EDUCATION, MIGRATION AND SUSTAINABILITY- HUMAN SOCIOECONOMIC DEVELOPMENT AND CHANGING TECHNOLOGICAL TRENDS

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ABSTRACT

Technological innovations earmark the trends witnessed today, driving various economic statuses. The current trends driving the education, migration, and sustainability of the human population include; cybersecurity, artificial intelligence, and blockchain technology. Artificial intelligence uses the data collected to predict future patterns in economic and climatic conditions, influencing migration as witnessed in Africa. The blockchain, as innovated, aims to establish a decentralized and stable financial economy in the current economy. Cybersecurity has arisen t curb the increased cyberattacks experienced in modern society hence the need for public education to curb the cases. The current trends depend on the various technological innovation driven by machine learning and algorithms.

KEYWORDS

Education, Sustainability, Socioeconomic Development, Technology Trends, AI, Blockchain

1. INTRODUCTION

The world continues to evolve daily with innovation in the various fields shaping the modern world. Technology is the propelling feature towards the various developments and trends shaping the contemporary community. Some of the innovations and technological trends experienced today surround cloud computing, through which other trends have emerged, as witnessed in Artificial Intelligence, Blockchain, and cybersecurity [14]. Cloud computing technological trends have influenced the various socioeconomic developments in modern society, such as migration, education, and sustainability. Technological trends have created jobs for multiple individuals in the community, either direct or indirect, through integrating technology into the various economic activities experienced in society [14]. Different technological computations have shaped the various innovations and trends we experience today, such as algorithms, machine learning, and artificial intelligence. As outlined below, the multiple technologies embraced in the trends continue to shape the various trends, influencing the community positively or negatively on numerous aspects such as education, migration, and socioeconomic sustainability.

2. ARTIFICIAL INTELLIGENCE

Artificial intelligence entails the technological advancement of digital computer incorporation to perform the various tasks associated with intelligent human beings. Artificial intelligence utilizes machine learning technology for the execution of multiple studies by mimicking human cognitive activity. The cross-disciplinary approach incorporates the mathematical, computer science, linguistics, and psychological practice in the execution of the various functions [12]. AI has colored the multiple aspects of the modern world; drug dosing, diagnosis, and treatment

administration to numerous patients alongside the administration of various surgical procedures. The automotive industry has also incorporated artificial intelligence in adopting self-driving and cashless payments. Technology has necessitated the economic livelihood of various individuals through the various aspects of innovation hence shaping the livelihood sustainability, education to the various students, and migration [12]. Besides, learners within computer science have their curriculum centered on artificial intelligence and various algorithms.

Artificial intelligence, as it centers modernity on socioeconomic sustainability, has influenced the various aspects of the community. For instance, artificial intelligence has necessitated self-driving in electric vehicles hence improving sustainability as it has reduced accidents and accidents occurring have fewer casualties [12]. The innovation and technology embraced in artificial intelligence have affected the human employment sector by automating various jobs. The intelligent machinery hence pushes for the elimination of workers from the workforce. For instance, self-driving cars present an indefinite future for taxis and car-share programs with a possibility of human labor replacement with machines, making people's skills obsolete.

Artificial intelligence helps predict immigration patterns across the population, especially in Africa. For instance, artificial intelligence helps predict various climatic conditions and future expectations, such as electricity accessibility during winter, which consequently influences the migration pattern to particular regions with assured electricity [12]. The future prediction relies on renewable energy data sources and technological execution. Besides, individuals utilize economic statistics in predicting the future economic growth likely in a particular nation against the various economic crises hence migrating to foreseeable future countries.

Artificial intelligence spurs innovation in teaching and learning practices. For instance, artificial learning predicts the learners' various learning abilities and consequently helps develop the necessary learning materials for multiple learners. Artificial intelligence also helps develop technological innovations to address diversity and cultural expression inequalities [12]. Besides, virtual reality addresses the scenarios of the learners connecting to various locations with other learners or during the learning practice within the classroom setting.

