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User Friendly Android-based Contact Application: Case of Accessible Contact in Educational Organization

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Abstract: ***In a digital era, people prefer to use smart gadgets and it is growing to be instrumental in daily lives. The features of the smartphone are also evolving, leading to effectiveness for end users. With such an aim, an android-based contact application was developed that would benefit an organization. As an interim measure, this application is based on Jigme Namgyel Engineering College under the Royal University of Bhutan. Currently, this organization do not have a 'contact application' that can be used as a digital phonebook. Therefore, the entire faculty, staff, and students have to search for contact details through person-to-person communication leading to several inconveniences. This android base application called JNEC Contact made contact detail of the college's staff available and accessible to staff and students without an internet connection. This application is implemented specifically for JNEC to ease the difficulties of acquiring contact information of faculty and staff. The application titled JNEC Contact has other features such as text messages and mail-to-direct correspondence. It is known to be more comfortable, efficient, and user-friendly to find a contact, unlike the phonebook. The current version of the application has limited compatibility with the android version only, but it can be developed for IOS phones in the future.***
Keywords: Accessible, Android, Application, Contact, and Phonebook

I. INTRODUCTION

There are estimates of 1.57 to 2.53 billion smartphone users from 2014 to 2020. As per [1], the smartphone cannot hold every contact detail of an employee in the organization without an application. Additionally, the smartphone cannot automatically save the contact detail and it is inconvenient to manually ask for the number and save it. In paper [2], the android-based application is developed to overcome the inconveniences of searching for contact details when needed. Currently, students do not know the entire lecturer/staff contact number and they have to search from others to contact, and during emergencies, it adds to inconveniences. Considering such issues, while acquiring contact information among staff, students, and other officials, this application was developed. JNEC Contact now has become a functional and efficient application among faculty, staff and students.

The tools used for the development of JNEC contact are Android Studio as the ground developing platform, Adobe Photoshop, Adobe Illustrator, and Balsamiq Mockups. To develop the application, the concept of System Analysis and Design is applied. JNEC Contact is the offline dictionary containing the contact detail of JNCE staff. The dictionary algorithm takes out all the distinct staff details from the department when the user searches for it. This dictionary stores the contact details of JNEC staff, thus the application is named 'JNEC contact'. In this work, XML is used for the android screen design of the application and java for defining the background activity of the application. This development has details stored in the memory of the agent, which is an android device containing the details of JNEC employees and respective searched staff's details are displayed and the user can make a call or send an email. This android base application 'JNEC Contact' was introduced to the organisation which has made contact detail available and accessible to users without an internet connection. With the use of this application, it has become convenient for many users in getting quick contact information. Moreover, the JNEC Contact app provides an interactive interface to users where users can directly call, email, and send messages.

II. RELATED WORK

Various analyses and research have been carried out to implement the contacts application that was developed by many developers. According to [3], explained that contacts and phones are part of Google's version of android since google linked the contact with a google account that can be recovered through a google account, meaning you can sync your google contacts to your phone, tablet, and computer.

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One can use Contact Groups to create different categories of contacts [4]. As mentioned in [5], the application was checked for concurrent users/access to the application. Therefore, JNEC Contact was developed as an offline app to ease users during the disruption of internet connection.

To design and develop a web application in [6], they collected requirements by brainstorming and interviewing stakeholders. After the requirement determination, the requirement structuring was implemented where data modelling was shown through conceptual design and logical design. The same method was implemented as mentioned above to design and develop the JNEC Contact. Further, the UML methodology was practiced. As per [7], Tshering et al. (2021) have created an IoT-based platform, using Apache Hadoop where they have followed UML methodology to enhance the process of understanding the system to be robust to control concurrency. With UML methodology, software development lifecycle activities were appropriate to follow. Thus, functional requirements and non-functional requirements were collected and analyzed before the development of the contact application. After the application was developed and implemented, user-friendly or user acceptance testing was carried out.

