

## Developing a Regulatory and Control Frameworks for Enhancing the Security of Facebook Users

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### ABSTRACT

Nowadays Social Media services are performing an active and plentiful role with high dynamism in our normal lifecycle. Facebook was the most popular and outstanding lead on online Social Media in very short span of time. However, some peoples whom are noticed as cybercriminals are doing unethical things by using Facebook like creating fake accounts name (profile) and fake pages in order to disseminate the fake news and the fabricated information that create conflict within a country and to remove sense of togetherness and stability locally and globally. The prime aim of this research is developing a regulatory and control framework for enhancing the security of Facebook users with better quality. This framework aims to restrict the scammers from creating fake profiles and to make the user verified and authenticated on the Facebook by using the unique attribute of the user. The study used MS form, Edraw Max, and JustinMind prototyper for data collection, framework design and prototype development respectively. This research attempts to apply an exploratory and constructive research design using mixed research approach to design and develop a framework that authenticate the legitimate users and restricts the illegitimate user from creating fake profiles from Facebook. The study uses Digital Residential UNIQUE ID issued by the Government of Ethiopia for AA city for cross checking the user provided data with DB of residents during registration times. The study concluded with developed better-quality Framework with improved and add-on parameters that produce better results for Facebook users in Ethiopia by eliminating the problems occurring by the fake identity through verifying and authenticating the user with the unique attribute called UNIQUE ID at the time of account creations. The developed framework validated with user acceptance test and the result confirms that it's helps to trace the origin of certain hatred content posted and necessary to track owner of the any profile easily due to the framework enforces the users to use only real and verifiable information.

**Keywords:** Facebook; Cybercriminals; Identity theft; Fake profiles; Impersonation; Unique Id; Verification

### INTRODUCTION

Currently the whole universe and the individuals are strongly shifting their effort, communication and societal culture with respect to changes in the time and modernization. Nowadays social Media services have been performing an active and plentiful role with high dynamism in our everyday lifecycle [1,2]. Social media sites such as Facebook, LinkedIn, and Twitter have become a widespread channel for communication, meeting people, and self-expression, and usage is growing rapidly on the short period of time [3]. Along with several advantages,

requirements and necessities, social media has got many disadvantages, drawbacks and difficulties too like security issues. From these disadvantages and problems, the major issue with the social media is the existence of fake accounts especially on the Facebook. Currently, on the Facebook since there are no efficient identity check mechanisms, everybody's can set up a fake profile in someone else's name, to post uncomfortable and insulting information by the account. The user creates an additional account while having his own primary account which was called duplicate accounts and on other hand when the user

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created account that are wished for to be used for purposes that disrupt Facebooks terms of service, like spamming is called false accounts. While many Facebook users deliver partially fake data in their user profiles, some profiles does not even signify a person who exists in real life, such profiles are widely used for hateful attacks on users privacy and on the platform [2,4]. Actually, in the current cybercrime scenarios creating fake accounts in social media causes more damage than any other cybercrime [5].

On the Facebook the existing mode of authenticating user identities is not sufficient in order to stop fake profile creation, due to this leakage the single user can represent his identity on Facebook with multiple profiles because there is no any effective identity verification process. Due to this, proving users' identities is one of the serious problems in the case of user security and privacy point of sight on Facebook [6]. Currently Facebook was mostly serving as a channel for hate speech, intolerance, and increased discriminate on particular ethnicity, religion, gender. In Ethiopia also the dissemination of hate speech and disinformation on Facebook becoming exponentially growing on the couple of years. They continuously post hateful contents that can potentially terminate the sense of tolerance and variety rather than posting something which builds the sense of togetherness [7]. Generally, in the area of digital world like social media identity of human being should be unique in the sense that each identifying item must only refer and mention to at most one person. The platform like Facebook cannot be, however, strictly check that the person with the identity mentioned to in the profile truly created and controls the profile. If this is not the case, somebody is using somebody else's identity [8]. Obviously on Facebook there is no efficient authentication and verification mechanism is integrated. Due to this deficiency users can easily lie about their identity, with no traceability in case of a serious protest. Password-based safety is simply too easy to compromise [9]. In the present situation, we are facing majority of criminalities related to security issues due to leakage of passwords or illegal authentications on social media like Facebook. A typical scenario for using false (fake) identities is aimed for using social media platforms to impersonate someone and in order to create a fake identity to establish trust with the target, which is then exploited: for gathering further information for a spear, phishing attack, mounting a spear phishing attack, or for directly interacting to get the information of interest.

