Auto-Retirement System (ARS) for University Workers

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Abstract: Automatic retirement system is a research work that provides the automation of the manual system of retirement process in an academic institution. The system will automatically trigger the retirement process once the set parameters are reached. In order to accomplish the proposed system for retirement, the following methodologies were adopted: Establishment of the theoretical foundation for the research work through considerable review of different range of works in personnel management and also developing a decision support system for the proposed system.This research work would be of great benefit to universities in the sense that the study will enable the institution to know when to recruit another set of employees once the date for older employees' retirement and their numbers are known. Also, there is a time-based reminder that gives alerts of the employees due for retirement; consequently, the employees are served reminder memo of their retirement date.

Keywords: automation, manual, retirement process, decision support system, time-based reminder

I.INTRODUCTION

Retirement system is a process where a person's employment stops completely or withdrawing an employee from active participation in a job.The "standard" retirement age varies from country to country and from institution to institution; but it is generally between 50 and 60. Talking in the context of academic environment in Nigerian setting, retirement age for academic and non-academic staff differs. While 70years is approved for academic staff (at professorial level), and 65years for non-professorial level, 60years is approved for non-academic staff, with the non-academic staff union is still agitating for a push to 65years (Punch, May 15, 2012). In some countries, this age is even different for males and females, although this has recently been challenged in some countries and in some countries the ages are being brought into line.

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Currently, Adekunle Ajasin University, our case study, operates a manual system for her retirement exercises. One of the major challenges caused by this is inefficient retirement process; since the process is complex and often suffers inconsistencies. From the survey carries out from the personnel unit of the school, the management of the employees' retirement process relies heavily on filing system, in which case most retirements were processed late. Another problem inherent in the system is the influence of godfatherism in deferring or undue extension of employees' retirement Hence the need for an automated retirement system that overcome these problems.

The study therefore aims at designing a computerized retirement system that automates the process of employees' retirement. The study's aim will be achieved through the following specific objectives:

1. Design an auto-retirement system.
2. Develop a decision support system that will cater for retirement and other personnel matters at AdekunleAjasin University Akungba.

In order to accomplish the proposed auto-retirement system, system analysis and design approach will be adopted. In this approach, the followings will be carried out:

1. Establishment of the theoretical foundation for the research work through considerable review of different literatures,
2. Developing a decision support system for the proposed system,
3. Data pertaining to the proposed system would be acquired by employing personal interview and raw data collection from the personnel record of AdekunleAjasin University Akungba.

II. **RELATED** LITERATURE

Decisions are made on the basis of information received. Information is expressed in form of facts, numbers, graphs, impressions and sounds. It is simplified and organised in form of models which help decision makers to understand the consequences of the decisions being made. The quality of the decisions will depend on the quality and credibility of the information, number of options and the model used.

Mallach (1994) referenced the conclusion of Dean (1991) that decision-makers decide along three dimensions; rationally by collecting and analysing information objectively and make a final choice, politically by making decisions as a group with organisation's goal and power, and flexibility by making decisions that break the mould of tradition and structure. Normally, humans are not entirely rational.

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Different types of psychological personality exist, influencing the decision maker's approach to decisions and their preferred support when deciding (Mallach, 1994). Another important factor that determines the types of preferred support is whether decisions are to be made by an individual or a group. Psychological types also affect how well people work together in teams.

Architecture of Decision Supporting System (DSS) for Retirement of Staffs

Decision Supporting System (DSS) for retirement is structured like any other Decision Support System. According to different authors, DSS has various components; Sprague and Carlson (1996) identified three fundamental components of DSS: the Database Management System (DBMS), the Model-Base Management System (MBMS), and the Dialog Generation and management system (DGMS). On the other hand, Marakas (1999) proposes a generalised architecture made of five distinct parts: the data management system, the model management system, the knowledge engine, the user interface, and the user(s).

According to Power (2002), academics and practitioners have discussed building DSS in terms of four major components: the user interface, the database, the model and analytical tools, and the DSS architecture and network. However, Haettenschwiler (1999) identifies five components of DSS: users with different roles or functions in the decision making process, a specific and definable decision context, a target system describing the majority of the preferences, a knowledge base and a working environment for the preparation, analysis, and documentation of decision alternatives.

