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EDITORIAL PREFACE

This is *Third* Issue of Volume *Five* of International Journal of Human Computer Interaction (IJHCI). IJHCI is an International refereed journal for publication of current research in Human Computer Interaction. Publications of IJHCI are beneficial for researchers, academics, scholars, advanced students, practitioners, and those seeking an update on current experience, state of the art research theories and future prospects in relation to applied science. Some important topics covers by IJHCI are affective computing, agent models co-ordination and communication, computer mediated communication, innovative interaction techniques and user interface prototyping for interactive systems etc.

The initial efforts helped to shape the editorial policy and to sharpen the focus of the journal. Started with Volume 5, 2014, IJHCI appears with more focused issues related to human computer interaction studies. Besides normal publications, IJHCI intend to organized special issues on more focused topics. Each special issue will have a designated editor (editors) – either member of the editorial board or another recognized specialist in the respective field.

This journal publishes new dissertations and state of the art research to target its readership that not only includes researchers, industrialists and scientist but also advanced students and practitioners. IJHCI seeks to promote and disseminate knowledge in the applied sciences, natural and social sciences industrial research materials science and technology, energy technology and society including impacts on the environment, climate, security, and economy, environmental sciences, physics of the games, creativity and new product development, professional ethics, hydrology and water resources, wind energy.

IJHCI editors understand that how much it is important for authors and researchers to have their work published with a minimum delay after submission of their papers. They also strongly believe that the direct communication between the editors and authors are important for the welfare, quality and wellbeing of the Journal and its readers. Therefore, all activities from paper submission to paper publication are controlled through electronic systems that include electronic submission, editorial panel and review system that ensures rapid decision with least delays in the publication processes.

To build its international reputation, we are disseminating the publication information through Google Books, Google Scholar, Directory of Open Access Journals (DOAJ), Open J Gate, ScientificCommons, Docstoc, Scribd, CiteSeerX and many more. Our International Editors are working on establishing ISI listing and a good impact factor for IJHCI. We would like to remind you that the success of our journal depends directly on the number of quality articles submitted for review. Accordingly, we would like to request your participation by submitting quality manuscripts for review and encouraging your colleagues to submit quality manuscripts for review. One of the great benefits we can provide to our prospective authors is the mentoring nature of our review process. IJHCI provides authors with high quality, helpful reviews that are shaped to assist authors in improving their manuscripts.

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Abstract

In recent years, some personal assistant systems have appeared in our daily life. They provided some services such as account management, curriculum management, diary management, financing management and so on. This study presents a design and implementation of a personal assistant system platform especially for students and employee to help to manage their learning, life and work better. One of the highlights of this system has an instant chatting system except for the above functions. This paper indicates not only some beneficial interactive functions but also presented detailed ideas of information system analysis, design, and test. It has a friendly interactive interface and a good manageable system, and experimental studies of these functions are proved to be reliable, efficient, and acceptable for users when applied to learning and working environments.

Keywords: Personal Assistant System, Instant Messaging, Human Computer Interaction.

1. INTRODUCTION

With the development of internet, people's learning and working rely on the network more and more. However, according to our investigation, we are sometimes too busy with daily small things to balance well between learning and working because we are lack of effective plan and management. So it is necessary to design a personal assistant system to support our learning and working with its instantaneity, speed, effectiveness and low cost.

Recently, as an interactive robot application and service platform, many personal robots have been developed by some labs or companies, such as VerBot, Xiao I robot, MSN robot, Chat robot etc. These robots are just like a real assistant, and can also query courses, schedules, maps, stocks, weather, television programs and other information.

At present, personal assistant systems have got new application with the promotion of instant messaging technology. Instant messaging (IM) is a communication technology, which allows a

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user to find out who is online and available to receive messages. Nardi et al. pointed out that IM can allow collaboration, scheduling, impromptu meeting and contact with friends and family(B. A. Nardi, S. Whittaker, E. Bradner, 2000). MSN robot is a friendly assistant robot with IM that provides novel user experience and practical network service for people basing on the research, development and application of artificial intelligence. For example, Xiao I Robot from Yingsi Software has integrated with the MSN, QQ, and Yahoo Messenger. It has become one of the most popular IM platforms. It has 10 million users and covers 100 countries. Now the company has developed other applications, such as Xiao I Chat, Xiao I Map, Xiao I Weather, Xiao I Q&A.

