

The Path to Ethical and Moral Use of Media Tools in Data Mining for Social Networks

David Tovi Muli, Nicholas Muthama Mutua

Abstract— The development of newer and easy to use ICT applications especially those that allow social interactions has led to in-creased user levels and experiences. It amazes to see the young operating a smart phone with no challenges unlike their parents. Although these applications have come of age, it is important to address the moral and ethical issues that have emanated with these new applications. This paper addresses moral and ethical issues related to various applications in ICT. It specifically identifies personal morals and ethics as the main agents of inculcating moral and ethical behaviors in the development of and usage of ICT related applications. It discusses the role played by morals and ethical behavior in ICT, Social networking sites and tools, and mobile phone applications (mobile apps). It recognizes the role of application developers and general users of ICT in instilling ethical behaviors among themselves and to other remote users. In conclusion, it identifies the critical roles of all types of users and proposes that all should be guided by their personal morals and ethical values that define their characters.

Index Terms— Ethics, Morals, Code of Ethics, Enforcement, Policy, Social Media.

I. INTRODUCTION

Criminal activities in and out of the work places have increased tremendously mainly due to advancements in all sectors of the world economy. The most current advancements are evident in the money transfers services in the so-called mobile money transfer technologies. This places countries like Kenya and others on the Global Map of being amongst developing countries that would help provide channels for redistributing wealth. These are benefits that are anticipated in other countries in the near future [17]. In addition, there have been an explosion in social networking websites and tools with increasing user connections around the globe [10]. The advancements have

their roots from the innovativeness of young scholars, non-scholars and even the unemployed who through being such innovative are able to design and develop mobile phone and computer applications that turnaround the way societal problems are solved. Although many benefits have been reaped by economies, there are a number of encounters that have come along with the technological solutions and innovations. These challenges emanate mainly from lack of and disregard of ethics in information and communication technology and from lack of morals [19] in the information age. Managements of organizations being aware of the existence of ethics in ICT may turn a blind eye on the enforcement of these codes of ethics. Enforcement is important towards the realization of an organization's objectives and above all, to choose right from wrong and make responsible decisions whenever one is working on and with ICT systems.

A. Role of Ethics and Morals in Information and Communication Technology

Every aspect of life especially that whose undertaking could negatively affect the quality of life of others calls for the adoption of positive societal value systems. This could otherwise be in the form of policy documents or guidance. Inventions in ICT present major challenges to the human kind with further inventions occurring each single day. As cited by the legal theorist Larry Lessig in the [17], the pace of transformation with ICT is faster than the process of drafting relevant policies and laws. It therefore leaves many aspects in ICT unregulated. If the use of these inventions go unchecked either policy wise or through prescription of code of ethics, it is likely to cause a lot of harm to the entire world. This clearly means that ethics is a critical component for ICT users and ICT professionals. ICT professionals would include system designers, analysts and developers. This would require specific ethical codes in addition to the common general codes that may apply to all classes of users or professionals. Ethics are rules that guide the behavior of a person or a group of people in a working environment or in religious settings. Ethics further involves structuring, securing and acclaiming the concepts of right and wrong conduct. Some organizations have made turnaround reviews to their codes of conduct and ethics to accommodate the progressions that have come with Information and Communication Technologies. This is a response to the ever evolving innovations that have been realized over time. Note worth are the current money transfer technologies and the social networking websites. It

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is believed that more innovations in these fields are likely to be unveiled with time. This would challenge the current ethical codes that have been put in place by different organizations and therefore the need for a continual review of these codes in relation to Information and Communication Technologies. Individuals should be guided by their own volition on doing the right thing and differentiating right from wrong. This kind of behavior depicts that they are guided by their discernment to right and wrong. As pointed out by [19], the exchange of information is vital to all users of social websites as without data input, no process can be completed. Data shared with these interactions should be protected from all human instigated bad practices. There could be instances when a person's data could be wrongly used [16] and this is why privacy requirements should be in line with the bills of rights and laws on data protection. Users guided by the principle of guarding their privacy and that of others and respecting the rights of others with regard to data are morally upright. Morality means the differentiation of intents, decisions and actions between those that are right and those that are wrong. ICT Professionals and other users of ICTs should be guided by personal morals. They should be able to principally tell right from wrong and refrain from doing the wrong things. A critical example is online viewing of pornographic content which has come with the internet age with over 72% of college age youth exposing themselves to it at will [8]. One would ask, are there morals? To exemplify this further, a business man who runs a cyber café and provides internet services would feel irritated when he finds one of his clients visiting a pornographic site. If he is guided by his personal morals that, nobody should visit such sites, he would go ahead to shut the website or install a firewall for blocking users from visiting such sites. This is the level of morality that would be required of any user of ICT or an ICT professional.

