

ROAD DISTANCE DETERMINATION SYSTEM (RDDS)

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Abstract

Road transportation is the most common type of all the transportation system. The major problem facing both the passengers and transporters is how to determine the actual road distance. The visual basic.Net was used to developed a program that is capable of determining road distance in Nigeria from Abuja. With this program the actual distance can easily be carried out. This will surely help in reducing the cost and also save a lot of time by taking the shortest distances.

Keywords: Road, Distance, Determination

Introduction

In the past twenty-five years, a host of professions have been in the process of developing automated tools for efficient storage (Akella et al 2003), analysis and presentation of geographic data. These efforts have apparently been the result of increasing demands by users for the data and information of a spatial nature. This rapidly evolving technology has come to be known as "Geographic Information Systems (GIS)". Geographic information system goes beyond description; it also includes analysis, modeling, and prediction. According to the Environmental Systems Research Institute (ESRI) 2009, a GIS is defined as "an organized collection of computer hardware, application software, geographic data, and personnel designed to efficiently capture, store, update, manipulate, analyze, and display all forms of geographic referenced information." Kang (2007) describes GIS is a computer system for capturing, storing, querying, analyzing and displaying geographically referenced data. GIS is essentially a marriage between computerized mapping and database management systems. Thus, a GIS is both a database system with specific capabilities for spatially referenced data, as well as a set of operations for working with the data. Geographically referenced data separates GIS from other information systems. Let us take an example of a road. To describe a road, we refer to its location (i.e. where it is) and its characteristics (length, name, speed limit etc.). The location, also called geometry or shape, represents spatial data, whereas characteristics are attribute data. Thus a geographically referenced data has two components: spatial data and attribute data.

Geographic information system (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data. The acronym *GIS* is sometimes used for *geographical information science* or *geospatial information studies* to refer to the academic discipline or career of working with geographic information systems. In the simplest terms, GIS is the merging of cartography, statistical analysis, and database technology (Bozarth et al 2011).

A GIS can be thought of as a system—it digitally creates and "manipulates" spatial areas that may be jurisdictional, purpose, or application-oriented. Generally, a GIS is custom-designed for an organization. Hence, a GIS developed for an application, jurisdiction, enterprise, or purpose may not be necessarily interoperable or compatible with a GIS that has been developed for some other application, jurisdiction, enterprise, or purpose. What goes beyond a GIS is a spatial data infrastructure, a concept that has no such restrictive boundaries.

In a general sense, the term GIS describes any information system that integrates, stores, edits, analyzes, shares, and displays geographic information for informing decision making (Wikipedia 2004). GIS applications are tools that allow users to create interactive queries (user-created searches), analyze spatial information, edit data in maps, and present the results of all these operations. Geographic information science is the science underlying geographic concepts, applications, and systems. The focus of the GIS program is to give a comprehensive education in Geographical Information Systems (GIS).

The aim of this paper is to develop a robustic software application that is capable of displaying geographical distances of all the major cities in Nigeria starting from Abuja the Federal Capital Territory of Nigeria. This will surely help the motorist and commuters and the passengers to plan their journey ahead and also to reduce the cost by taking the short distance for a particular journey.

Material and Method

In this paper, the map of Nigeria, which consists of all the major cities in Nigeria, was used as a source of data for this paper development. Visual basic which is a graphical application software was used to develop the program for determination of all the distances for all the major cities in Nigeria. With visualbasic, the results were showcased in form of numerical values in kilometers to represent the distance covered from Abuja to the chosen destination (Town or Cities).

