Development of an Android Based Intelligent Service Delivery Mobile System

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Abstract: **This paper presents the development of an android based intelligent demand service delivery mobile system. The aim is to provide a system which incorporates various domestic home service professionals into a single platform and intelligently monitor their behaviors when services are requested. This will be achieved by developing an intelligent algorithm which monitors service request using time control function and then send feedback to the request user of the service professional behavior which includes request acceptance notification, rejection notification (i.e if the request is ignored or rejected). With this system, the service request person will never be disappointed or kept stranded. The system will be developed using necessary universal modeling diagrams, process models, data model and implemented with android studio as a mobile application system. The system was tested and the result showed that when service request was accepted, the user received notification of the request acceptance, and in another case where service was rejected or ignored the request user received notification within 60 sec of service request.**

Keywords: **Intelligent algorithm, Feedback notification, Service request, Service professional**

I. INTRODUCITON

Service delivery system is an online application which will render domestic services once demand is requested by the user [1]. The structure is in place to help combat the challenges of domestic home services [2], maintenance, delivery, catering and lots more activity. However till date, very few of them have gained market acceptance and also none as far as the researcher has the capacity to solve multiple problem. In order words, none was able to integrate multiple service professionals in one platform for easy access and service delivery [3, 4, 5, 6].

Over time popular service delivery applications like Opay, handy, merry, maids, home joy , slate, O-food, 1mg for health care [7] among other have been developed and published for publish applications [8]. However each of these systems solved specific problems like logistics as in the case of O-pay [9, 10] or food delivery as in the case of O-food. However it will be more appreciated if a single system will incorporate these service and more together. This is because users will no longer see the need to download multiple applications which consumes more memory space and cost, but to simple get this single app which will solve the domestic problems required.

Today, user experience of some of these applications revealed that they lack intelligent features. This is because the user only receives notification, when the service requested is accepted. The problem with this feature is that, users keep on waiting until their request is accepted, and most time not knowing that the service professional ignored the request due to other engagements. This act can be frustrating, disappointing and time wasting. These as a result have affected the integrity, credibility, general acceptance and reliability of the conventional service delivery systems. Therefore, there is an immediate need for a simple mobile system which integrates various professionals into a singular platform and then an intelligent algorithm which monitors their behavior when services are requested. If this can be achieved, it will help solve the everyday domestic problems we experience at homes, offices, churches, emergency car breakdown, accident, health issues among others.

II. METHODS

The methods will be discussed into three categories which are registration management, service management, Request management system and also objected oriented approach will be adopted..

The registration and login system: this system provides platform for the creation of both customer users and service professional's account. The service professionals will be mandated to register in the category of their skills and professions, providing basic data about the services they intend to render to the public. The other part of the system will provide the users the platform for login access to the main system using the details provided during registration.

Service management system: this system provide management platform for service professionals to create their work (service) profile, edit their account by providing more skills, qualifications, address among other vital information that will easy attract the attention of customers. This will be developed using necessary data model and class diagram during the system design section as the research progresses.

Request management system: the system provides platform for customers to navigate the categories of available professional's services, view their profiles, services they can provide, and request for services. It will also be responsible to connect the request of a particular customer to the desired service professional. The platform will also provide monitoring intelligence to the request sent to ensure desired feedback is sent to the customer based on the behavior of the service professional. The essence is to eliminate the problems encountered in some of the conventional system, which when

service are requested, the professional ignored the request, without the knowledge of the customer. At this point the customer keep on waiting and hoping for respond form the service person due to the account is online, not knowing that the order was ignored on purpose. This act has frustrated a lot of users and hugely affected the integrity of the conventional system, hence this problem will be solved developing an intelligent algorithm which monitors every service request sent and notify the customer based on the behavior of the service professional after a specified time. The algorithm will be provided in the system design section.