3. BLOCKCHAIN TECHNOLOGY

Blockchain entails the shared, immutable ledger that facilitates transaction recording and asset tracing within the business network. This technological innovation allows tracking the various aspects alongside blockchain network trading, reducing the risks and costs involved in trading. Businesses make decisions based on the information available, with faster generation translating to better decision-making [2]. The blockchain offers an extensive advantage to the community as it provides immediate, shared, and transparent information contained within an immutable ledger accessible only through the network authorized to the various specific individuals [7]. The nature of sharing a single view of the truth among members allows the accessibility to all details of all transactions hence assuring confidence, efficiencies, and opportunities.

Blockchain technology incorporates various characteristic features. For instance, distributed ledger technology restricts the recording of transactions, eliminating effort duplication and eliminating double spending common problem in modern society [7]. Blockchain also features the immutable records characteristic, limiting transaction tampering after recording on a shared ledger [2]. The correction of a transaction error demands the addition of a new transaction to record the error. The technology has also incorporated smart contracts defining the conditions for corporate bond transfers.

Blockchain technology centers on the tangible or intangible innovation of the asset movement. The data block record highlights the various information related to the condition demonstrated by place, time, and the amount and state shown in the shipment of the goods alongside the requirements [2]. The blockchain presents the asset movement through the interconnection with each block, confirming the time and transaction sequence. The linkage of the block prevents any block from alteration or insertion between existing partnerships [2]. Blocking together the transaction in an irreversible chain strengthens verification, removing the malicious actor tampering as the transaction ledger builds on the trustable network.

Blockchain technology has facilitated numerous advantages to the community, especially in the financial market. For instance, it reduces the immutability of transactions, providing a permanent record safe for future information flow analysis and accountability [2]. The technology also features a decentralized system, giving the various network members accessibility to data record verification within the blockchain [7]. The decentralized technology system eliminates censorship as multiple organizations, such as the government, control the technology and transactions like in single-party-owned organizations [2]. Therefore, organizations have utilized this mode of technology in marketing their operations as they escape the government enforcement of the various policies, which may limit their operations.

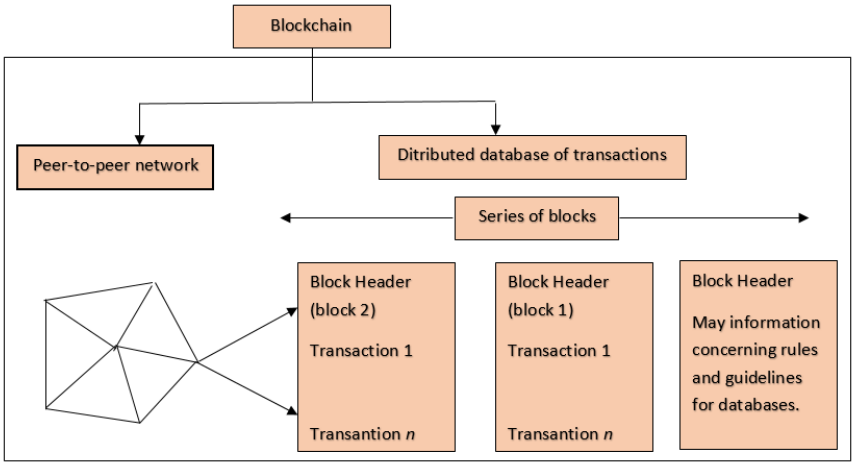

Fig 1. Blockchain technology diagram

4. CYBER SECURITY

Cybersecurity entails technological innovation to protect systems, networks, and programs against digital attacks, commonly dubbed cyberattacks. The cyberattacks, as launched, aim at the accessibility and destruction of personal and sensitive information alongside the extortion of money from users through ransomware. The increasing technological innovation by attackers has necessitated the creation of cybersecurity to protect various users from technical attacks [6]. The technological innovation works best through the Cisco security updates, which perform the integration automation and accelerate security functions through detection, investigation, and remediation. Technological innovation aims at educating and providing technology that facilitates the protection of the various organization systems with a consideration of the main entry, such as computers, smart devices, networks, and the cloud [6, 21]. The entities incorporated include the next-generation firewall utilization through DNS filtering, antivirus software, and email security.

