

THE 2ND IIAI-INTERNATIONAL CONFERENCE ON APPLIED INFORMATICS AND MEDIA DESIGN (IIAI-AIMD2022)



Sponsored by International Institute of Applied Informatics (IIAI) Conference Dates: Feb.26-27, 2022 Venue : California State University,Bakersfield(CSUB),USA

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Message from the Conference Committee

Welcome to AIMD2022 in Bakersfield.

The 2nd IIAI-International Conference on Applied Informatics and Media Design (IIAI-AIMD2022) is sponsored by the International Institute of Applied Informatics, Japan. The conference is held at California State University, Bakersfield(CSUB) ,USA.

IIAI-AIMD2022 focuses on practices, technologies, applications and theories for Applied Informatics and Media Communication, including Social Informatics, Computer & Humanities, BioInformatics, Data Science and so on. AIMD2022 offers a multidisciplinary approach to Applied Informatics. this conference brings together scientists, engineers, computer users, and students to exchange and share their experiences, new ideas, and research results about all aspects of Applied informatics in a broad range of fields.

We would like to thank the organization staff, and the members of the Program Committee for their hard work. And most importantly, we would like to thank all the authors for sharing their ideas and experiences through their outstanding papers contributed to the conference.

I hope that IIAI-AIMD2022 will be successful and enjoyable to all participants.

Tokuro Matsuo, Ph.D.

Executive director of International Institute of Applied Informatics, Japan Professor of Advanced Institute of Industrial Technology, Japan

Taishi Nemoto

Conference Chair of IIAI-AIMD2022 Professor of Mejiro University, Japan

February, 2022

Conference Information

Conference Date : February 24-27, 2022 Venue : California State University, Bakersfield(CSUB) Sponser : IIAI

Conference Committees :

- Executive director of International Institute of Applied Informatics Prof. Tokuro Matsuo(Advanced Institute of Industrial Technology)
- Conference Chair
 Prof.Taishi Nemoto (Mejiro University, JAPAN)
- Local Arrangement Chair
 Prof.Takayuki Fujimoto (Toyo University, JAPAN)
- Financial Chair
 Prof.Tokuro Matsuo (Advanced Institute of Industrial Technology, Japan)
- Program Committee

Prof. Mikihiko Mori (Mejiro University, JAPAN)
Prof. Koji Fujita (Cyber University, JAPAN)
Prof. Ziran Fan,PhD. (Toyo University, JAPAN)
Prof. Tokuro Matsuo,PhD. (Advanced Institute of Industrial Technology, Japan)
Prof. Taishi Nemoto (Mejiro University)
Prof. Takayuki Fujimoto, PhD.(Toyo University, Japan)
Prof. Yuri Sakamaki (California State University, Bakersfield, USA)

List of Accepted Papers

Paper ID	Title		
	Keynote Speech		
2201ky	Service Design towards Industry 4.1		
	Tokuro Matsuo		
	Session 1		
2201am	Structure and classification of chatbot systems using simple artificial		
	Intelligence Taishi Nemoto		
22020m	The Effectiveness of a Support Application for TMS Content Creation		
ZZUZam	The Effectiveness of a Support Application for TWS Content Creation		
0000	Shuhsuke Aoki		
2203am			
	Designing an Application that Replicates the Theatre Optique		
	Nanami Kuwahara		
2204am	Development of a complex platform to improve business efficiency		
	Wangjie Xu		
2205am	Physical Touch Interface Based on Information Design Theory		
	Yulana Watanabe		
Session 2			
2206pm	The Influence of "Page-turning behavior" on Reading with E-books		
	Yulana Watanabe		
2207pm	Verification of the difference between the two search tools, library and Internet		
	Li Xuezhen		
2208pm	Research and Analysis on Humans and Life Ambient Sounds		
	Mizuki Watanabe		

2209pm	Research on using videos to help Vietnamese people overcome cultural
	differences while living in Japan
	Cu Hong Bich
2210pm Construction of a distance learning environment that utilizes benefit	
	inconvenience
	Koji Fujita
2211pm	Functional design of memory aid application based on memory palace method
	Nan Wang

Program at a Glance

Feb. 24

Room	401C
9:30am-11:00am	Steering Committee Meeting (invitation only)

