



## Visualization of underground utility networks using augmented reality

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### ABSTRACT

This poster describes a smartphone application developed for visualizing underground utility networks using augmented reality. The existing version of the system can be used to provide an augmented reality picture of the underground water distribution network of the DEYA Hersonissou. It could be extended, however, for visualizing any underground utility networks if GIS maps of the networks are available.

The reported results are from the EPIRROH project funded by the Interreg Greece-Cyprus 2014-2020 program. Coordinator of the project is the Cyprus University of Technology and the project participants include the Water Board of Lemesos, Cyprus, the Foundation for Research and Technology-Hellas (FORTH) and the Hersonissos municipal water company (DEYAH). The objective of the overall project is the development of an information system for the detection of water leaks using acoustic (noise) sensors and its implementation in pilot areas of Lemesos in Cyprus and Hersonissos in Crete. The augmented reality application could be used by the maintenance workers to guide them to the exact location of the leak once it has been detected.

The application that runs on smartphones and tables has been developed using the Unity (<https://unity.com/>) "Game Engine" and Google's ARCore (<https://developers.google.com/ar/discover/>) Software Development Kit. GIS data that show the structure and characteristics of the water distribution network are imported in Unity and appropriate classes are created with information on the characteristics of the various components of the water distribution network (pipes, fittings, valves etc.). At this stage, the 3D object for the visualization in augmented reality of each component is defined. For example, pipes could be represented as cylinders of different color and diameter depending on their size and material. Using ARcore SDK's functionality and the smartphone's GPS sensor and camera the 3D image of the water distribution network is portrayed on the smartphone. The GPS sensor defines the geolocation and therefore the portion of the network to be displayed and the camera provides the surroundings on which the augmented reality object is overlaid.

The system provides a "user-friendly" interface to the GIS data and therefore can be used by maintenance workers when making repairs in the water distribution network. The system as available now could be easily extended to display any underground utility networks. The necessary information will be the availability of GIS maps and the definition of the 3D object to be used for representing the network components. Future work will concentrate on the development of a more realistic representation of the network and the development of a real time interface of the application to the GIS database.