

An Algorithm for Personal Health Information System for Diabetic and Hypertensive Patients

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ABSTRACT

Science and technology have come to stay in the society and their contributions to almost all fields of human endeavour cannot be overemphasized. In the world today, so many people; both health workers and non-health workers alike tend to look out for a better way of keeping their records. The only thing that is constant to human race is change and we must embrace it with one heart. To this, this research work – Personal Medical Record System is written, designed and implemented to solve the problem of inconsistency in the data of patients. Some of these are cases like misplacement of patients' information when they are needed, uneasy of access to the right medical records when they are needed, unstructured patients' information when there is urgent need. Though many researchers have done whole lots of works in this field, but they have not done it in a way that client (patients) could get involved in the detail keeping of medical histories. Some of these detail includes Bio-data, Treatment chart, Health case, Visitation to health facilities, Medication and mode of intake, when, why and where. To achieve this, Java script, PHP, MySQL, DHTML and CSS were used both for the front and back end development and the basic Integrated Development Environment (IDE) as per editor used for the coding where Visual Code Studio and Dreamweaver CS6. Alongside these, the graphic package used for the beautification of the user interface is Adobe Photoshop CS6, finally, at implementation stage, the system runs live on browser like safari, Mozilla, Chrome, opera both on mobile phone (android or windows) and on computer systems, which are having internet access.

Keywords: Diabetes, Hypertension, Health, Personal Health Record, Mobile phone Responsive, Responsive Web, Medical Record and Patients.

1.0 INTRODUCTION

The health condition in Nigeria is highly reprehensible, because, thousands of Nigerian dies every day from different medical conditions that are largely preventable and treatable with the presence of adequate health facilities manned by well experienced health workers. In recent times, diabetes, hypertension, and other cardiovascular diseases are the major causes of morbidity and mortality in adults in Nigeria. Although there are other diseases with almost the same records like cerebrovascular accident and renal diseases, this fact lead to the conclusion that in the last decade, there is a

paradigm shift from communicable to non communicable diseases world wide. These diseases (diabetes and hypertension) are often associated with high disease burden in developing countries like Nigeria. In the early nineties, not much was known about diabetes and hypertension in Nigeria and traditionally, people related them to “curses” and “hexes” unlike this time where there is somewhat proper awareness about these conditions. Medically speaking, High blood pressure (hypertension) is a condition that often affects people with diabetes, and it is widely assumed that, obesity, a high fat, high sodium diet and inactivity have led to a concurrent rise in both conditions.

If a patient has hypertension, it means the blood is pumping through the heart with too much force overtime and diabetes simply mean abnormal blood glucose level. Gabriel G. et al.(2014), Both diseases are risk factors for cardiovascular diseases (CVD) and when they co-exist it is particularly lethal and they multiply morbidity and mortality of CVD. Hypertension in diabetes accelerates development and progression of micro vascular and macro vascular complication and diabetes related diseases such as retinopathy which may cause blindness and kidney diseases. Research in the last decades has shown that lowering blood pressure in diabetic patients leads to sizeable reduction in death rates. Gabriel G. et al. (2014).

While there has been an increase in the design and implementation of Personal Health Record (PHR) systems in the developed world, little has been done to explore the utility of these systems in the developing world. Despite the usual problems of poor infrastructure, PHR systems designed for the developing world need to conform to users with different models of security and literacy than those designed for developed world.

This study is on a PHR system distributed across mobile devices with a security model and an interface that supports the usage and concerns of low literacy users in developing countries. The main question addressed in this study is: *“Can personal health records be stored securely and usefully on mobile phones?”*

Mobile phones are very flexible and cost efficient devices that offer adequate storage and computing capabilities to users for typically communication operations. However, it is also

worth noting that, mobile phones generally do not provide sufficient security mechanisms to protect the user data from unauthorized access

There is no doubt that healthcare is a social-scale problem. Especially with the elderly populations increasing, the burden of healthcare is steadily increasing. Also, health care providers are faced with a shrinking professional care giving force, which means there is a need for the patients' family members, friends and communities to involve in the care activities. Thus, there is an urgent need for building collaborative care environment to maximize caregivers' efficacy, to improve the safety and quality of care by providing timely health information to professional health care providers, patients and patients' family members or friends.

Sachs (2008) described that public health is one of the basic services that can greatly improve people's standard of living in developing countries. However, several challenges such as scarcity of financial resources and infrastructure, combined with ineffective health structures and mismanagement are among the critical constraints of health services in developing countries (Sachs, 2004).

