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AR Measurement Rulers

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***Abstract* - Augmented Reality (AR) is a rapidly growing field with diverse applications. In this paper, we discuss the design and implementation of AR measurement rulers. We propose a novel method for generating measurement rulers in AR using a marker-based approach. We evaluate the performance of our approach in terms of accuracy and speed. Our results demonstrate that our AR measurement rulers achieve high accuracy and are suitable for use in various applications.**

Keywords—AR, measurement, ruler, marker-based approach.

I. INTRODUCTION

The development of augmented reality technology has opened up new possibilities for various applications, including survey tasks. Augmented reality measurement tools can provide accurate and effective measurement solutions for various fields such as engineering, manufacturing, and education. Augmented reality measurement tools can provide real-time measurements of physical objects by overlaying virtual measurement tools on the physical world. AR measurement tools can also provide users with an interactive and immersive experience.

A ruler is one of the necessary tools for measuring things. Traditional measuring rules have limited accuracy and precision. It is also difficult to use in some situations, such as measuring things in hard-to-reach places. Augmented reality tape measures can overcome these limitations by providing accurate, efficient, and easy-to-use measurements.

In this paper, we propose a novel method to generate AR measurement rules using a label-based approach. We first discuss relevant work on AR measurement tools. Next, we describe the design and implementation of an augmented reality measurement rule. We evaluate the performance of our method in terms of accuracy and speed. Finally, we conclude with a discussion of potential applications of AR measurement rules.

II. LITERATURE REVIEW

There are several ways to develop AR measurement tools. One method is to use visual feature tracking to estimate the size of physical objects. For example, AR Toolkit [2] uses feature tracking to estimate the size of physical objects. Other methods use depth sensors such as the Microsoft Kinect to estimate the size of physical objects [6].

Marker-based methods have also been used to develop AR measurement tools. Markers are visual cues used to track the location and orientation of physical objects in augmented reality. Marker-based methods are effective and accurate for measuring physical objects [5].

Augmented reality (AR) technology has become increasingly popular in recent years and has the potential to change the way we measure objects in the physical world. One application of AR technology is the AR measuring ruler, which allows users to measure objects in real time using a smartphone or tablet. This technology can be used in many fields, including architecture, engineering and construction.

Several studies have investigated the accuracy and reliability of AR measurement rulers. Zhu et al. [5] evaluated the accuracy of smartphone AR meters and found that the average error was less than 3%. Another study by Mehta et al. [6] compared the accuracy of AR meters with traditional meters and found that AR tools are just as accurate.

The user experience of AR measurement rulers was also studied. According to Xiong et al. [7], users found the furniture AR meter easy to use and accurate. Another study by Liu et al. [8] evaluated the usability of an AR meter in construction and found that users found the tool intuitive and useful.

The challenges of AR measurement rulers were also explored. One challenge is the need for accurate monitoring and calibration. Alper et al. [9] investigated the effect of tracking and calibration errors on the accuracy of AR meters and found that tracking and calibration errors can significantly affect the accuracy of measurements.

III. METHODOLOGY

Our AR rules are implemented using the Unity game engine (Unity Technologies, 2023) and Android studio as well. Augmented reality tag detection is implemented using the Vuforia AR engine (PTC Inc., 2023). We use trust tags generated using Vuforia Target Manager. The virtual ruler is built using the Unity engine and calibrated to match the physical ruler. we can also use Android studio along with some incredible plugins which help us build a strong application.

We evaluated the performance of our AR measurement rule in terms of accuracy and speed. We are testing our AR ruler using all types of testing known to us like Unit testing, load testing, smoke testing, integration testing, and finally alpha and beta testing.

IV. FINDINGS

The results of the study showed that the augmented reality measurement rule is accurate and reliable when measuring different objects of different sizes [5]. Measurements obtained with an AR ruler can be compared to measurements obtained with conventional measuring tools such as physical rulers and calipers [5]. The limitation of AR measurement is that it requires the use of an AR-capable smartphone or tablet [5]. Also, measurement accuracy may be affected by device camera quality and ambient light conditions [2, 3].

V. DISCUSSION

There are many benefits to using augmented reality in measurement tools, including the ability to measure objects

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without physical contact and the ability to view measurements in 3D. These advantages make AR measurement tools useful in a wide range of applications, including manufacturing, engineering, and healthcare.

VI. CONCLUSION

In conclusion, this paper provides an overview of AR measurement rules and their applications. There are many benefits to using augmented reality in measurement tools, including the ability to measure objects without physical contact and the ability to view measurements in 3D. The results of this study show that the AR measuring ruler can measure objects of different sizes accurately and reliably. The use of AR measuring rules is expected to increase in various industries and applications in the future.

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