III. METHOD

JNEC Contact was developed in a sequential life cycle model with the Code Fix approach, where each phase is scheduled to proceed after the completion of the earlier phase. After the completion of each phase, it is reviewed and tested. Thereafter, we deployed the application. JNEC contact development includes the following phases:

A. Phase I- Requirement Determination

All the requirements for the JNEC contact app development are being collected before getting started with the designing and coding phase or next phase. For the collection of requirements, brainstorming and interviewing were conducted with stakeholders. Interviews were conducted using the questionnaire and the data were analyzed based on the need of the system and user satisfaction as well as for the ease of development stages.

B. Phase II- Requirements Structuring

After determining the requirement, the structuring of functional requirements and non-functional requirements were collected and analyzed using the UML approach. In addition, process modelling and data modelling were practiced to understand the logical design.

C. Phase III- Design

For the JNEC Contact interface, the Figma interface design tool was applied for database design and wireframe features. This phase made it convenient for us to code and implement and follow-up phases.

D. Phase IV- Code Fix

With the completion of the design, coding was initiated with the [7] pair programmer concept. Wherein the driver focused on coding and the navigator focused on fixing the error simultaneously. In the due course of app development, functional testing was carried out to ensure that it was as per the design.

E. Phase V- Testing

Black box testing and white box testing were a concern during the development and implementation of the application. For the success of the application, it was tested at the time of coding to check and ensure it is functioning.

When the coding was done with the final version, the complete testing of the app was done on a different level of the android version in emulators.

F. Phase VI- Deployment

JNEC Contact app module was deployed on the actual smartphone (android based) for real-time testing as beta testing. It was necessary to deploy it on the real phone for user acceptance testing and to study the drawbacks of the application from real users. With deployment, the application was able to check for concurrent user/access control. Consequently, the JNEC Contact app was observed to be used as an offline app to prevent disruption from the internet connection.

G. Phase VII- Maintenance:

Even though the application is deployed for real-time testing, yet it does not guarantee a successful result. Therefore, JNEC Contact was deployed and kept running to work as expected. To check the user-friendliness and know user's feedback, the interview was conducted to know the issues and to improve the application. It was known that it should be maintained properly every time by keeping track of its data being updated and its performance with different phones. Thus, maintenance should be done after a certain interval for further improvement as well as to make it efficient and effective for all.

IV. RESULT

To run an application on android devices, developer options are enabled on android devices to debug. Thus, an application that stores the contact details of JNEC employees is installed on an android device. JNEC Contact Application is launched and used as shown in figures 1-6 which is self-explanatory.

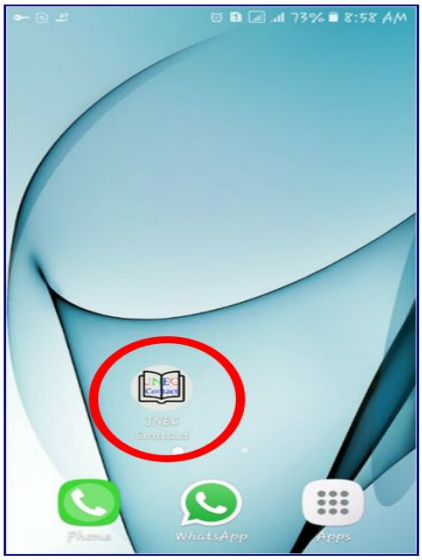


Figure 1. Appear Icon of JNEC Contact on mobile screen



Figure 2. Display of Flash Screen



Figure 3. Press button to display of contact



Figure 4. Select any department button



Figure 5. Press on lecturer/staff button you want to contact



Figure 6. Display of contact information and press on button that you want

V. DISCUSSION

The JNEC Contact app was deployed by giving the Android Application Package (APK) file or setup file to all android phone users. Although android phone users found the contact application user-friendly and convenient in their daily lives. However, those iPhone Operating System (IOS) users preferred the application to be compatible in their IOS system. Therefore, this group of users stated that it is user-friendly. Nevertheless, in the future, the application can be upgraded to the IOS version.