Feb. 25

Room	401C
11:00am-13:00pm	Preparation and Registration
	(Participants may also register at this time.)
14:00pm-16:00pm	Welcome Networking Event

Feb. 26

Keynote		
	Room 401C and Zoom	
10:00am-10:20am	Paper ID: 2201ky	
Session 1		
	Room 401C and Zoom	
10:20am-10:40am	Paper ID: 2201am	
10:40am-11:00am	Paper ID: 2202am	
11:00am-11:20pm	Paper ID: 2203am	
11:20am-11:40pm	Paper ID: 2204am	
11:40am-12:00pm	Paper ID: 2205am	
12:00pm-13:00pm Lunch on your own & Coffee		
Session 2		
Room 401C and Zoom		
13:00am-13:20am	Paper ID: 2206pm	
13:20am-13:40am	Paper ID: 2207am	

13:40am-14:00pm	Paper ID: 2208am
14:00am-14:20pm	Paper ID: 2209pm
14:20am-14:40pm	Paper ID: 2210pm
14:40am-15:00pm	Paper ID: 2211pm



Evening Beverage Break		
18:00pm-20:30pm	Banquet at Harris Ranch Restaurant	
24505 W Dorris Ave, Coalinga, CA 93210		

Feb. 27

Room	401C
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9:30am-11:00am	Forum Discussion (invitation only)

Proceedings



Paper ID
 2201KY
 Author Name Tokuro Matsuo
 Affiliation Advanced Institute of Industrial Technology, Japan

Keynote Speech: Service Design towards Industry 4.1

Industry 4.0 makes a lot of changes in human life. Nowadays, these changes are developed with several key technologies are related with robots, artificial intelligence, data science, IoT and several social science theories. In this talk, I will introduce history of industrial robot, IoT and these future perspectives. In the first half of my talk, I will also introduce our recent outcomes on convention attendee support system research. Also,

I will illustrate an image of future IoT and robot research with its social impact.

Then, in latter half, I will introduce the strategy to create an emergent market to provide a new value for customer. Also, I introduce the blue ocean strategy, which provides a methodology to create new market with customer's/user's utility map.

Dr. Tokuro Matsuo' Bio:



Dr. Tokuro Matsuo is a full professor at Advanced Institute of Industrial Technology since 2012. He received his Ph.D. in computer science from Nagoya Institute of Technology in 2006.

He then joined the faculty of the Yamagata University, where he is an Associate Professor of Informatics until 2012. Currently, he is a director of research center for AI and service science in AIIT, Japan; a director of center for professional higher education in AIIT; a guest professor at Bina Nusantara University, Indonesia; a guest professor at Nagoya Institute of Technology; and a professor at Asian University, Taiwan.

He was a visiting professor at University of Nevada, Las Vegas, USA from 2016-2017; a visiting researcher at University of California at Irvine, USA from 2010-2011; was a research fellow at Shanghai University, China from

2010 to 2013; a research fellow of SEITI in Central Michigan University, USA from 2010-2018; an invited professor at City University of Macau from 2018 to 2020; and was a project professor of Green Computing Research Center at Nagoya Institute of Technology, Japan from 2011 to 2014. His current research interests include electronic commerce and business, service science and marketing, business management, artificial intelligence, material informatics, tourism informatics, convention and event management research, and incentive design on e-services. Some of his researches are presented in the top international conferences on AAAI, IEEE CEC, AAMAS, and WWW.

He gave over 100 keynotes and invited talk at international conferences, symposia, and seminars. He also received over 20 awards and 30 research grants from research foundations, company and government.

He is a founder of International Institute of Applied Informatics. He is also commissioned as Japan Conference Ambassador and Kumamoto City MICE Ambassador.



Paper ID Author Name <u>TAISHI NEMOTO</u>
 2201am Affiliation <u>Mejiro University</u>, Toyo University

Structure and classification of chatbot systems using simple artificial intelligence

In recent years, there has been a lot of research on artificial intelligence. The use of AI by general consumers is rapidly expanding. Among them, the most familiar AI would be chatbots. Chatbot systems, which have been proposed since the 1980s in the image of general-purpose artificial intelligence, are simple mechanisms, but many of them have a high degree of humanity. Voice assistants installed in smartphones are often based on chatbot technology, and the digital native generation uses them on a daily basis.

