National Crime Intelligence System

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Abstract: In this research we developed an online National Crime Intelligence System, which helps to store and retrieve all information about persons with criminal related record in Nigeria. As a buildup to this work, we visited all relevant organizations that are responsible for monitoring and controlling crime in Nigeria with a view to understanding their modus operandi and to examining the current shortcomings in crime monitoring and control. Legal experts opinions were sought in respect of administration of criminal cases in Nigeria. With the help of the intelligence information gathered, we were able to build a robust database using the oracle database tool as backend. Also, Visual Basic program was used to build the interface, which provides access medium to the database. The developed package is a crime intelligent system consisting of a distributed database, which makes it very easy to access the criminal status of every citizen and resident in a Nigerian law court and in every part of the country. It facilitates the computer storage, retrieval and processing criminal cases in Nigeria law courts. With the help of the developed software, the problem of identifying an ex-convict, the time and where a crime was committed and all other related problems would have been solved.

Key words: Crime, oracle, database, intelligence, system

INTRODUCTION

Crime is an act of illegality. Crime and criminality have been associated with man since his beginning. Crime remains elusive and ever strives to hide itself in the most unlikely places. Different nations have adopted different strategies to control crime depending on their nature and extent. But one thing is certain, a nation with high incidence of crime cannot grow or develop. That is so because crime is the antithesis of the former. It leaves as its trail negative social and economic consequences. Various crimes exist and their effects on the socio-economic development of a nation is dependent on the severity of the Crime. Crime ranges from simple crime such as false declaration, to serious crime such as murder and much more sophisticated organized crime such as narcotics trafficking activities, gun running, advanced fee fraud popularly known as 419 (in Nigeria) etc. It is the major threat and serious challenge to the development of Third World Nation and in fact to the entire world is crime. Over the years crime had evolved in rapid progression to assume an organized nature. In all corners of the globe, organized crime has permeated societies, growing to such an extent that it is now treated as an international security threat. This can be attributed to the decline in political order, deteriorating economic conditions and expanding underground economies. Criminal organizations activities that tend to cross national borders are on the increase. These activities have evolved into transnational entities (Granville, 1961; Constitution of the Federal Republic of Nigeria, 1999).

In addition we are all witness to the failed bank regime in the '90s and the attendant consequences on our nation economy. Until recently many foreign company have consistently refused to invest in Nigeria just because of the menace of crime. So there is no gainsaying that the foremost problem Nigeria has is threat of Crime. Nobody wants to invest in a crime-infected society. Crime constitutes a serious challenge to peaceful existence of citizenry in any society. In a situation where there is no safety guarantee for individual existence in a country, there could not be any meaningful development. Nigeria financial crimes remain more potent than AIDS epidemic. Transparency International, a New York base watchdog rated Nigeria as the second most corrupt country in the world (EFCC 2004; Elhinder, 2005). Therefore, the Specific objectives of the Research are as to design a crime intelligent system that could store data about all known cases of crime in Nigeria Law courts and similar statutory bodies, develop intelligent system which would provide easy point-and-click means of retrieving data in respect of crime cases in Nigeria Law courts or similar body and develop a system that could generate statistical index for Nigeria Police force or other stakeholders and provide input data for other government agencies to use for statistical purposes.

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Motivation: The most single threat to human advancement, peace and in fact existence of human race is crime. In African particularly Nigeria crime related offences have assumed a disproportionate level. These include simple fraud, advance fee fraud christened 419, robbery, political killings, etc. It is generally known fact that most of criminals often change their identity and later continue these origies of crime in new proportion thereby unleashing a significant damage to the Nation economic, social-economic and political sphere. In Ogboru Vs Ibori (Ogedengbe, 2004) the Delta State election tribunal sitting in Abuja found it an heinous task finding the real Ibori formerly convicted for crime. This was as a result of allegation that he was convicted some years ago on crime related offences in connection with a petition filed by Chief Great Ogboru, the Alliance for Democracy governorship candidate for Delta State. The tribunal therefore ordered eight persons including the Chief Judge of the Abuja High Court, Justo Lawal Gummi to appear before it. This controversy would have been avoided if there were a foolproof way of determining the real Ibori that was actually convicted.