This research paper takes the implementation of unique identification of the user identity on Facebook during account creation and login time in order to prevent fake account and duplicate account creation by avoiding the value of fake information provided by the user automatically. For this study, Digital Residential ID card technology used, so that suitable user verification and authentication can be done in order to save our data from user who act unethical behavior on Facebook.

**Problem under investigation with the goal of research**

The progression and the development of Social Media have brought great changes to the way users interconnect with each other. Inappropriately, our extended dependence on ICT and

the massive interconnectivity of our ICT services impose us to include a range of cybercrime threats. In the existing situation, whole worlds are facing majority of criminalities related to security issues due to leakage of passwords or illegal authentications of person on Facebook. Currently since there are no effective and efficient identities checking mechanisms on Facebook platform, anyone can set up a fake and duplicate profile in someone else's name, to post fabricated, uncomfortable and insulting content over the Social Media platform by lying about their identity [9]. The item that used for user identity verification must be something that cannot be guessed, lost or stolen; means item that unique feature of the users; for examples Aadhar card system that is used in India, as well as few European Countries also initiated their national ID card to authenticate themselves. The current Facebook page only uses the password and phone as identification of the user but this is not enough to uniquely identify the owner of the accounts and the source of the content circulated on the platforms. Using Social Media most of the users are spreading fake information; nowadays it is one of the problems in the world wide as well as in our country. Currently on Facebook, user authentication is not thinkable to detect if the same person is trying to open multiple duplicated accounts under different names. In the existing Facebook platform during user registration to the system, the new reference file cannot be compared and matched with those of all existing accounts. Facebook are designed with multiple techniques for solving problem of the verifying and authenticating user, but none of them are promised to give the verified users only. Mobile authenticate, Email authenticate etc. are the ways to authenticate users but this information can be stolen or they can be used by entering fake mobile numbers or email during account creation or registration.

In this research, UNIQUE ID on the Digital residential ID of the AA cities are used for unique identification of the reality of the Facebook users. So, in order to overcome the above stated problem and to enhance the security of Facebook users the new improved framework was developed; here the researcher implements the use of UNIQUE ID as user uniqueness assurance in Facebook registration form to reduce the creation of fake profiles and other related identity thefts issues.

**LITERATURE REVIEW**

Generally, in order to appreciate and understand the contribution and research-ability gapes of different researchers in the world with related problem under study; this study reviewed several research papers, reports, Journal papers and thesis documents. The summary of reviewed papers is summarized in Table 1.

Authors, year	Titles, journals	Significant contribution	Critical remarks with research ability gap
Sileshie semahagn	Challenge and opportunities of Facebook	The researcher discusses benefit of the	The research study is not fully relevant to



a critical knowledge gap on the security checking of Facebook users and some developing countries also used different approaches to secure social media users, however, those method are not properly enhancing the security of the users on Facebook to have only authenticated users accounts. This motivates the study to conduct both survey and interview and then develop improved regulatory and control framework for enhancing the security of Facebook users especially for Ethiopian citizen to avoid the current identity theft, impersonation and propagation of hatred information in our country mainly on the Facebook page with better and quality results that most fit to overcome and avoid the existing problems. Therefore, based on strong analysis of salient literature from various offline/online resources/media, it has been detected that there is a crystal-clear research gap between the solutions have and the solution have not in the existing research literature. This justifies that the strong need for conducting research and therefore this research study is value responsibility.

## MATERIALS AND METHODS

### Research design

The research study came up with mixed research design both exploratory and constructive research through mixed research approach both Qualitative and Quantitative in which a framework is developed with functional prototype to validate and conduct the acceptance test for the research outcomes. The research begins with literature review by assessing previous researches conducted by different scholars and experts on Social media security specifically on Facebook and continues with identification and analysis of the utilization and problems of social networking sites or Facebook in everyday activities.

### Research approach

This study follows mix of both qualitative and quantitative methods for gathering the most important and relevant evidences from the respondents who are target population to give detailed inputs and answers related to the research problem domain. For the purpose of data collection survey questionnaires and interview which are pretested were employed to gather relevant information that goes with the research study problems. Finally, a workable framework was being developed, in order to mitigate the existing identity theft problems on Facebook.

