An Improved Framework of Healthcare Supports System for the Treatment of Dementia Cases

Akaninyene Udo Ntuen
Department of Computer Science, Akanu Ibiam Federal Polytechnic, Unwana, Nigeria
Email: auntuen@akanuibampoly.edu.ng

John Edet Efiong
Department of Computer Science, Wesley University, Ondo, Nigeria
Email: john.efiong@wesleyuni.edu.ng
(https://orcid.org/0000-0003-4391-2475)

Eme Ogwo
Department of Computer Science, Akanu Ibiam Federal Polytechnic, Unwana, Nigeria,
Email: ogwoeme@yahoo.com

Edward O. Uche-Nwachi
Department of Computer Science and Informatics, Alex Ekwueme Federal University, Ndufu-Alike, Nigeria,
Email: ucherose2001@yahoo.com

Received: 18 September 2021; Accepted: 29 October 2021; Published: 08 December 2021

Abstract: This research proposes an improved framework that would support the healthcare services and attention given to dementia patients. The paper shows the design and implementation of a web-based application that demonstrates the proposed framework. This study was necessitated by the observed flaws and weaknesses in the current manual technique of handling dementia cases in care homes which are plagued with loss of records, time wastage in retrieving records, data insecurity, user entry and data management errors, among others. The system design was realized using the unified modeling language (UML) on EdrawMax. The frontend implementation was done using HTML5, CSS3, and JavaScript, while the business logic was achieved using PHP, and the Database was designed with MySQL and managed through PHPMyAdmin. The system was tested by medical practitioners and dementia patients in a select care home. Other tests on browsers' compatibility and platform interoperability were successful. The result of the study advances technical knowledge in developing medical expert systems using web 2.0 technologies, and promotes academic inquiry in the domain. The demonstration of the framework shows an improvement on the existing techniques which use quasi-automated approach. The proposed model is suitable for supporting efficient management of data of dementia patients.

Index Terms: Caregivers, Care Home, Dementia Cases, Healthcare Application, Improved Framework, Patients.

1. Introduction

Dementia is a psychiatric condition (set of symptoms) triggered by multiple illnesses [1]. It is further described as diverse brain disorders or acquired deterioration in thinking and memory because of brain disease resulting in notable impairment of social, personal, or occupational purposes [2]. The disease affects other functions of the brain such as communication, memory, personality, mood, orientation, language, calculating ability, judgment, comprehension, reasoning, learning capacity, and information processing [3].

Pavisic, Suarez-Gonzalez and Pertzov [4] inform that short-term memory is the common challenge of people with dementia. Oftentimes they do not remember things they have just done or said, although they can recollect occasions that took place some years back. Their perception of location and time is of course gone, rendering it impossible to use new terms, absorb new knowledge, and do new stuff. As the dementia stage progresses, victims require assistance to carry out common tasks of daily living, such as bathing, dressing, washing, eating, and toileting. Oftentimes, there is a severe behavioural challenge that makes them uncontrolled and uncommunicative. At this stage, they require 24-hour
monitoring and care. Dementia may lead to sudden death, but it is not the actual cause of death. If people with dementia are properly taken care of, they can live with the situation for many years.

Koumakis et al. [5] assert that there is an urgent need to improve dementia care quality by designing a framework and developing a web application to increasingly gather information and artifacts about patients, their history and interests, diagnosis, and treatment, care, and support, and making this information available when needed. Efforts have been made to develop solutions for managing dementia cases such as the COGKNOW, Context-aware, Alzheimer's Caregiver Internet Support System (ACISS), and Net-book Specific, used as Cognitive Help, Reminders, Health and Activity Monitoring, and Socialization respectively. These systems have pertinent flaws majorly in usage time, accuracy, ease of data presentation and management, and user-friendliness, as highlighted in Table 1 in the next section.

Therefore, the objective of this research is to develop an application that is simple, efficient, secure, and cost-effective to deliver real-time updates to care home administrators, caregivers, and patients to make their jobs more enjoyable and less frustrating. [6] proposed that an application-based method of data management is cost-effective and would improve the quality of treatment and care, minimize medical mistakes, and enhance communication between caregivers and patients. It would also boost information storage, update, retrieval, readability, reliability, and data quality [7]. The study significantly enriches modern approaches to dementia care. It will benefit patients, caregivers, healthcare stakeholders, and researchers.