In addition, the application was developed to be used offline or to make contact detail accessible even in places outreach of the internet. Therefore, users appreciated this feature and recommended keeping the same even in the upgraded version. Thus, it is understood that the application was deployed as a one-time application and developed as a static application without database integration.

During the post-interview session, concerns related to the application and feedback were collected from users. It was found functional as illustrated in figure 7, where 10% of the user mentioned it was not working since it was only available on the android base and some mentioned that it was not found in the Play Store. However, 9% of the participants stated that the application was not user-friendly since it did not have an IOS version. Nevertheless, those users who were using actively opted to be user-friendly.

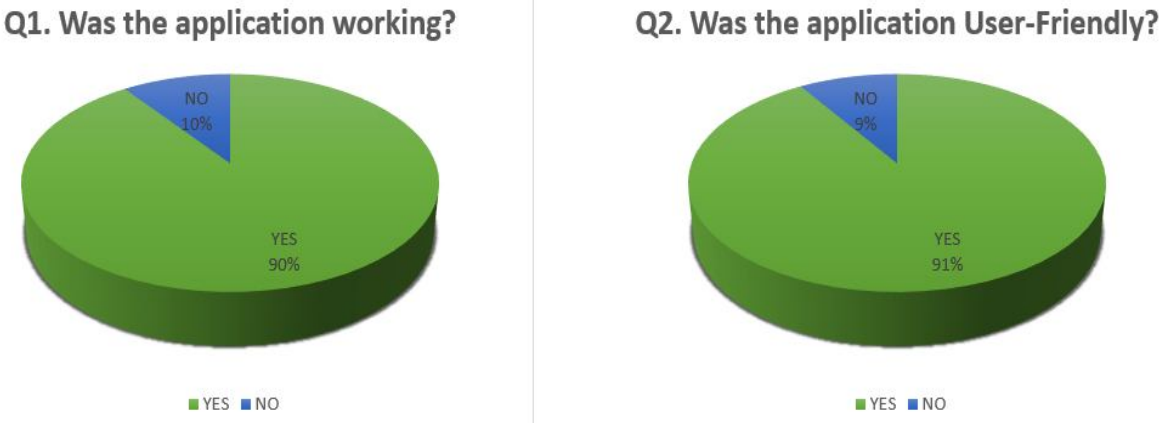


Figure7. Application Functioning and User-Friendliness Report

The pie chart above depicts that users were satisfied with the application and being user-friendly. Figure 8 shows that 47% of users said it help them with easy access or to search contact detail, 33% of users thought that it helped them to easily contact and 20% of the user mentioned that it is helpful since they do not have to save the number separately. Additionally, the users of the JNEC Contact app indicated interesting features of the application as shown in figure 8 where 80% of users liked the calling, texting, and mailing feature that was available in the application. 20% of users again mentioned that the application is interesting since it gives the details of staff.

