



Geo-coding of Voter's Residential Address: A Panacea to Election Malpractice in Jos South LGA of Plateau State, Nigeria

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Abstract: According to NSGIC's Geo-Enabled Elections project 2017-2019, transiting from the un-verifiable election method to Geographic Information System (GIS), elections management requires a sound plan, effort, and resolve. The inherent technical capacity of GIS visualization and analytical advantages involves replacing non-spatial 'voter's address file' systems with election district and voter location data in a GIS format. But in practice, it requires some additional investment, technology and resolve to answer the most frequently asked question from the electorates 'If the election management body (INEC) in Nigeria knows the geographic locations of their voters'. This task of-course requires a relentless efforts from INEC and building the staff capacities continuously. The file geo-database of point attribute data set of all voters in the study was exported to ArcMap of ArcGIS into the geo-coder, where parameters were set for both urban and rural at prompt. The result on a spread-sheet format revealed name of each voter, the demographic characteristics, location (in terms of latitude and longitude) and shortest or nearest voting point. This reduces to a great extent multiple voting, reduce apathy and help INEC plan effectively.

Keywords: Geo-Code, Geo-Coder, Point Attribute, GIS and Arcgis.

1. INTRODUCTION

The proceeds and the paraphernalia of office enjoyed by the Executives and the Legislatures in Nigeria can never be compared with other clients over the world that has been practicing constitutional democracy for centuries. That is why, the political elites involve itself in all sorts of election malpractice to paper rate themselves in office by introducing twisted policies to subvert the will of the electorates.



The Election Management Body that is Independent National Electoral Commission (INEC) and staff are not truly independent by virtue of the appointment of key management staff and the chairman which is vested on the Executive, that is the incumbent; because, he who pay the piper dictates the tune. That is why it was said by YAGA Africa (2023) and European Union Election Observer (2023) that INEC was partisan in the conduct of 2023 general election, and did not know where those voting on election day are residing, whether or not are Nigerian citizens and the required number of voting places and which is the nearest ballot place to their usual place of residence.

Besides all these Bill Sweeney (2015) in his article says, Goodluck Jonathan (the then incumbent President) congratulated the Mohammed Buhari after the polls, but there is never a perfect election and the 2015 general election in Nigeria was no exception. The Card reader machines with the PVC for voter verification could not read the incumbent president's fingerprints do many across the country. In fact, there were nearly 120,000 voting points operating on Election Day, many of which did not have access to cell phone or internet service and were thus unable to receive INEC's directive. At the end, INEC official resolved to accredit manually and unfortunately, desperate politicians leveraged on this loop-hole to move those smuggled into the country prior to Election Day to vote, since there is no means of verification.

All these are fundamental to avoiding or reducing multiple voting, ballot stuffing, thuggery, militarization of election, vote buying and selling, unleashing violence on innocent Nigerians and the host of others.

Nigerian electorates on the other-hand seem to have lost confidence in the Nigeria's election process and was why the February, 2023 general election and the lowest turn-out in the history of voting as alluded by IPAC, (2023) during the recent review of the last general election.

The Nigerian Judiciary may not be exonerated, because the head was appointed by the incumbent, therefore he or she is at the whims and caprices of the executive. The last 2023 elections witnessed nine-hundred and eighty-four (984) litigations in the aftermath despite huge voter apathy, says SERAP (2023). In fact, about 48hrs after the February 2023 general election, the INEC chairman (Prof. Mahmood, Yakubu) started announcing the result via all television (TV) stations (Channels TV) with all political party present; the moment inconsistencies was observed by the opposition party (PDP), the INEC chairman says, 'If you are not satisfied, go to court'. This means, there is the likelihood of Judiciary working in collaboration with INEC to subvert people's mandate.

However, if INEC can key to geo-coding technology, the Judiciary will have little or no election adjudication and people's mandate shall prevail; because voters can easily identify the nearest voting point, INEC also knows the geographic location of each eligible voter. It is against this background that this article geo-coded the addresses of all the voters in Jos South LGA as a proto-type for other rest 774 LGAs in Nigeria.



2. MATERIALS AND METHOD

2.1 Materials

The needed materials for this article as required from the need assessment study were sourced as secondary point attribute data set of addresses of all eligible voter (from age 18yrs and above) obtained from the file geo-database of the National Population Commission (NPopC). While the Very High Resolution (VHR) satellite imagery 2019 at 0.6meter resolution was sourced from National Center for Remote Sensing (NCRS).