2. Related Work

Dementia is a serious and rising health issue worldwide [8]. Despite an uncertain eventual solution, delivering high-quality and cost-effective treatment and care over what is always needed for a longer period is and will continue to be a significant issue for caregivers [9]. Healthy life for people living with dementia in care homes has been the concern of researchers, practitioners, and policymakers [10]. Efforts in recent times are centered on how to manage patients’ information and data to drive better care, however, the challenge associated with these efforts involves but is not limited to the cumbersomeness of the data which results from inadequate entry or and redundancy of available data of patients’ lived experiences and biographies when they are needed for policies or research [11].

According to [12], one challenge identified in dealing with dementia cases is that too many of the cases are under-reported, hence, the need to have an effective and efficient reporting system that can capture the real-time data needed for patients experiences improvement. Although the information or data obtained from people living with dementia requires adequate storage for future use, the current practice (paper-based) of managing patient records in care homes is not efficient for such voluminous data. This approach has continued to present numerous drawbacks and challenges to caregivers, patients, and administrators such as data replication, data discrepancy, data insecurity, and un-updated information making it difficult to trace the histories and flow of prescription data of patients, therefore, hampering prognosis outcome [13].

People with dementia behave differently. As such, the effect of dementia at each of the stages hangs on the type of dementia the individual has. According to [14], there are more than 100 confirmed types of Dementia, nevertheless, most of them are very rare. The four main (common) types of dementia found in clinical practice are Alzheimer’s disease, vascular dementia, frontotemporal dementia, and dementia with lewy bodies, which account for 90 to 95 percent of all cases. This study does not limit itself to any dementia. The proposed model would satisfy all and any.

Szczechowiak, Diniz & Leszek [15] reported that there is no single cause of dementia or a cure for it. Rather, it is a progressive disorder, with deterioration likely to occur in all areas and people at the age of 90 and above are highly at risk of developing dementia than those at the age of 60. This argument agrees with the publication of [16] where they emphasize that various kinds of dementia have diverse possible causes. The authors noted that dementia is generally found in elderly individuals, but age is not an indicator of the true cause of dementia.

The World Health Organization [17] informs that dementia has notable economic and social implications concerning the rates of medical services, informal treatment, and direct clinical care. In 2015, the total global societal cost of dementia was estimated to be US$ 818 billion, equivalent to 1.1% of global gross domestic product (GDP). The overall expense as a share of GDP varied from 0.2% in low- and middle-income countries to 1.4% in high-income countries.

Although time has not provided a solution for dementia, it has brought modern medical applications (Table 1) that can alleviate the strain of treatment and help medical practitioners to execute their task in a more relaxed and safer manner [18] which in return promote the quality of healthcare among dementia patients.
Table 1. The Medical Software for Dementia

| Medical Software for Dementia | Application Area | Use                                                                 | Pros                                                                                                                                                                                                 | Cons                                                                                                                                                                                                 |
|-------------------------------|------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| COGKNOW [19]                 | Cognitive Help   | For an innovative solution to cognitive reinforcement from a services perspective such as selection and engagement in a choice program | Increases the quality of life and independence and elongates the period individuals with dementia can live within their home environment. Suggestions indicated that reminders should be more personalised and should support personal configuration. |                                                                                                                                                                                                      |
| Context-aware [20]            | Reminders        | For reminding people suffering from mild dementia to perform their daily activities in time and in the correct manner | Moderates memory impairment of dementia patients and improving their independence level thereby minimising the burden on caregivers. The occurrence time of disruptive activity, such as answering a phone call, cannot be predicted. It may disrupt the pre-planned activity. |                                                                                                                                                                                                      |
| Alzheimer’s Caregiver Internet Support System (ACISS) [21] | Health and Activity Monitoring | For monitoring of health and activity of people with dementia | Offering decision making, clinical, and emotional support to family caregivers of patients with Alzheimer’s disease. The privacy of the patient is not taken into consideration. |                                                                                                                                                                                                      |
| Net-book Specific [22]        | Socialisation    | For improving the performance of people with dementia in social activities engagement | Enable patients diagnosed with Alzheimer’s disease to independently make phone calls to various partners, like friends, family members, and caregivers. Time-consuming in selecting call contacts independently, support is still needed by the dementia patient in this aspect. |                                                                                                                                                                                                      |