At present manual method is adapted for verifying identity and past history of criminal in our society. For Independent National Electoral Commission (INEC) it is very important to get the past history of individual in order to clear him for electorate purpose. Nuhu Aliya (2005), reported the presence criminals who later becomes honorable and distinguish senators in our national legislative arm government. Also in Ihuoma (2006), the chairman of Federal Capital Territory (FCT), Malam Nasir El-Rufai said Vagabonds and crooks seized power in 1999 and 2003 elections and suggested we should do everything to stop the repeat in 2007. For the State Security Service, it is very essential body for reference when investigating citizen for elective or responsible position and other purposes established by law.

The immigration officials need to know the past history of individual before issuing him an international passport. Also, when recruiting people into deferent arms of our security agencies (police, State Security service, Immigration, Prison service as well as armed forces) we need to verify the past record so as not to recruit criminal into the bodies. Recently president Obasanjo accused the police of recruiting criminal into the force. Agreeing with president Obasanjo on his allegation the inspector general of police, Mr. Sunday Ehindero, admitted having armed Robbers in the Nigeria Police Force (Punch December, 2005). Hence the need to have an integrated database where criminal record could be easily obtained by just a click becomes imperatives.

Also, as at the time of this research, there was no reliable and accurate record to track originator of these crimes. In some cases where there is a record to track the criminal, the records are sometimes doubtful as in the case of the Ogboru vs Gov. Ibori (Ogedengbe, 2004) and that of the celebrated case of Fred Ajunwa involving a whopping some of 143million dollar (This day, 3 March 2005). As of the time of writing, many accused Kingpin of 419 has been enjoying air of freedom as result of either missing or distorted records. In most cases the criminal often deny knowledge of the crime because in most cases they (the criminals) always used fake identity and sometimes buy and destroy the records or bribe court official. Considering all abnormalities associated with the present manual system of record keeping in the national judicial system, this work was propelled by the desire to create a database using the underlining principle of digital library proposed in Falaki et al. (2003) and Falaki (1984). With this system it becomes relatively an uphill task to destroy evidence and other records of criminals in our midst.

In addition the current method adopts by state security service is too manual and is therefore error prone. Often the criminal bribes their way through in obtaining crime free clearance report from the security outfit whenever the need arises. Even the current reform in immigration procedure in obtaining passport makes the work becomes more attractive. In the cause of this work we discovered that there is no comprehensive record to know if one is a criminal or not before Nigeria Passport is issued. Maybe, of cause, if one is a celebrated criminal the case may be different. With our proposed system it is possible to obtain international passport in a day therefore eliminating the sheer tress in collating all the court cases of indicted people. Presently, the State Security Service (SSS) would only rely on limited number of cases in their file or at most few celebrated criminals cases in arriving at whether someone has criminal records or not. By doing this allows the people with criminal record could evade detection. Thus they are given clean clearance and the crime associated with such person becomes recycled.

As it is today, it is possible to recycle a cultist into our higher institution because there is no comprehensive data on the culprit. Also recruitment into our security agencies requires a substantial amount of data on the intending applicants so as to prevent unscrupulous elements from enlisting into the agencies. The police rely more on pattern matching in investigating criminal activities. This could only be achieved if you have adequate data to match, thus necessitating the need to
have computerized record storing and retrieving system to facilitate the march. The various figures and in fact the
criteria used in facilitating statistical analysis as in the
database of criminal record becomes an immediate useful
material.

RESEARCH METHODOLOGY

A distributed database, consisting of Oracle Backend,
was created in the zones with one of the zones designated
as primary database site. The primary database would act
as central repository for all data in the secondary sites.
Data about criminal cases in Nigeria Law courts and
similar statutory bodies would be collected and stored in
the database.

The thirty-six state of the federation (including the
Federal Capital Territory) was be divided into six
geopolitical zones. The architecture of this will be
similar to the one adopted in Folorunso et al. (2003) as
shown in Fig. 1.

In addition an intelligent and menu-driven interface
was built, using visual basics as the underlining software,
to facilitate data input and information retrieval from
the system.

