Navigating exit routes using Augmented Reality (AR)

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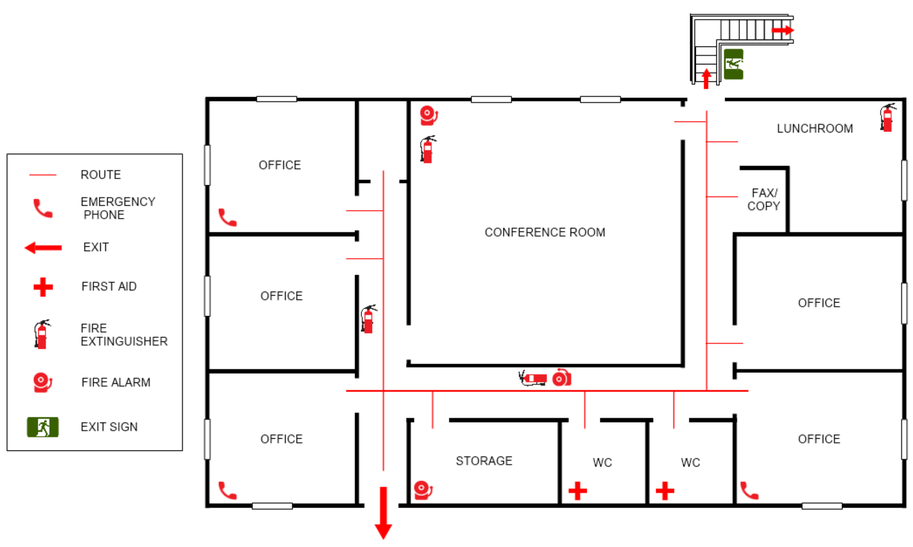
Summary

The utilization of Augmented Reality (AR) is a great way to make complex routes and buildings easy to navigate. With the widespread availability of high-resolution phone cameras, we can implement AR seamlessly into everyday life. Using QR codes we can place these three-dimensional AR objects on a two-dimensional plane and have people scan them. Simple arrows are projected in the direction we would advise the person to walk towards in case of an emergency. This method provides a simple solution to complex escape routes as the only necessary equipment for a person to follow would be their cell phone camera and the 3DQR app that is available for free on the app store.

Introduction

Navigation of complex building layouts can be a real problem, especially during an emergency. Be it the complexity of the building or the rushed mindset, people tend to not follow emergency escape routes in an actual emergency. To help with this we thought to place scannable QR codes that would project an arrow using augmented reality. This would alleviate confusion during an emergency as most people have access to a phone with the camera quality needed to use this. The number of arrows that could be placed is virtually limitless placing no limit on the size of building this could be implemented in.



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App link: https://apps.apple.com/us/app/3dqr/id1148998342

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Methods

To solve the problem of quick navigation using advanced technology we considered various possible routes. The first route considered was that of utilizing wireless network's tracking capabilities. This seemed like a great idea due to most complex buildings having a pre-existing WIFI network leading to low cost. The reason this route was eventually discarded was due to the imprecise nature of WIFI tracking which could be off by up to 5 meters. This presented a major problem in multilevel buildings as the system could think you were on a floor you were not on leading to completely wrong directions. Another avenue considered was the utilization of Bluetooth beacons. These beacons were much more precise at determining the user's position, but their range was severely lacking compared to WIFI positioning. This became a problem with larger buildings as we would need increasingly more beacons and more maintenance costs. The last alternative considered was the utilization of markers at crossroads. These markers would be placed at crossroads and would have asymmetrical designs so that the phone camera would be able to make clear distinctions based on your positioning to the marker. This route had a similar problem to Bluetooth beacons as each marker would have to be asymmetrical and distinct in design. This would quickly add up in start-up costs and seemed to defeat the purpose of making the process as virtual as possible. The method that was selected was that of QR codes using an already established augmented reality scanner (3DQR) to be able to place printed codes at intersections where they could easily be scanned. This method was selected due to the availability of the software, since it could easily be downloaded for free on the App Store, and low startup and maintenance costs.