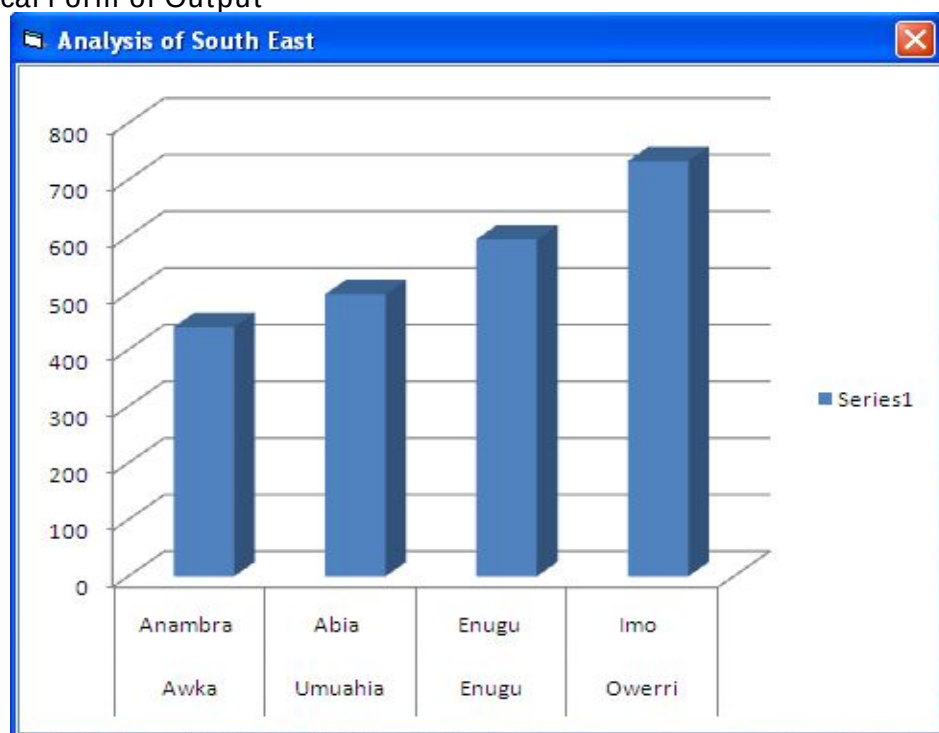
Input Design: the input to the system is the values of the distance from Abuja the Federal Capital Territory to the major cities of the 36 states of Nigeria and are displayed in the table below.

ID	Name of City	State	Distance From Abuja
1	Abeokuta	Ogun State	740
2	Akure	Ondo State	700
3	Asaba	Delta State	404
4	Awka	Anambra State	440
5	Bauchi	Bauchi State	445
6	Benin City	Edo State	450
7	Birnin Kebbi	Kebbi State	573
8	Calabar	Cross River State	857
9	Damaturu	Yobe State	757
10	Dutse	Jigawa State	512
11	Enugu	Enugu State	595
12	Ibadan	Oyo State	659
13	Ikeja	Lagos State	879
14	Ilorin	Kwara State	500
15	Jalingo	Taraba State	691
16	Jos	Plateau State	313
17	Kaduna	Kaduna State	180
18	Kano	Kano State	442
19	Katsina	Katsina State	533
20	Lokoja	Kogi State	138

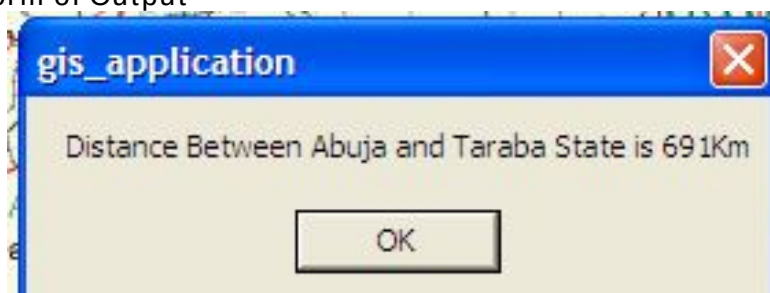
21	Maiduguri	Borno State	908
22	Makurdi	Benue State	323
23	Minna	Niger State	117
24	Oshogbo	Osun State	428
25	Owerri	Imo State	733
26	Port Harcourt	Rivers State	830
27	Sokoto	Sokoto State	793
28	Umuahia	Abia State	498
29	Uyo	Akwa Ibom State	828

Output Design: The output generated from the supplied input are in two forms which are the numerical form as well as the graphical form.

A Graphical Form of Output



A Numerical Form of Output



Discussions of Result

The results were displayed in numerical value and in form of figures.

