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With artificial intelligence and augmented reality, IPN graduate develops tourist guide for Teotihuacan

- **The application has a virtual assistant capable of answering 56 specific questions and can deploy 3D models with digital restorations**
- **Secretary of Public Education, Delfina Gomez Alvarez, stressed that historical memory is the spirit of Mexico, which gives us identity and unites us**
- **IPN's General Director, Arturo Reyes Sandoval, highlighted the institution's commitment to tourism promotion as a contribution to the country's development.**

To introduce the tourism industry to the digital world, Laura Paz Abedoy, a graduate of the Interdisciplinary Professional Unit in Engineering and Advanced Technologies (UPIITA, for its acronym in Spanish), of the National Polytechnic Institute (IPN) developed a Tourist Guide with Artificial Intelligence and Reconstruction in Augmented Reality for Teotihuacán, an archaeological zone that constitutes one of the greatest attractions of the country, according to the National Institute of Anthropology and History (INAH).

The Secretary of Public Education, Delfina Gomez Alvarez, stressed that historical memory is the spirit of Mexico, keeping it standing is essential for all Mexicans because it gives us identity and unites us.

The IPN's General Director, Arturo Reyes Sandoval, highlighted the institution's commitment to tourism promotion, as a fundamental activity that adds to the contributions of the Polytechnic to the development of the country, to underpin the national economy.

In addition to providing general information of the archaeological zone, the AI Guide for Teotihuacán, available in English and Spanish, has a virtual assistant capable of answering 56 specific questions asked through voice commands about the history, culture and general characteristics of various archaeological monuments that are in the enclosure, in addition to other data such as economic activities or the meaning of the various symbolisms of the worldview of the Teotihuacan culture.

The telematics engineer explained that the application, designed for the Android operating system, also contains a georeferenced augmented reality module with the coordinates of the monuments, which is activated by focusing the camera of the mobile device on a marker on the





text of the information sheets of the enclosure, to display a 3D model with the digital restoration of the pre-Hispanic monument or object, such as the Temple of the Feathered Serpent or the Teotihuacan flower.

"The development of the application in Android Studio not only involves the modeling of the program but also a communication structure, through voice interaction with the user that was possible with the training of a virtual assistant with convergent artificial intelligence, of the Watson Assistant platform, of IBM Cloud, which uses Natural Language Processing (NLP) and Deep Neural Networks (DNN), which predict the spectral characteristics of speech and provide a conversation as natural as possible," explained Paz Abedoy.

With the advice of the teachers, Dr. Miguel Felix Mata Rivera and the M. in C. Carlos Hernandez Nava, of the UPIITA, the young polytechnic designed the augmented reality with the development engine for the creation of Unity video games, which also allowed her to integrate the 3D digital replicas of the archaeological pieces and monuments, which were designed in Blender.

The application not only seeks to be attractive, but also to provide truthful and reliable information, for which Laura Paz had the support of Dr. Maribel Espinosa Castillo, from the Interdisciplinary Center for Research and Studies on the Environment and Development (CIEMAD, for its acronym in Spanish), with whom she reviewed and selected various bibliographic sources of the specialists Linda Rosa Manzanilla Naim, Beatriz Ramirez de la Fuente and Eduardo Matos Moctezuma.

Laura Paz Abedoy stressed when developing new technology you should never lose sight of the importance of the raw material, that is, the objective for which applications and programs are created, whether in education, medicine, economics, etc., "It is necessary to understand that this technology is not the objective but the means to approach our reality and improve or preserve it", highlighted.

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