The justification of this research is that many applications developed to assist people living with dementia as reviewed in this study focus on cognitive help, reminders, health/activity monitoring, and socialisation without making provision for information storage. The proposed system enables patients to upload personal data, make complaints, and receive feedback from their caregivers. The caregivers can also access the patient’s record for decision-making. Adopting this system would enhance effective performance by caregivers thereby improving the quality of healthcare for people with dementia.

3. Methods

3.1 System Design Technologies

The technologies used in designing the framework and developing the application are HTML, CSS, JavaScript, PHP, MySQL, and XAMPP. The database was first designed using MySQL. The justification for choosing MySQL includes Server reliability and compatibility with numerous applications programming interfaces (APIs) [23]. Next, the project framework (CodeIgniter) was set up to help in writing and organising the programming code. The rationale for adopting this framework includes Highly Secure [24]; Faster Execution Time [25]; and Easily Management of Errors [26]. Thereafter, the front-end (client-side) was designed to meet the users’ needs using HTML5, CSS3, and JavaScript. The rationale for selecting these tools was to easily determine the content, appearance, and responsiveness of the webpage [27]. The server-side (back-end) was designed using PHP to enhance the retrieval of data. The rationale being that the PHP code can be executed on all major platforms and can interact with numerous database languages including MySQL [28]. XAMPP server was then activated and some SQL queries were written to retrieve the desired information.

3.2 Class Diagram

The class diagram lays the framework for all subsequent design and implementation tasks. It is a technique for defining various data types, proves the presence of object classes and their fixed linking in a logical flow of the system [29]. The class diagram for this study includes the following classes: Admin, Patients, Doctor, Nurses, and Carers. Each class is responsible for managing the operations of that class. For instance, the admin class manages all the operations of admin, while the patients’ class manages all the operations of patients. Fig. 1 is the representation of the class diagram.
3.3 Use Case Diagram

A use case diagram is a visual representation of the user’s interactions with the system. In this system, the users are the Admin, Patient, Carer, Doctor and Nurse. The admin, for example, can assign patients to a carer; the patient, on the other hand, can submit complaints that are available to caregivers; a carer can, among other things, see the patients who have been allocated to him and submit a report after the shift. Following a successful login, a doctor's tasks include reviewing patient complaints and writing prescriptions. The nurse can collect and record a patient's vital signs, as well as the drugs dispensed. The use case diagram for the proposed system is as shown in Fig. 2.
3.4 System Flowchart

System flowcharts show how information flows through a system and how decisions are made to regulate occurrences. Therefore, at the start of the sequence in this system, a new user registers in the system to receive login credentials, which are generally a username and password. After successful registration, the information is transferred to the database for storage, which qualifies the new user as an existing user. Logging into the system is the first step for an existing user. The system then verifies the user's credentials to see if they are valid or not. If the login is successful, the user will proceed to perform the desired task and then exit. The flowchart for the proposed system is as shown in Fig. 3.
3.5 The Proposed Framework

The research framework as shown in Fig. 4 demonstrates the flow of information from different terminals. The main users of the system are the admin, patients, and caregivers (doctors, nurses, and carers). The usage of the system requires a computer system, internet connection, and a web browser. The framework offers an interface where the users can sign up to obtain their login credentials to further access the system resources. Patients can make complaints and receive feedback; Caregivers, for instance, carers can log any observation or assistants given to a patient; nurses can register patients’ vital signs and medication; while doctors can access carer’s reports, patient’s complaints, and vital signs and make prescriptions.
3.6 Database Design

To complete the flow of data and data processing tasks in this study, a database named “dementia care” was created with thirteen (13) tables. Each table was designed to meet the needs of the user. The thirteen (13) tables created are patient, admin, carer, nurse, doctor, booking, vital signs, complaint, payment, report, patient-doctor, patient-nurse, and patient-carer. The relationship between the tables is established. For instance, the patient table is connected to the doctor table through an extension table patient-doctor which shows that the patient relationship with the doctors is many to many. Also, the relationship between the patient table and the payment table shows one-to-many relationships. The tables’ relationships link tables and help in retrieving the desired information from the database. Fig. 5 shows the entity-relationship diagram of the database.

