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MOBILE APPLICATION FOR THE DETECTION OF PEOPLE AGGLOMERATIONS THROUGH THE PLANS OF A BUILDING AND THE WIRELESS NETWORK

PROBLEM

Social distancing was one of the admission measures established after the pandemic caused by Covid-19 that altered the activities of companies worldwide.. Controlling crowds within buildings is difficult to carry out and requires investment in expensive equipment. Failure to comply with these measures exposes companies to a greater probability of contagion from their personnel, fines and sanctions

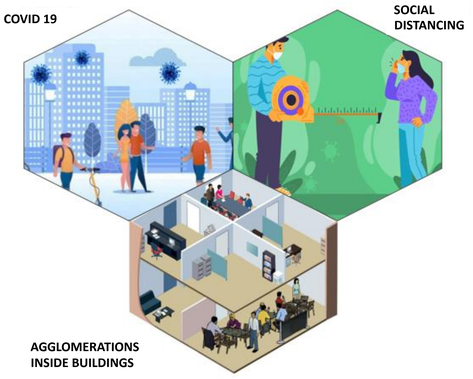

Figure 1: Problem in the control of crowds of people inside buildings.

GENERAL OBJECTIVE

Develop a hybrid mobile application to detect crowds through people's mobile devices connected to the WI-FI network managed by wireless LAN controllers (WLC).

PROPOSAL

Create a hybrid mobile application called Tinkvice to generate alerts in real time indicating the area of the building that has exceeded the allowed capacity of people, with the interaction of a desktop application that will extract the number of people that exist in each area by detecting smartphones using the existing wireless network..

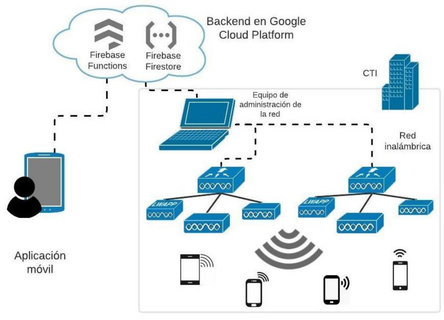

Figure 2: Proposal for the detection of crowds of people using WLC

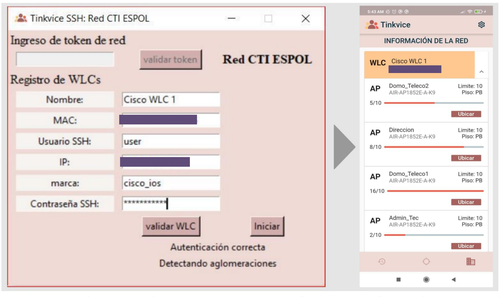

Figure 3: Desktop application to extract information from the network

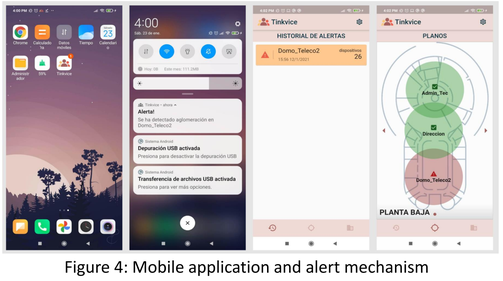

Figure 4: Mobile application and alert mechanism

RESULTS

Tests were carried out in the ESPOL CTI building with several smartphones in different areas of coverage of the AP, the following results were obtained.

- :The generation of an alert works well and takes an average time of 11.75 s for it to be displayed in the mobile application.
- The average time to deactivate an alert is 17.71 s
- Tinkvice was positively accepted by the public in terms of design, price and ease of use.

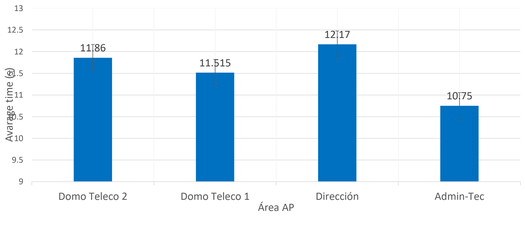

Figure 5. Average times per area to generate an alert when the maximum capacity is exceeded.

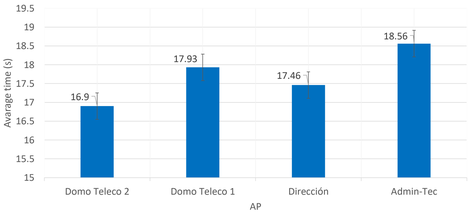

Figure 6. Average times per area that it takes to deactivate an alert when an excess of devices is passed to an allowed amount..

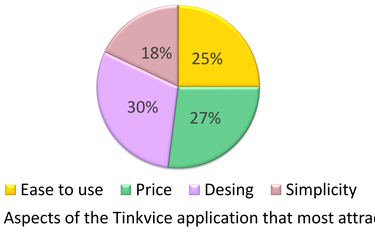

Figure 7. Aspects of the Tinkvice application that most attract the public..

CONCLUTIONS

- The alert generation time is efficient and allows the user to react simultaneously thanks to the push notification system.
- The application only detects smartphones with the WI-FI interface turned on and that have connected to the wireless network.
- In the mobile application there will be no duplicate smartphone records for multiple areas.
- The Tinkvice system is oriented only for buildings that have WLC equipment for managing the wireless network