Chatbots are used in a variety of fields beyond business and education, and are expected to be used more and more in the future. The number of such chatbots is increasing all over the world, and the number of services is increasing rapidly. The number of users and characteristics of these services are changing every day, and Mega-Techs such as apple, Google, and Microsoft are building chatbot platforms in rapid succession. The market size is also on the rise, and the needs and uses of chatbots are diverse, ranging from simply answering questions to recommending products and guiding payments. Chatbots are beginning to replace call centers and other services that require a large number of human resources.

In this study, we look at simple artificial intelligence systems from ELIZA, the ancestor of chatbots, to the present, and classify them in terms of mechanism and structure. At the same time, we will conduct a survey on attitudes toward AI and chatbots, in order to highlight the challenges of chatbots. In fact, many people argue that chatbots are merely displaying search results in a web browser. In this research, existing chatbots of various sizes, as well as existing systems and services for each purpose, will be organized, analyzed, and then the issues will be proposed.

Keywords: AI(Artificial Intelligence), Chatbot, Social media(SNS).



2202am Author Name <u>Shunsuke Aoki</u> Affiliation <u>Toyo University</u>

The Effectiveness of a Support Application for TMS Content Creation

In today's information-rich society, companies are using all kinds of media to reach out to consumers in order to build engagement with them. With the diversification of media and content creators, the concept of transmedia storytelling, in which narrative content is developed using multiple media, has been constructed. The effect of TMS is that the use of multiple media expands the world view of the story, and as the content is developed, consumers become fans and follow the content. This leads to building audience engagement. TMS content is being produced at a variety of scales, from Hollywood productions to small educational spaces, and the effectiveness of TMS is already being proven in several papers. The effects of TMS have already been proven in several papers, and TMS content is more effective in all aspects than content developed in a single medium.

However, a complexity of TMS is a barrier to its proper understanding and adoption. For example, it requires a good combination of narrative and narrative experiences, and prediction of target behavior. devising TMS content is next to impossible for those who have no knowledge of TMS. In this study, we designed and implemented an application that enables people without knowledge of TMS to understand TMS and plan TMS content effectively by using eight steps and a project visualization function. The eight steps are: defining goals and prerequisites, media selection, target setting, plot creation, character creation, story world creation, story experience creation, and review.

The application is equipped with a visualization function using a tree structure. By pressing the tree button, the user can grasp at a glance the flow of the plot and how the narrative experience is connected to the story. In this study, we conducted an evaluation experiment of the application. The experiment was conducted twice with 10 participants. In the first experiment, we explained TMS to people who were not familiar with TMS, and they planned TMS content on one topic without any support. in the second experiment, the subjects planned TMS content on another topic using the application. As a result of the experiments, it was revealed that our application covers the broad steps of TMS production and can efficiently tackle TMS content creation.



Paper ID Author Name Nanami Kuwahara
 2203am Affiliation Toyo University

Pre-cinema Movie Device: Designing an Application that Replicates the Theatre Optique

It is said that the movies, animations, and images that people see in their daily lives began as shadow pictures. Today, the shadowgraphs appear to pop out and can be freely edited. In other words, contents and visual expressions have been changing with time. If we look back at the history of the moving image, we can see the existence of a moving image device called the Theatre Optique. The Theatre Optique has had an impact on the history of media. Before the birth of the Theatre Optique, visual devices were for personal enjoyment. In addition, moving images were a repetition of several different pictures.

The Theatre Optique require a player and show moving images on an ad hoc basis. The player manipulates a film of limited length using two types of film. The scale of the story changes depending on the player's manipulation. In other words, showing a film at The Theatre Optique is like showing a play, but only once. In this case, the player actually used the device to show a short film of 600 to 700 frames for 15 minutes. Currently, this kind of visual expression is not available in moving images. This is an expression that is being lost. Moreover, the Theatre Optique does not have actual machines. Imitations do exist, but they are few in number and we rarely have the opportunity to touch them.

Therefore, in this study, we design an application that replicates the Theatre Optique. Users will be able to get a real feel of using the original device. Users can easily learn about the past technology using their smartphones, which are more familiar items. People often adopt technologies and ideas from the past in order to get ideas. By recreating technologies and senses that existed in the past but have been lost, we can get out of the "natural" way of thinking. From an educational standpoint, the use of the Theatre Optique application also provides an opportunity to learn about media history. In the application, two films are manipulated in the same way as in the Theatre Optique. Because it is a video playback application for the masses, the application is connected to a desktop, TV, or screen for operation.