II. ENFORCEMENT OF MORALS AND ETHICS IN ICT APPLICATIONS

A. Social Networking Sites and Tools

Social websites are mainly used by people from all walks of life whether literate, semi-literate or those who have never gone to school based on exposure to relevant devices. As observed by Pew Research Center, 2015 in [13], 73% of those adults who use the internet, 73% use social networking tools while 53% use more than one platform. A variety of social tools and websites including Blogs, Facebook, Twitter, Instagram, Google plus, LinkedIn, Webcasts and WhatsApp among others, carry information that is electronically discoverable [14]. They play constructive roles in the life's of people. People can share very constructive ideas and concepts that could change the life of a person for the better. Conversely, it could also ruin a person's life. At work places, majority of employees approximately 95% as cited by DLA 2011 Piper Survey in the [11], would be working and at the same time chatting with friends online through social networks. Ideally, any individual should always ask him/herself of the value he/she is creating on his/herself or the organization from

such social interactions. In the work place, users could be using resources of an organization to carry on with their social interactions. These could include but not limited to Wi-Fi, power, time and other computer resources. For instance, they would print their own work using the organization's paper, printer and toner. They could even go ahead to undertake illegal installations of unwanted software in the work computers. Others would use office telephone lines/mobile phones to make their own private calls. They could engage themselves in immoral behaviors such as watching pornographic/obscene content in the office. Consequently, these acts could influence the totality of a person's behavior in the future. Organizations could harness the positive changes that have come of age from advancements in technology. Social networking would create a solid foundation for such organizations in-terms of customer base as they could be in communication in real-time. Organizations that have embraced the use of social websites in marketing and advertisements [11] are making good business especially those that are engaging social tools like Blogs. People in business too are making good living as they have established relationships that are solidified by the social network. In addition, tour operators are too using blogs to advertise their routes, hotels and certain social activities that they have planned. Users should be guided by strong ethical and moral principles. Organizations should develop policies and ethical guidelines which should be upheld and enforced. Enforcement of ethics in an organization is critical in the realization of a human resource that upholds integrity. Ethical guidelines should be specific on certain aspects such as privacy of personal and organization's information, security of information systems [14] and the activities that they can perform or not on the organization's information systems among other aspects. They should commit themselves to uphold all clauses in the ethical code. Breach of the code should be met with dire consequences including but not limited to sanctions and dismissal from service. However, the code should be clear on the consequences thereof.

B. Ethical and Moral issues in the use of Mobile Phone Applications (Mobile Apps)

The ICT sector has gone through various evolutions especially in the mobile technology. This can be exemplified by the current mobile money transfer technologies that are in the world market. This has positively changed the life's of people with many of them having installed bank agency outlets. Banks have embraced mobile money technologies with many linking the mobile phone number of the subscriber to his/her account. This is beneficial as it saves time and it's very efficient. People are able to chat on real-time basis. These are examples of benefits that people have and can reap from mobile applications. Besides, the benefits being so enormous, there are many more challenges which would pose a threat to morality and ethical culture. For instance, competing for clients through social media, damaging the reputation of an organization [11] or person through social media, posting

confidential information [15] on social sites and infringing on the privacy of others [19] among others. Currently, many relationships have soured due to exchanges and interactions on social media. In fact, new relationships have arisen from social site interactions which is encouraged as it nurtures cohesiveness among people of different origins. However, if such relationships are not focused, they might lead to instances of one party being socially withdrawn, depressed and/or suicide by the party. In addressing the moral and ethical issues that might arise from social site interactions, closer attention should be rendered to the enforcement of moral and ethical behavior especially in offices, private or in business premises/cyber café [21]. Organizations should develop policies that would guide employees on use of social media platforms at work place. Using systems that can monitor their work stations [11] could be a step forward but it raises other questions of infringing on a person's privacy. This can however be streamlined through organizational policies on the use of these tools which all in the organization should read and understand. Operators of cyber café business should develop their own regulations that should guide customers on the use of social websites and the conduct they should exhibit when using them. Although the use of social sites is voluntary and depends on a person's impetus, organizations and business premises should steer it clear that the use of social site must be responsive to users and to the organizations. It is important to let all to be aware of the existence of defamation laws which would apply to messages made on social websites/tools [12] and that people should follow any guidelines prescribed to guide them on using these tools. According to [9], people need to understand the drawbacks of defensive legal and rigid structures and provide realistic tenable actions that can put ethical behaviors ahead of other mechanisms. This will help increase the benefits and reduce any harms thereof.