Discussion of Result Involving Graphical Value

The demonstration of the software that was developed was shown below in graphical format of pie chart:

Fig 1.1 Shows the analysis of cities in South East to Abuja in term of dstance comparison. Imo has the farthest distance while Anambra is the shortest to Abuja.

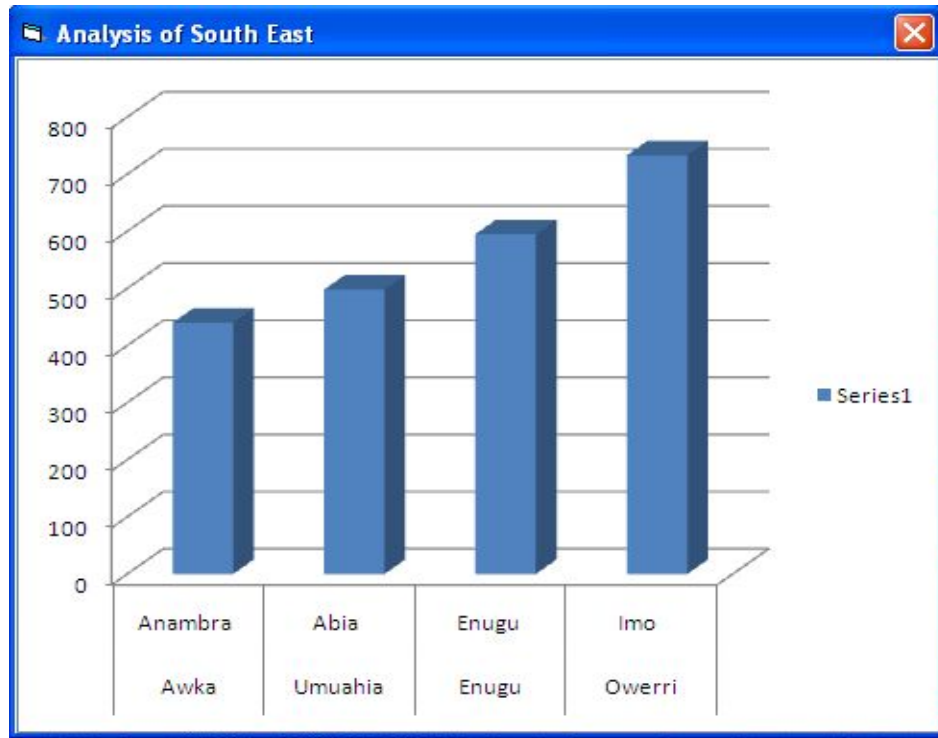


Fig 1.1: Analysis of the South East of Nigeria

Fig 1.2 shows the analysis of cities in South South to Abuja in term of dstance comparison. Cross River has the farthest distance while Delta is the shortest to Abuja.

