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Introductory Project Report

Apartment Information System

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Problem

In day to day improvement of industrial era, Bangladesh has been improving, changing for the better. Through the use of technology, a digitalized system to reduce human hard toil labor to a technology base system, making more technical approaches rather a brute force approach is currently on the air which is simplified as calling "Digital Bangladesh". The concept of "Digital Bangladesh" greatly focuses on inducing more and more technology to our day to day life where manually by one or more humans, the work is being done. In such cases, there are some facts that come to light:

1. A manually done work by human is more probable of being concatenated by mistakes rather used by technology.
2. A manual human endeavor takes time considering technology which is optimized properly.

However, in many cases in Bangladesh we still see the existence of manual labor at work. As it is impossible for us, a small group of people to solve all those cases, we concentrate here with one case.

As for industrial revolution, the rising cities are taking up apartment systems for residence system, and so has been in Bangladesh. Though the more we leave from urban to rural based life, such sight is vanished rapidly, still the number of apartments that are present and that are being constructed in cities like Dhaka, Chittagong, Sylhet and other cities of Bangladesh is not of a small count. However, once the residence moves in an apartment, many issues that could be done digitally are actually done manually. By introducing digital system, the residence will be receiving a lesser hassle. Also, in some information collection for government officials are being done manually. The regular life of an average Bangladeshi person is already quite tiring. Among them some tasks that are seen frequently are,

1. Providing different bills every month (dish bill, internet bill, newspaper bill etc.)
2. Paying utility fees (electricity bill, WASA charge etc.)
3. Government certified officials going door to door to collect census information on some interval (Population and Housing Census, Voter List Update)
4. Bangladesh Police is taking information about residence through manual work of scrutinizing papers filled up by residence

Most of the jobs are described above are done by both the provider and taker of information or money manually. If only technology could be induced, some people would get benefitted by the removement of such hassle that they have to face in regular intervals, and also another sub-path towards "Digital Bangladesh" could get open that will help our country excel towards a brighter tomorrow.

Motivation

We want to induce some digitalized system to reduce some daily task from manual to technologically enhanced digital system where the probability of data misinterpretation will be reduced due to reduction of human manual power and increase of computer-based information and data handling. The tasks we are targeting to achieve for the time being may be summarized as:

1. Storing data of all the residence of an apartment building in a database, so that when government officials arrive, through verification they can be given any information that is not breach of personal data and provided to the database by the owner of the information to be used for such cases.

2. Helping police provide required data through database about the residence and people visiting them so that they can ensure public security with ease and without collecting data from door to door. Also, by using database system, the personal information of any residence is far less to be opened up to unwanted persons considering the current paper fill up technique in use.
3. Provide the residence of an apartment with an optional account system that will allow them to provide monthly bills such as dish bill, internet bill etc. without the service provider personal coming to their doors unless the resident wants to.
4. Collecting and storing information about all those who come visit the apartment complex. In such case, if any bad or prejudicial actions occur, from a safe database the person who is guilty could be founded out easily through analyzing the data.

So, if we can generate a system that can fulfill such feature, we can ensure many human hand held work being controlled digitally which will reduce process time and can obviously speed up data search. Also, by storing data the system will additionally help increase security of the apartment complex.

Solution

To approach a solution for decreasing hassle of life we propose a software-based solution that has more integrity and by deployment should provide easy of access, security of some extent and most importantly easy exchange of required information. The solution that we propose can be described as:

1. Build a database for an apartment building where the information of each of the apartments are stored of both the current residence and previous residence of that particular apartment.
2. Also store data about people who come to the building but do not reside in it (i.e.: house maid, personal vehicle driver, guests) and build a log system to be used for later analysis if needed.
3. Provide a warning through e-mail when a pre-paid utility service is about to end or expire.
4. Entitle a particular person who has some technology knowledge so that he can operate a software-based system for information handling.
5. In case of any inconsistency, the one appointed for the software handling will be responsible and can easily be cornered, so chance of ill-use of data is reduced.
6. The person already responsible for data monitoring, can also operate on behalf of the residence to provide bills if they are given permission or access to, such will free the hassle of sudden arrival of people to collect bill to come to house.