### Data collection procedure

Describes the data collection procedure in which the primary and secondary data are collected using survey and in-depth interview with well-structured questionnaire and summarized for understanding the cause effect relationships of Facebook (Figure 1).

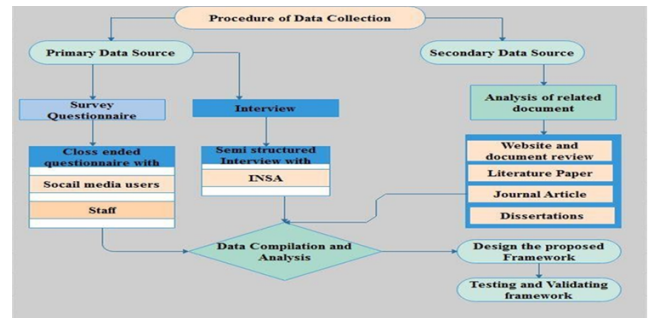


Figure 1: Summary of data collection methods.

### Sampling method

The target populations of this study could have been users of social media in Ethiopia and Security domain expert from INSA. Due to a non-probability sampling technique was employ under which the inquiry purposively chosen the particular units and it allowed the researcher to gather information quickly and in an inexpensive way it's selected for this study. So that research study implements purposive sampling technique by selecting cases that would help to understand and learn the current status of the security of social media user's problem in hand. Still the study proposes to use the Rao soft Tool for deciding about the sample size. Based on that the researcher selected the sample frame for this study can be Addis Ababa and Arba Minch. The total social media user population selected by deciding using Rao soft tool was 344 samples from that 300 for survey and 4 for interview were selected for the collection of the primary data. Here the research study is more over scientifically constructive and therefore 344 sample sizes is sufficiently representative for generalization.

### Data analysis

In order to clearly examine and describe the identified research gape in the currently available solutions, several related researches work from literatures such as journal papers, research thesis, and dissertation and research project reports are rigorously reviewed and analyzed in the context of the target research problem. And their gap is identified in order to solve on research under study.

## DISCUSSION AND DATA ANALYSIS

### How do you rate your participation in discussions on social media, especially Facebook?

This question about to know the rate at which respondents they participate on the discussion through Facebook. Hence the greater percentage as mentioned in Figure 2, (42%) of the respondents sometimes participate. The number of respondents that never participate on discussion on the Facebook was 19%. The number of respondents who always participates in Facebook discussion was 19%. With the flip side of this, frequency respondents frequently participated on such discussions 14%. There are a few respondents 6%) who rarely participate on discussion on Facebook. This implies that



maximum number of users are not participating the discussions on the Facebook. So, this has its own reasons.

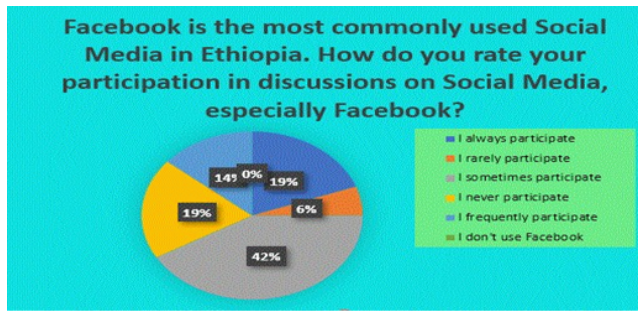


Figure 2: Participation of respondents on Facebook.

**If your participation in discussions is minimal, what prevent you from engaging in discussions on Facebook?**

This question is following up questions of figure Question 1 that respondents are asked to reason out if their participation on Facebook is minimal. Hence as expressed in Figure 3, respondents reasoned out that it is the fake information that prevents them from the participation (36%) followed by interest reason (29%). The response of Security reasons and political reasons are 17% and 16% respectively. Language of discussion takes only (2%). This implies that the reason why respondent's participation is minimal were due to currently Facebook became the Media on which most of the fake information was propagated and the interest and security reason also the second problem that stopped the respondent from actively participating on the Facebook. Therefore, this analysis result shows that the current Facebook system needs the enhance solution that satisfies that needs of the users in order to save them from any uncomfortable things.



Figure 3: Reasons that prevents respondent from participating on Facebook.