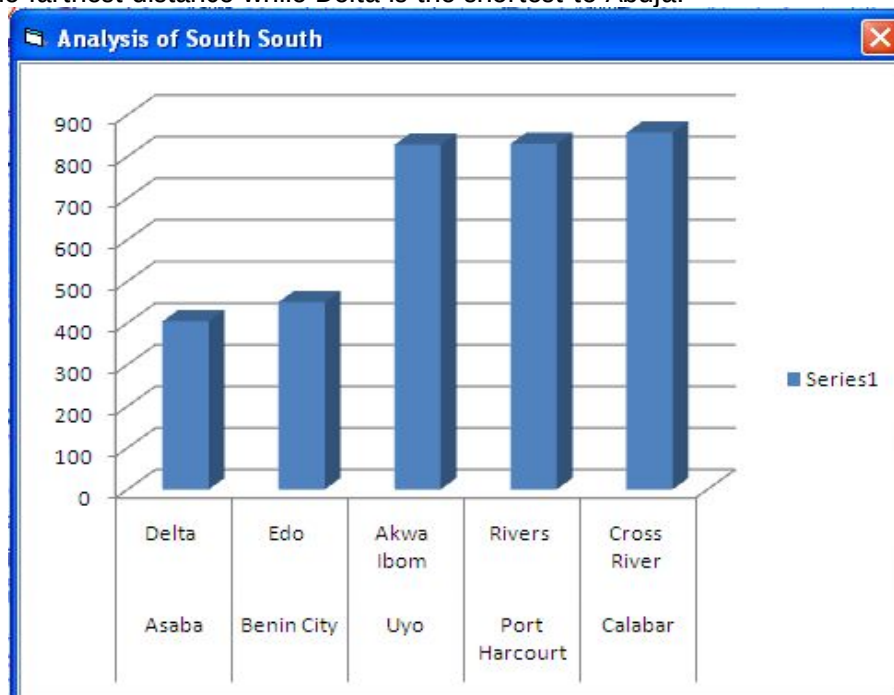


Fig 1.2: Analysis of the South South of Nigeria

Fig 1.3 Shows the analysis of cities in South West to Abuja in term of distance comparison. Lagos has the farthest distance while Osun is the shortest to Abuja.

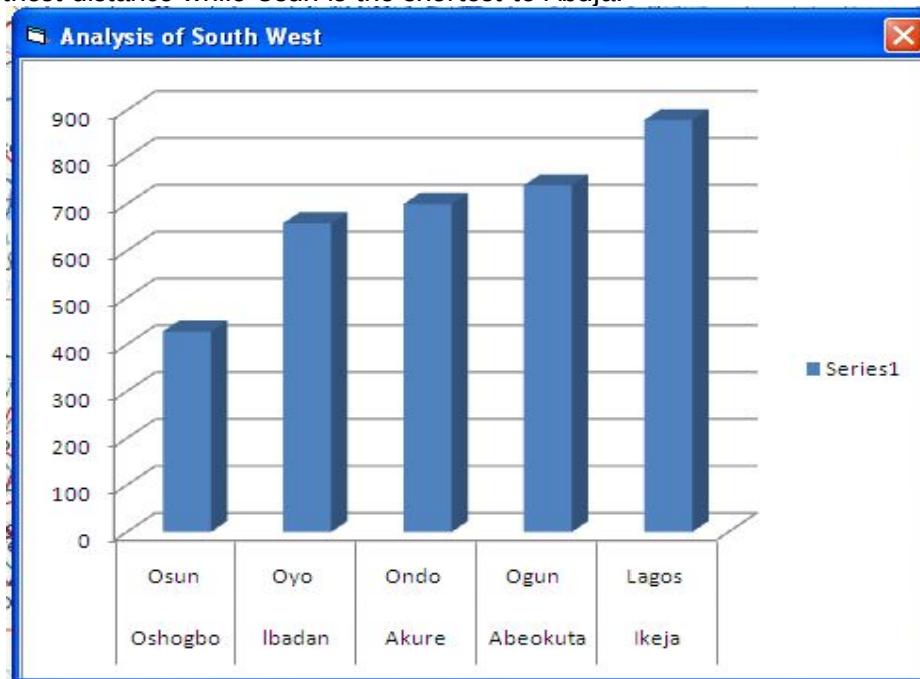


Fig 1.3: Analysis of the South West of Nigeria

Fig 1.4 shows the analysis of cities in North Central to Abuja in term of distance comparison. Kwara has the farthest distance while Niger is the shortest to Abuja.