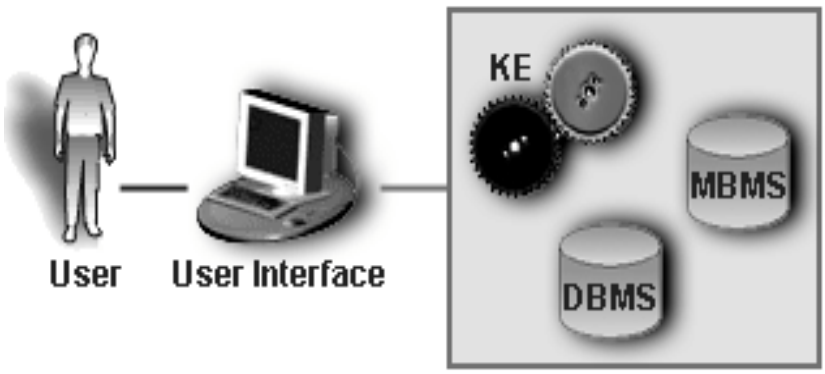

Fig. 1: Functional components of DSS

Source: Haettenschwiler (1999).

The DSS components play distinct functions. The Database Component serves as a data bank for the provision of relevant information to the DSS. The Model base component, usually represented by equations, transforms data from the database component into information which is useful in decision making. The User Interface helps the DSS to communicate with the decision maker. The DSS architecture and networking design component refers to how the hardware is organised, how software and data are distributed in the system, and how components of the system are integrated and connected. The User is the final component of a generic DSS that influences the way a final decision is reached. Twinamasiko Denis (2008).

Decision support system technology levels

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Sprague and Carlson (1982) identified three levels of DSS technology: Specific Decision Support System (SDSS), DSS generators and DSS tools. DSS tools are used to construct DSS generators, which in turn are used to construct SDSS. These are discussed below:

Specific decision support system

SDSS is an application that allows a specific decision- maker or group of them to deal with specific set of related problems. However a specific DSS may be built directly from DSS tools. The construction of a DSS using an iterative design process seems to be the most appropriate because of the need for flexibility and the short development cycle needed by decisions and decision makers, (Sprague and Carlson, 1982).

An iterative design compresses the traditional levels of the system life cycle to generate repeated versions of the SDSS which in the end results to an adaptive DSS capability. A specific DSS may only support operational decision making or it may support more strategic and long run decision making and problem solving

Decision Support System Generator

A DSS generator is an integrated package of software that provides a set of capabilities to build a SDSS quickly, in expensively and easily (Turban, 1995). A DSS generator is an integrated easy-to-use package with diverse capabilities ranging from modelling, report generation, graphical presentation to performing risk analysis.

The ideal DSS generator may be a special-purpose language, which is used to build a DSS application easily. Sprague and Carlson (1982) argue that DSS generators promise to create a platform from which SDSS can constantly be developed without much consumption of time and effort.

Decision Support System Tools

DSS tools form the lowest level of technology and consist of software utilities or tools which facilitate the development of a DSS generator or a SDSS. The DSS tools include graphics, editors, query systems, random number generators and spreadsheets all of which are used to make SDSS and DSS generators.

Decision Support System Models

A model is a simplified representation or abstraction of reality, which has advantages such as lower cost of experimentation, compression of time, manipulation of the model itself, lower cost of error, reinforcement of learning and enhanced training.

In DSS, models are used to predict the outcome of decisions choices made Mallach, (1994). Models can be made with various degrees of abstraction and are classified into four groups; Iconic, Analogue, Mathematical and Mental (Turban et al, 2001). According to Mallach (1994), DSS uses the third type of model: Mathematical or Symbolic model also called an information-based model. Reality is represented by data, which can be processed or interpreted as information. The data elements used in this model normally consists of values containing logical characteristics, character strings or numerical values - any type

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that computers and computer programs can deal with. The symbolic model incorporates procedures and formulas to manipulate the models data elements. Of recent, Logical relationships have come into use through mathematical-based DSS models still constitute the majority of applications (Finlay, 1994; Turban et al, 2001).

Mahdi describes a Multiple Criteria Decision Support System (MCDSS) for the selection of the most appropriate contractor. The system first evaluates a list of contractors by matching their qualifications with specific project conditions. A shortlist of eligible contractors is thus selected and further the MCDSS compares the current capabilities of the shortlisted contractors and their plans for the project under consideration, to select the most appropriate contractor. The Delphi method is used to evoke expertise and obtain reliable assessment values for all criteria related to the contractor qualification, while the Analytical Hierarchy Process (AHP) is used to assess the specific project conditions.