C. The Role of Personal Ethics in the use of Social Media Tools

Values and morals will determine the levels and types of interactions people engage in using the social media sites or tools. Most often, people require friends with almost similar characteristics and qualities. It is difficult to measure a virtual person's humility, patience among other values. This then calls for a different level of judgment for online social friends as opposed to judging the nature of the virtual friend using the assumed virtues [17]. This will also determine the type of persons and/or organizations to interact with. Those individuals on business ventures would want to interact with certain organizations that would give them a business advantage. Conversely, if one is not guided by values and morals, he would accept any request from whatever source just by trust [19]. The current advancements in ICT technologies have seen a lot of positive and equally negative effects to users. For instance, there are new email servers that are in use. With these advancements, every email account holder has received at least a spam email. If a user is not guided by values and morality, he would go ahead to open that email out of

curiosity. This could be a phishing email or a security threat to the computer and the entire ICT infrastructure. The developers/account holders of phishing emails are not guided by ethics and morals or they disregard ethical aspects on the development and usage of ICT resources. In this regard, it is important for all stakeholders in ICT to develop ethical guidelines on development of all ICT applications [9], and have them applied and enforced uniformly around the world. Though governments of different states in the world could be having their own ethical guidelines, there is no uniformity in them and lacks coherence in the way how each state enforces them.

Accordingly, users of social websites and tools should be guided by their morals and personal values. If one receives a request from an unknown person or organization, he should take a lot of precaution to accepting the request. Normally, majority of users do not use their real names and remain anonymous [19] to the other remote user and therefore it could be difficult for anyone to guess whether the requester is an intelligent system or is a real person. In fact, several incidences have been reported on the internet or local media that several people had been lured through the social media and on the extreme, some have even committed suicide or lured into a trap and disappear without trace. Other have suffered defamations [14]. Personal ethics and moral behaviors are therefore important at guiding our actions.

Subscriptions to certain services that come within the social tools and websites should be well analyzed before taking a step forward to the subscription. Remember, a person will always identify him/herself during registration to the app. A question arises that, has the app identified the requester fully or is he/she using acronyms? This gives a user an opportunity personal information which would compromise on a person's data privacy [15]. However, this should be a moral requirement that instills into a person, personal ethical behaviors. Ethically, it should be made mandatory to the app, site or blog provider to require full names of users and any other data items that could form the primary key and surrogate key that can identify users to avoid situations of registering with acronyms.

D. Implications of the Research and Practice

The research is a key ingredient to the ever changing ICT world where new social, ethical and moral issues continue to manifest and therefore need to be addressed. All application developers and general users of ICT in organizations or in private businesses should be aware of these issues. This will help stem out future technologically instigated social problems.

III. METHODS AND MATERIALS

A. Research Issues on Social Network Analysis

The following have been identified as the research issues and challenges facing the realization of utilizing data mining techniques in social network analysis:

- **Linkage-based and Structural Analysis** – This is an analysis of the linkage behaviour of the social network so as

to ascertain relevant nodes, links, communities and imminent areas of the network – [39].

- **Dynamic Analysis and Static Analysis** – Static analysis such as in bibliographic networks is presumed to be easier to carry out than those in streaming networks. In static analysis, it is presumed that social network changes gradually over time and analysis on the entire network can be done in batch mode. Conversely, dynamic analysis of streaming networks like Facebook and YouTube are very difficult to carry out. Data on these networks are generated at high speed and capacity. Dynamic analysis of these networks are often in the area of interactions between entities – [40], temporal events on social networks [41]; [34] and evolving communities – [42].

The following are the identified different data mining approaches used in analyzing social network data emanating from the research issues and challenges.