**Do you trust the information you get on social media especially on Facebook?**

This question was asked to know whether the current Facebook platform satisfies the verification level of the user's needs or not, in order to develop the new framework that enhances the verification levels information that satisfies the user's needs. The below Figure 4, shows that, the trust of the information on Facebook was depends on the information and other factors (83%). The respondents who don't trust means doubtful to Facebook information (14%). The numbers of respondents do

not depend on issues rather they do trust as it is (3%). From this result we conclude that maximum number of users was not trust the information on the Facebook, they only depend on the information. This confirms that currently the source of information which propagated on the Facebook site was not verified and authenticated.

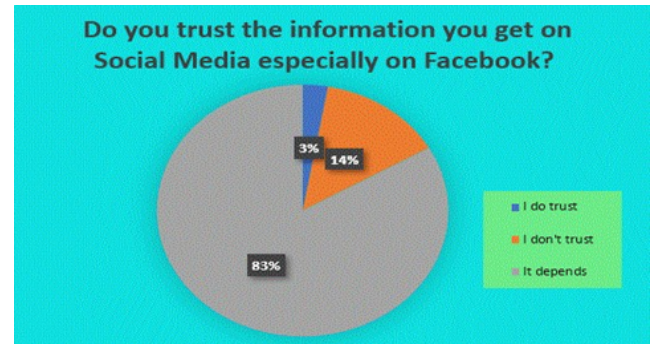


Figure 4: The rate of trust on the information from Facebook.

**Can you believe that the current Facebook page verify the real identity of the users?**

Respondents were asked to respond as "Yes or No" in order to know whether they have the faith on the current Facebook page to prove the identity of the user on the Facebook or not. As Figure 5, a show (42%) of respondent was responded as No, 8% was responded Yes and other 50% was responded Maybe.

As the result shows the maximum numbers of the respondents are responded as maybe and No. This shows the current Facebook page needs the urgent framework that enhance the security of Facebook users by solving the issue of identity verification and authentication in order to prevent and avoid identity theft presently happening on the Facebook site. Matching the real or physical identity of the users with digital identity was strictly recommended.

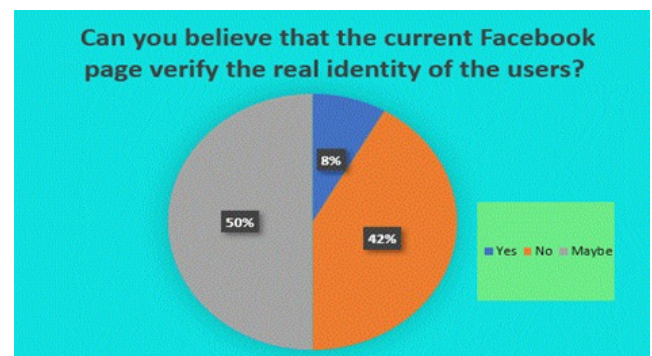


Figure 5: The rate of identity verification of the Facebook.

**Can you believe that the required information in order to create the account on Facebook is enough to avoid fake account and duplicate account creation?**

This question raised to verify whether the required information on the Facebook page during account creation were enough or not in order to avoid fake account and duplicate account creation. This is followed by 64% of responded by NO, that means the required information is not enough in order to

prevent the fake account and duplicate account from Facebook, 11% responded yes, that is means it's enough and 25.0% responded by maybe as described in Figure 6.



Figure 6: Rate of respondents on duplicate ad Fake accounts inhibition way of Facebook.

This result implies that the Facebook user needs the improved framework that enhances the security and prevents the problem happening because of fake account and duplicate account. Highest number of respondents responded by “NO” that means, the current Facebook page was easy for creating fake and duplicate account as described in the literature review part as there is no authentication way to verify the actual identify of the users with the digital one.

**Can Facebook features such as ease in having fake accounts, names, and identity facilitate the discourse of hate speech as these features help abusers go undetected and unpunished in our country?**

Based on the question raised as described in Figure 7, 33% of respondents responded by Agree, 28% of respondents responded by Strongly Agree, 11% and 6%of respondents responded by Disagree and Strongly Disagree and the other responded that they are Neutral (22%). This show, the Social Media called Facebook can be the motive of the hate speech dissemination and does facilitate and becomes a safe port for individuals, groups and activists who intend to post even toxic ideas. Based on the respondent’s response this phenomenon needs the urgent solution that advanced methods that solves and does not allow fake information spreading on the Facebook by developing the improved technique that makes easy to identify and detect the owner of every account and contents without affecting the privacy of the users.



