

Digital Reva – A Paper-Free Security Solution

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Abstract— The administrative department of any residential college has one major concern, i.e., the safety and security of their students. This is due to the fact that students from all over the country leave their homes to pursue a good education in the college of their choice, leaving their parents anxious about their safety. To ensure the security of hostellers and put their parents' mind at ease, our team came up with a solution which is to digitizing the entire permission process in such a way that the usage of paper is completely eliminated and the involvement of the warden is minimalized. "Digital REVA" is a paperless venture which uses a website that allows hostellers to seek permission digitally. The request is received as a notification (SMS or e-mail or simple login) by the respective parent who can respond to it in a stipulated time period. Following this, a QR code is generated which represents "Permission Granted" or "Permission Denied" based on the parent's response. The QR code is scanned at the security gate and the data is stored in a database.

Keywords—*Safety, Security, Hostellers, Warden, Permission, Digitizing, QR Code*

I. INTRODUCTION

The administrative department of any residential college has one major concern, i.e., the safety and security of their students. This is due to the fact that students from all over the country leave their homes to pursue a good education in the college of their choice, leaving their parents anxious about their safety. Hostels in most college have adopted an "Time out-Time in" system where students record their comings and goings from their respective hostels. Although this seems to be the logical solution to know the whereabouts of the hostel resident, it isn't always effective. There have been several reported incidents of accidents involving hostellers due to the ineffective security systems in college.

Based on some quick research, it has been found that REVA University has a fool-proof security system where each hosteller is only allowed to exit the hostel premises with their respective warden's permission, who in turn informs their parents about it. The main problem with this system is the workload of the hostel wardens. Each time he/she wants to go out, the hosteller has to submit a permission slip to the warden, who then verifies their parents' phone number manually from a register and calls them to inform them about the outing. It might seem as an easy task when we take only a handful of hostellers into consideration. But, in reality, each warden is in charge of at least 270 students who go to them for permission on a daily basis. Not only is it a Herculean task to manage this situation every day, but it becomes a burden on the parents too.

To improve this situation, our team came up with a solution which is to digitizing the entire permission process in such a way that the usage of paper is completely eliminated and the involvement of the warden is minimalized. "Digital REVA" is a paperless venture which uses a website that allows hostellers to seek permission digitally. The request is received as a notification by the respective parent who can respond to it in a stipulated time period. Following this, a QR code is generated which represents "Permission Granted" or "Permission Denied" based on the parent's response. The QR code is scanned at the security gate and the data is stored in a database.

II. RELATED WORK

A digital security system is a more effective way to ensure the safety of the users involved. To have a well-functioning system, we need to have certain elements that enhance the productivity of the system. We conducted a search for the most efficient and affordable security systems by going through some research papers. The cheapest solution we found was to use QR codes.

Project [1], Project [2] and Project [6] are based on QR code technology and talk about the various uses of using it. It is definitely one of the most easily available, economical and effective solutions.

Since our project is a service-based system, we needed to understand the complexities of a Service-oriented

Architecture (SOA). Project [3] and Project [4] talk about SOA and how it can be used in websites. Project [5] talks about the applications of a security system in the real world and why it is important in today’s world.

III. METHODOLOGY

Methodology 1 - SOA

Service-oriented architecture (SOA) is a style of software design where services are provided to the other components by application components, through a communication protocol over a network. The basic principles of service-oriented architecture are independent of vendors, products and technologies.

A service has four properties according to one of many definitions of SOA:

1. It logically represents a business activity with a specified outcome.
2. It is self-contained.
3. It is a black box for its consumers.
4. It may consist of other underlying services.

In SOA, services use protocols that describe how they pass and parse messages using description metadata. This metadata describes both the functional characteristics of the service and quality-of-service characteristics.

Service-oriented architecture aims to allow users to combine large chunks of functionality to form applications which are built purely from existing services and combining them in an ad hoc manner. A service presents a simple interface to the requester that abstracts away the underlying complexity acting as a black box. Further users can also access these independent services without any knowledge of their internal implementation.