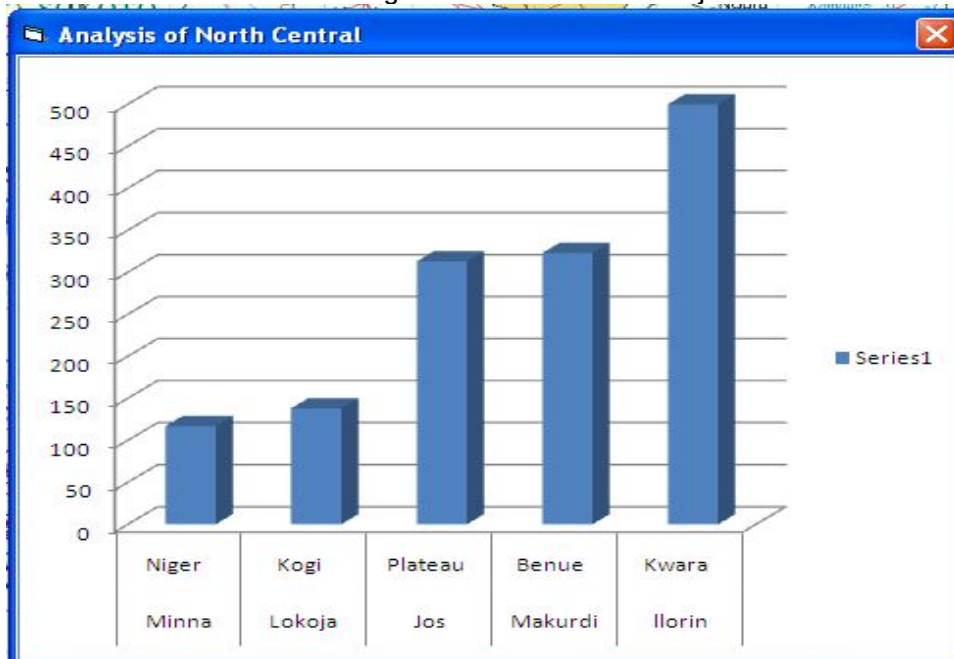


Fig 1.4 Analysis of the north central of Nigeria

Fig 1.5 shows the analysis of cities in North East to Abuja in term of distance comparison. Borno has the farthest distance while Bauchi is the shortest to Abuja.

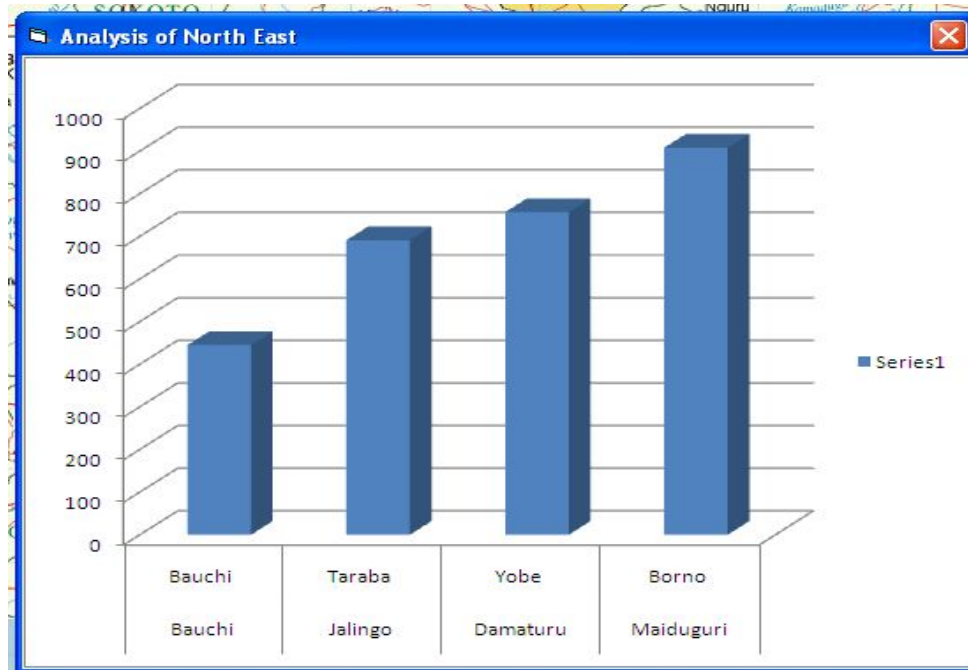


Fig 1.5 Analysis of the North East of Nigeria

Fig 1.6 Shows the analysis of cities in North West to Abuja in term of distance comparison. Sokoto has the farthest distance while Kaduna is the shortest to Abuja.