This design allows the user to experience the operation of the Theatre Optique, and to gain a sense of the difficulty and sensation of playing a film live. This is a test of the user's ability to express and entertain themselves in a way that only the Theatre Optique can create. This application will also deepen the user's understanding of media history. In media education, it is important to understand how the technologies of the past were born and used. We design this application in order to connect to the understanding of media history.



2204am Author Name Wangjie Xu Affiliation Toyo University

Development of a complex platform to improve business efficiency

Many companies use multiple office software and tools. Existing office software and tools are intended to meet various user demands and solve problems.

However, user demands are becoming more diverse, and every time users have to switch multiple software, tools, and platforms frequently to do their work. Tools developed to solve this problem eventually lead to the work inefficiency and it is now a new problem. To solve this problem, the author introduces the modules concept and proposes a working environment that integrates office software and tools into a single platform.

We devise a platform that can be customized based on each user needs and according to his or her work situation. This paper mainly describes its mechanism and development of functions.



2205am Author Name <u>Yulana Watanabe</u> Affiliation <u>Toyo University</u>

Physical Touch Interface Based on Information Design Theory

In recent years, with the spread of the Internet, a variety of digital terminals have been distributed. Of course, conventional computers and laptops are also used. On the other hand, there are many touchscreen devices in use, such as iPhones and tablet devices, where you touch the screen with your finger.

Most people today have a smartphone, such as the iPhone, in their possession, and some people use more than one for work and personal use. The main function of a smartphone is to make a phone call, which is the role of a traditional cell phone, but many other functions are also used. For example, it includes functions such as watches, wallets, and other things that are natural to wear, calculators, recorders, and other things that are useful in some cases, and even entertainment such as books and games.

This means that today, it is possible to go out with only an iPhone or tablet device connected to the Internet. Similarly, tablet devices can be connected to the Internet to make calls through software and applications, but there are also tablet devices that specialize in entertainment functions and dedicated accessories. For example, the Kindle, the world's most famous e-book, has its own dedicated device. There is also a protective film for LCD screens that gives a paper-like texture to multifunctional tablets such as the iPad, which is sometimes used as a dedicated device for electronic notes.

On the other hand, there are those who choose the old-fashioned, traditional format as a "thing" rather than a function. For example, many people wear watches despite the fact that watches are included as a function in smartphones and other devices. In this study, we attributed this choice to the fact that "things" are more attractive than the convenience of being smart. In other words, this study believes that many people today are attracted to the physical sensations of "things" that are centralized as functions.

The "physical sensation" means that there is physical contact, not just the movement of fingertips on the touch screen, and that many parts of the body unconsciously work together to perform actions.

In this study, we define this kind of interaction with "things" that involves physicality based on physical contact and sensation as "physical touch. Although there have been such studies and discussions in interaction, most of them undermine the convenience of smartness by emphasizing physical touch. Therefore, this research aims to combine the physical touch, which is the major attraction of traditional "things," with the convenience of digitization.



Paper ID Author Name Yulana Watanabe2206pm Affiliation Toyo University

The Influence of "Page-turning behavior" on Reading with E-books

Although there are several types of bookbinding methods and techniques used in today's formatting, this study uses the "walnut binding" method, which is the most mainstream method of binding books without using thread or needles, as an example. In the case binding, four pages are created on a single sheet of paper, and the cover and text are printed separately. In order to be published as a book in Japan today using case binding, the minimum number of pages is 24, that is, six or more sheets of paper are required, and the book is bound with a cover.

In this study, we examined the factors that contribute to a better reading experience, and focused on the importance of the physical action of turning the page. Therefore, we conducted behavioral observations and experiments related to reading to enhance the sense of reading, thinking that it might be possible to enhance the sense of reading using actual paper.