The advancement in technology comes with educating the public on the various threats that come along with cyberattacks and creating awareness of the dangers of cyberattacks. The different companies and organizations housing critical personal data have outlined the various methods of securing the data to keep society functioning, exemplified by the hospital and financial institutions [6]. Common cybersecurity threats include phishing, social engineering, ransomware, and malware. Phishing entails sending fraudulent emails resembling authentic emails to steal sensitive data, exemplified by credit card numbers and login information. Email filtering has protected the public from falling into such traps. Social engineering entails the common tactics cybercriminals use to reveal sensitive information to solicit monetary payments. The crowd falls prey to such criminal acts by clicking malicious software or downloading malware. At the same time, the malware causes unauthorized computer access, and ransomware aims to extort money by blocking file accessibility until the culprit pays a certain amount.

5. TECHNOLOGIES SHAPING THE TRENDS

5.1. Algorithm

An algorithm entails o the procedure utilized by the various information technologists in executing a particular computation. It contains instructions necessary for the execution of specific specified actions stepwise through hardware or software-based routines. Algorithms perform multiple functions through data processing and automation of various procedures. For instance, algorithms sort complicated tasks based on initial data inputs and instructions for specified computations [5]. The programming languages depend on an algorithm for the execution of the functions. Numbers or words direct the instructions executed with input data getting through instruction sets, including arithmetic and decision-making processes. The final step includes an algorithm expressed as data. Some examples of automation software include algorithms.

Various algorithms exist for modeling the different software, as exemplified by encryption, search engine, recursive, and divide and conquer algorithms. The encryption algorithm entails data transformation per specified actions for its protection. Data encryption standard utilizes similar keys in encryption and decryption [21]. Search engine algorithm entails using search string keywords and operators as inputs in searching for the various databases for webpages and results return [11]. The recursive algorithm solves the different computations by repeatedly executing itself until it solves a particular problem [8]. The recursive algorithm utilizes the strategy of smaller value calling upon invoking a recursive function. The divide and conquer algorithm entails the division of the algorithm into two parts, with one part division demonstrating a smaller sub-problem. In contrast, the second part disintegrates the other problem, solving it. The algorithm hence combines the problems solved to provide a definite solution.

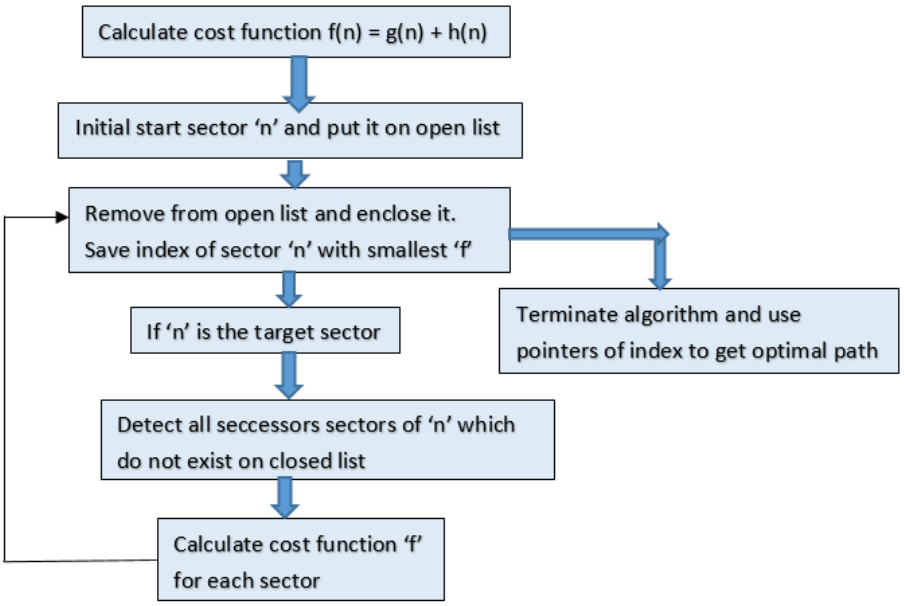

Fig 2. Star algorithm [15]

The algorithm has resulted in various data science technologies, such as machine learning. Machine learning utilizes the algorithm in the prediction of outcomes without explicit programming. Machine learning uses supervised learning to supply complex algorithms with labeled data training and the definition of the variables for correlation assessment [13, 14]. Machine learning also utilizes unsupervised learning in data prediction. It involves the algorithms for unlabeled data training with unsupervised machine learning sifting through unlabeled data for the execution of patterns used in grouping data points into subsets. As exemplified by neural networks, unsupervised learning has prompted deep understanding [15-17]. Artificial intelligence depends on algorithms for functioning. The machine-learning-based systems comprise inherent biases in data-feeding machine-learning algorithms resulting in untrustworthy systems development.

