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Design and Build Virtual Tour Exhibition Application at INKINDO East Java

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ABSTRACT

This study aims to design and develop a web-based Virtual Tour Exhibition application to support the promotion and introduction of the Indonesian Consultants Association (INKINDO) East Java. The application leverages 3D Vista Virtual Tour technology to create an interactive exploration experience for users. The development process follows the Waterfall methodology, encompassing requirements analysis, design, implementation, and testing stages. Testing was conducted using the Blackbox method to evaluate system functionality and the System Usability Scale (SUS) to assess user satisfaction. The results indicate that the application effectively meets user needs with optimal functionality and achieves a high SUS score, reflecting significant user satisfaction.

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INTRODUCTION

Nowadays, technology is experiencing very rapid development. This advancement allows access to information quickly and unrestricted by space and time, which brings about great changes. The use of information technology in various aspects of life makes it easier for people to get information quickly (Muawwal, Zaman, and Arianti 2021). By using this technology, a person can find out how information is from an object or place even if it is far away without having to go to it first (telepresence). The application of this technology is also of course very helpful for companies or agencies in promoting the existence of the entity so that the public can find out how the profile in general is about the company. (Kachach et al., 2020) (Muawwal et al., 2021)

One of the technologies that can be applied in promoting the existence of a place is *virtual tour* (VT) technology. In the rapidly evolving digital era, virtual tours (VT) have become one of the mediums that can be used by users to explore locations from a distance. VT combines images, videos, and various other media to create an interactive simulation of a place. This technology not only offers

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a visual experience, but also the integration of audio, narration and text elements to enrich the user experience . (Gama & Kurniawan, 2022) (Primary, 2022) (Primary, 2022)

The Indonesian Consultants Association (INKINDO) is a national association consisting of professional and independent consulting firms. INKINDO was formed in Jakarta on June 20, 1979, as a result of the merger of PKTPI and IKINDO was established on October 8, 1971 as a professional organization in the field of development engineering consultants in Indonesia has more than thousands of members including experienced consultants and has high integrity. INKINDO (Indonesian National Association of Consultants) is a professional organization that accommodates consultants in Indonesia. The main goal is to improve the competence, professionalism, and integrity of consultants in various fields, including engineering, management, and other consulting. INKINDO also functions as a mediator between members and the government and the private sector, providing training and certification, as well as providing advocacy and legal protection for its members.

Over time, INKINDO has grown rapidly and has several branches. One of INKINDO's branches is in East Java. INKINDO East Java is located at l. Rungkut Asri Utara No.VII / 7, Kali Rungkut, Rungkut District, Surabaya, East Java 60132 and already has a company profile website. Even though they already have a company profile website, the general public still does not know how to get a more in-depth picture of the organization. This is because the information displayed on the site is information that is presented in general only and the public also does not know much about the in-depth description of the office of INKINDO East Java.

Based on this, the researcher has an interest in conducting website-based design research by applying Virtual Tour (VT) technology in it which is intended for the INKINDO East Java Office. This is done in order to promote the organization in the eyes of the public so that information and conditions in the organization can complement the existence of the INKINDO company profile website that has previously been built. Therefore, the researcher raised the research title "Design and Build Virtual Tour Exhibition at INKINDO East Java".

METHOD

This research is a research on application build design, which requires various research tools and materials as support to build the application. The following is a description of the software and hardware used in this study.

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In the software section, there are several applications used. First, 3D Vista Virtual Tour, a software that utilizes 360° panoramic photo media, 360° video, sound, floor plans, and fully customizable skin UIs to create virtual tours (Muawwal et al., 2021). Second, SketchUp, a 3D modeling computer program that is commonly used in various applications such as architecture, interior design, landscape architecture, civil engineering, mechanics, film, and video game design. Third, Draw.io, an application that functions to create diagrams in system design, including UML diagrams needed in application development. This application can be accessed online as well as offline. Fourth, Visual Studio Code, which is a text editor to compile and compile coding. This application is used to implement the system to be designed. Finally, XAMPP, a complete program that supports website programming using PHP and MySQL (Setyawan and Prawiro, 2020).

In addition to software, this research also requires hardware to support the optimization of the software used. The main hardware used is an ASUS ROG Zephyrus M15 laptop with the following specifications: Windows 11 Home 64-bit operating system, Intel® Core™ i7-10750H processor CPU @ 2.60 GHz, 24 GB DDR4 3200 MHz memory, NVIDIA® GeForce® RTX 2070 8GB GDDR6 VGA Card, and 1 TB Solid State Drive (SSD) storage. These laptops serve as the primary medium for running various applications and software used in research.

The research will be conducted at INKINDO East Java which is located on Jl. Rungkut Asri Utara No.VII /7, Surabaya. In conducting this research, researchers will take pictures from various angles at the INKINDO exhibition. The results of the objects that have been taken are then converted in the 3D Vista Virtual Tour application so that each photo that has been obtained will be combined and built into a virtual tour that will be implemented in the website to be built.

The research to be built is research using the waterfall methodology. The waterfall method is an approach in the software development cycle that takes place in sequence, starting from analysis, design, coding, to testing (Satzinger, Jackson, and Burd, 2015).