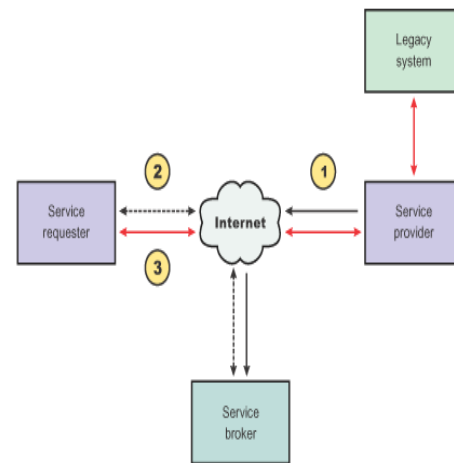


Figure 2: Working of SOA

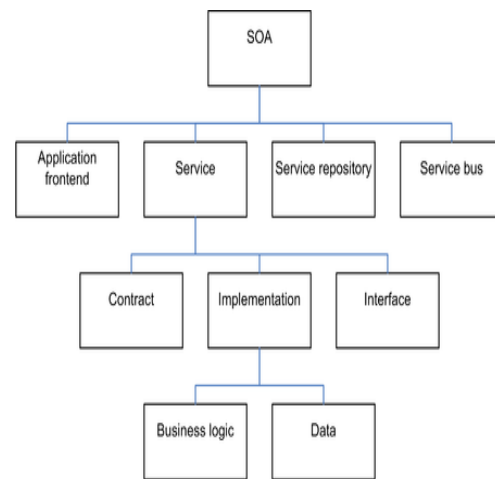


Figure 3: Components of SOA

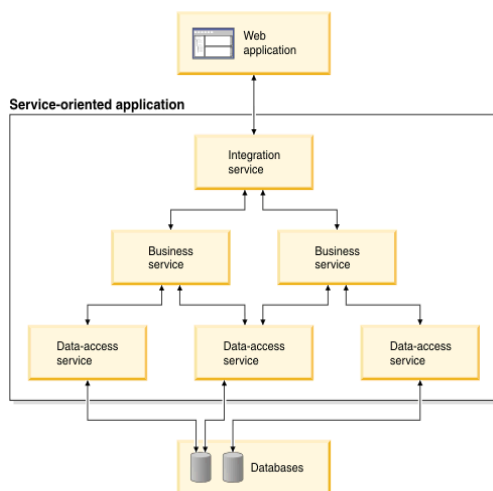


Figure 1: Block diagram of SOA

Methodology 2- QR Code

A QR code is much like a bar code, except that because it carries data in two dimensions (horizontally and vertically), it is able to hold much more information than a one-dimensional bar code. In fact, compared to a bar code’s 20 alphanumeric character limit, a QR code can hold thousands of characters of data. As a result, a QR code can be used to share multimedia content, a landing page or an entire e-book. However, QR codes can do much more than that – they can actually direct a phone to perform certain actions. For example, a theatre company might provide a QR code that not only sends the person who scans it to the company’s website for show times and ticket information, but also embeds information about the dates, times and locations of upcoming shows into the phone’s calendar.

QR codes were designed by DENSO WAVE in Japan and first came into use in 1994. Although the term “QR code” is a registered trademark, the technology itself has not been patented and is therefore available for anyone to use. One key benefit of these codes for the Japanese is that they are one of the most efficient ways of encoding Japanese characters. However, their high data capacity, small print-out size and resistance to dirt and damage (QR codes can still be read when up to 30 percent of the code has been corrupted) ensured the proliferation of this technology to other applications. In addition, unlike bar codes, which can only be read by a special scanner, many smartphones are able to scan QR codes, making them an excellent way to provide large amounts of information in a very small space.



Figure 4: An example of a QR Code

IV. RESULTS AND DISCUSSION

Implementing Digital REVA will be a much more effective system in comparison to the existing system. It will eliminate the use of paper and help us in moving forward as responsible citizens. The carbon footprint of REVA University will be reduced greatly.

The security system will be enhanced greatly and will bring a sense of peace to both the wardens and parents of the students of the college.

V. CONCLUSION AND FUTURE SCOPE

“Digital REVA” proposes a concept of a digitized security system which introduces a service-oriented approach to solve the security issues faced by students. Each type of activity in the system is regarded as a service and this service is provided to the end-users. “Digital REVA” is a venture in hopes that the security system becomes paperless, environmental-friendly, less cumbersome and more beneficial.

Some future enhancements are:

1. An android application for the same
2. Live-tracking of ward

3. Location sharing during emergencies
4. Linked with already existing facial recognition system
5. Integration with the official college website

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Authors Profile

Alisha Bilquis, Anmol Itmal and Akash Rana are students pursuing a Bachelor of Technology in Computer Science and Engineering and are currently in their final year. They started college in August, 2015 and will be completing the course in June, 2019.