B. Graph Theoretic

Graph theory is probably the main method in social network analysis in the early history of the social network concept. The approach is applied to social network analysis in order to determine important features of the network such as the nodes and links (for example influencers and the followers). Influencers on social network have been identified as users that have impact on the activities or opinion of other users by way of followership or influence on decision made by other users on the network. Graph theory has proved to be very effective on large-scale datasets (such as social network data). [8] notes that this is because it is capable of bypassing the building of an actual visual representation of the data to run directly on data matrices.

C. Opinion Analysis on Social Network

According to Technorati, about 75,000 new blogs and 1.2 million new posts giving opinion on products and services are generated every day [22]. Also massive data generated every minute on common social network sites are laden with opinion of users as regards diverse subject ranging from personal to global issues [23]. Users' opinions on social network sites can be referred to as discovery and recognition of positive or negative expression on diverse subject matters of interest.

D. Sentiment Analysis on Social Network

Sentiment analysis research has its roots in papers published by [24] and [25] where they analyzed market sentiment. The concept later gained more ground the year after where authors like [26] and [27] have reported their findings. Sentiment analysis can be referred to as discovery and recognition of positive or negative expression of opinion by people on diverse subject matters of interest. Opinions expressed by social network users are often convincing and these indicators can be used to form the basis of choices and decisions made by people on patronage of certain products and services or endorsement of political

candidate during elections [28], [29].

Having given an overview of sentiment analysis on social network, some of the data mining tools used for sentiment analysis on social network include Sentiment Orientation (SO), Product Ratings and Reviews, Reviews and Ratings (RnR) Architecture (Rahayu, 2010), Aspect Rating Analysis and Sentiment Lexicon.

E. Unsupervised Classification of Social Network Data

A straightforward unsupervised learning algorithm can be used to rate a review as 'thumbs up' or 'thumbs down' [28]. This can be by way of digging out phrases that include adjective or adverbs (part of speech tagging) [31]. The semantic orientation of every phrase can be approximated using PMI-IR [120] and then classify the review using the average semantic orientation of the phrase. Semi-supervised and supervised classification are more structured techniques used in Social Network Analysis.

F. Topic Detection and Tracking on Social Network

Topic Detection and Tracking (TDT) on social network employs different techniques for discovering the emergent of new topics (or events) and for tracking their subsequent evolutions over a period of time. TDT is receiving high level of attention recently. Many researchers and authors are conducting experiments on TDT on social network sites, especially on Twitter [32]; [33]; [34]; [35]; [36]; [37]; [38]. In [32] the abruptness in hashtags usage is labeled unexpected rule evolution which is demonstrated by TRCM (Transaction-based Rule Change Mining).

IV. CONCLUSIONS AND FUTURE WORK

Basically, users and developers of ICT applications should be guided by their morals and ethical values that define their characters. Moral and ethical issues reflect on the soft aspects of a human being. It is difficult to determine whether or not one has morals and is ethical in behavior unless he/she exhibits certain characteristics. It is therefore difficult to control moral and ethical aspects without enforcement. Character is not only visible from physical interactions but also from on online interactions. People should be able to judge the nature and kind of relationship they want to engage in on social media. Too, developers should embrace a culture of ethical behavior and a culture of morality in their work of developing applications. This will eventually instill morals and ethics to users by giving them mandatory requirements and terms of using the app or social site. If they don't follow these requirements and terms of use, their social site accounts, pages or blogs would be blocked completely as part of enforcing ethical behaviors. Similarly, organizations should embrace the use of social media objectively where ethical behaviors are evident. It is therefore our recommendation that users of ICT whether professional or general users be guided by their morals and ethics. It is indeed important for governments to enact relevant laws [9] that would regulate the use of social media and require all organizations and businesses to develop ethical codes to guide people on the

use of social media. Although there could be some aspects of non-unification of cross-border regulations and laws, this is a journey that could be taken in the long run. Different data mining techniques have been used in social network analysis as covered in this paper. The techniques range from unsupervised to semi-supervised and supervised learning methods. So far different levels of successes have been achieved either with solitary or combined techniques. The outcome of the experiments conducted on social network analysis is believed to have shed more light on the structure and activities of social network. The paper recommends a comparison of similar data mining tools and the most suitable tool(s) for the dataset to be analyzed.

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