III. SYSTEM DESIGN

The system will be designed using necessary universal modeling diagram compatible with the methodology adopted for the system. This will begin with the design of the registration and login system using activity diagram as shown below;
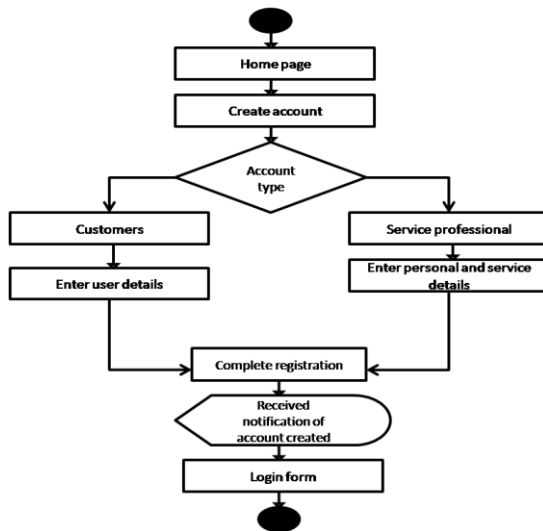

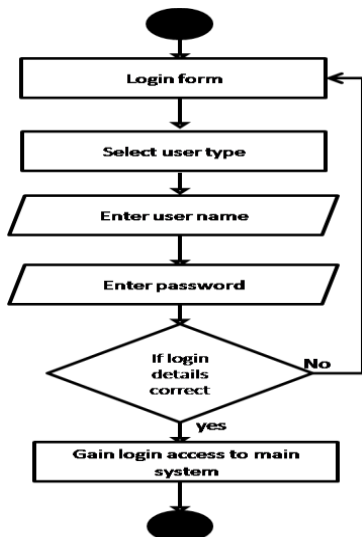Figure 1: activity diagram for registration system

Figure 2: activity diagram for login system

The activity diagram in figure 1 above was used to model the registration process for the customers and the service professionals. The service professionals are meant to register with their personal and service details while the customers register with just basic information of themselves. When the registration is completed, the user received a confirmation notice of the complete registration process. The data used for registration is then required to login to the main system. The activity diagram for the login process is modeled in the figure 2 above. It describes the process flow of the users type and guide them on the steps and information required to gain access based on the user requirement.

Service management system design

This section models the service management structure using data model. The was done considering the service professionals such as nanny, electrical service professionals and mechanics to be incorporated into the system and then develop the data structure using class diagram presented in figure 3.
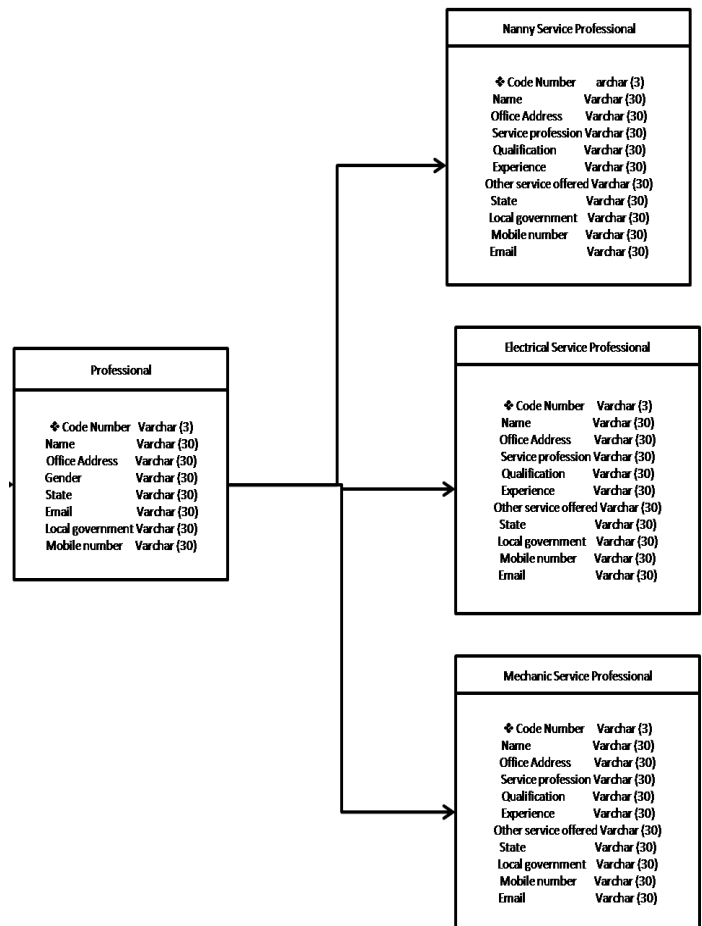

Figure 3: the class diagram for the service management

This diagram in figure 3, serves as a blue print for which the relational database managing the various service professionals was deduced as sown in the tables below.