The system can be easily modified to adopt specific conditions of the proposed project and also to facilitate the decision maker in explaining the reasons for the elimination of an excluded contractor. The MCDSS uses AHP which was introduced by Saaty (1980) to provide a simple multiple-criteria analytic method for evaluating alternative solutions.

The ESS for Contexxa Corporation can deliver an unprecedented savings of time and effort to the interviewing organisation, while concurrently offering a significant increase in the overall quality of the candidate screening and evaluation process. Though the solution provided by Contexxa Corporation aids in decision-making in regards to selecting suitable candidates, the selection process is highly subjective because it involves human judgment while carrying out a comparative analysis in an endeavour to get the most suitable candidate(s) for a particular vacancy.

III. METHODOLOGY

Data Collection

The existing manual retirement system for Adekunle Ajasin University was analysed in order to get the requirements for the new system. This includes looking at the user requirements, functional requirements and the non-functional requirements to be able to design an appropriate decision system. The following methods were used:

(i) Interviewing: Direct personal interviews and structured interviews: Direct personal interviews was used to get information personally from the staffs (academic and non-academic) and the personnel officers of the university. This method was used for intensive investigation. Direct personal interviews were used for clarification purposes during data analysis and design phase of the work.

(ii) Document analysis: Documents from Personnel concerning the retirement of staff was perused so as to gain more understanding of what would compose a DSS for promotion and retirement. These documents included written documents such as books, magazines and the Internet with materials on appointments, promotion and retirement of the staffs.

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IV. DESIGN OF THE PROPOSED SYSTEM

The system design was done based on Object oriented design methodology using the Unified Modelling Language (UML). Entity relationship modelling would be done by use of entity relationship diagrams to show the relationship between entities and the activities conducted in the retirement system.

Architectural design of computerized retirement management system

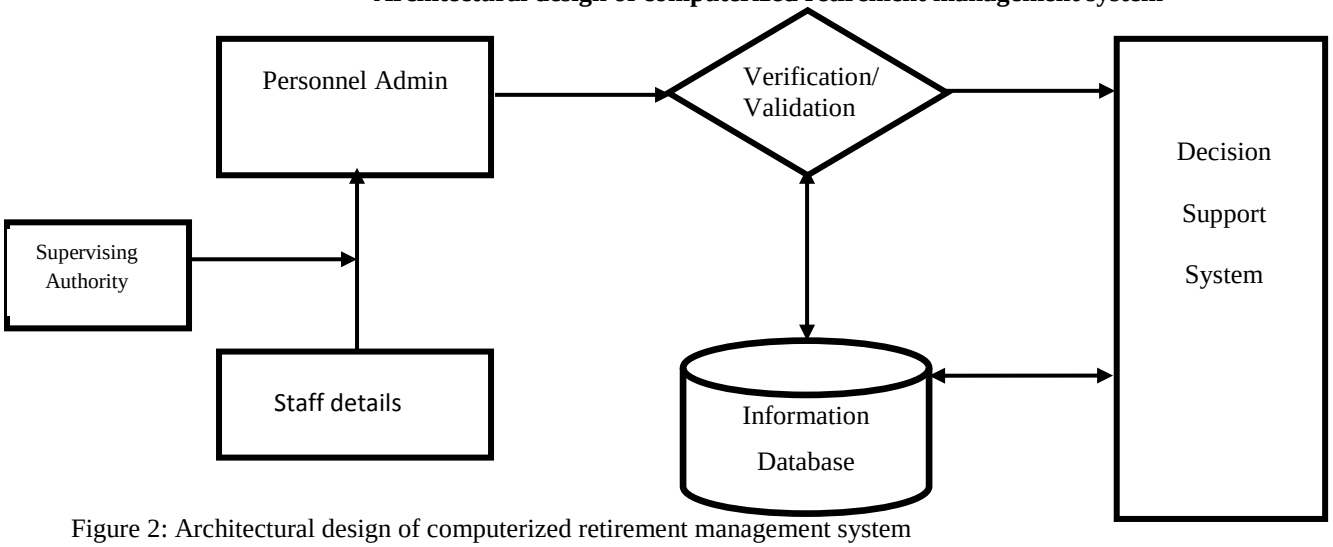

Figure 2: Architectural design of computerized retirement management system
Source: Author