In our research, we first studied the IM protocol, and used its landing principles and message sending principles to design and achieve an IM client. The client can login a number of accounts at the same time in one computer, and start chatting with different friends. Then we studied the operation principle and designed the chat robot system based on the client.

At the same time, in order to develop a convenient personal assistant tool for people's learning and working, we also studied the application of personal assistant software, instant messaging software and personal robots. At last, we made some investigation in our university and decided to develop a personal assistant system to help students manage their courses, homework, review plan, research subjects, campus activities and board wages. In addition, we also study the impact on interaction effect for students by providing chatting functions. For future work, we hope to develop a personal assistant system with more interactive and visual functions.

2. DEMAND ANALYSIS AND SYSTEM DEVELOPMENT

In our university, we made many investigations about the students' problems and requirements. We investigated the conditions and request of students, and learnt that many students often meet with the problems such as financing management, study plan, time management etc., which are as follows:

Main Problems	Demand Analysis
Financial chaos, no financial concept	Personal management tool is in need
Chaotic diary and logs	Personal diary tool is in need
Diffused and forgettable curriculum time	Effective curriculum reminder tool is in need

TABLE 1: The Demand Analysis.

At the same time, we researched other personal assistant systems. The analysis results about them are as follows:

- Main functions: cash management, bank account management, diary management, schedule management and assets management.

- Classification based on two classification-standards:
  internet: standalone version and network application;
  charge: free edition and charge edition;

- Targets: They mainly focus on white-collar and ordinary people on SNS or other independent software.

Thus, according to our investigation and demand analysis, we decided to develop a practical personal assistant system platform to provide more convenient services to facilitate students' learning and working. The system integrated the functions of information query and intelligent service, including daily scheduling, diary management, curriculum reminder, financing management and chatting for help based on learning and working.

In order to design a beautiful and friendly interaction interface, the system was developed by structured design method and designed by Delphi7 with Oracle database. We also used the WEB application of MVC structure. Besides, the system is suitable for all kinds of computers. Its operation environment can be Window 2000/XP/VISTA. It doesn't need to write into registry to reduce burden system. Its code is reliable, clear and easy to read. The component's seal of Delphi development modular is good and easy to debug. Its cost is very low. In sum, it has many advantages.
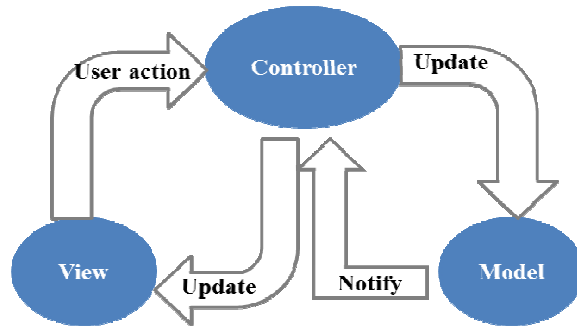

FIGURE 1: The Interactions Between M, V and C.

3. SYSTEM DESIGN AND FUNCTION ANALYSIS
3.1 MVC Model and Framework
Model–View–Controller (MVC) is an architecture that separates the representation of information from the user's interaction with it.

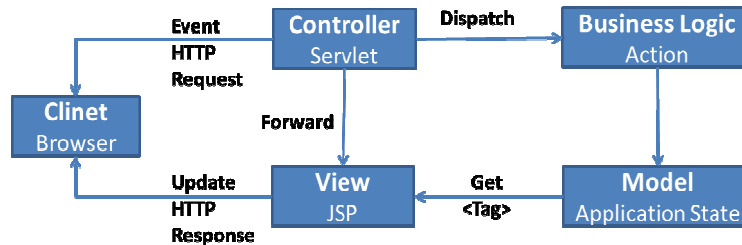In Figure 1, it indicates that MVC model defines the interactions between them.

FIGURE 2: The Principle of MVC.

From Figure 2, we see that MVC framework consists of application data and business rules, and the controller mediates the input, converting it to commands for the model or view. The controller can send commands to its associated view to change the view's presentation of the model. It can send commands to the model to update the model's state. The model notifies its associated views and controllers when there has been a change in its state. The view requests the information from the model that it needs to generate an output representation. This notification allows the views to produce updated output, and the controllers to change the available sets of commands.