Finally, a third party program resident outside the
database was be introduced to resolve the complexity
involved in multidimensional indexes as well as
aggregation indexes.

Figure 1 and 2 shown the architecture of such
system. This is to eliminate the limitation associated with
hardware criteria (usually high hardware requirement) to
cater for large growth rate usually associated with such
database as in this system. It would also serve as partial
means of enforcing data independence of the system
(Gate, 1980).

Scope of the study: The research built an electronic online
record system for cases involving convicted and
discharged criminal in Nigeria law courts and similar
statutory bodies. It makes use, as a background study,
the use of conventional approach currently being adopted
to build a robust database where the data could be
retrieved and mined for different purposes.

The research is limited to reported court cases only.
It does not account, for example, for non-prosecuted
culprit incidences on our higher institution. For the cases
of criminal that has never been convicted it assumed they
are not guilty as far as they are not convicted. The work
does not cover the cases of people convicted or acquitted
of crime outside the shore of Nigeria.

Fig. 1: Backend architecture of National crime intelligent
system

Fig. 2: Architecture of the typical index management of
the database

CHOICE OF DATABASE STRUCTURE

The overall objective of choosing a particular
database is to optimize various criteria and methods used
to store, query and maintain security and integrity check
on our proposed distributed database. Hence there is a
need to pay a particular emphasis on method of storage
retrieval and resistant of the systems to security threat.

It is important here to make mention that Nigeria
being the most populous country in black Africa, would
need a relatively large database to store different records
regarding her criminal records. Also, Nigeria is one of the
three most corrupt countries in the world according to the
transparency international corruption index. Therefore the
database, would as a matter of necessity, need to be
robust, resilient to attack, high availability, fast, high
degree of integrity and have some degree of intelligent.

Of the three data structure namely Hierarchical,
Network and Relational the relational model is found to be
most appealing. In relational database objects can be
model to mimic their counterpart in real world. Interestingly all known successful distributed modelled
based their design on relational model. Indeed there are
several other reasons to why, for a distributed system to
be successful, that system must be relational. Relational technology is in fact a prerequisite to, effective, distributed technology.

Choice of oracle as an underlying database: In the design and implementation of a robust application as in the case of this work priority must be given to efficiency and how effectively database would perform in short and long time cycle of the system. As discussed earlier, the best model for work of this nature is the relational model. However we have possibly hundreds of relational products nowadays each claiming one advantage over the other. At present we have probably hundreds of relational vendors whose products are currently been used as at today. Such products range from less popular Microsoft access to highly popularized Sybase and Oracle.

In this project, Oracle Database was be used based on the following derived advantages.

- **Robustness of the database**: The Oracle provides one of the best DBMS in the market today in term of robustness. In practice it can store records in order of terabytes without data bust. Data bust here refers to a staleness of the database as a result of exceeding capacity of the underlying DBMS. It here refers to a situation where the database significantly is slowed down or perpetually hanged as a result of too much stored data.

- **Fastness**: The Oracle database is so fast and in fact can retrieve millions of records in a matter of few minutes if the underlying SQL statement is properly constructed.

- **Support for almost all the twelve functional objective of distributed system**: Oracle database as a tool for this work has support for a substantial number of the key features of the distributed database.

- **Support for high level of security**: Oracle database products are well known for its major relational product that supports high level of standard security. It worked on improved packages enable secured password as opposed to the conventional application level password. It is also well known for having no rival competitor.

- **Oracle supports both fine grain audit control and fine grain access control**: Oracle supports both Fine grain Audit Control and Fine grain access Control are well-defined security policy that is aimed at discouraging unauthorized access to the database. It audits access and any attempted attempt to manipulate or log in to the database. This is good for our proposed system because of several reasons vis-à-vis:

- It is expected that the system would hold record of influential personalities in the societies in society with record of criminal cases.

  Now as a direct consequence of this people may try to seek unauthorized access to the Database in order to corrupt the entire system.

- It is common knowledge that most information concerning State Security is confidential in Nature and thus need a high degree of security. The proposed system data would as a matter of necessity includes data from various security formations in the country and thereby need as much security as possible.