Operational Flow Diagram

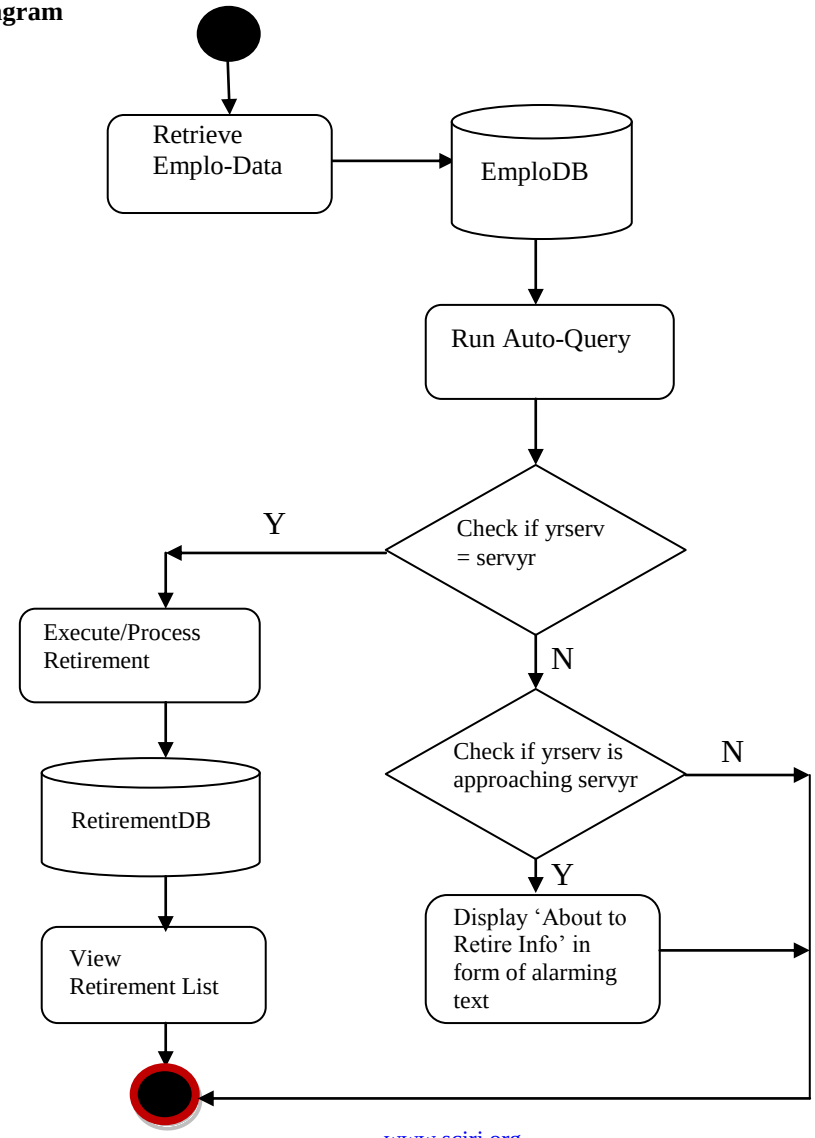

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Figure 3: Auto-Retirement System Model