Table 1: Professional Service Management

S/N	NAME	DATA TYPE	DESCRIPTION
1	Code number	Integer	primary key
2	Full name	Varchar	
3	Office address	Varchar	
4	Gender	Varchar	
5	State	Varchar	
6	Email	Varchar	
7	Local government	Varchar	
8	Mobile number	Integer	

Table 2: Electrical Service Professionals

S/N	NAME	DATA TYPE
1	Code number	Integer
2	Full name	Varchar
3	Office address	Varchar
4	Qualification	Varchar
5	Experience	Varchar
6	Other services	Varchar
7	State	Varchar
8	Local government	Varchar
9	Mobile number	Integer
10	Email	Varchar

Table 3: Nanny Service Professionals

S/N	NAME	DATA TYPE
1	Code number	Integer
2	Full name	Varchar
3	Office address	Varchar
4	Qualification	Varchar
5	Experience	Varchar
6	Other services	Varchar
7	State	Varchar
8	Local government	Varchar
9	Mobile number	Integer
10	Email	Varchar

Table 4: Mechanic Service Professionals

S/N	NAME	DATA TYPE
1	Code number	Integer
2	Full name	Varchar
3	Office address	Varchar
4	Qualification	Varchar
5	Experience	Varchar
6	Other services	Varchar
7	State	Varchar
8	Local government	Varchar
9	Mobile number	Integer
10	Email	Varchar

Design of the request management system

This system models the request management process using the use case diagram below;
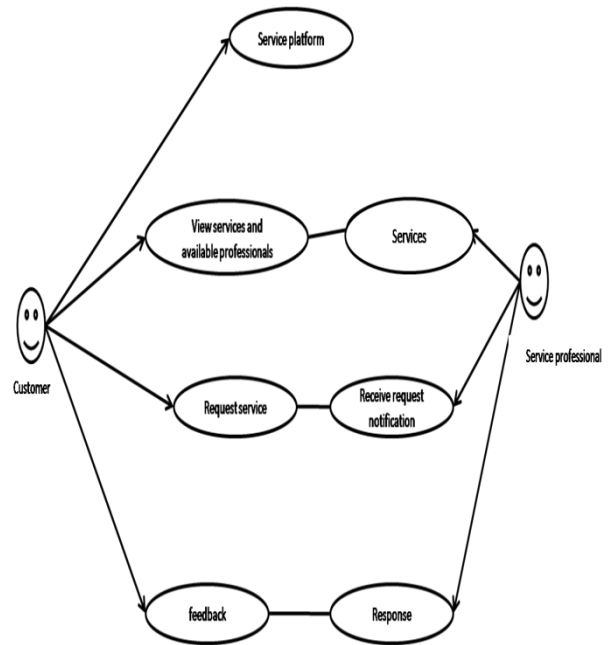

Figure 4: use case diagram of the service management system

Primary actor: customer

Secondary actor: service professional

Brief description of event: From the modeling diagram above the customer access the service platform and view various professionals profile and their available services to select and request for service of choice. The service professional selected, receives the request notification and responds. The response is monitored using the intelligent algorithm presented below in figure 5 and sends feedback to customer.

Pre-conditions: it was assumed that the customer and the service professionals have already been registered with the system and logged in already.