2.2 Method

The point attribute data set obtained from the NPop C was aggregated or harmonized into a standard format, then convert all the geographic data to valid reference data (I, e., Geo-reference) of the same geographic coordinate system or unit, which can be used for spatial analyses. Although, postal address and or e-mail address could also be used to describe the 'Place' or location of a voter. It could be by vernacular, text-based descriptions which are easily understood by people. But it must pass through some processes before being used by the geo-coder at promote. The in-built algorithm after setting the required parameters for both rural and urban, because the pixel size for urban voters is larger than those in rural they may not have access to move easily on election day; then the geo-coder generates coordinates of the residence of each voter, attributes and nearest voting point on excel spread sheet as shown in figure 1 below

3. RESULTS AND DISCUSSIONS

Output 1

Geo-coding of Eligible Voters

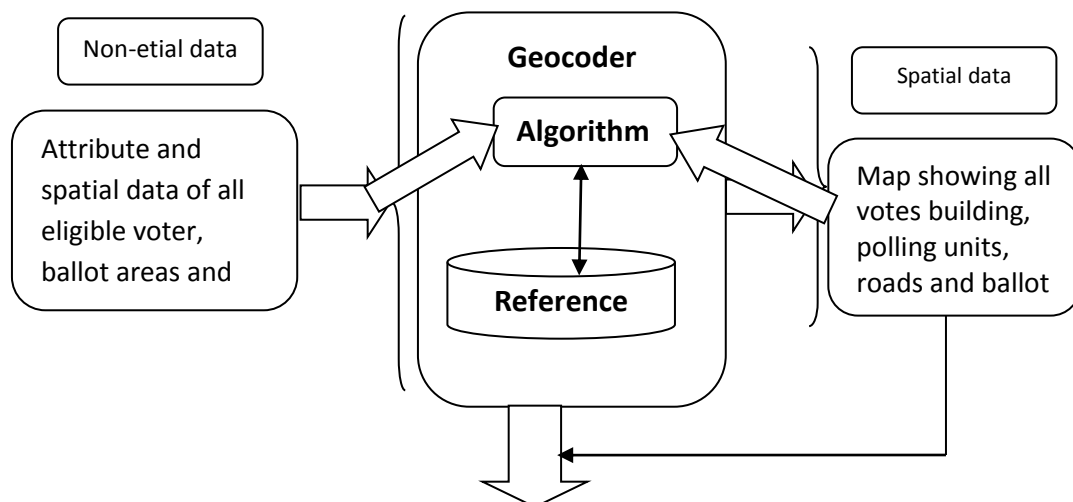
The in-ability to pin or relate a voter to a specific geographic location was one of the major pitfalls identified in February 25th, 2023 general elections and that of the 2015 elections. This is, because elections took place across a multitude of administrative units and geographic extent (country-wide, state-wide, etc.). The sample of data used as obtained is shown below on Table 1 and processed by the researcher for each of the different level by harmonizing these data into standard in order to avoid incoherence of data and for ease of integration in the GIS environment. Then, differentiate the format from the unknown lineage or accuracy. Person, place, and time were the three basic axes of data needed for geo-coding of residence of voters addresses; because it is not all vector objects (building) necessarily fill the geographic space and not all locations need to be referenced by objects. But, one or more attributes like street names was assigned to individual objects to describe what is where and when with vector-base data (i.e. building locations). Although, the satellite image used for this study (raster data) was meant to provide information relative to what occur every where (this include voter's address, location, polling units and accessibility), all are space filling since every location of interest correspond to a cell in the raster.

Table 1: Sample of Eligible Voters Address

S/N	Ward/District	Locality	Ballot Area	Old PUs
1	GIRING	HWOLSHE	Dilimi	4
2		RIGIP	Dakupyam Turu	
3		DANCHOM-GIRING	Kuru babba	
4		DANCHOM-GIRING	Danye ii	
5	GYEL 'A'	GYEL	Rankyang	6
6		GYEL	Tanchol	
7		LYOH GYEL	RatyaI (Toplokadang)	
8		GYERO	Gyero	

Source: Author's Field Work (2023)

However, there were three main steps at prompt of ArcGIS to geo-code the addresses of eligible voters in area under investigation and it include: a) The descriptive locational input data (e.g., addresses of eligible voters using their residential building, polling units, etc.), b) The algorithm inside the geo-coder, after defining the required parameters for distance to cover by urban and the rural voters during elections goes ahead processing. Those in the urban are more than that of those in the rural, because of in-accessible route to ballot place. C) The valid spatial output data in the format of excel spread-sheet as shown in figure 1 below include the name of eligible voter, the demographics, nearest voting point to residence and the geographic coordinates of residence.