In Experiment 1, we conducted an evaluation experiment to see how many sheets of paper would be closest to what we were aiming for in our research if they were attached as attachments, assuming that the pages in the e-book could also be turned by turning actual sheets of paper. For the experiment, the number of pages was reduced one by one, starting from 5 - 20 pages, which is the maximum number of pages that can not be published as a walnut-bound book, and each page was evaluated on a 5-point scale. We also experimented with a total of six patterns, including the case of only one sheet of paper with minimal attachments, considering the convenience and unity of e-books. As a result, the optimal number of pages was found to be "2 sheets - 4 pages," although the results were divided between those who wanted to focus on the reading experience as a book and those who wanted to focus on the convenience of digital books.

In Experiment 2, we conducted a test to clarify how we move our fingers when we read a paper book and turn the pages. In order to observe more unconscious behavior, we did not give them an overview of the experiment or any observations, but simply asked them to read for a few minutes. We then took video of the participants reading and analyzed where their fingers were placed and how they were "turning the pages" When we analyzed the dots on a similarly sized piece of paper with squares about 1.5 cm square, about the size of a finger, we were able to classify them into four patterns.

The most common of these was to place the thumb on the bottom of the page and follow the text while holding the other four fingers, mainly the index and middle fingers, on the paper. Then, when turning the page, the pattern is to put your thumb under the paper and hold the page between your index or middle fingers as a base point, and turn it. The percentage was about 70%. In other words, there is a certain degree of consistency in the page-turning behavior of paper-based reading, even if there are multiple patterns.



Paper ID Author Name Li Xuezhen2207pm Affiliation Toyo University

Verification of the difference between the two search tools, library and Internet

With the trend of the Internet age, it has become inevitable that public libraries will go online while continuing to provide their traditional functions in real space.

However, while the current online libraries emphasize the digitization of its collection and the services provided online, they lusted the sight of the essence of "library" and have become just a library homepage with a function of Internet search.

Before discussing the next generation of libraries, it is necessary to rethink what the essence of a library is.

Therefore, this study conducted two behavioral experiments of information retrieval to clarify the characteristics and differences between Internet search systems and libraries.Internet search and libraries have their own merits, but "encounter with unknown knowledge and information" can only be realized in libraries is a merit that is difficult to obtain with online search systems.How to recreate the whole knowledge space, not just to improve a single function such as search, will be the next challenge for online libraries.

Therefore, the online libraries must utilize the systematic display methods of traditional libraries to prevent users from wandering off when exploring uncharted territory in the world of knowledge in next period.

As mentioned above, future works will require an online library that reproduces the library as a place where encounter knowledge accidental.



Paper ID Author Name Mizuki Watanabe
 2208pm Affiliation Toyo University

Research and Analysis on Humans and Life Ambient Sounds

In this study, I formulate a hypothesis about how humans perceive life ambient sounds. Then, I conduct a questionnaire survey about the sounds of daily life and analyze the results to verify my hypothesis. Human beings live with the sounds of daily life. The term "daily life sounds" here refers to the sounds that humans make in their daily lives, such as the sounds of cooking, the sound of the TV playing in the living room, the sound of family members walking around the house, and the sound of things being placed in a room. Humans sometimes judge the sounds of daily life as something noisy. However, I believe that the sounds of daily life have the effect of enriching the human mind. It is because when people share the sounds of their lives with others, they feel that they are also sharing the same time. Also, people will feel more at ease if the sounds they hear are those of others in their lives. It is because when people share the sounds of life with others, they feel that they are also sharing the same time. For example, when students are studying at night, they may miss some sound and listen to the radio. Then, they can feel that others are speaking to them and feel a sense of oneness with them. Therefore, we all have experienced at least once the case that we feel a sense of security by listening to the sounds of other people's lives.

- 1. Humans unconsciously desire the sounds of life.
- 2. Humans have a high demand for daily life sounds.

I set up a questionnaire with multiple response items in order to prove the above two hypotheses about the sound of daily life. The following are some of the questions that were asked.

[1] Survey on feeling of loneliness and sense of security

I asked the subjects to imagine that they were alone in a house with almost no household sounds. 17% of respondents answered, "1) Absolutely," "2) A little noise is better," 47%, "3) Not much noise is better," 22%, and "4) No noise is better." is 13%.

[2] Ambient sounds and their unpleasantness

I conducted a survey to find out how people perceive the natural sounds of daily life in their homes and neighborhoods. "1) uncomfortable and noisy" was selected by 35% of the subjects, "2) reassuring" by 46%, and "3) pleasant" by 18%. These results show that 64% had a positive feeling about the sounds of daily life.