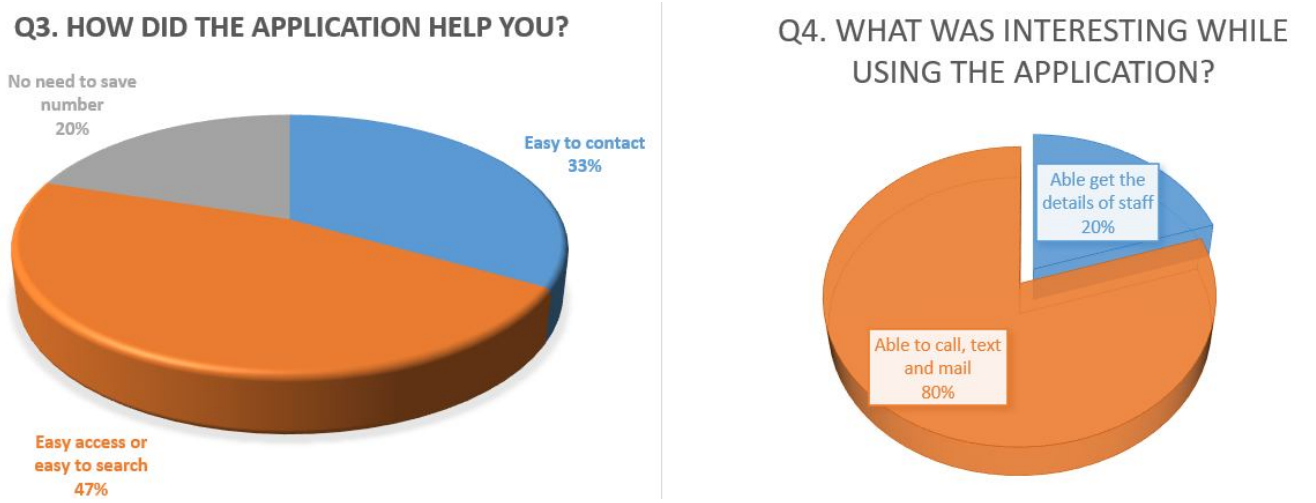


Figure8. Application helpfulness report and interesting about the application

There were some limitations with the application and needed some improvement as shown in figure 9. Users responded that the application had some problems such as 52% said that the contact details are not updated, and the existing ones were outdated. 27% commented on having the IOS version and 20% were requesting to have the application available in the Play Store. Similarly, the feedback given for the improvement of the app was to deploy in the Play Store and make the application dynamic where the contact details can be modified as and when required. Some users with technical background also suggested using the database or integrating with SQLite.

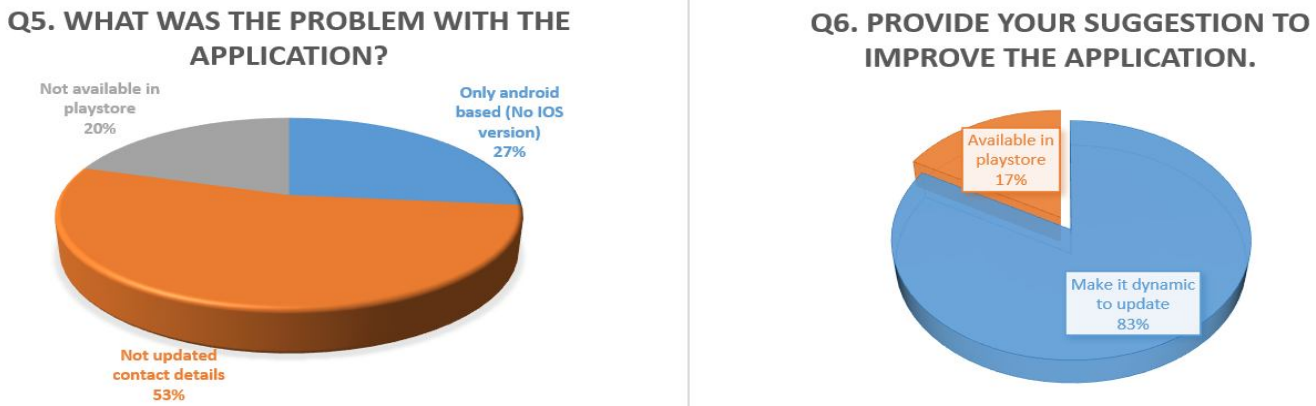


Figure9. App Problem and feedback report.

VI. CONCLUSIONS

This application enables users to save their contact details offline and get access to it when needed by simply downloading and installing the application. It can be easily installed by APK files in android supported devices. Smartphone's default application can hold maximum contact detail, but it cannot hold every contact detail automatically. With the growing number of staff and students in the college, this application is expected to be instrumental for every user in the future. The current version has limited features based on its compatibility. In the future, a similar app can be developed for IOS smartphones. As a part of this application, other possible features can be upgraded depending on the needs of the users. However, the amount of information collected from different resources helped in developing as well as added knowledge about integrating databases where the application can be made dynamic.