- **High degree of replication**: The system of this nature needs a high degree of replication. Oracle Database is reputed to support different levels (low high) degree of replication.

- **Availability of professionals**: The system need periodic maintenance for it effectiveness. The immediate implication of this is that there must be availability of expert to tune and effect any required changes in the database. There are a lot of Oracle expert to employ for that purpose in Nigeria as of the present.

- **Oracle advance indexing**: The advanced indexing mechanism of Oracle provides easy retrieval based on different methods provided by Oracle DBMS.

- **Support of host systems**: It is pertinent to say support for different operating systems running on different host system is a good desirability feature of distributed systems. Fortunately Oracle runs on many host systems. This universality makes Oracle more attractive in database implementation of this Project. For example it can runs on UNIX, Window, LINUX etc without affecting the core functionality of the Oracle DBMS (David, 1997).

**SYSTEM IMPLEMENTATION**

The crime monitoring package: The package developed is divided into two parts vis-à-vis the back-end (database parts) and the front-end (application part). The backend could be any database, which supports TCP/IP protocol. Examples of databases that have been found to have support for TCP/IP protocol are Oracle, Ingres, MS-SQL, Sybase and MS Access. We have however limited our self to Oracle in this work. The front-end consists of Visual Basic application program. It is completely menu driven. It has an intelligent and a user-friendly interface. Also, the interface is organized so as to give the user a self-learning easy step-by-step way of using the package.
User requirements:

System administrator with database administration experience: The package requires at least a System Administrator with Database Administration Experience. This is required to constantly tune the database for utmost performance. The administrator would also be saddled with the additional responsibilities of backing-up and restoring the database in an event of instance failure. In addition the database administrator is expected to create different level of services whenever it is necessary to do so. This depends on the networking requirement of the installation sites.

Package operators (users): This is divided into different levels depending on the roles assigned. Different types of roles are created. Each role is assigned a definite type of privilege(s). The privileges control different access mode. The access mode determines which type of object in the interface the user is allowed to view or manipulate.

In all cases the user is assumed to have a certain degree, though at low level, of computer literacy. The low level literacy requires the ability to navigate and click on a menu. In general the system is self-learning and would not require any high-level computer expertise to operate.

Figure 3 gives the package when the program is first installed and launched.

After the loading the following interface of Fig. 4 appears.

User authentication units: The first operation a user is expected to perform on the system is to authenticate the validity of his account. Here the user is expected to type his/her user ID, password and the group he belongs. The group he belongs is a measure of his privilege. For example group one is assigned an administrative privilege.

Figure 5 shown above exemplifies how the interface appears to the user. The administrative roles here consists of all the privileges needed to setup the user, assigned role(s), input data, manipulate the system to get specific information. The security is the bedrock of this type of application and as such measure must be taken to ensure that the right person or group of person is assigned the correct privilege otherwise the whole essence of the package could be compromised.

The second level of roles is assigned to the next category of people with lesser privileges than the administrators. The privileges here could be privilege just to view specific reports(s). The level of privileges degrades gracefully down the ladder as the group number increases. However it should be noted that if the user does not exist the system is able to detect and alert us of the in existence of such user. Figure 6 shown this points.
Main interface: After the user is granted access right to log on to other system, the next interface appeared showing three access buttons as appeared in Fig. 7.

The first button in the above interface is administration, the second is Processing and the third is reports. As the name suggests checking the administration launches administrative interface, the processing button launches-processing interface while the reports launches the report dialog box. It should be noted here however that if the user does not belong to administrator group then only two button vis-a-vis processing button and reports are visible. On the report menu too a user may enable the roles in such a way that only report could be view in the current session.

Administrative session: The interface assigned to the administrator consists of administrative menus. The interface consists of two main menus. The first one is for setup and the other for removing data from the database. Figure 8 depicts administrative menus as it is shown during one of its sessions.

The setup: We have different types of administrative functions that need to be performed during the setting up of the system. These functions must necessarily be accomplished during the first installation of the program. Figure 9 shown as it appears in the program interface.

User setup: The user is setup in the form displayed on the interface (Fig. 10).