Post-conditions: the customer is expected to act based on the notification response status received.
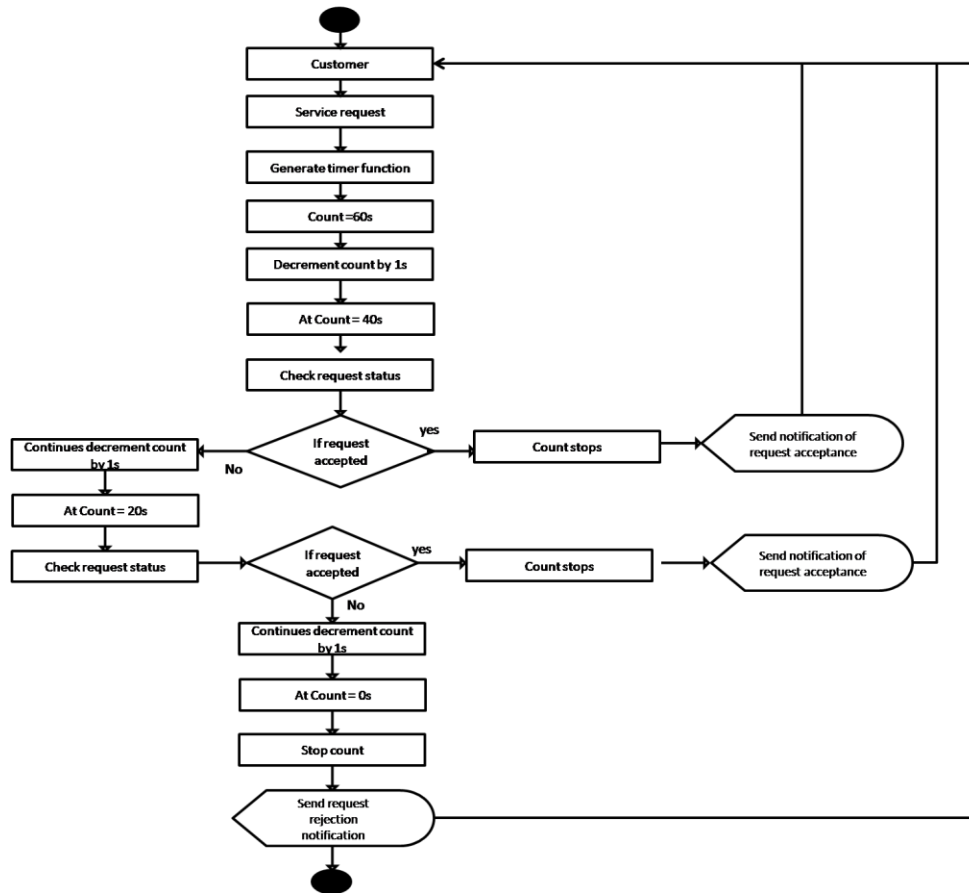
Figure 5: the request monitoring algorithm

The activity diagram in figure 5 models the monitoring algorithm of service request. When customer request service, an automatic time function of 60s is generated and count by minus 1s, after 20s count the request status is checked for confirmation, if "yes" the timer stops and sends a request acceptance notification of the customer. But if the request confirmation status is "no" then, the timer function continuo to count down till at another 20s, then request status is checked again for confirmation, if "yes" the timer stops and send request acceptance notification to the customer, but if status is "no" then the timer continuo until at 0s, then timer stops and send a request rejection notification to the customer. This will help eliminate disappointment, unnecessary waste of time by service professionals and also provide integrity and confidentiality of the system.

IV. IMPLEMENTAITON AND RESULTS

The design was implemented using android studio and the results are presented as shown below, starting with the login form for the customers and service professionals in figure 6(a) and (b) respectively.
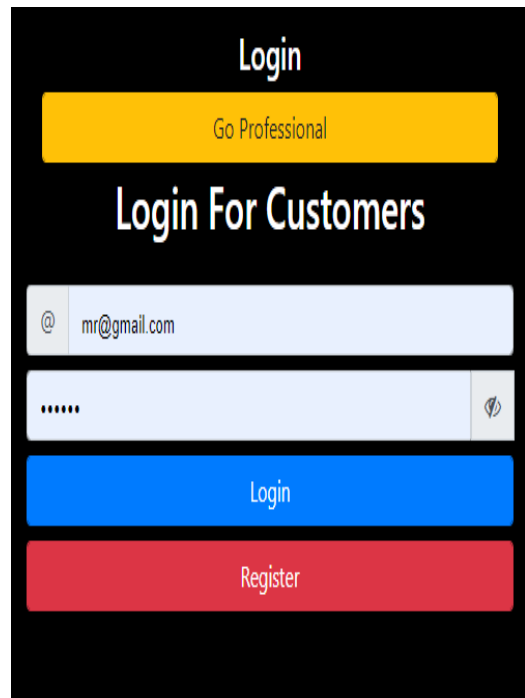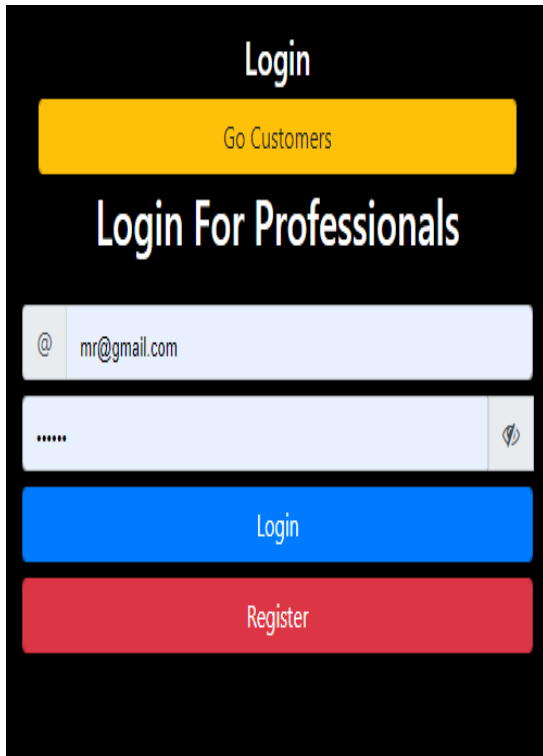