According to the following MVC framework based on the system, users can input names and passwords from Unit_main and transfer two fields to Unit_login, which is as follows:
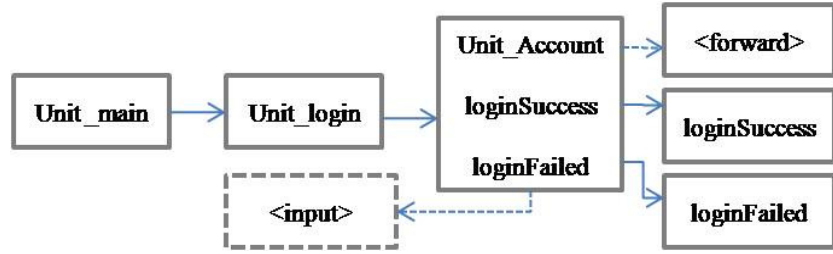
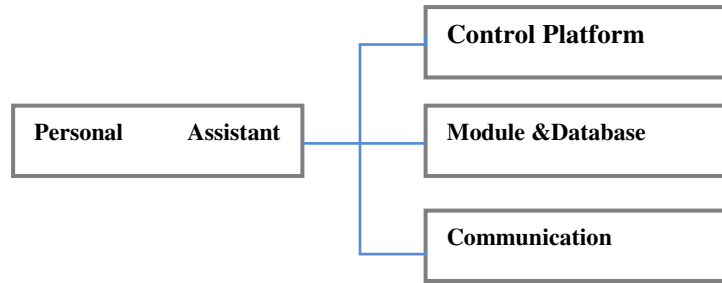**FIGURE 3**: The MVC structure of login Model

FIGURE 4: The Module Structure of this System.

From Figure 3, the system can find Unit_login and get the user name and password in Unit_account, and then give the decision. And it connects with database.
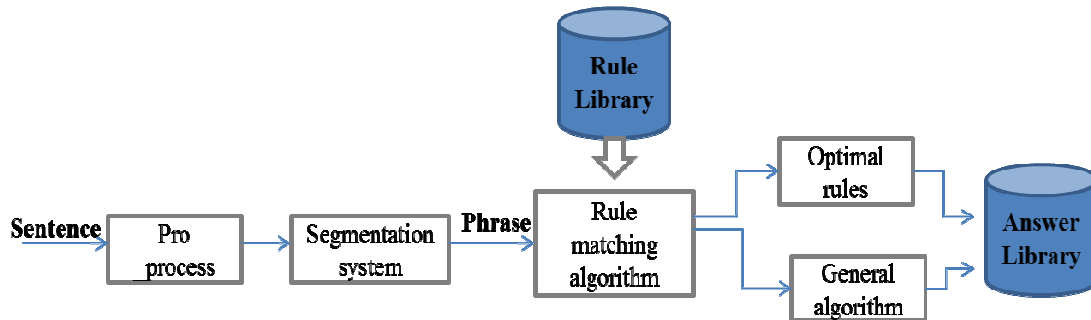

FIGURE 5: The System Structure.

3.2 System Structure

As we mentioned in the previous part, the whole system integrates many modules for these functions. In system structure design, we divide them into five parts: control platform, module & database, communication & interface. The module structure of this system is as follows in Figure 4:

According to the demand analysis, the design of personal assistant system is mainly based on MVC structure. The system is based on corpus and artificial intelligent methods for rule learning, which is as follows in Figure 5:

As we can see in Figure 5, when a match request is initiated, the system takes a string of the key words and returns necessary information based on rule library and corresponding algorithm.

3.3 Data Flow Chart and Business Flow Chart of this System

The personal assistant system mainly provides some effective management functions and communication methods on learning and work. These functions are divided into several modules to design each flow chart, interface layout. The core data flow chart is as follows in Figure 6:

Figure 6 displays the date flow chart from the point of developer. The following figure 7 starts with all the possible operations from the point of user's operation and displays the business flow chart of the system.
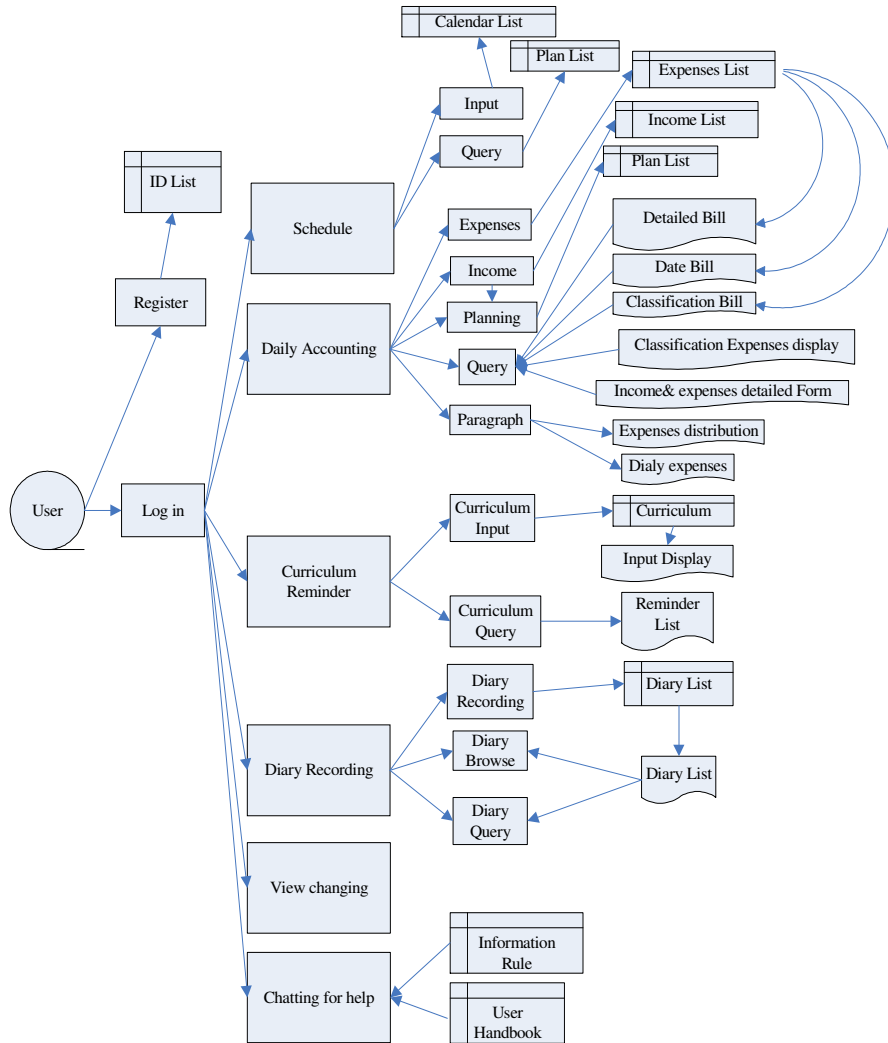

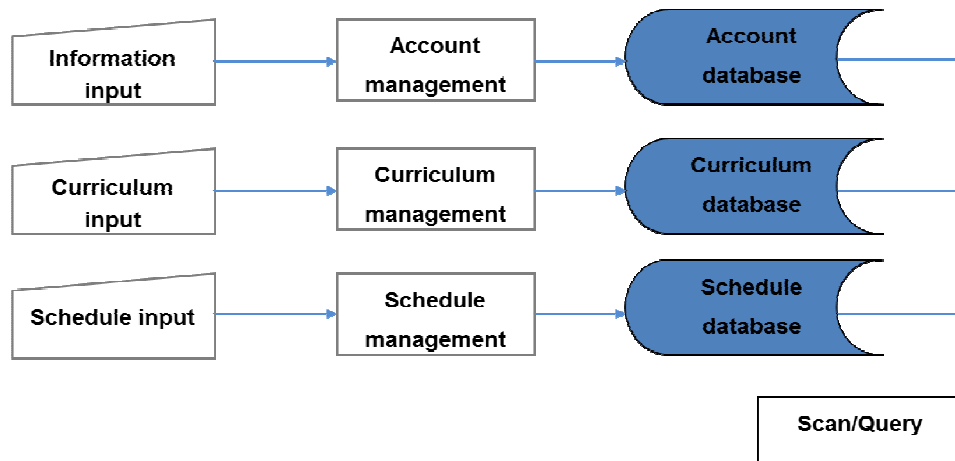**FIGURE 6:** The Data Flow Chart of this System.

FIGURE 7: The Business Flow Chart of this System.