The four fields are input into the database through this interface: User ID, User Name, User password and User Administrative group. The use of password and group would be emphasized here. By default the password should not be more than eight digits. Also, care must be taken here in assigning group to individuals. As mentioned earlier, the group determines the type of roles acquire by the individual.

The court setup: Here we must necessarily have a court where the cases are documented. This follows Codd (1970) referential integrity rule, which implies that for a case to exist it must have a trial court. Also, for a
suspect to be tried he must necessarily has a court as a venue for the trial. The Fig. 11 exemplifies the interface.

The field to be entered here are Court ID, Court Name, Court address, Judge ID, Comments.

**The judge setup:** The judge unique Id is stored in the database. This is followed by the court name, court address, judge ID, Zone ID and remarks. Figure 12 depicts our Judge setup.

**The suspect setup:** The suspect or criminal is actually introduced to the database using this interface. The interface in Fig. 13 captures the data to be stored in the database.

Here the suspect ID, Suspect Name, Suspect address, Suspect data of birth, Suspect offence and Suspect Special features are all capture into the database.

**The zone setup:** The country is divided into six geographical zones. The available court is divided into the six zones. We now setup our databases into the six zones to constitute our distributed databases. What we need to input here is the Zone ID, Zone name, Location and address (Fig. 14).

**The security agent setup:** This is another administrative function needed to setup the security organization available in Nigeria for proper reference. Some of this organization can actually prosecute while some can only refer the suspect to another sister security organization or agency for prosecution. Examples of organization that can prosecute are the NPF, EFCC, ICPC, NAFDAC and NDIA. Also, organizations such as State Security Service, Immigration and Custom usually refer their cases to other agency for prosecution. From Fig. 15 for a typical interface from our application program.

**The record updating menu:** What we have here allows us to update record in the database. This is completely
Fig. 15: Administrative menu

Fig. 16: The system alerting the user what he is about doing

Fig. 17: The system gives the user option to change his mind

Fig. 18: System asking for user ID number to disable administrative procedure and only people in group one can view it. This place allows us to disable an unscrupulous user or a user who no longer enjoy the privilege to use the database. In Fig. 16 we are presented an option to choose from disabling user account and from transferring the Judge.

The system gives us enough warning before disabling the user. Once a user is disabled it is permanent. You need to reassign another user id for the user to re-activate it. This action is deliberate to enforce security of the application.

Figure 17-19 shows some typical scenarios in the implementation of the system.

Also it is possible that a judge is moved from one court to another. In this case the interface shown in Fig. 20 allows you to effect the change. All you need to do is just to enter the new Judge ID.

Fig. 19: The system prompting you to enter the judge ID and the new court ID

Fig. 20: The processing unit

Fig. 21: Processing interface

Processing menu: The processing section consists of an interface where a case is actually filed against an accused and the result of the case is stored. This forms part of data stored in our database, which may be retrieved. The interface in Fig. 20 gives description of this important ingredient of our processing unit. Here we have two menus, which gives access to the Query the system for Transaction unit and the actual transaction itself where the case processing actually takes place.

Case processing: Also Fig. 21 shows the interface for carrying out the actual transaction on the case file. The fields in question here are caseid, case title, Prosecutor
Lawyer ID, defense Lawyer ID1, Defense Lawyer ID2, judge ID, court ID, case Status, Initial case ID. When a suspect is arrested, he is adjudged to be innocent until proven otherwise in a recognized lawcourt. It is also possible that the defense lawyer or prosecution lawyer appeals.

If this happens another case file is opened with different case ID. It should be born in mind that whatever you do here would inadvertently affect report you generate in the next section.

**Query menu:** Another important unit is the area where record can always be search and retrieved is query menu. What you just need to do here is to type the Suspect ID to retrieve the data relating to the suspect. Figure 22 shows typical Interface, which the Suspect information is displayed.

The query menu consists of an interface that is used to process some query when certain information is needed in the database. Such query could be searching through the database to obtain information about whether a criminal exists or not in order to get information regarding a criminal other identity if the criminal exists. Such other identities include photograph and finger print.

**The report and statistic section:** The immediate result of clicking on restate button is shown in Fig. 23 below.

Here you have option of selecting statistic or report option. You can either click on report generation or statistic generation in the dialog box presented in Fig. 23.