Considering these challenges, it is essential to find a sustainable way for the undeveloped communities to achieve a healthy standard of living. In some countries, an optimistic vision has emerged that undeveloped communities might employ digital technology in a sustainable way to help them achieve many development goals. This is referred to as Information and Communication Technology (ICT) for Development, or ICT4D. Meaning,

providing several billion people in the undeveloped communities with sustainable technology to achieve development goals such as improved access to healthcare services (Heeks, 2008).

For example, in the last 50 years, advances in computing and other information and communication technologies have transformed the way individuals create and share information. Within healthcare, ICTs have spurred an empirical revolution to electronic health or E-health. The potential of E-health systems in the management of healthcare information is also emphasized by the following quote from Braa and Blobel (2003).

2.1 RESEARCH REVIEW

High blood glucose and high blood pressure are the two common disorders among adults worldwide with great burden on socio-economic life of the patient and the health care system. So many researches have made a lot of contributions to this field and they'd talk both on it treatment and a therapeutic lifestyle that could help in keeping these health cases in check. Among these control measure, proper record keeping is a key point. In this work, many authors like **Gray et al (2011)** who talk about the relation of hypertension and diabetes. From his work, he stated clearly that medical records made him to establish the fact that hypertension is most common in patients that are diabetic compared to non-diabetic patients across the globe. His claim was also supported by the fact finding of **Jai Ganesh and Vijay Viswathan**. In their work, they said; Hypertension affects 20-60% of patients with diabetes, depending on obesity, ethnicity

and age. And Hypertension is disproportionately higher in people with diabetes, while person with an elevated blood pressure is likely to develop hypertension in 5-years.

Hanson et al (1998) did a pretty work too. In his work, he ascertain that various studies have shown that lowering blood pressure in high risk patient with diabetes reduces overall mortality. This is evidenced from the mode of treatment and data storage on a given patient and how they react to the treatment per time.

Gunter et al (2005), stated in his research work that Electronic health records enable the efficient communication of medical information and thus reduce operating costs and administrative workload, but this was in theory.

The EHRs can exist on standalone computers, networked server computers, removable disks or mobile devices and can be accessible online from interconnected network systems providing the opportunity for healthcare organizations to improve healthcare delivery **Haux (2006)**.

Robison et al., (2012); PCAST report, (2010) Did a pretty work but still limited to health providers alone. In this, a patient just has an ID but cannot enter or query her history in the absence of a health worker.

Based on the work of Robison, in conjunction with many other researchers, their work were done well, but do not give room to clients or patients to partake fully in the record keeping process as stated in his work. Which is shown below?

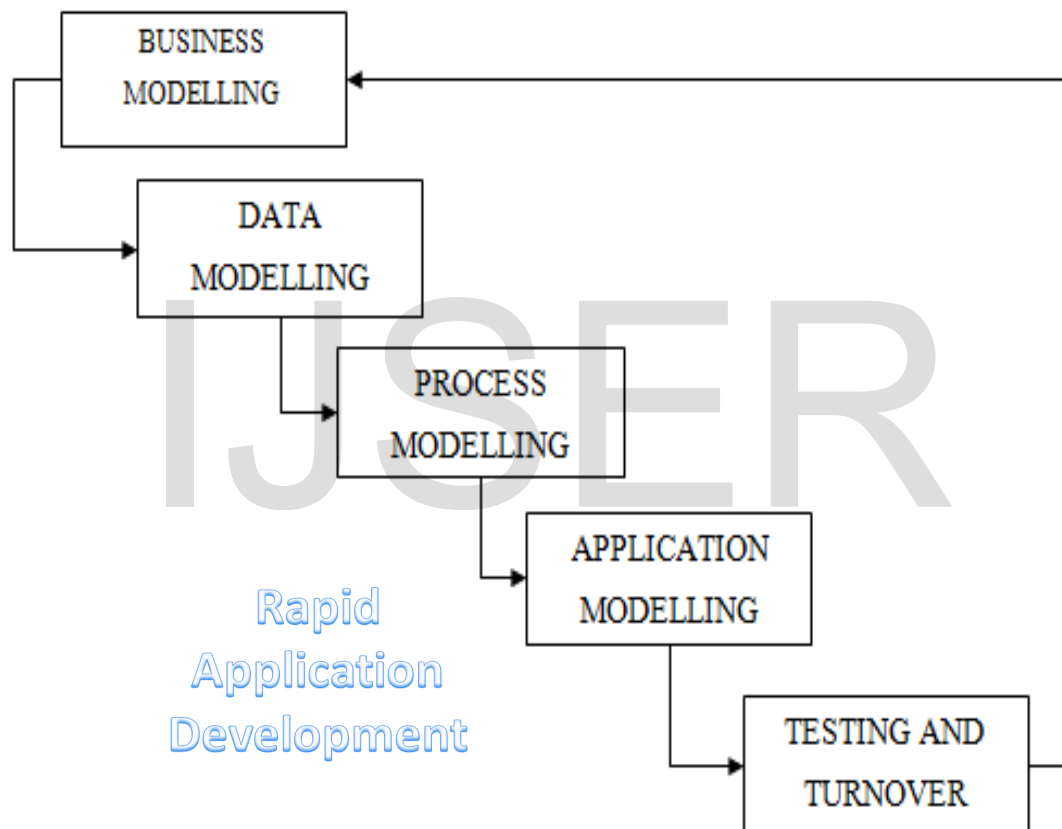
In cases where the patient has no access to his/her personal health record, it becomes impractical to export the data from the previous provider to the new provider.