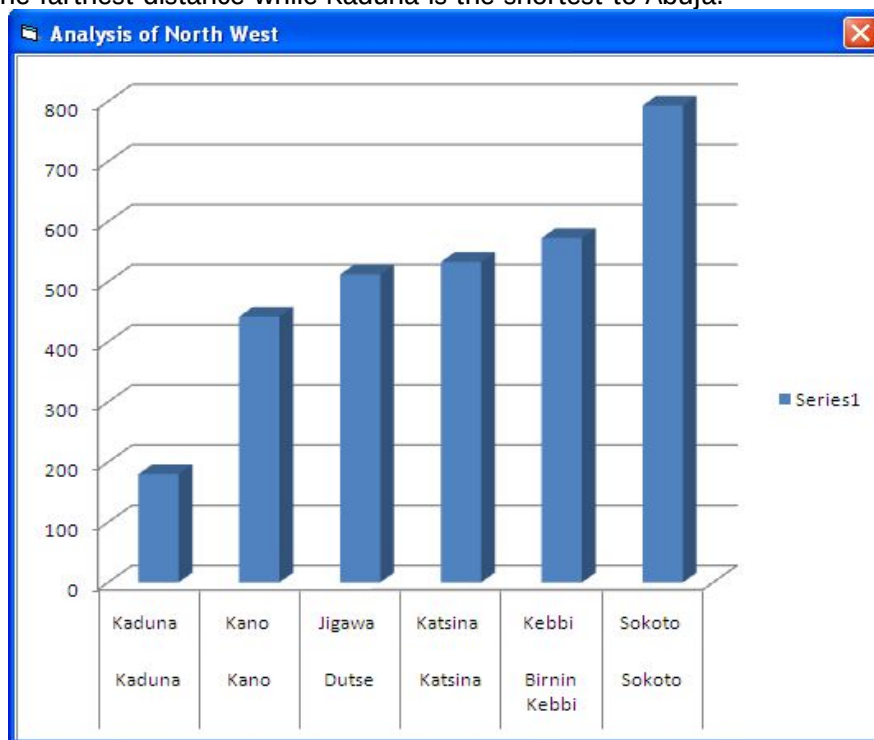


Fig 1.6: Analysis of the North West of Nigeria

Discussion of Result Involving Numerical Representation of Distance Covered

The demonstration of the software that was developed was shown below in graphical format of pie chart:

Fig 1.7 shows the analysis of distance between Abuja and Sokoto in terms of numerical value.

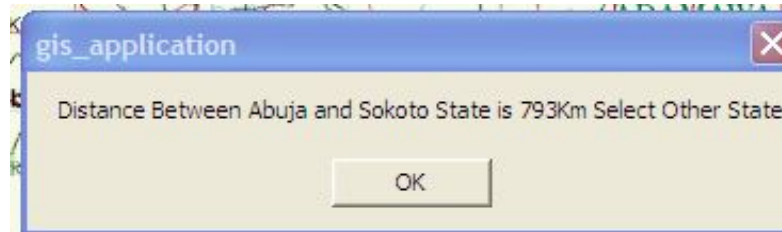


Fig 1.7: Distances Between Abuja and Sokoto

Fig 1.8 Shows the analysis of distance between Abuja and Taraba in terms of nymerial value.

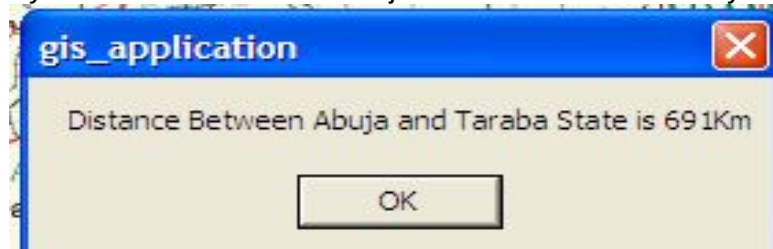


Fig 1.8: Distances Between Abuja and Taraba

Fig 1.9 shows the analysis of distance between Abuja and Edo in terms of nymerial value.