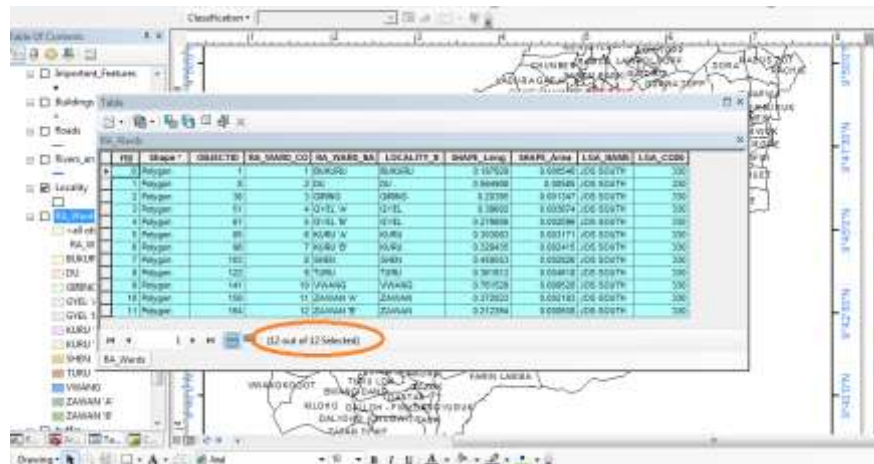


Figure 1: Geo-coder Architecture and Output

Source: Author's Field Work (2023)

Output 2

Nearest Voting place

Figure 2 below shows the ballot areas identified in Jos South LGA as the time of investigation generated from ArcMap of ArcGIS. This will assist INEC to plan and monitor effectively, before, during and after election with the geo-coded address of eligible voters derived from pre-code Voters register.

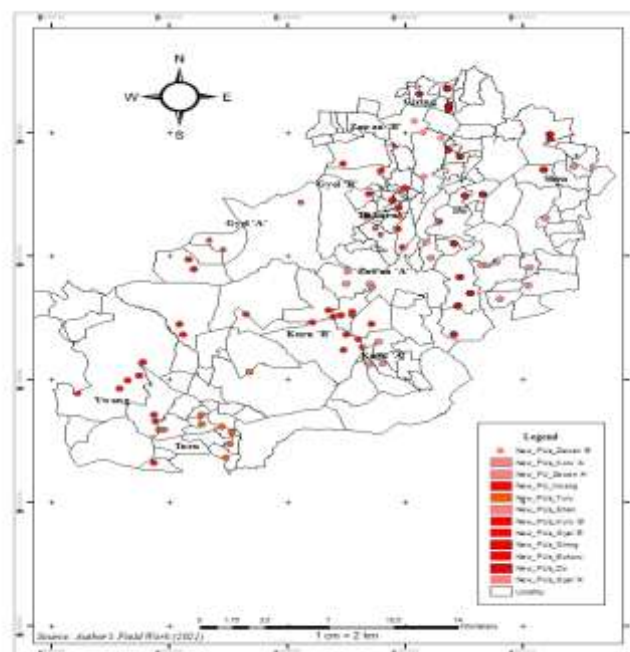


Figure 2: Ballot Areas of the Study
 Source: Author's Field Work (2023)



4. CONCLUSIONS

This article was able to provide a panacea to multiple voting, smuggling in non-Nigerians prior to election in order to vote, ballot stuffing, provide clues to voters the nearest voting point, INEC now knows not only where eligible voters are residing, they can also be identified and effective planning and monitoring can be done seamlessly without necessarily having any physical contact with the voters.

However, the three stakeholders need to make a resolve in doing the right thing particularly, the election umpire (INEC) and staff by building their capacities in this new technology in order to mitigate different tactics of election maleficent as it manifest.

The government on the other side should provide the enabling policy, law and the necessary financial assistance to support the system.

This indeed will restore sanity in the Nigeria's election process and reduce the burden of Judiciary given mandates to those the voters elected.

Although, the next edition of this article shall unveil how the contextual database for one-one match voter would completely eradicate all forms of election malpractices in Nigeria.

Compliance with Ethical Standards

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Disclosure of conflict of interest

The authors declare that they have no known competing financial interest or personal relationships that could have appeared to influence the work reported in this paper.

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