users, and provide basic data support for subsequent social functions such as forums. The super administrator role in this module has the authority to manage all user information, and also has the authority to appoint and dismiss various administrators. The specific function points are introduced as follows:

Super administrator users can only log in by entering the set account and its corresponding password in the login box of the user management interface through the website, and cannot create users themselves. Ordinary users and administrators can register accounts based on employee identity information, and after approval by the super administrator, they can have registered accounts. When you have a registered account, you can log in by entering your username and password and use the corresponding follow-up services provided by the system.

A user profile table is formed based on the employee information provided during registration. After logging in, users can view and modify existing information on the user information page. In addition, administrators can query the personal information of existing ordinary users, and super administrators can also modify the user information of existing users in the user information editing module, or set user permissions to be certain administrators.

3.2. Data Management Function

The data management function module aims to provide users with relevant information on intelligent software engineering. The module is responsible for all new upload, maintenance, and modification operations by the learning administrator. This major feature includes the information management function for learning administrators and the information viewing and downloading function for ordinary users.

3.3. Forum Management Function

The forum management module provides users with a platform to publish personal articles or questions, and also supports comment exchange operations between different users, thus building an open and transparent online communication platform for users. Users can share their problems or experiences in knowledge learning or exams to achieve mutual assistance; In addition, forum administrators can manage posts in the forum to prevent posts with inappropriate content from remaining for a long time. The specific functions are summarized and introduced as follows:

Logged in users can post their personal posts in the forum section and edit their viewpoints and content in the posts. At the same time, users can delete their published posts. Forum administrators can also post posts with administrator privileges, and these types of posts will not be operated by other forum administrators. In the post list interface, users can enter keywords in the search box to perform a fuzzy search and return the relevant post list.

Users can post their own comments or reply to others' comments at the bottom of the page while viewing the details of the post. They cannot modify or delete comments.

Forum administrators can view all published posts in the forum, including deleted posts, on the system forum management page. Forum administrators can delete or revoke posts published with normal user privileges, or restore deleted posts with administrator privileges.

3.4. Exam Management Function

The functional module aims to provide users with corresponding intelligent software engineering knowledge exams, in order to provide enterprises with standards and data support for evaluating employee learning progress. This function includes the exam management function for learning administrators and the exam participation function for ordinary users. Administrators can also view the exam results of ordinary users. After logging in, users can experience complete functional operations on the exam page of the system.

The online exam function is the main function of the exam module. Provide complete test paper content and answering function for logged in ordinary users in this function. Users can complete the exam process at the end of the time or by clicking submit.

The purpose of the view exam results function is to allow users to view exam scores after completing the exam, and to allow users who do not meet the score to retake the exam after learning. Administrators can query the results of existing users by exam or by user, making it convenient to collect and analyze the learning situation of employees.

The exam management function is a system control function open to learning administrators. Learning administrators can add, delete, modify, and check information such as content, answers, time, and description of existing exams in the exam management interface; In addition, the learning administrator can also add or delete exams. The edited exam will be synchronized to the exam list, and all users can view and participate.

The search exam function is attached to the exam list interface, allowing ordinary users and administrators to perform fuzzy searches through exam names. Ordinary users can also classify searches based on exam completion status, thereby achieving targeted search operations for users and administrators.

4. Design of Functional Modules for Intelligent Software Engineering Learning System

Design the functional structure module implementation for the intelligent software engineering learning system based on the requirements analysis. Based on the previous analysis of system requirements, this system is divided into five major roles and four major modules: super administrator, learning administrator, forum administrator, administrator, and ordinary user.

4.1. Information Management Module Design

The homepage function of the information management module is responsible for the overall management of all data information of users and websites. This module will include the part of user managing self information data and the part of super administrator managing all user information in the website. This module involves frequent interaction with the database, mainly utilizing the process of reading database information, organizing and transmitting it to the front-end display by the backend system, and synchronizing it to the database after the user makes changes. This module involves two major parts: the login registration submodule and the user information management submodule.

4.2. Design of Data Management Module

The data management module system manages and operates all stored data in the authentication system at a unified file system level. File information is divided into two categories in the system: public information and non-public information. Super administrators can perform corresponding operations such as adding, deleting, modifying, and querying all data, and have the highest authority. But ordinary users can only search and view, and are only allowed to download public information content. This module designs permission detection and file read operation. This module involves two main parts: "data backend management" for learning administrators and "user data download" for other users.

4.3. Forum Management Module Design

The forum management module provides users with an open communication platform, enabling them to share, leave messages, and other functions. Any user in this module can upload new posts or comments and like their favorite content. Ordinary users can only delete their own posts; Forum administrators can delete or undelete any posts posted by ordinary users. This module also uses the system permission management function.

4.4. Design of Exam Management Module

The exam management module provides users with online exam functions. Users can choose the corresponding exam paper and answer it within the specified time. The system will calculate the results and display them to the user on the results page. The learning administrator has the authority to edit test papers, edit test questions, etc. in the system, and can publish or modify test paper content.

5. Conclusion

This paper combines the learning system with the Internet, develops the intelligent software engineering learning system by using the web page development technology of the Internet and cooperating with the relevant learning materials of intelligent software engineering, and goes deep into the actual needs of enterprise users. This system includes four major modules: information management, data management, exam management, and forum management. The system realizes the orderly and long-term preservation of various information and materials in intelligent software engineering; Enterprise employees can use this system to learn engineering certification knowledge and share experiences anytime and anywhere, and management can also use this system to manage employee learning progress and content.

The developed system can enhance the convenience and timeliness of enterprise employees in learning knowledge related to intelligent software engineering, and provide a communication and assessment system, thereby meeting the needs of enterprise employees in the field of intelligent software engineering learning, communication and assessment.

In the future, the system needs to make necessary dynamic improvement according to the changing complexity of knowledge in order to better adapt to the needs of competition.

Abbreviations

UI User Interface

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Conflicts of Interest

There is no conflict of interest.

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