Figure 6(a) customer login

Figure 6(b) professional login

The service management form is presented as shown in figure 7, showing how a customer logged in as ufoeze@gmail.com was able to gain access to various professionals available and their services as shown below;
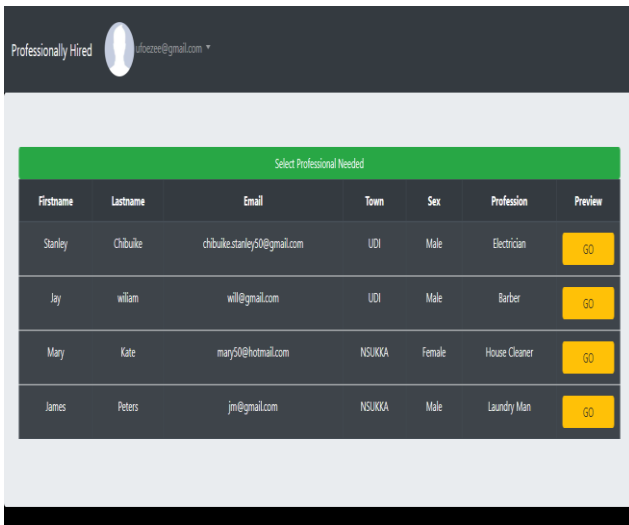

Figure 7: Professional service manager

From the figure 7 above, the customer user selected peter with email jm@gmail.com which is a laundry man as shown in figure 8.
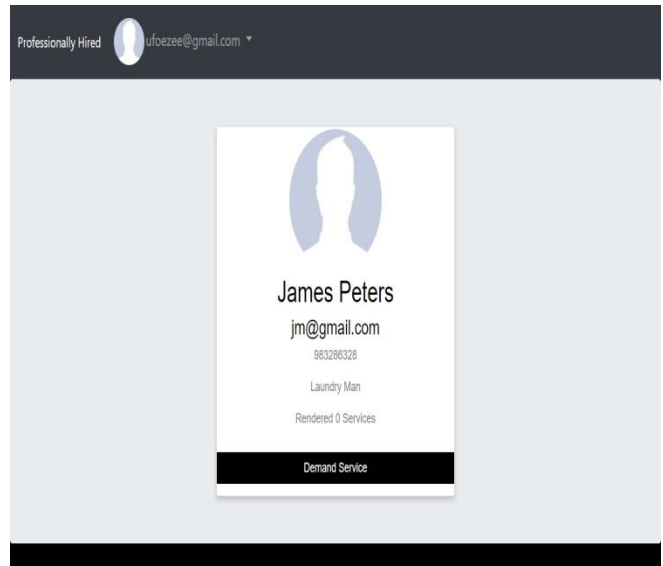

