BIOMETRIC PROPERTIES AND NETWORK TECHNOLOGIES AS DETERMINANTS FOR A SECURE ELECTRONIC VOTING ARCHITECTURE

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ABSTRACT

Most of the E-voting architectures used currently to identify and verify a voter use single biometric source over the Internet. However, single biometric source have many challenges which include; noisy data, intra class disparity, inter class resemblances, universality, spoofing and sometimes insecure. Similarly, the use of Internet poses yet another problem which is that not all parts of the country have Internet connectivity and electricity as well. This research was aimed at developing a secure e-voting architecture using biometric properties and network technologies. The architecture was based on a polling station setup involving a Local Area Network that uses GSM/4G technology for transmission of data to the tallying centres. The study used both quantitative and qualitative data from two Independent Electoral and Boundaries Commission (IEBC) regions, (Kakamega and Kericho) to provide practical evidence of the study. The study is grounded on contemporary democratic theory which suggests that elections should be characterized by equality, transparency and fairness of access which constitute an important component of the structures of liberal democracies around the world. The study used descriptive research approach. Purposive sampling as employed to select respondents. The reliability of the research instruments was ensured by carrying out a pilot study. Qualitative and quantitative data that was collected was then analysed using both descriptive and inferential statistics. Election coordinators' opinion survey was used to develop the proposed e-voting architecture. The study found out that the existing electronic voting architectures only involved identification of voters and not electronic voting. The study established the face and the fingerprint as the key biometric properties for identification in e-voting application. GSM/4G network technologies were determined to be useful for transmission and improving the electoral process by the study. An e-voting architecture was developed based on a polling station setup where adoption of electronic voting technologies using multimodal biometric for identification and verification was employed. The findings of the study are important to the government in officiating general elections and also form a foundation for future development of e-voting architectures.