4. Results and Discussion

This section presents and discusses the results of the implementations. The application for this study comprises of five actors: Admin, Patient, Carer, Nurse, and Doctor. To begin using the application, new users sign up to get registered in the system. Once successfully registered, login credentials usually the username and password are issued to the users which enable them to access the services available for them. The connection of the user interface to the
database ensures information centralisation, unlike the paper-based approach that separates information into different storage thereby causing data inconsistency, replication, insecurity, and difficulty in updating information. The proposed system promotes easy communication among caregivers and patients. Also, data protection is ensured because users are uniquely identified and authenticate before granting access to the system.

Furthermore, once the admin has successfully gain access into the system, the modules designed for the admin enables him to verify patient’s payment to ascertain if it is legitimate. Once the invoice is verified as genuine, the admin assigns caregivers (carer, nurse, and doctor) to the newly registered patient which now created a communication channel between the patient and caregivers. Fig. 6 shows an instance of patients’ allocation to a doctor for treatment. There are a total of five (5) doctors and twenty (20) patients. Doctor 1 treats patients 1, 5, 9, and 11; Doctor 2 treats patients 2, 8, and 12; Doctor 3 treats patients 3, 6, 15, 16, and 20; Doctor 4 treats patients 4, 10, 13, and 18; while Doctor 5 treats patients 7, 14, 17, and 19.

Also, patients can among others make complaints that are accessible by the caregivers. The Complaint module enables patients to lodge any complaints to enhance quick intervention from their caregivers.

Fig. 7 shows the interface that enables patients to make complaints. Part of the responsibilities of a carer is to provide support to patients allocated to him and make reports at the end of the shift (Fig. 8). The reports include the assistance given to patients, observations made, and any complaints from patients. The carer’s reports are accessible by the doctors and nurses. The nurse collects and reports the patient’s vital signs (Fig. 9). The doctor uses the carer’s report, patient’s complaint, and vital signs to make decisions and prescriptions for patients. The nurse then uses the prescription as a guide to dispensing medications to patients and registers it in the system for future reference.

Fig. 6. Patients’ allocation to doctors for treatment

Fig. 7. The interface that enables patients to make complaint to caregivers
After a successful development of the application, a Cross-browser Compatibility Testing (CCT) was performed on the system to ensure that the behavior and user experience were consistent across all browsers, devices, and platforms. This also ensured that the features of the application such as code validation, performance, responsive design, and user interface inconsistencies worked perfectly. Chrome, Opera, Firefox, and Edge were used to evaluate the application that was built in this study. Table 2 displays the outcome.

### Table 2. The result of the CCT test

| S/ N | Interface       | Features                  | Scenario                      | Expected Output                             | Actual Output                          | Result   | Chrome | Firefox | Opera | Edge |
|------|-----------------|---------------------------|-------------------------------|--------------------------------------------|----------------------------------------|----------|--------|---------|-------|------|
| 1    | Users           | Login                     | Wrong username or password    | Error message                              | Invalid username and password          | Pass     | ✓      | ✓       | ✓     | ✓    |
|      | Users           | Login                     | Correct username and password | Load the user’s interface                  | User’s interface loaded                | Pass     | ✓      | ✓       | ✓     | ✓    |
| 2    | Patient         | Make Complaint            | Click make complaint          | Show interface                             | Interface is shown                     | Pass     | ✓      | ✓       | ✓     | ✓    |
| 3    | Admin           | Make Schedule             | Click schedule                | Show schedule                              | Information displayed                  | Pass     | ✓      | ✓       | ✓     | ✓    |
| 4    | Carer           | My Patients               | Click my patients             | Display Patients assigned                  | List of Patients showed                | Pass     | ✓      | ✓       | ✓     | ✓    |
|      | Carer           | Make Report               | Click make report             | Show interface to file reports             | Interface is shown                     | Pass     | ✓      | ✓       | ✓     | ✓    |
5. Conclusion