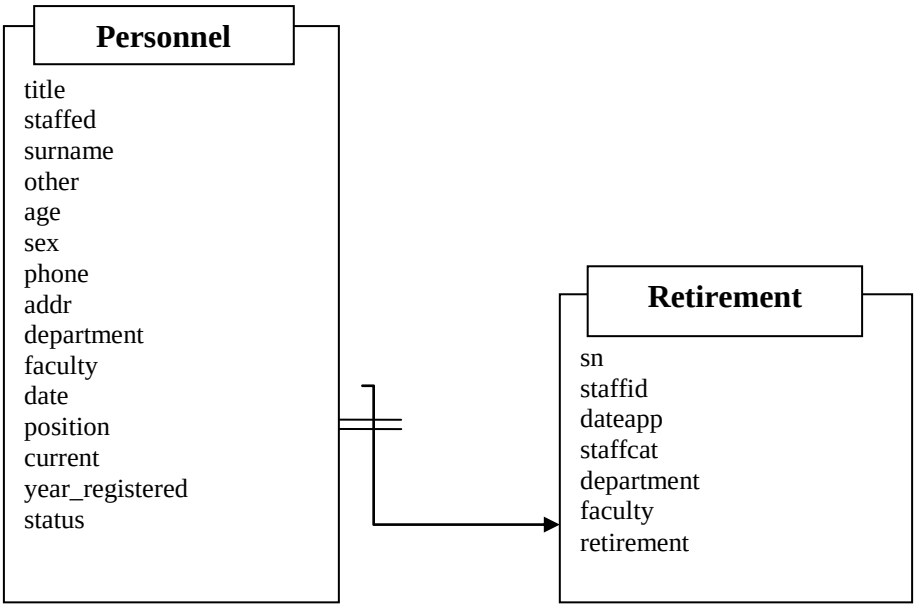
Source: Author

Retirement (Database that takes care of staff retirement)

Field	Type	Collection	Extra
s/n	Int(11)		Auto_increment
staff_id	Int(20)		
Dateapp	Varchar(30)	Latin1_swedish_ci	
Staffcat	Varchar(30)	Latin1_swedish_ci	
Department	Varchar(30)	Latin1_swedish_ci	
Faculty	Varchar(30)	Latin1_swedish_ci	
Retirement	Varchar(30)	Latin1_swedish_ci	

Query_tab

Field	Type	Collection	Extra
Id	Bigint(20)		Auto_increment
Staffed	Bigint(20)		
qr_yr	Varchar(255)	Latin1_swedish_ci	
q_desc	Text	Latin1_swedish_ci	



V. ANALYSIS OF THE PROPOSED SYSTEM

The proposed AUTO-RETIREMENT SYSTEM is considered an improvement of the existing system. This is because the tested system takes care of the main problems associated with the current manual method of retirement system in the case study. The new system is a menu-driven and user-friendly application that automates the process of retirement. With this system, there is a proper and systematic monitoring of staff due for retirement, and alert the management instantaneously.

VI. IMPLEMENTATION

The system, meant to be a standalone system or an intranet-based system, was implemented using PHP and MySQL as the backend database. The retirement parameters (according to age and categories of workers) were used as the rule-based