We Developed on this algorithm in order to make the patients recording system mobile

responsive and not just that also to allow room for patients to enter their daily medical cases and procedures in a secure form, which could be accessed from anywhere in the world with just their phone number or ID.

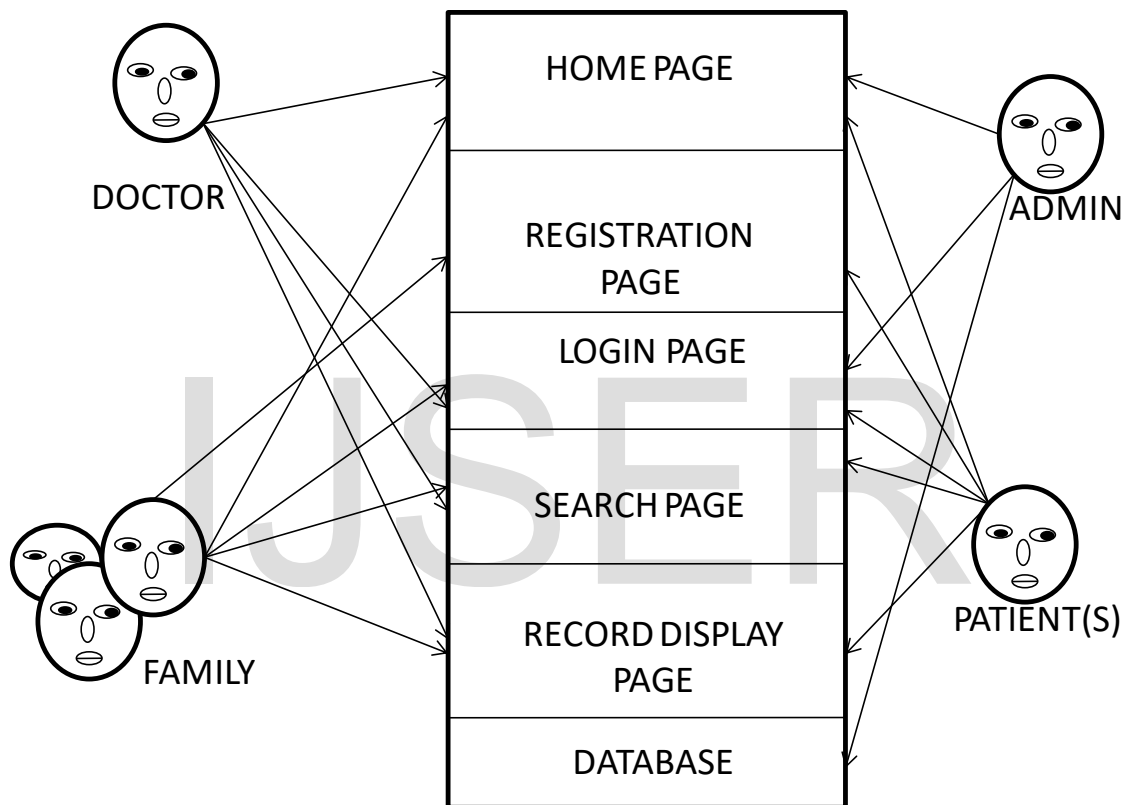
3.1 RESEARCH METHODOLOGY

The method used in carry out this research is a RAD Model



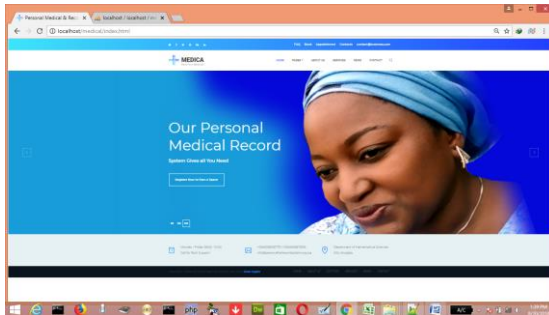
RAD model is Rapid Application Development model. It is a type of incremental model. In RAD model the components or functions are developed in parallel as if they were mini projects. The developments are

time boxed, delivered and then assembled into a working prototype. This can quickly give the customer something to see and use and to provide feedback regarding the delivery and their requirements.