The lack of a firm information system to serve patients and caregivers has led to inconveniences in the care home. The paper-based method and quasi-automated techniques of recording, accessing, and exchanging information between caregivers and patients is a tedious task, time-consuming, repetitive process which may result in exposure or loss of sensitive information. The implementation of a web-based application in the care home is vital to the effective handling of information, and the proposed framework would bring about a significant change. The application has fulfilled the key targets set for the project. The application offers several interfaces for the completion of tasks by Admin, patients, and caregivers (Doctors, Nurses, and Carers). For instance, patients can make complaints and receive feedback; Carers can log any observation and assistant rendered to patients; Nurses can report patient’s vital signs and document medication dispensed; Doctor can access patient’s complaints and vital signs for decision making and prescriptions, while the Admin can schedule caregivers for duty.

Having one application that can handle these tasks is expected to dramatically improve the quality of treatment and care for patients by effectively decreasing the time for caregivers to make decisions. The application does not need installation on a separate computer; therefore, it is also expected to be easier to use. With further improvements, the application would become a powerful guide for patients with dementia being managed more effectively. While the study identifies in literature a few systems proposed for dementia problems, the healthcare facilities chosen as the case plant for this study uses a paper-based and quasi-automated system, managing data majorly on electronic spreadsheets. This made benchmarking our model with the existing system difficult. However, our system was subjected to testing by the medical personnel in the facility with their live dataset and found a good replacement of the current solution.

This paper, thus, advances academic knowledge in leveraging web 2.0 technologies to enhance data management in the healthcare sector by reducing paper-based bookkeeping techniques. It attempts to promote scientific inquiry into the role data management plays in the treatment of dementia cases in particular, with huge potentials for adoption in other cases and domains. Future work will consider the implementation of appropriate machine learning algorithms to improve the accuracy of the proposed framework. Publicly available dataset of dementia cases shall be used for training and testing such as algorithms.

References

[1] Draper, B., 2004. Dealing with dementia: a guide to Alzheimers disease and other dementias [e-book]. St Leonards, New South Wales, Allen, and Unwin. Available through: PDF Drive Website <pdffdrive.com> [Accessed 10 June 2020].

[2] Cayton, H., Graham, N., and Warner, J., 2008. Dementia: Alzheimers and other dementias. [e-book]. Class Publishing (London) Ltd, WS Bookwell, and Juva. Available through: PDF Drive Website <pdffdrive.com> [Accessed 10 June 2020].

[3] Cahill, S., O’Shea E., and Pierce, M., 2012. Creating excellence in dementia care: A research review for Ireland’s national dementia strategy. [e-book]. Trinity College, Dublin. Available through: PDF Drive Website <pdffdrive.com> [Accessed 10 June 2020].

[4] Pavisic, I.M., Suarez-Gonzalez, A. and Pertzov, Y., 2020. Translating visual short-term memory binding tasks to clinical practice: From theory to practice. Frontiers in Neurology, 11, p.458.

[5] Koumakis, L., Chatzaki, C., Kazantzaki, E., Maniadi, E. and Tsiknakis, M., 2019. Dementia care frameworks and assistive technologies for their implementation: A review. IEEE reviews in biomedical engineering, 12, pp.4-18.

[6] Klar, R., 2004. Selected impressions at the beginning of the electronic medical record and patient information. Methods of Information in Medicine, 43(05), pp.537-542.

[7] Roukema, J., Los, R.K., Bleeker, S.E., van Ginneken, A.M., van der Lei, J. and Moll, H.A., 2006. Paper versus computer: feasibility of an electronic medical record in general pediatrics. Pediatrics, 117(1), pp.15-21.

[8] Larson, E.B., 2010. Prospects for delaying the rising tide of worldwide, late-life dementias. International psychogeriatrics/IPA, 22(8), p.1196.

[9] Wimo, A., Ballard, C., Brayne, C., Gauthier, S., Handels, R., Jones, R.W., Jonsson, I., Khachaturian, A.S., and Kramberger, M., 2014. Health economic evaluation of treatments for Alzheimer’ s disease: impact of new diagnostic criteria. Journal of internal medicine, 275(3), pp.304-316.

