Distributed Computer System to Display the Waterproof of a Product in Real Time

Eng. José Manuel Cuenca Lerma [1], Sofía Isabel Vera Vega [2]
STEM department at Colegio Agustín de Hipona, Coatzintla, Veracruz, México.
1. Email: josemanuelcuencalerma@gmail.com, 2. Email: sofiavera@smarthipona.com

Keywords:

System Information, Waterproof, Augmented Reality.

Introduction:

There are situations that affect the distribution of water in Mexico. According to the latest reports from the National Water Commission, until February 2021 it was detected that 80.4% of the national territory presented some drought condition, which affected 1,540 municipalities in the country. Therefore, a Natural Drought Disaster was officially declared in these regions (Moon, 2021).

Moreover, according to Toche (2021), the COVID 19 pandemic has modified the water consumption habits of Mexican population. Although, in public places the demand for water has decreased, in homes it has potentially increased. Just considering the change in habit regarding hand washing, the demand for this liquid has increased 12 times. Therefore, governments will have to invest even more in the purchase of water treatment plants to meet this demand.

Hence, Mexico is facing a water shortage where 47% of the population does not have constant access to water (Quijano, 2021). For this reason, it is important to continue formulating strategies for better water management since it is essential both for humans and for the production of all products on the market.

Objectives:

This project focuses on creating awareness about the water that we consume directly or indirectly in our daily lives. To know this, it is necessary to use the water footprint of the products, which is defined

as the amount of water that is consumed or contaminated in their production (Water Footprint Network, 2021).

Methods:

A three-tier client-server architecture is used for this platform. The client is the mobile application through which the user accesses the system and the server stores all the information regarding the water footprint of the products.

The user interacts directly with the client's graphical interface, which is a Unity mobile application that enables the camera to detect products that have information about their water footprint by simply focusing on them. The detection is carried out by the logical layer through the Vuforia API, To achieve the latter, products contain an element that uniquely identifies them. These elements are personalized QR codes, which once detected display an infographic where the amount of water used to manufacture the product is explained.

In case the user requires more specific information such as the amounts of green, blue and gray water in the water footprint, it would only be necessary to tap on the infographic so that the logical layer instantiates the communication layer in order to obtain information from the server. This communication is carried out through the REST protocol, a JSON encapsulation and SHA-256 encryption (Agocs and Goff, 2018).

The server receives the requests in the communication layer, said request is interpreted by the logical layer. This layer is synchronized with the data layer to obtain information from the database. After the request is completed, the logical layer returns the response to the communication layer to respond to the client's request.

Results:

The platform is implemented for use by high school students at Colegio Agustín de Hipona in Coatzintla, Veracruz, Mexico. Which is one of the most important private institutions in the northern part of the state of Veracruz. This institution has 41 registered students.

More than 50% of those surveyed agree that the platform uses already known technologies, reduces information search times compared to other platforms such as search engines, data repositories, etc. and that the data provided contains information about your personal and professional context. It is shown that the use of the platform facilitates access to information on the water footprint of a product in high school students from Colegio Agustín de Hipona in Coatzintla, Veracruz, Mexico.

Conclusions:

With this application it is hoped to create awareness about the impact of our actions on water management using innovative technologies such as augmented reality.

In addition, it contributes to the fulfillment of the UN Sustainable Development Goals, especially in the fourth of quality education and in the sixth of clean water and sanitation.

Likewise, through this platform, government authorities can create data transparency laws so that all companies share the amount of water they use to make their products. Thus, users would have the option of choosing the product that has the least impact on the consumption of water.

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