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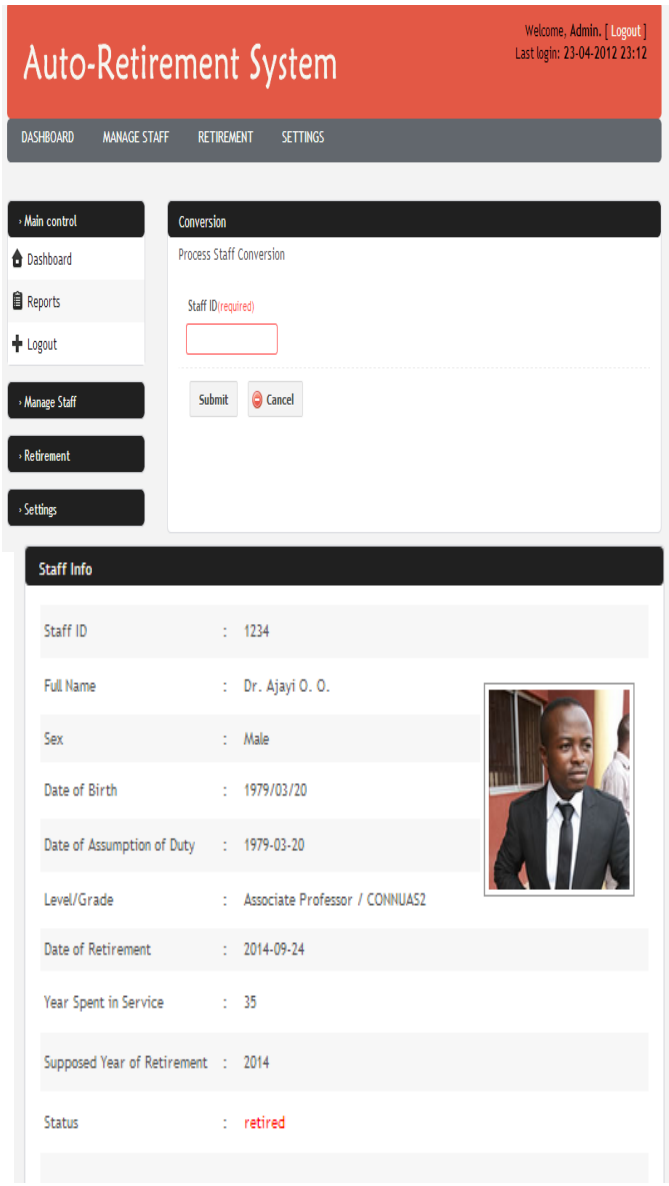
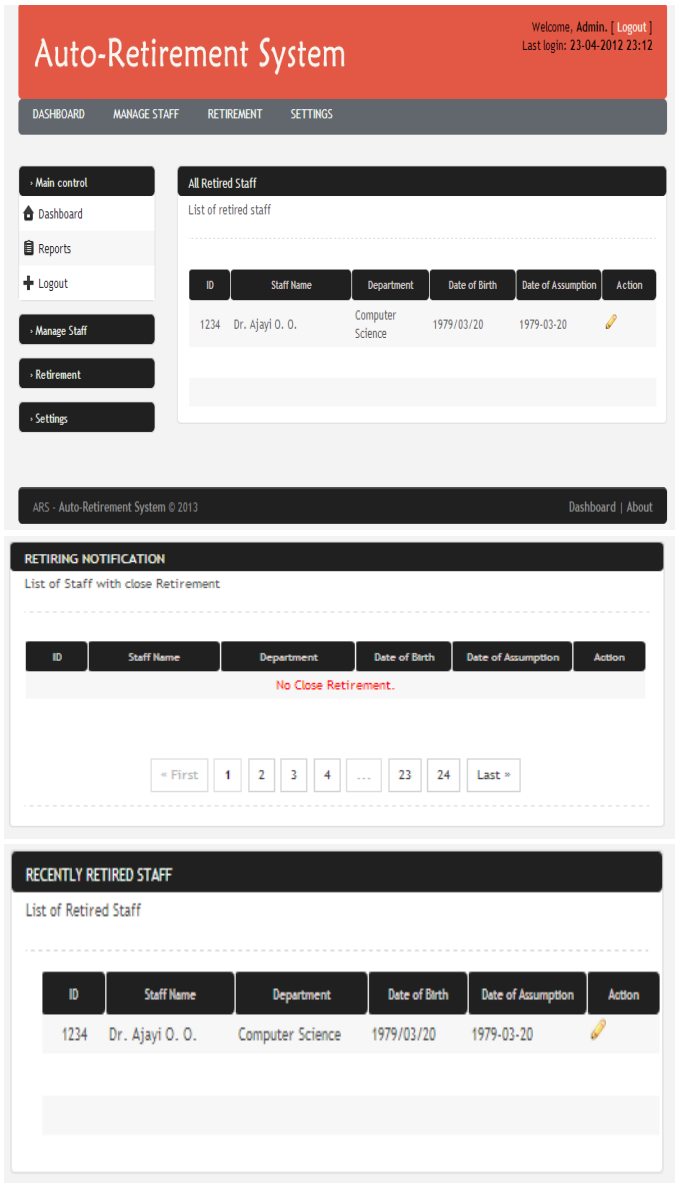
parameters to determine the retirement decision and status of each employee. Some of the implemented application interfaces (screenshots) are shown below.





VII. CONCLUSION

This research study has elaborated much on the use and need for a computerized retirement system at AdekunleAjasin University Akungba. The proposed system is a time-based retirement system that triggers when the service year of an employee lapsed. Therefore, the new retirement system will offer greater opportunities in personnel management. All retirements with regards to staff could be carried out efficiently and effectively in a way that has little or no human interventions.

VIII. RECOMMENDATION AND SUGGESTION FOR FURTHER RESEARCH

The effectiveness and efficiency of this new system provides room for further improvements. Having clearly tested and observed that the application provides a great improvement on the existing methods of executing retirement system, it is therefore recommended that institutions/organisations adopt this automated system of handling retirement of system.

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However, it should be mentioned that, this system did not consider the issue of retirement benefit. It is opined therefore that, researchers should extend the work to cover the computerization of retirement benefits/gratuities.

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