Figure 7: Rate of respondents on facilitation of Facebook for hate speech.

**Currently in our country is there any political activists with interest to destabilize the Country and going to abuse Facebook features for getting speedy and vast audience connectivity?**

This research survey question was about to understand whether any political activity was takes place on the Facebook in order to destabilize our country by abusing the feature of Facebook to get the speedy and vast audience connectivity. Hence the greater percentage as mentioned in Figure 8, 71% of the respondents responded “Yes of course” while 19% respondents responded “I don’t know” and the rest was responded 10% as “Neutral”; which clearly indicates that the current Facebook page allows some person to destabilize and put the country in the violence by using the fake account that difficult to identify the real identity of the account owner.

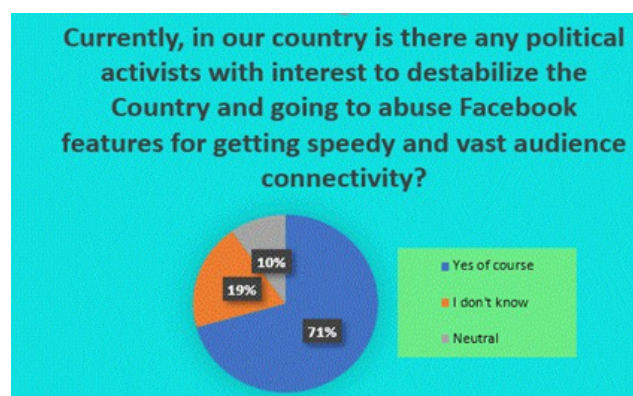


Figure 8: Rate of respondents on facilitation of Facebook for hate speech.

**Why the government was blocked Facebook and other related media in past few years?**

This research survey question was asked the respondents to know about the, in the last four years and still now in some area of our country the government was taking some control on Social Media by totally blocking the internet. Hence as mentioned in Figure 9, from the selected sample 37% respondents responded that because Facebook “causes society instability”, 24% of respondents responded that Facebook used as the “propagation of hatred information”, 13% of respondents responded that “not easy to identify fake identity”, 25% of respondents responded for “increase of hate speech” and 1% responded that Facebook is “not important for Ethiopian”.

37% and 25% of respondents responded as Facebook blocked because it causes society instability and hatred information propagation, this specifies that currently there are the problem of regulating and controlling of security on the Facebook. However, blocking the total internet form the country in order to stop the movement of ‘hate and ethnic cleansing propaganda messages by Facebook in country was not recommended.



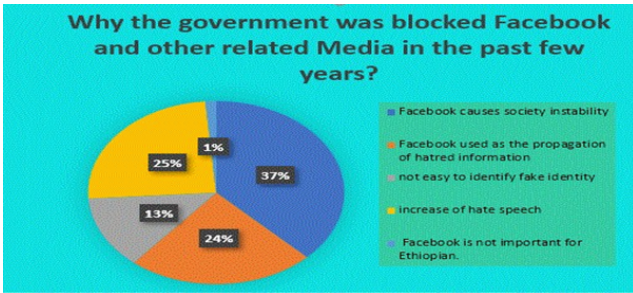


Figure 9: Rate of respondents on the reason of blocking Facebook site.

For the research survey question asked the respondents to understand about the access behavior of Facebook that is “How often do you use Facebook?” Hence from the selected sample 66% responded that “Many times a day”, 14% responded that “Once a day”, 17% responded that a few days in a week, 3% responded that A few days in a month. This indicates that from other Social Media the Facebook was the popular and mostly accessible by the people and as well as maximum number of people are using Facebook as Media in which they post their everything activity in day to day activity (Figure 10).

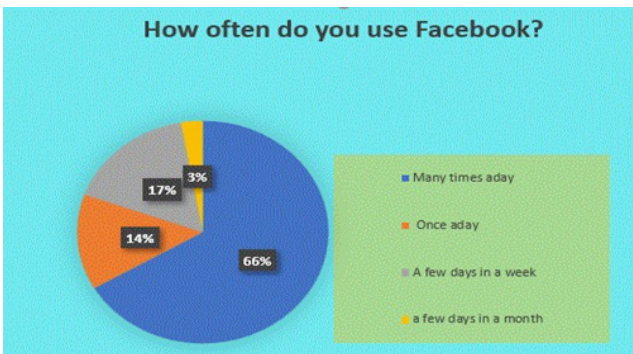


Figure 10: The rate of how often the respondents uses Facebook.

