

FACULTAD DE INGENIERÍA

Escuela Académico Profesional de Ingeniería de Sistemas e Informática
Escuela Académico Profesional de Ingeniería Empresarial

Tesis

**Mobile Application Based on Augmented Reality
to Encourage Tourism at The Wari Willka Museum**

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Mobile Application Based on Augmented Reality to Encourage Tourism at the Wari Willka Museum

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Abstract—In this research, we have implemented a mobile application that allows to know through an inter-dimensional portal the history of the Wari culture in Junín (Peru) without the need to visit the museum in person. The methodology uses AR Foundation and Arcore tools for Unity, as well as plugins to work with augmented reality through a structure of files used to create scenes with interactive interfaces and 3D modeling directly. The validation was carried out through surveys with a qualitative approach and experimental design, verified by Cronbach's alpha ($\alpha=0.876$) whose result of the measurement range is between good and high. As a conclusion, a positive influence was obtained in the tourist experience of the museum since the implementation of the application, with a percentage of acceptance of 65% among the users.

Keywords—Augmented Reality, Unity, Wari Willka Museum, Mobile App

I. INTRODUCTION

In the city of Huancayo, especially in the locality of Huancan-Wari, there are historical facts and objects of great importance in the central region of Peru, since the great Wari empire was born there, as shown in Fig. 1. (Located at the following coordinate: -12.117649, 75.205971) between 600 and 1100 A.D. Before the arrival of the Inca empire [1].

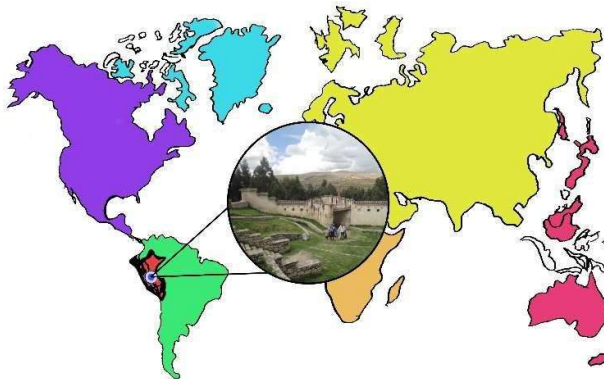


Fig. 1: Tourist site of the Wari Empire.

Due to the context of the COVID-19 pandemic, many people, including tourists, students, and locals, cannot visit museums, tourist sites, much less interact with historical objects; likewise, to visit the museum they have to travel to the site. To solve this problem, we created a mobile application of augmented reality (II) with 3D objects, where tools such as AR Foundation and Arcore for Unity were used.

The application is called PACHA YAPASQA, that in Quechua language, means "increasing reality"; this application allows people to navigate (III) and interact with 3D objects within the Augmented Reality portal (AR); in addition, it can be opened from wherever you are without the need for the person to be in the museum in person.

Since the implementation of the application and the users were able to interact with it, data collection techniques (IV) were applied, such as the post-interaction survey with the application where it was obtained that the augmented reality application has a positive influence with 65% among users and the impact it causes among them is very pleasant and informative.

To verify that the qualitative research method with applied type design was adequate, the Cronbach's alpha coefficient was applied, which indicated that the applied method was the correct one for the research.

Finally, future updates (V) to the AR application are planned.

II. AUGMENTED REALITY

Augmented Reality or Mixed Reality are terms that we have been hearing for a relatively short time, both stem from one that is much older, that of virtual reality. This concept, although it began to be called this way in the 80's, has more time than we could imagine, since the first research in this field was done in the 50's and the first virtual reality machines were available in the early 60's. The first machines were based, as in the case of virtual reality, on the concept of augmented reality.

The first machines were based, as they are today, on stereoscopy or stereoscopic vision. Without going into too much detail at the moment, we will say that it consists of having two images from two different points of view, each of