Figure 8: result of the service ordering platform

The figure presented some of the basic info of the service professional selected with contact details like phone number, email, number of previous service rendered via this platform and the type of service to render. The result also presented the customer with platform to request for service. When this action is true, the intelligent algorithm designed in figure 5 monitors the action of the service person and sends feedback to the customer as shown below;
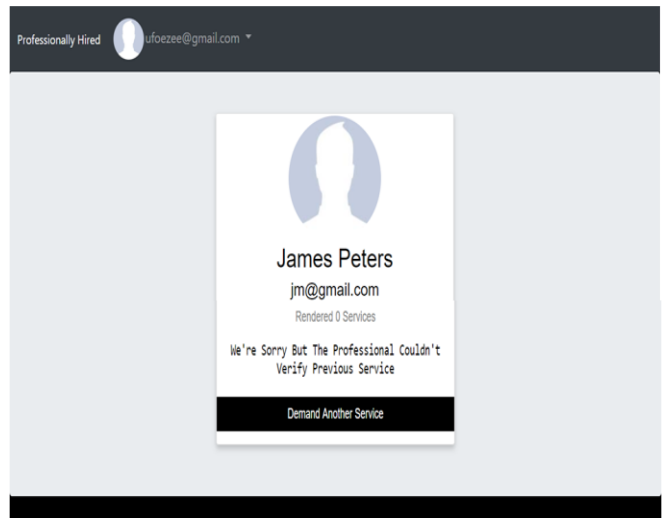

Figure 9: result of the feedback notification to the customer

The result in figure 9 shows the feedback notice received by ufoezee@gmail.com. The message implies that the service person ignored the request sent for his service. This action was noticed by the algorithm developed and then sends feedback to the customer within after 60s. The implication of this result shows that the user cannot be kept stranded and will always be notified so as to act immediately his or her request is rejected, ignored or accepted.

V. CONCLUSION

This paper has successfully presented the development of an android based intelligent service delivery system. The system integrated mechanics, nannies and electricians into a single service provision platform and intelligently manage their services to customers and effectively ensured that both parties are satisfied at the end of the day. Eliminating factors like time wasting, disappointments, frustration among other constraints characterized with the conventional systems. The system was designed with high level of integrity and confidentially using an intelligent algorithm which monitors and immediately sends feedback of the service professional behavior to the customer after service was requested within 60s.

REFERENCE

[1] Ponsignon F., P.A. Smart and R.S. Maul (2010) l" Service delivery system design: characteristics and contingencies Centre for International Service Research (ISR), University of Exeter Business School, Exeter, UK

[2] Hwang, T., Park, H. and Chung J. W. (2016).Design and implementation of the home service delivery and management system based on OSGi service platform. In International Conference on Consumer Electronics, 2016. ICCE '06., pp.189-190, 7-11 Jan. 2016.

[3] Karwan, K.R. and Markland, R.E. (2006), "Integrating service design principles and information technology to improve delivery and productivity in public sector operations: the case of the South Carolina DMV", Journal of Operations Management, Vol. 24 No. 4, pp. 347-62.

[4] Cardoso, J.; Lopes, R. and Poels, G. (2014), Service Systems: Concepts, Modeling, and Programming, Springer.

[5] In Yinxin and David (2011), presented a work on the modeling of complex global service delivery system. Proceedings of the 2011 Winter Simulation Conference S. Jain, R. R. Creasey, J. Himmelspach, K. P. White, and M. Fu, eds.

[6] Karni and Kaner (2016) An engineering tool for the conceptual design of service systems. In Advances in Service Innovations, edited by Spath and Fahnrich. Springer.

[7] Carmel (2012) worked on improving service delivery system for health care settings. Friedrich Ebert Stiftung South Africa Office 34 Bompas Road, Dunkeld West Johannesburg, South Africa P O Box 412664, Craighall .

[8] Chen, M., Hsu, C. and Lee Y. (2012). Applying quality function development to develop the home delivery service model for specialty foods in traditional market. In Industrial Engineering and Engineering Management (IEEM), 2012 IEEE International Conference on , 10-13 Dec. 2012.

[9] Huang, Y. and Kuo, Y. (2008).The evaluation of logistics service quality on home delivery service for online auction. In EEE International Conference on Service Operations and Logistics, and Informatics, pp.1343-1348, 12-15 Oct. 2008.

[10] Campbell A.M. and Savelsbergh M. (2015) "Incentive Schemes for Attended Home Delivery Services" Transportation Science Published Online: August 1, 2006 - Page Range: 327 – 341