[10] Gridley, K., Brooks, J.C., Birks, Y.F., Baxter, C.R., and Parker, G.M., 2016. Improving care for people with dementia: development and initial feasibility study for evaluation of life story work in dementia care. Health Services and Delivery Research.
[11] Roach, Pamela., Keady, John., and Bee, Penny., 2014. Familyhood” and young-onset dementia: Using narrative and biography to understand longitudinal adjustment to diagnosis. Beyond Loss: Dementia, Identity, and Personhood.

[12] Woods, R.T., Keady, J., and Seddon, D., 2008. Involving families in care homes: a relationship-centered approach to dementia care. Jessica Kingsley Publishers.

[13] Meingast, M., Roosta, T., and Sastry, S., 2006, August. Security and privacy issues with health care information technology. In 2006 International Conference of the IEEE Engineering in Medicine and Biology Society (pp. 5453-5458). IEEE.

[14] Hung, L., Leitch, S., Hung, R. and Phinney, A., 2020. Creating dementia-friendly and inclusive communities for social inclusion: a scoping review protocol. BMJ open, 10(6), e035028.

[15] Szczepanska, K., Dziewczenko, W., & Leszek, J. (2019). Diet and Alzheimer's dementia—Nutritional approach to modulate inflammation. Pharmacology Biochemistry and Behavior, 184, 172743.

[16] Koch, T. and Lifshitz, S., 2010. Rapid appraisal of barriers to the diagnosis and management of patients with dementia in primary care: a systematic review. BMC family practice, 11(1), pp.1-8.

[17] World Health Organisation, 2019. Dementia [online] Available at: <https://www.who.int/newsroom/factsheets/detail/dementia#;--text=Dementia%20is%20one%20of%20the,families%20and%20society%20at%20large> [Accessed 14 June 2020]

[18] Sauer A., 2019. 7 Technological Innovations for Those with Dementia [online] Available at: <https://www.alzheimers.net/9-22-14-technology-for-dementia/> [Accessed 14 June 2020].

[19] Davies, R.J., Nugent, C.D., Donnelly, M.P., Hettinga, M., Meiland, F.J., Moelaert, F., Mulvanna, M.D., Bengtsson, J. E., Craig, D. and Dröes, R.M., 2009. A user-driven approach to developing a cognitive prosthetic to address the unmet needs of people with mild dementia. Pervasive and Mobile Computing, 5(3), pp.253-267.

[20] Du, K., Zhang, D., Musa, M.W., Mokhtari, M. and Zhuo, X., 2008, December. Handling activity conflicts in reminding system for elders with dementia. In 2008 second International conference on future generation communication and networking (Vol. 2, pp. 416-421). IEEE.

[21] Vehvilainen, L., Zielstorff, R.D., Gertman, P., Tseng, M.C., and Estey, G., 2002. Alzheimer's caregiver Internet support system (ACISS): evaluating the Feasibility and effectiveness of supporting families caregivers virtually. In Proceedings of the AMIA Symposium (p. 1185). American Medical Informatics Association.

[22] Perilli, V., Lancioni, G.E., Laporta, D., Paparella, A., Caffo, A.O., Singh, N.N., O'Reilly, M.F., Sigafoos, J., and Oliva, D., 2013. A computer-aided telephone system to enable five persons with Alzheimer's disease to make phone calls independently. Research in developmental disabilities, 34(6), pp.1991-1997.

[23] Adoga, A. J. and Yakubu, D.D., 2019. Secured website. British Journal of Computer, Networking and Information Technology, vol. 2, issue 1., p.1-8.

[24] Griffithis, A., 2010. CodeIgniter 1.7 Professional Development. Packt Publishing Ltd.

[25] Gunnery, A., and Kurnia, Y., 2020. Design of Website for Elders with Dementia. In Proceedings of the 2nd International Conference of the IEEE Engineering in Medicine and Biology Society (pp. 5453-5458). IEEE.

[26] Meingast, M., Roosta, T., and Sastry, S., 2006, August. Security and privacy issues with health care information technology. In 2006 International Conference of the IEEE Engineering in Medicine and Biology Society (pp. 5453-5458). IEEE.