3.4 The Master Platform Interface Design of System

To design a more interactive layout of main interface, we adopt more friendly and convenient style similar to MSN or QQ. The system provides many system functions for the users by the function icon mode. The specific design effect is as shown in Figure 8:
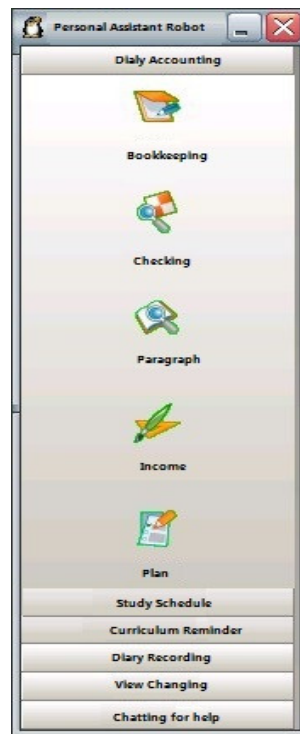

FIGURE 8: The Layout Design of Master Platform Interface.

In Figure 8, the main functions were divided into six groups. The view and skin of master interface can be changed. The chatting for help is intuitive so that everyone can operate it and get what you need easily

3.5 Function and features analysis

The personal assistant system platform integrates the functions of daily schedule, finance management, chatting for help, calendar and curriculum reminder etc. It can help you to find and deal with the information about financing, curriculum, schedule, recording, saving, query, log and so on. For example, diary recording and chatting for help are shown in Figure 9.
Figure 9 shows the friendly interaction function between human and the robot.

According to the above design and function analysis, we can see the features of this system platform as follows:

•Don't depend on the environment setting of PC. Can be run without development platform;

•Provide data analysis function, and can timely inspection effect, convenient information feedback;

•Friendly and interactive interface;

•Clear system structure, independent function module;

•It is multi-function and centralized platform, and can support personalized function and page style Settings;

•The extensible system and small error;

•Database design of 3NF and it has a good data integrity and data response speed, and little data redundancy

To summarize, in software operation, we try to make memory space smaller and reaction quicker. In data management, we pay more attention to simple input, intuitive output, accurate information classification so that the information can be convenient to update and output. In system function, we try to make it more utilizable.

4. IMPLEMENTATION AND ALGORITHM ANALYSIS

The personal assistant system adopted rule-learning and artificial intelligent method to implement these functions. As we know, the main task of rule-learning is to establish library of rules.

According to Figure 5, rule library is the core database of the system. In order to improve its accuracy and speed of matching, we build a rule to keep the rule. The matching process adopts the depth of first search algorithm. When the system didn't find the corresponding root node in the
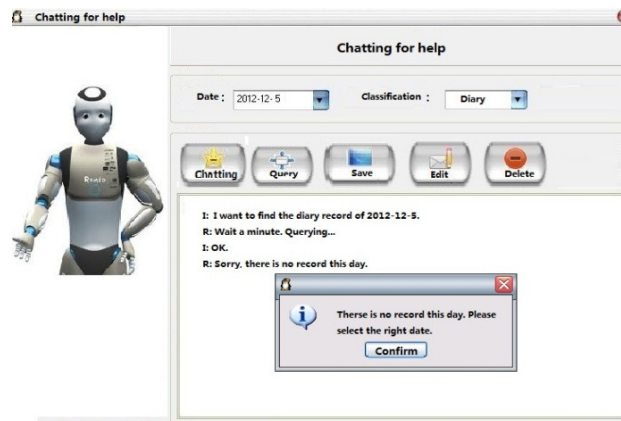

FIGURE 9: The Chatting for Help Function.

rule library, it will automatically create a new root node rule tree. If it does find the corresponding root node, it will record the ID number, and then continue until the end.

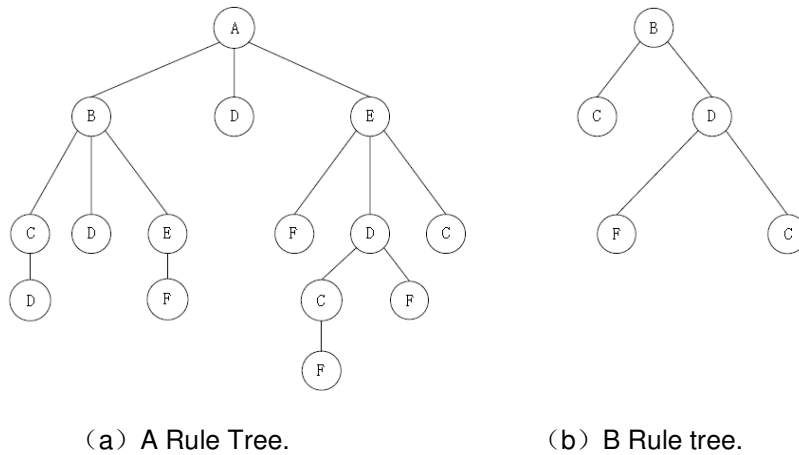（a）A Rule Tree.   （b）B Rule tree.