Internal testing is carried out by the developers themselves using the blackbox method, where the functionality of the application is tested without looking at the details of the internal implementation. Meanwhile, external testing is carried out by distributing questionnaires to users who have tried the program in the company. This method aims to measure the usability of the system through the System Usability Scale (SUS), User Experience Questionnaiere (UEQ) and get direct feedback from users regarding the interface as well as their overall experience. By combining these two methods, it is hoped that the system will not only meet business needs and provide the desired response, but also provide an optimal level of satisfaction for users.

International Journal of Social Discussion
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RESULTS AND DISCUSSION

The researcher identified the need for the system through direct interviews with the INKINDO team and observations on physical exhibitions. This data includes key user needs, such as intuitive booth listing features, easily accessible contact information, and location map integration. These observations aim to understand how physical exhibitions can be represented virtually without missing important elements.

System requirements are formulated based on primary and secondary data. The researcher determined mandatory elements, such as a 360° panoramic gallery to visualize the exhibition space, an easy-to-understand navigation menu, and the ability to display exhibitor company profiles. All of these needs are geared towards providing a convenient and interactive user experience.

The initial design was created using SketchUp, with a focus on realistic exhibition layouts. The booth layout is arranged in close proximity for easy navigation. This design is then rendered into a 360° panoramic image to provide an immersive visual experience. Every element such as navigation icons and interactive information is designed to ensure ease of use.

Application development is done using Laravel for the backend and XAMPP as the local server. Visual Studio Code is used as the main text editor. Researchers also utilize the 3D Vista Virtual Tour to integrate multimedia elements, such as audio, video, and text, into a 360° panorama. The use of this technology aims to increase the appeal of the application.

Black Box testing is done to verify that each feature is working according to specifications without checking the internal code. This test includes testing the navigation menu, panoramic icons, and CRUD (Create, Read, Update, Delete) features on the stand. The test results show that all features work as expected. The SUS method is used to evaluate the usability of the application from the user's point of view. The results show a high score, which reflects that users find the app easy to use. Users also gave positive feedback about the seamless integration of the feature.

The main menu is designed to include important features such as "Tour Information," "Panorama List," "Location," and "Contact Information." Each menu offers an intuitive interface, with navigation that allows users to easily explore the app's features. The 360° panoramic gallery is an excellent feature that allows users to move from one booth to another with simple navigation icons. This feature provides an interactive experience like being at a physical exhibition location. The admin dashboard is equipped with features to manage exhibition content, such as setting company logos, banner images, and contact information. This makes it easier for admins to update information in real-time.

The integration of multimedia elements, such as narrative audio, product videos, and descriptive text, makes the user experience more engaging and interactive. The app also supports a wide range of devices, ensuring wide compatibility. This system requires a browser that supports the latest technology, such as Google Chrome or Mozilla Firefox. Some outdated browsers may not be compatible, which can affect the

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user experience. Respondents from various age groups, ranging from 17 to 60 years old, indicated that this application is accessible to all groups. This shows that the app is designed with inclusivity in mind.

Civil servants dominated the group of respondents, indicating that the app is relevant to professionals. This can be a potential indicator of an application for use in business and corporate contexts. On the question about feature integration, respondents gave high scores, indicating that the app's features are working as expected. This indicates the successful integration of multimedia elements in the panorama. The use of 360° panoramas allows users to explore the exhibition space interactively. This technology provides a visual experience that is close to reality, making users feel more connected to the exhibition.

The arrow icons used for navigation allow users to move between exhibition areas easily. This improves the efficiency of use, especially for users who are trying the app for the first time. The contact information menu includes social media details and phone numbers, making it easier for users to contact the company or get more information. The login system ensures that only registered users can access administrative features. This increases the security of the data managed by the application.

The study expands the scope of previous research by adding more interactive and web-based features, which allow for wider access to the exhibition. This app allows INKINDO to promote their services to a wider audience without geographical restrictions. This can increase the visibility of the organization in the eyes of the public. Researchers recommend regular system updates to ensure compatibility with the latest browser technology, which is constantly evolving.

By reducing the need for physical exhibitions, these applications can save on operational costs, while still providing an equal experience. The table shows the results of the Black Box test with all features working according to specifications. This indicates that the system has been well designed and tested. The age chart shows an even distribution, which reflects that the app can attract users from different age groups. The SUS score chart shows that the majority of respondents find the app very easy to use, reflecting the success of the interface design. This application successfully meets the needs of users and supports INKINDO's promotional goals. All features function optimally, and the user satisfaction rate is very high. Researchers recommend exploring technologies such as augmented reality to improve the user experience in the future.

CONCLUSION

This study produces several important conclusions that can be summarized as follows. The process of making a virtual tour is carried out using the 3DVista application with the application of Augmented Reality (AR) technology developed using the Waterfall development method. This research aims to design a virtual tour application, implement AR technology into a virtual tour, and

evaluate the results through a series of tests. The test was carried out using the Blackbox and System Usability Scale (SUS) methods involving 76 respondents.

Blackbox test results show that all features have worked according to the expected specifications. Meanwhile, the SUS test yielded a final score of 81.02, which falls into the "Excellent" and "Acceptable" (B) categories. This shows that the application has a very good level of usability and deserves to be accepted by the public. However, to maximize application performance, the use of a fast internet network is one of the main needs.

As a result of this research, a website-based application in the form of Virtual Tour INKINDO East Java was produced that implements AR technology to visualize the three-dimensional environment of the INKINDO East Java exhibition building. The development is carried out sequentially and structured using the Waterfall method. The usability and functionality of the application were measured using SUS and Blackbox testing methods, which ensured that the application met the user's needs and was optimally ready for use.

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