### What kind of information you give to open Facebook account?

This research survey question was about understanding whether the Facebook users are providing the real information or not. Hence from the selected samples 80% responded that “I give my real information”, 17% responded that “I give other my nicked information” and other 3% responded that “I don’t give real information”. By assuming the consequence of fake account, this result indicates that maximum number of Facebook users is using the Fake information in order to open the Facebook account.

The result responded by respondents show that, the current Facebook sites have the problem of identity theft and it needs the urgent improved framework that improve the security and restrict the users from the fake information providing (Figure 11).

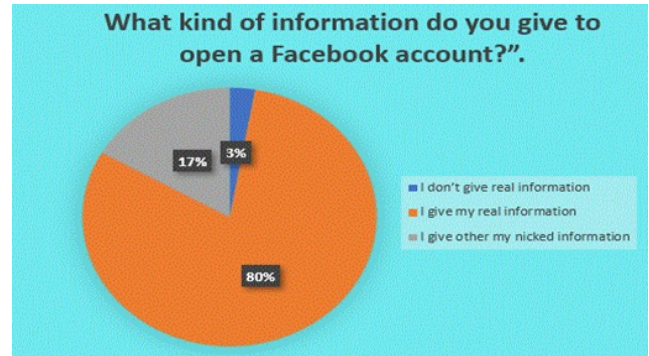


Figure 11: Rate of access behavior Facebook by respondents.

### For what purpose you are using facebook?

This is the research survey question asked to understand about the why using Facebook. Hence from the selected sample 32.65% respondents responded that they use Social Media for reading news updates, 25.49% responded that they use for to know friends life, 19.44% responded to share political dissect, 3.04% responded that to criticize the government, 6.13% to share information and to present political idea, 5.10% discuss about the issue of cultural identity and discussion, 8.15% for Comment on people who are impacting my religion.

These phenomena indicate that maximum number of respondents are uses Facebook for the good purpose that was appreciated, but there were some respondents that uses Facebook for illegal purpose. This specify that in order to make the users only uses the Facebook for Good purpose there is the need to develop the regulatory and control security framework that enables to easily identify the users who does unethical and post illegal content using his/her account on the Facebook (Table 2).

Purpose of using Facebook by respondents	Frequency (%)
To read news	32.65%
To know about fiend's life	25.49%
To share political, dissect	19.44%
To criticize the government	3.04%
To present political ideas	6.13%
Discuss about the issue of cultural identity	5.10%

Table 2: Rate of access behavior on Facebook by respondents.

### Can you check the source of the message before like, react, share or comment on the post during Facebook using?

The respondents were asked to know about whether the responded was trusting the content on Facebook before verifying the source or not. From the selected sample 25% responded that

“NO” while 75% was responded us “Yes”. This indicates that maximum number of users on Facebook is accepting the contents on whether they are checking the truthfulness of the posted information or not. But this leads difficult problem in our country because many scammers who use Fake account are post hatred and misinformation that leas violence and intolerance between people every time. So, they issue of Fake account and duplicate account prevention and avoidance needs the urgent serious solution on the Facebook as the result from the survey implies (Figure 12).

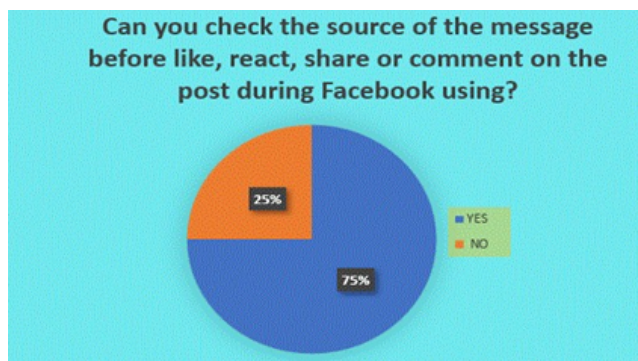


Figure 12: Rate of Respondents on checking the source on content on Facebook.

**Can you agree that Facebook plays a substantial role in catalyzing hate speech, discrimination among society, increasing instability and lack of peace in our county?**

This question was asked to understand the role Facebook playing removing stability and tolerance with a country’s then 53% of respondent responded that “Strongly agree”, 22% of respondent responded that “Agree”, 8% responded that “Neutral” and 17% responds that “Disagree”. This percentage indicates that the highest number of respondent or the highest number of Facebook users need an urgent development of regulatory and control framework to enhance the security of users to prevent Fake account and duplicate account creation (Figure 13).