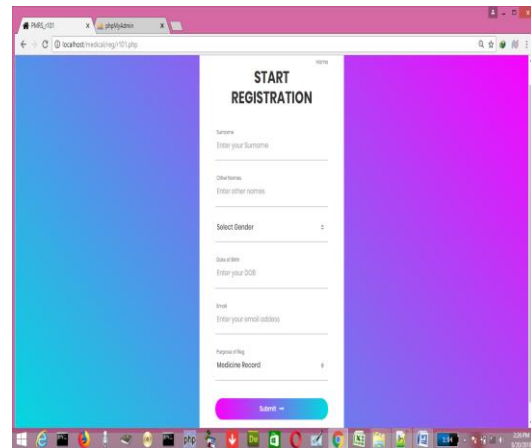


USE-CASE
DIAGRAM

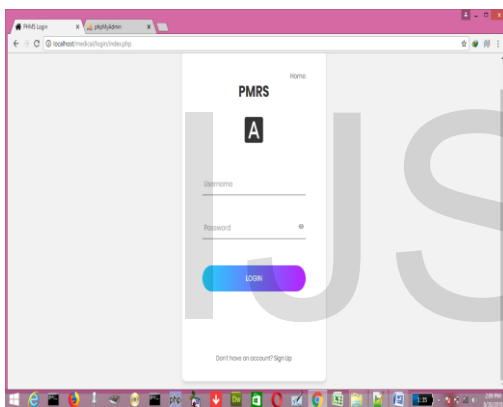
4.1 RESEARCH IMPLIMENTATION



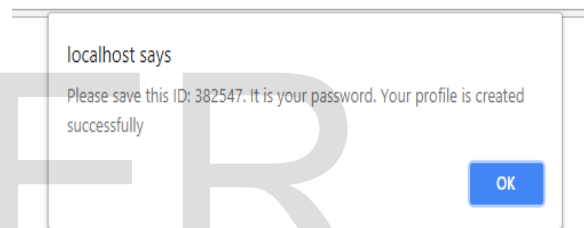
HOME PAGE



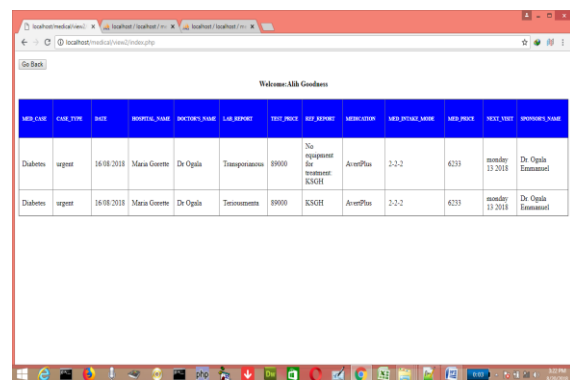
REGISTRATION PAGE



LOGIN PAGE



GENERATION OF USER ID ON SUCCESSFUL REGISTRATION PAGE



A PATIENT SEARCH DISPLAY WITH RECORD

5.1 CONCLUSION

Based on the objectives of this study and the various analysis made, we hereby conclude that the web based Mobile Responsive Personal Medical Record System has formed an integral

part of Information Technology (IT) in Computer Science Department and all institution of higher learning at large. As the cases presented in this seminar demonstrated, the patients' role in the health care arena is

expanding, and nurses are becoming an increasingly critical link between patient and physicians. Nurses and Doctors must take affirmative steps to learn the applicable standards of care for their particular skills, so that they can be able to make independent assessments of patient's condition as easy as possible, and also to enable them recognize signs and symptoms that they must communicate to patients' physicians based on the history they are

able to lay their hands on. This should be made available to the health practitioner either based on legal access grant by the patients or as needed by the health institution for further study of the case concerning the being.

Conclusively, this seminar work has been a worthwhile effective because it has exposed us to project design and implementation which I know will surely be an experience that will be of help to us in the near future.

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