According to these results, in a quiet situation with no sound, there are more people who seek out sounds such as daily life sounds than those who do not. In addition, more people answered that they would prefer to have the sound of life than those who felt they would prefer not to have it. These considerations suggest that the two hypotheses about the sounds of daily life presented in this paper are valid.



Paper IDAuthor NameCu Hong Bich2209pmAffiliation Toyo University

Research on using videos to help Vietnamese people overcome cultural differences while living in Japan

The increasing number of Vietnamese coming to Japan has led to the higher demand for Japanese language education. While the cultural aspect is as essential as the linguistic one, it does not receive enough attention it deserves. In this paper, I proposed a method of using videos that describe Japanese culture to help Vietnamese people overcome cultural shocks as soon as possible.

<u>The importance of cultural understanding</u>: Preparing cultural knowledge before going abroad can help people overcome cultural differences. Understanding Japanese partners' gestures and determined manners in Japanese society lets Vietnamese people avoid many awkward conversational situations.

Vietnamese people can recognize the beauty of Japanese tradition and lifestyle, thus avoiding the prejudice or even negative viewpoint towards Japanese society. It is also important for people to develop the intercultural flexibility to adapt new communication styles and behaviors easier. By having solid cultural knowledge, people will have more chances for promotion at the workplace and development of their international careers.

<u>Concept of Japanese cultural videos</u>: In general, the interactive video allows users to read the information while watching a video by touching the screen only. I combined Japanese cultural videos and interactive function to come up with a cultural application for Vietnamese users. With the concept of using visual and audio channels to help users gain more Japanese cultural knowledge, the proposed videos in this paper allows Vietnamese viewers to read the cultural information only by touching installed Interactive items appearing on videos.

<u>Examination methodology</u>: In order to investigate the usefulness and the level of comprehensive of cultural videos content, I conduct a small questionnaire to gain Vietnamese viewers' feedback. The majority of respondents' comments are positive, which claimed that the proposed videos are useful and easy to understand. Yet, there are drawbacks in interactive videos illustrating Japanese culture. Therefore, a detailed plan for improvement will be revealed in the full paper.



Paper ID Author Name Koji Fujita2210pm Affiliation Cyber University

Construction of a distance learning environment that utilizes benefits of inconvenience

In this research, I will construct an integrated distance learning environment that utilizes the benefit of inconvenience. In recent years, there are many ways to take education. The development of information technology has made it possible for students to take courses online instead of going to school.

In addition, the spread of COVIT-19 has led to the rapid growth of distance learning throughout the world. These were opportunities to redefine what it means to learn in the physical space of a traditional school. In many schools, in-person classes were no longer possible, and distance learning was conducted using existing video conferencing applications. However, when comparing the in-person class and the distance class, there are some inconveniences and disadvantages that exist only in the in-person class. In this research, I focused on this point. In this research, I will construct an integrated distance learning environment that utilizes the inconvenience. The concept of "benefits of inconvenience" is utilized in this research.

This is the concept of the benefits that can be gained by daring to make things inconvenient. I thought that it would be possible to construct a system that gives positive benefits by utilizing this system in a distance learning environment. Based on the above, I have constructed an integrated distance learning environment that utilizes the benefits of inconvenience. These systems are constructed so that students can use them in a variety of environments.



Paper ID Author Name Nan Wang2211pm Affiliation Toyo University

Functional design of memory aid application based on memory palace method

Memory Palace is a well-known memory method at present. The memory using this method has many advantages such as firm, clear, and durable memory. Nowadays, it also continues to use methods with different characteristics and different ways. With the continuous development of applied science and technology, it is possible to implement the memory palace on mobile devices.

The main function of the memory palace auxiliary application is to help users build their own memory palace through simple operations on mobile devices such as mobile phones, and to help users remember by arranging memory reference objects in the memory palace. Therefore, this application is essentially an application that can make scenes on mobile devices.

At the same time, to improve the user's experience and the applicability of the scene itself in different environments, consider using 2D and 3D for the presentation of virtual memory palaces.

This article will mainly explain the system structure of the virtual memory palace construction and application, the 2D and 3D presentation forms in the process of virtual memory palace implementation, and the introduction of the process of using tools to implement the virtual palace.