To successfully attain the full benefit of our software, we introduce some ideal assumptions. As the project is of new concept, we are interested in deploying the basic structure and later on develop a real case application from our ideal application. In other words, currently our objective is developing a prototype software that will act as a skeleton structure for our project so that in future in can be used for more versatile cases. Some of our ideal assumptions are:

1. The apartment complex consists around 30 or more apartments and have a dedicated Manager ranked employee assigned for the establishment. For prototype development however, we will be considering lesser number of apartments with a manager in the complex.
2. All apartments in the complex use pre-paid system for services like electricity, water and a hardwire system automatically provides data about how much amount is left, that will be provided manually for the time being.

3. Any new guest that arrive in the complex shall be given a "GuestId". When a guest comes once again to visit someone, he will be providing some unique verification information like mobile phone number from which we can store data of guests wo come to the apartment complex.
4. All the information given to the database is correct and no person with ill-motives or fraud is allowed to reside or is residing in the apartments of the complex.
5. Services like television dish, newspaper, internet, each of the same type are provided by the vendor of a particular company and no multiple companies providing the same service are giving service to different apartments of the same complex.
6. For people who work in apartments for like driver or being house maid:
    a. Each apartment has only one or no driver and no two or more apartments have the same driver at the same time.
    b. A house maid may work in several apartments and an apartment may have several house maids working in it.
    c. Driver and house maids do not leave the apartment complex or enter, they work as long as they are assigned and leave when no one hires them.
7. The data of manager and security is stored by "Flat Owner's Association" and in case of any misconduct of their designated acts, the association has sufficient data to reach them that is not included in the database of our project, but in some other source or database.
8. A system administrator with full authority over each and every part of the software is available and can take any necessary steps if needed.

Features

The prototype application is going to have some features. Most of them are cased ideal which will be gradually improved and optimized through higher processing systems and algorithms. The current targeted features are:

1. A separate interface for Manager, Security and Apartment resident
2. A security can only enter data about people coming to the apartment complex and information related to him. He also has access to minimum data about residence of the apartment complex that is required to find which flat the person is going and whom he is visiting.
3. A manger through his interface can manage several things
    a. He can see whether the residence of an apartment has enough money in his account so that he can pay bills for services like newspaper bill, internet bill. Also, he can see if there are any comments left for him from a resident. He can also add amount of money to account of any person when he receives from a person by hand.
    b. He can add data of any new person moving in to the apartment complex and edit if the any member permanently leaves the apartment complex. However, as for editing, he can only change the status of that person, any other information is view only for him. Only System administrator can change any other required information.
    c. Deletion of any data is not allowed through the manager interface.
    d. The manager can view all data that the resident has provided openly to the database and can manage some simple filtered actions like through age or profession that will let him conduct acts of providing data to Government officials and police when needed.

4. The resident Graphical User Interface is solely for the purpose so that a person can see all the transactions a manager is committing through the money he is providing the manager to his account. He may add comments or instructions for the manager through the interface and in case any transaction seems foggy can report it also. The comments that a resident add can not be changed or deleted by the manager, he can only view it and as per his job requirement we assume that he has seen the message as soon as the resident has provided it.
5. Once the pre-paid bill hits a marginal amount, if the resident has provided an e-mail and the device is connected to internet, an e-mail will be sent to the resident about the warning of reducing amount.

Platform

Software Platform:

Java is a software-only platform that runs on top of other hardware-based platforms [*1*]. We will be using Java as our software platform on developing this prototype software.

Framework:

We will be using Swing as our framework. Swing is a platform-independent, "model-view-controller" GUI framework for Java, which follows a single-threaded programming model. Additionally, this framework provides a layer of abstraction between the code structure and graphic presentation of a Swing-based GUI. Application Framework (JSR) which is a java specification for a simple application framework for Swing applications, with a Graphical user Interface (GUI) in computer software [*2*].

Database Platform:

To store and manage data through database we will be using a database platform. We will be using Microsoft SQL Server, a relational database management system developed by Microsoft [*3*] for the purpose.

References

[1] https://docs.oracle.com/javase/tutorial/getStarted/intro/definition.html
[2] https://en.wikipedia.org/wiki/Swing_(Java)
[3] https://en.wikipedia.org/wiki/Microsoft_SQL_Server