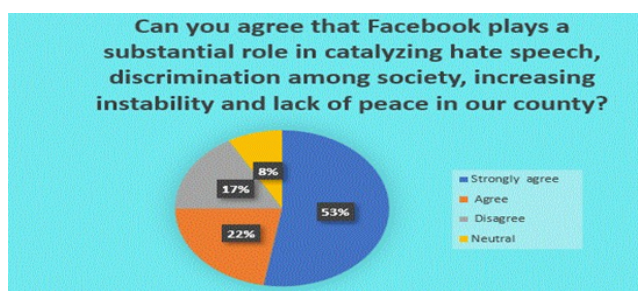


Figure 13: Rate of Respondents on Facebook uses as the substantial role for catalyzing instability.

**Proposed solution and how it works**

So, this research study introduces new concept that used to uniquely identify whether the users are providing the real personal information or not by asking the unique id number user have on digital residential ID card. In the proposed framework due to the unique id number that can be issued by

the country government on the digital residential id card can be used the chance of creation of fake identity and related problem described above was solved by cross checking the provided information with data already exist in the database.

**RESULTS**

**Creating a profile on Facebook**

First, the user accesses the Facebook sites via the internet and provide the information to the registration form. In addition to the normal information previously provided by the users in this framework one attribute is added in order to check whether they users was filling the form with the real evident on the digital residential id card data base in the country. Secondly, the data received by the Facebook server can be validated before allowing the user creates the accounts. The server-side authentication and verification were done in order to proof the data provided by the users. The data provided by the user were cross checked from the digital residential id card of the country in order to proof whether the persons with the received personal information was in the data base or not. The UNIQUE ID NUMBER that are taken as identifiers must be certified by the authorities of a country of issue, recognized inside this country, and beyond its bounds with a mutual agreement with other countries. Generally, as every person cannot issue an identity card by its own, the institutions that have authority are responsible for issuing proper unique identifiers.

**Login to profile**

The login process was similar to the existing one.

**Major components of proposed framework**

Figure 14, presents the general framework of the Facebook page. It is designed by combination of different set of processes and components expected from the framework to be delivered at each of the steps. These components are:

**Users:** The persons that came to the Facebook page in order to access and use it every day. Internet: - is the network of network that allow the word to interconnect and communicate together

**Facebook website:** Facebook was the most popular and outstanding lead on online social media in very short period of time.

**Registration form:** It is a form which is used to create new Facebook account using name, phone, UNIQUE ID, gender, birthdate and password. It was the form that accept the user’s personal information and submits to the Facebook server in order to open account for the first time. Facebook server: Facebook server is the place where Facebook company store and preserve the data of their users.



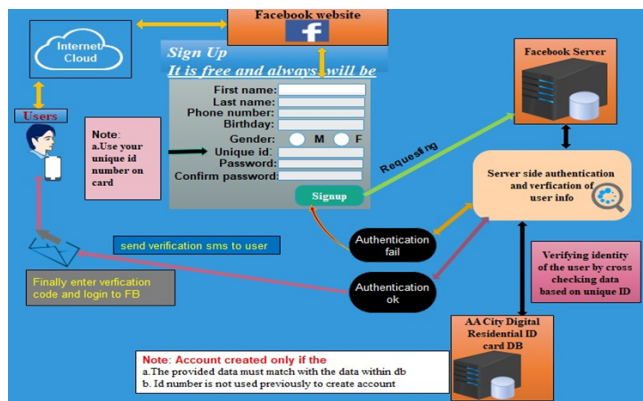


Figure 14: The developed regulatory and control frameworks for enhancing the security of Facebook users.

**Server side authentication and verification:** it's the place where the proofing the identity of the user was takes place.

**Authentication failed:** it's the response message that responded if the cross check between the personal information provided by the user during account creation and the resident information in the data base of the digital residential id card was not match or different.

**Authentication success:** it's the response message that responded if the cross check between the personal information provided by the user during account creation and the resident information in the data base of the digital residential id card was match or different.

**Verification SMS:** it is the verification code that sent to the phone of the user who trying to create the new Facebook account to authenticate the owner of the profile

**Addis ababa city digital residential ID card database:** this is the database that contains the personal information on the resident of the country.