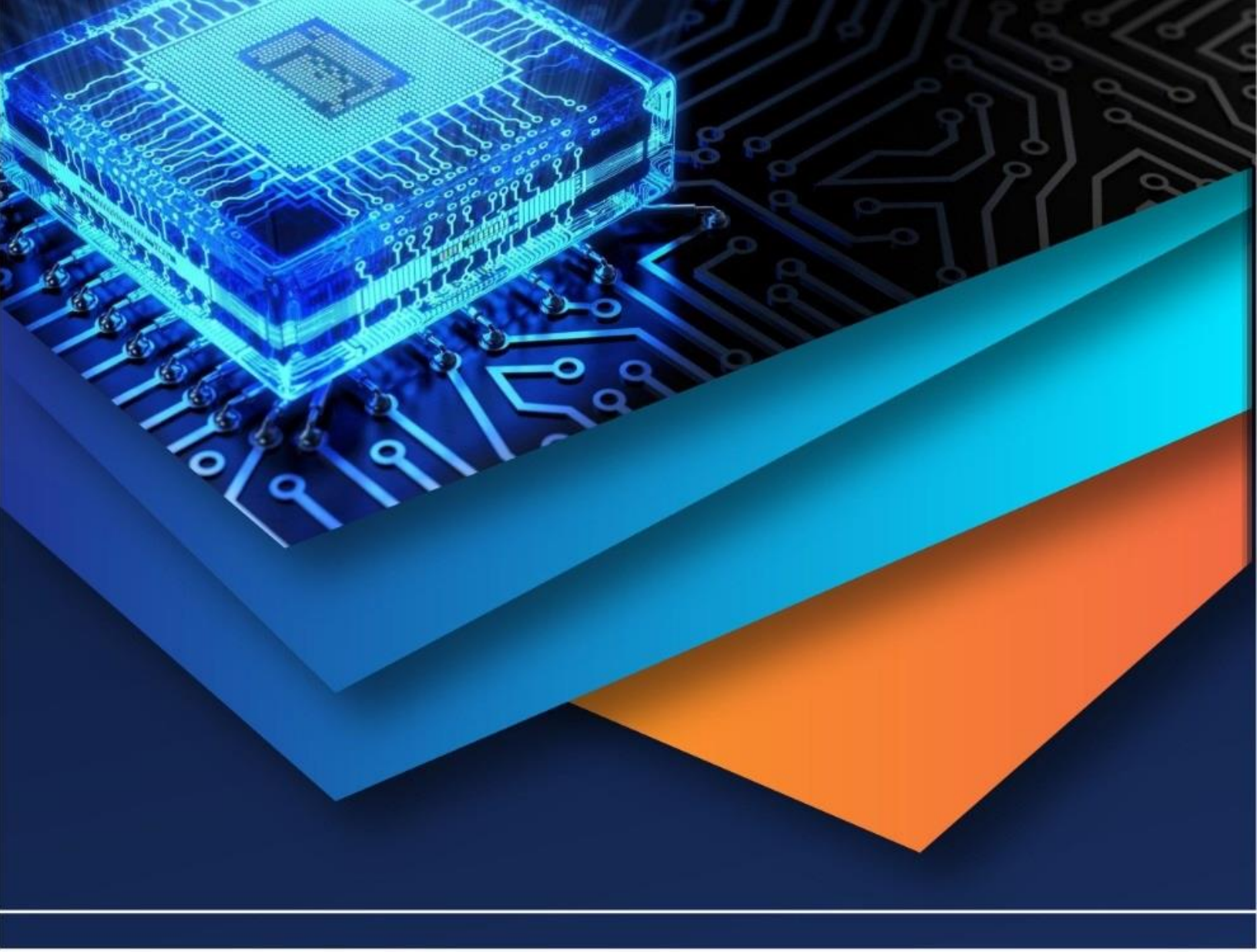
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