5.2. Machine Learning

Machine learning entails the artificial intelligence skill that drives machines' capability to imitate intelligent human behavior. Artificial intelligence helps in the execution of various complex tasks in similar human mechanisms. Machine learning has guided the formulation of artificial intelligence technology that helps in recognition of visual scenes, understanding text formulated in natural language processing, and execution of an action in the physical world [21]. Machine learning incorporates the data, numbers, and photos in gathering and preparing data for training or developing a machine learning model to execute a particular function. Some of the data gathered help evaluate the program's effectiveness and demonstrate the accuracy of the machine-learning model upon execution of new data [3, 18]. Machine learning functions as descriptive, illustrating the occurrence of a particular action, predict of future activity, and prescriptive of the data utilization in making suggestions of whatever action improvised.

Machine learning employs three categories; supervised, unsupervised, and reinforcement. Supervised machine learning entails training with labeled data sets to allow the model in education and illustrate accurate decisions. The particular algorithm train on identification models of a specific object [3]. Unsupervised machine programming seeks to identify unlabeled

data, identifying patterns and trends that individuals have less interest in looking at. Reinforcement machine learning entails the program training the machines on trial and error for an established reward system [10, 18]—reinforcement learning models in playing games and autonomous vehicle driving through directing the best decision-making.

Machine learning is associated with various artificial intelligence fields demonstrated by natural language processing and neural networks. Natural language processing entails machine learning for understanding natural language written by humans rather than data and numbers in computer programming. Machine learning algorithms model the human brain through interconnection and layer organization, facilitating the technology [4, 20]. Natural language processing improvises the data labeling through nodes, with each cell performing a particular function. The different nodes assess information and dictate the action response.

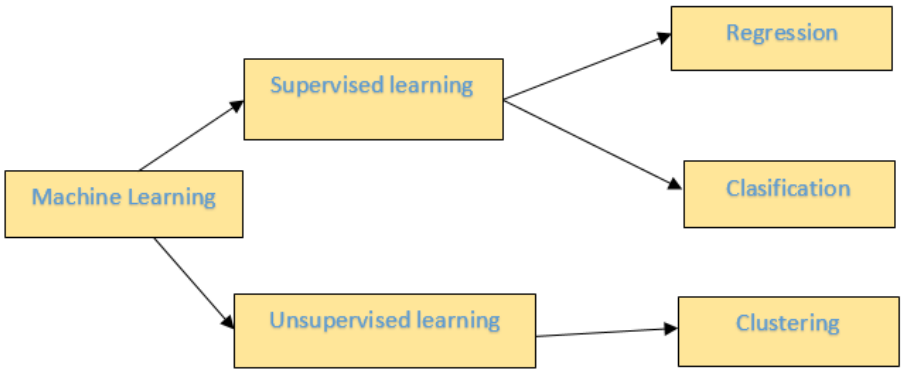

Fig 3. Machine learning block diagram [9]

6. STATISTICS ON SOCIOECONOMIC USE OF THE TECHNOLOGY

$$g(z) = \frac{1}{1+\exp(-z)} \qquad \text{Equation (1)}$$

Different companies have initiated the utilization of various technologies in running their companies. For instance, 67% of companies like Netflix utilize machine learning to run sales and control supplies. Multiple companies also use the google search algorithm, such as Netflix, in providing suggestions on movies to their esteemed users [20]. The linearity assumption in machine learning helps highlight the linearity between independent and dependent variables using a mathematical formula.

7. CONCLUSION

Ultimately, technological innovations continue to shape modern trends due to technological advancements. Some current trends include blockchain technology, artificial intelligence, and cybersecurity. Artificial intelligence has demonstrated the population's changing nature depending on the future situations demonstrated by electricity availability and economic conditions. Blockchain technology aims to establish a stable currency propelling the various functions in a society free from government intervention due to the decentralized system. Cyberattacks havenecessitated cybersecurity awareness to protect the population from cybercrimes. Different technologies drive innovations,as demonstrated by machine learning and algorithms.

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