[27] Tatroe, K., and MacIntyre, P., 2020. Programming PHP: Creating Dynamic Web Pages. O'Reilly Media.

[28] Robbins, J.N., 2012. Learning web design: A beginner's guide to HTML, CSS, JavaScript, and web graphics. “ O'Reilly Media, Inc.”.

[29] Cortellessa, V., and Mirandola, R., 2000, September. Deriving a queueing network-based performance model from UML diagrams. In Proceedings of the 2nd international workshop on Software and performance (pp. 58-70).

Authors’ Profiles

Akaninyene Ntuen is a highly qualified and skilled computer scientist. He received a Bachelor of Science (BSc) degree from the University of Uyo in 2011 and a Master of Science (MSc) from Anglia Ruskin University in Cambridge, United Kingdom in 2020. He is a lecturer with Akau Ibiak Federal Polytechnic in Uwan, Nigeria, in the Department of Computer Science. He is the coordinator of the department's examinations and lectures. He is a member of professional bodies and has written books in the field of computer science. Assistive Technologies and Learning with Disabilities, Cloud Computing, IoT, Cyber Security, Databases, and SoftWare Engineering are some of his research interests. He is currently undergoing professional training in the United Kingdom.

John Efiong received Bachelor of Science (BSc. Hons) degree from the University of Uyo, Uyo and Master of Science (MSc) from Obafemi Awolowo University, Ife-Ife, Nigeria, all in Computer Science. He holds a teaching position in the Department of Computer Science at Wesley University, Ondo, Nigeria, where he doubles as the Director of ICT/MIS and Coordinator of Computer Science Program. His research areas are Cyber Security, Machine Learning/Artificial Intelligence, Industrial IoT and Mobile Computing. He is currently a doctoral student in the Department of Computer Science & Engineering at Obafemi Awolowo University, Ife, Nigeria. John is a Young Researcher and Alumnus of the Heidelberg Laureate Forum Foundation, Germany; Research Member, Association of Computational Linguistics (ACL); Black in Artificial Intelligence (Black in AI); International Economics Development and Research Centre and other professional bodies.

Copyright © 2021 MECS I.J. Information Engineering and Electronic Business, 2021, 6, 36-47
Ogwo Eme is currently a lecturer at the Department of Computer Science, Akanu Ibiam Federal Polytechnic, Unwana, Nigeria. He received a Bachelor of Science (B.Sc.) degree in 2004 from Michael Okpara University of Agriculture, Umudike, Nigeria, and a Master of Science (M.Sc.) degree in 2011 from Imo State University, Owerri, Nigeria, all in Computer Science and a Post Graduate Diploma in Education in 2013 from Usman Dan-Fodio University, Sokoto, Nigeria. He conducts research majorly in Computer Science and Computer Education and his research interests include Cloud Computing, Internet of Things (IoT), Information Systems, Computations, and Modelling. He is a member of the Computer Professionals Registration Council of Nigeria, Nigeria Computer Society, and the Teachers Registration Council of Nigeria (TRCN).

Uche-Nwachi Edward pursued a Bachelor of Science (Computer Science and Management) and Master of Science (Geoinformatics) from the University of the West Indies, Trinidad and Tobago. He is currently pursuing a Ph.D. and is a lecturer at the Department of Computer Science and Informatics at Alex Ekwueme Federal University Ndufu Alike Ikwo, Ebonyi State, Nigeria. He worked previously at Republic Bank of Trinidad as a Data Analyst and Programmer. He is a member of the Association of Computer Professionals (UK) and Nigeria Computer Society. He has published more than four research papers in a reputed international journal. His research work focuses on Online voting, Computer-Based Forecasting, Using Object Orientation Programming (OOP) to Model Geographic Information systems (GIS), IoT, Data Mining, and Data Analytics. He has 4 years of teaching experience and 5 years of research experience.

How to cite this paper: Akaninyene Udo Ntuen, John Edet Efiong, Eme Ogwo, Edward O. Uche-Nwachi, "An Improved Framework of Healthcare Supports System for the Treatment of Dementia Cases", International Journal of Information Engineering and Electronic Business(IJIEEB), Vol.13, No.6, pp. 36-47, 2021. DOI: 10.5815/ijieeb.2021.06.04