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A distant augmented reality system for cultural heritage sites using drones

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Statement of the Problem: Augmented Reality (AR) is a view that integrates the real world imagery with computer generated sounds, images or 3D objects. It has been possible by AR to place 3D reconstructions of buildings, which have been subject to wear and tear of thousands of years, on a historic site. In this way, cultural heritage sites can be better explained and handed on to future generations. Physical reconstruction in ruined cultural heritage sites can be financially costly and time consuming. In addition, site can be damaged during physical reconstruction. With state-of-art AR technology, 3D models can be placed in-situ without any damage, while increasing the appeal of the area for tourists and enthusiastic students. The aim of this study is augmenting the video images received from mobile devices or drones with 3D models of Roman bath which is one of the important cultural heritage sites in Ankara, Turkey.

Methodology & Theoretical Orientation: 3D model of Roman bath were generated using reconstruction images drawn by expert archaeologists. Using Unity 3D Game Engine, this model was overlaid to the camera stream which is received from mobile devices such as mobile phones and tablets. The location services provided by these mobile devices were also used to place the model using actual GPS locations. Furthermore, an AR application was developed for drones to augment camera streams from a top-view (Figure1).

Findings: The developed application allows the users to display the models augmented on the camera view. The use of drones in this study brings a new dimension to augmented reality by adding a third eye to the user. We name this approach as distant augmented reality.

Conclusion & Significance: The authors expect that such applications not only provide an entertaining way to learn about history but also preserve cultural heritage sites.

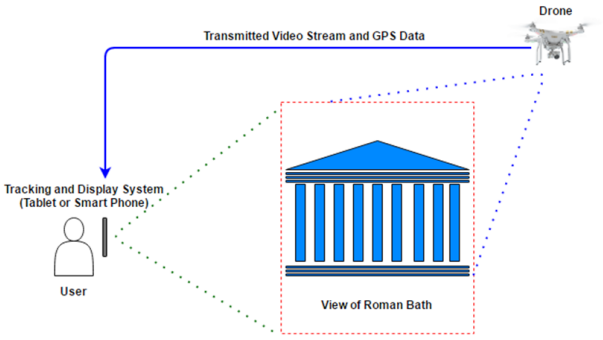

Figure 1: System architecture

Biography

Metehan Unal completed his BSc in Computer Engineering department at Ankara University and now, he is pursuing MSc. He worked as Trainee at Turkish Aerospace Industry in 2013. He has been working as a Research Assistant at Ankara University since 2015. His research interests include Augmented Reality, Computer Graphics and Artificial Intelligence. He is also an enthusiastic Android Developer.

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