

# Demo: An Immersive Visualization of Micro-climatic Data using USC AiR

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## ABSTRACT

The air pollution level is increasing globally at an alarming rate. In the last two decades, many cities have adopted policies to control the emission of pollutants to the atmosphere as well as to promote sustainable urban developments. However, many of these initiatives have concluded that a long term success would require investing in the environmental literacy of the general population. In this demonstration paper, we present USC AiR, a mobile application that translates the air quality sensor feeds from the CCITI smart campus testbed into augmented reality visualizations for the USC community. USC AiR also allows users to report alarming air quality conditions and recommend environmental interventions such as planting trees. We believe that the integration of augmented reality for air quality monitoring enables the citizens to become more engaged with the air quality data while encouraging them to contribute to the reduction of anthropogenic air pollutants.

## CCS CONCEPTS

• **Human-centered computing** → **Information visualization.**

## KEYWORDS

Augmented Reality; Mixed Reality; Air Quality; Smart Campus; Smart City; IoT

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## 1 INTRODUCTION

The World Health Organization reported that in 2019, 91% of the world's population lived in places where pollution levels exceed the standard, resulting in the annual eight million deaths. This alarming number is approximately one in nine of the total global deaths which categorizes air pollution as the world's most significant environmental health risk. Thus, making people aware of urban air quality variation is one of the critical steps in minimizing anthropogenic air pollution and its contributing factors [1]. The U.S. Environmental Protection Agency (EPA) recognizes the week starting on the 29th of April, 2019 as the Air Quality Awareness Week and focuses on encouraging people to check Air Quality Index (AQI) to find out the best time of the day to be active outdoors<sup>1</sup>.

History of modern urbanism is entangled with conversations around air quality monitoring. However, the complexity of its acquisition and visualization has removed the general public from understanding its nuances. Environmental data has been generally visualized as tabular data or two-dimensional plots that have traditionally only interested environmental scientists and meteorologists. With the growth of DIY culture, along with the accessibility of IoT hardware platforms and sensors, a new generation of scientists, policymakers, and active citizens, have begun exploring alternative methods of environmental data acquisition and analysis [2]. For example, exploring the idea of data marketplaces in the context of smart cities has enabled the city administrations to acquire data from community members [3].

In the past decade, numerous applications and frameworks have been developed to gather air quality information. However, such efforts have not focus on creating educational platforms which

<sup>1</sup><https://www3.epa.gov/airnow/airaware/index.html>