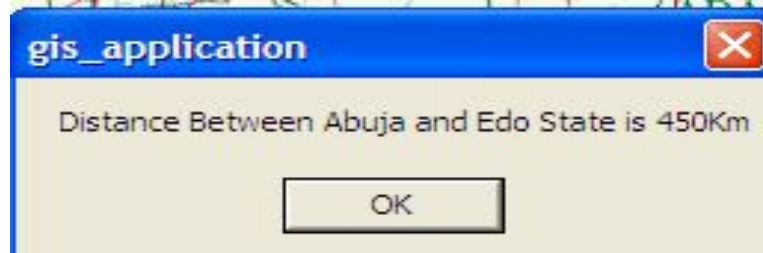


Fig 1.9: Distances Between Abuja and Edo State

Fig: 1.10 shows the analysis of distance between Abuja and Ekiti in terms of nymerial value.

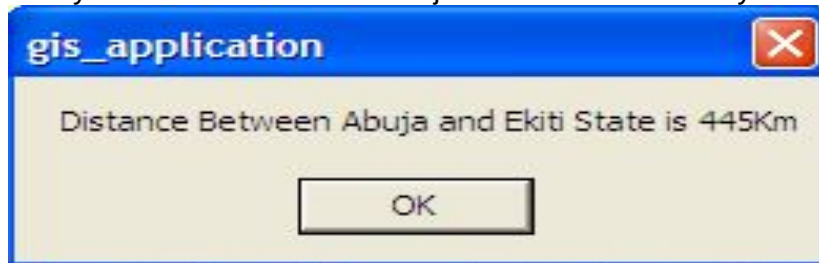


Fig 1.10: Distances Between Abuja and Ekiti State

Fig: 1.11 shows the analysis of distance between abuja and Bayelsa in terms of nymerial value.

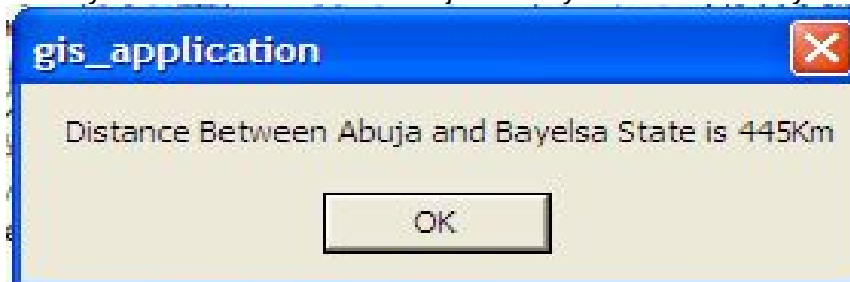


Fig 1.11: Distances Between Abuja and Bayelsa State

Fig: 1.12 shows the analysis of distance between Abuja and Kwara in terms of nymerial value.

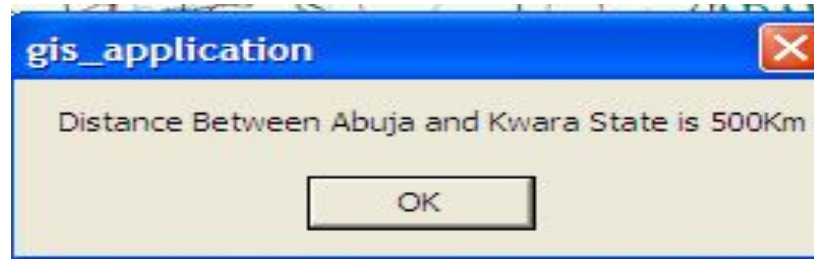


Fig 1.12: Distances Between Abuja and Kwara State

Conclusion and Recommendations

Based on findings, we can use this software that was developed to illustrate the distance covered from Abuja to different locations In Nigeria. This software assists to display the result in electronic format and as a guide to choose a particular route during the time of travelling. The work is recommended for the following reasons:

- (i) The summary of the graphical distance In Nigeria can easily be represented in form of figures and this will definitely help both the road sers and the government for proper planing about the maintenance and the uses of those roads.
- (ii) The software that was developed definitely reduces the cost of travelling by taking the shortest route when there is need for travelling.
- (iii) This type of software can also be used to determine a particular time that a journey will take once the distance and the speed of the vehicle is determined.

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