**The report section:** Now let examine report section. When you click on report generation you get an interface presented in Fig. 24.

The report section consist of various report generated from the database. Such report ranges from current user of the database and the role/group they belong to the sophisticated report showing all the prosecuted people across different zone in the country. To get report section, click on the report button presented in Fig. 24. It launches you to an interface where various option of the report to show is displayed. To access each of this report you must click on the report to show as well as our preferred printing destination. The printing destination could be chosen to be network printer or send directly to the screen. If no printer is chosen you are presented with another dialog box telling you have to choose a printer. The application program here is able to monitor your generation of this report. If the report has been viewed, it immediately alerts you and gives you the option to continue or not.

**The user report:** Below is the sample of the user report of the current user that is allowed to manipulate the Database. The user ID, User name and group ID were shown in the report presented in Fig. 25 below. The user password was intentionally omitted for security reasons.

**The court report:** The result of different court available in the database and their zones could be published. Example of this is shown in Fig. 26.

**The judge report:** The list of judges existing as well as other information about judges in the database is obtained in this section. The Judge ID, Judge name etc could be mined here. Extract from the report from this section is printed in Fig. 27.

Also a simulated report of the Judges in each of the designated zone is presented in the Fig. 27.

**The zone report:** As earlier stated the country is divided into different zones. Each court is put into a certain jurisdiction within the zone. Information about Zone and which court is within certain zone is obtainable here. The full detail of each of the zone is given below in Fig. 28. It should be noted here that the zone name are fictitious to avoid litigation, which could arise as a result of using real name.

**The suspect report:** We have described a database as a collection of electronic data file. The database report could be generated here to obtain various information pertaining to a suspect. Figure 29 gives an instance of the suspect report.

Figure 29 above gives the full-simulated report of suspect personal information as shown in the report section.

**The case report:** The case report gives the report generated from the database. Here we have the case Id, title and other information pertaining to the case including the overall identity of the person(s) involves in a particular case.

The Fig. 30 gives the full details of the suspect including the graphical detail of his signature, Fingerprint and passport photograph.

**Statistical generation:** The last but not the least here is statistic generation optional button. To navigate to statistical section you must click on statistical option menu as appears in Fig. 31. The various statistics that could be generated from this section are.
Fig. 22: Query menu

Fig. 23: The report and statistic section
Fig. 24: The report generation interface

Fig. 25: The user report
Fig. 26: The court report

Fig. 27: The judge report
Fig. 28: The zone report

Fig. 29: The suspect report
Fig. 30: The case report

Fig. 31: Statistical report
The crime rate in the country
The crime rate in the country
The sex ratio
The age ratio
Grow rate

Various simulated can be generated from the database. For example, Fig. 31 below shows statistical information about the number of men to woman involve in the crime. It may also expedient to show the age group of those involves the convicted criminals. This is also captured in the Fig. 31. From the hypothetic data used in this report it could be seen that there are more female involved in crime than their male counterpart. Also we can query the database to obtain the predominant age of committing crime in the society.

CONCLUSION

A Crime intelligent Database for criminal related offences in our law court has been presented in this paper. The key features of the resulting system are as follows:

• A crime intelligent System consisting of a Distributed Database, which facilitates the computer storage, retrieval and processing criminal cases in Nigeria law courts.
• An application package that facilitates the storage and retrieval of all people involve in Criminal cases in Nigerian law courts.
• A user-friendly interactive, intelligent, menu-driven interface, which provides self-learning approach that can easily be used by the user to store and retrieve data on the suspected criminal.
• An intelligent model which can help the police and various stakeholders to obtain various statistic in respect of crime in Nigeria.
• An intelligent model which could generally serves as a reference point for various securities agent and international communities in Nigeria when the need arises for needing the criminal history of anybody in Nigeria.

It is our belief that the work would be beneficial to the Nigeria as well as the international communities. Also, we believe that the work could be extended to other West African countries by taking advantage of the current effort to strengthen Economic Community of West Africa (ECOWAS) and the integration of Africa through Africa Union.

REFERENCES