FIGURE 10: The Rule Tree of this System.

The above (a) and (b) shows the rule tree starts with A and B as the string of the initial key in Figure 10.

The rule library is built by artificial selection. The benefit of this method is more accurate. Its disadvantage is needing more time to build a practical and big rule library.
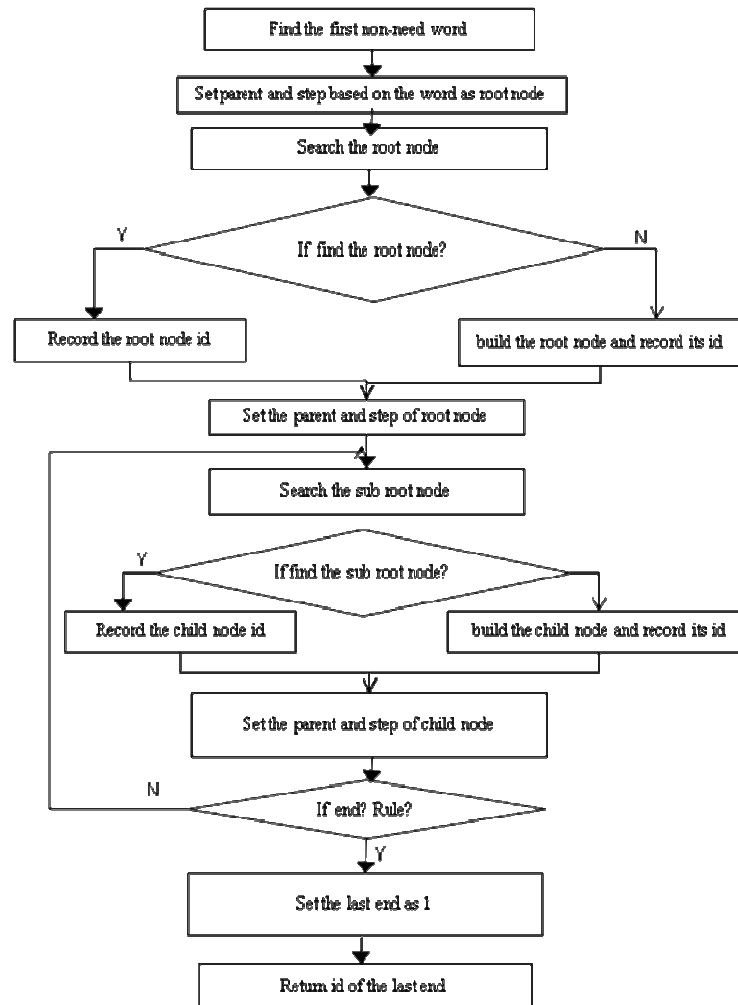
FIGURE 11: The Flow Chart of Matching Algorithm.

Figure 11 indicates the flow chart of matching algorithm. Although the algorithm has some limitations, it can basically satisfy the request. The tolerance control of data type fault is good, and the algorithm is simple to understand. Its code is easy and clear to read. There is no conflict among function modules. So the maintaining ability of this system is good.

5. CONCLUSION AND FUTURE WORK

In this study, we studied many similar applications and products. But they cannot deal with the stack of more user data and its accuracy is not high. In order to better meet users' demand, we adopted the structured design method of MVC framework and the optimized algorithm. We created a dependable and convenient system that can effectively identify the information from a database and timely deal with it. Besides, from the present robot system, each rule library has hundreds of rules and the system basically have automatic query and interaction effect. Instant messaging and interactive function could appropriately help users with their learning and working achievement. All in all, through this study, the personal assistant system will be beneficial and acceptable to apply to students' learning and working.

As for future work, the system will simulate the language environment to adapt to the practical pragmatic environment. In this way, its interactive behavior will be more real. Moreover, we will improve its function further according to the user's feedback. Some new interactive functions will be improved and added, too.

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