**Prototype development**

Here the desired prototype, which is designed and validated using user and experts' views, this research, used JustinMind prototypers.

**Design description of a prototype for mobile devices**

The proposed prototype design of a system is composed of a client application running on different kinds of computing devices and a server-side prototype application (Facebook server side) capable of handling user process and data or authentication and verification of user and the other is third part that is Addis Ababa city digital residential ID server which is the database that contains the digital information about any persons that live in that country in order to perform server side authentication and verification of the user data by cross checking the user provided data to Facebook server and with data already stored on the Database of city residential (Figure 15).

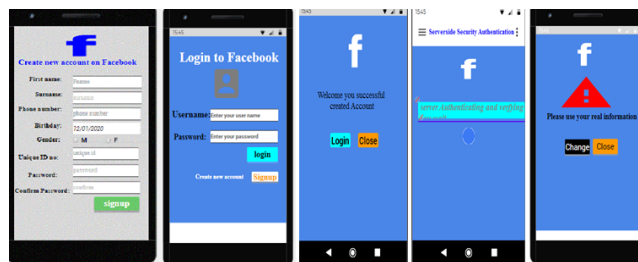


Figure 15: Facebook login through mobile.

**CONCLUSION**

Based upon the primary data collected and analyzed using survey (questionnaire), interview (questionnaire) and analysis of secondary data, the researcher concluded that in our country and as well as worldwide there is the problem of identity proofing or identity authentication and verification in order to assure whether the Facebook users was registering by the real or fake information during account creation. They study exposed that there is the need to develop the regulatory and control security framework that enables to easily identify the users who does unethical and post illegal content using his/her account on the Facebook. The proposed Frameworks based on using the unique item or attribute that represent only one person like UNIQUE ID number issued for the residents could be a great and significant to resolve the above-mentioned issues and challenges with immediate effect on ground in reality.

Finally, the better-quality frameworks with add-on parameter was designed which used the item or attribute that uniquely identify the real identity of the uses in order to match the digital and physical identity of the Facebook user.

**RECOMMENDATIONS**

In order to make the news developed framework functional and implemented, the city Digital Residential ID Card system must negotiate with the Facebook Company. This were to integrate them on user authentication and verification improvement. The future researcher must work on the improvement of the user data. Currently the researcher used the digital ID card which was started in the Addis Ababa city. So, in the future if our country implemented the national residential digital ID card then this framework can be functional in whole country. Finally, this study implement the unique id number as the unique item or attribute that used to check the reality of the user and to proof whether the information provided by user was fake or not in order to avoid and restrict fake and duplicate account and impersonations problem.

**REFERENCES**

1. Asres K, Gure AT, Sharma DP. Automatic Surveillance and Control System Framework-DPS-KA-AT for Alleviating Disruptions of Social Media in Higher Learning Institutions. Journal of Computer and Communications. 8;1-15:2020.
2. Smruthi M, Harini N. A Hybrid Scheme for Detecting Fake Accounts in Facebook. International Journal of Recent Technology and Engineering (IJRTE). 7;5S3: 2019.
3. Wickramaarachchi LS, Prabashini WGP, Hemachandra L, Babiththira S. Bio-metric Social Media Network Secure. 2016.

4. Krombholz K, Merkl D, Weippl E. Fake Identities in social media: A Case Study on the Sustainability of the Facebook Business Model. *Journal of Service Science Research*. 4;175-212:2012.
5. Mohammadrezaei M, Shiri ME, Rahmani AM. Identifying fake accounts on social networks based on graph analysis and classification algorithms. *Security and Communication Networks*. 1:2018.
6. Meligy AM, Ibrahim HM, Torky MF. Identity verification mechanism for detecting fake profiles in online social networks. *IJ. Computer Network and Information Security*. 1;31-39: 2014.
7. Sibhat HN. Spreading hatred a study of facebook in Ethiopia. 1;2:2018.
8. Romanov A, Semenov A, Mazhelis O, Veijalainen J. Detection of fake profiles in social media-literature review. 13th International Conference on Web Information Systems and Technologies. 2; 363-369:2017.
9. ChangKlaus HB, Schroeter G. Creating safe and trusted social networks with biometric user authentication. *International Conference on Ethics and Policy of Biometrics*. 89-95: 2010.