

Modelling the Effect of Social Media on Female Student Using Artificial Neural Network

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Abstract: - Social Media are proliferating among the young generation all over the world. The impact of social media (SM) in our education institutions and society today is undoubtedly overwhelming. Students in developed and developing countries are becoming more addicted to social media and its applications for various reasons which will affect students' especially female student's personal and professional life. This study aims to determine the impact of social media on female student's social lifestyle using Artificial Neural Network (ANN). The study deployed a quantitative research methodology involving a questionnaire as research instrument among 100 female university students in Bangladesh. After training and testing the dataset, we find that model accuracy is more than 90%. The findings include the following: social media refines how female students think, interact, communicate, and fall in love (find love), positive and negative effects on them, their social lifestyle, and many more. It was concluded that despite public views concerning the misuse of social media among female students in society, some of the students were interested to use social media positively for their education and other activities of their social life. But the negative impacts of social media among undergraduates appeared to be higher as compared to the positive impacts.

Key-Words: - Artificial neural network (ANN); Social media effect; Multilayer perceptron; Mean squared error.

Received: July 19, 2022. Revised: February 13, 2023. Accepted: March 15, 2023. Published: April 11, 2023.

1 Introduction

Social media has exploded as a category of online discourse where people create content, share, bookmark, and network at a high rate. Because of its ease of use, speed, and reach, social media is fast changing the public discourse in society and setting trends and agendas in topics that range from the environment and politics to technology and the entertainment industry. Over the decades, there has been a huge change in the world of technology. Social media which means the togetherness of individuals or organizations through some medium, for the purpose of sharing thoughts, interests, and activities is the most utilized method of communication. It is mainly for carrying information that has importance among students including female students. About 100 million people began to engage with the internet and social networking websites, by the start of 2000. Till now, more people visit daily social media websites for socializing, interacting, online business, jobs, marketing, and educational intention. The progressive turn in World Wide Web (WWW) has enhanced knowledge gathering, sharing, and

exchange of information. With the advanced technology, using social media with the help of smartphones, tablets, or personal computers, many female students have up their sports in terms of using the social network wisely for achieving knowledge but many waste their time on chatting, recreation, and uploading pictures, videos which are not advantageous for them.

Many studies have been carried out on student's usage of social media, its impact on their social behavior, education, and academic performance as well as the positive and negative impact, the factors that influence the usage, ethical usage and many more [1] [2]. While a study covered social media effect on academic advancement and social well-being of adolescents [3]. As social media application has become most popular among young students, much research conducted on youth but with female student, this type of study is limited in Bangladesh. In this research paper, Artificial Neural Network has been applied to predict the effect of social networking media on female students. Multilayer perceptron with one or more than one hidden layer has also been checked to measure the performance

of the overall network. So, by analyzing data which will be collected with the help of surveys from female students of different universities we can find out how social media affect female social lifestyle, how female students interact, and behave, how much they depend on social media, affected by others lifestyles, benefited or waste their time. Al-Sharq stated that SM creates a new innovative mind set in students and improves inter-social interaction and relationships between students and educators [1]. This new media can be addictive, time-consuming, distractive, social gathering isolation, monophobia, and others. Also, Mingle and Adams suggested that the usage of SM negatively causes bad handwriting and spelling, lateness to class and assignment submission, addiction, study time, and others. These negative effects can be visualized in social lifestyle or cultural belief system changes. They asserted that SM changes educational settings and learners' behavior [3]. The platform exposes students to posting unethical content and views [4]. The extent of changes from SM is one of the most innovative of the 21st century. But SM can cause harm to the user [5].

2 Problem Formulation

This section will explain the research methodology used for the research under study. The aim of this research paper is to predict the effect of social media effect on female. Artificial neural networks based on multilayer perceptron with a varied number of outputs have been applied to determine the impact of social networking sites. For this, the data set needs to be converted into a dataset that defines the array form of our data. After that, the dataset needs data pre-processing using the scaling function. Hidden layers with several numbers of outputs are added to achieve accuracy. After compiling the model, an evaluation is made for prediction and accuracy. In this study, primary data for this research study was collected using a questionnaire; the data of questionnaire were collected from 100 participants from different universities. Artificial neural network and their internal procedure help in this prediction and guesses of the upcoming outcomes. So, selection of neural network is important for building an accurate neural network for prediction and accuracy.

The multilayer perceptron uses the back-propagation method. Back-propagation is simply a generalization of the least mean squares algorithm in linear perceptron. This is a supervised learning technique where learning occurs by changing connection weights after data is processed. The overall workflow process is shown in figure 1.



Fig 1: Block diagram of the overall method

Data processing is done based on the amount of errors in the output compared to the expected results. In figure 2 shows a MLP neural network with two hidden layer is shown. The configuration of the MLP for detecting presence or absence in this study composes of two hidden layer with 32 neurons and the epoch number of the network is 1,000.

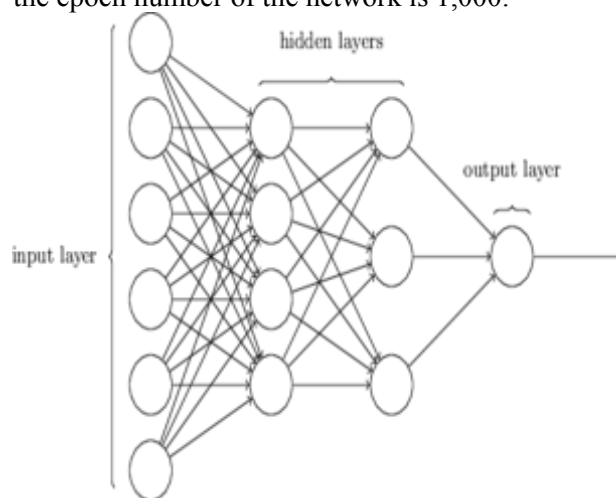


Fig 2: Multilayer perceptron with single output.

3 Problem Solution

In this study, an approach is made to predict the effect of social media on female student. The multilayer perceptron artificial neural network provides a way to predict the outcomes. In this training and testing process, 67% data are used for training and 33% data are used for testing. The MSE (mean squared error) has decreased after each epoch. It has been seen that the mean squared error of the training and testing data are decreased with the increasing number of epochs. Each iteration takes the model towards the accuracy.

In figure 3, when epoch is 100 then mean squared error is 0.067 but with the increment of epoch number like when epoch is 500 then we can see in the graph that mean squared error rate decreases in 0.038.

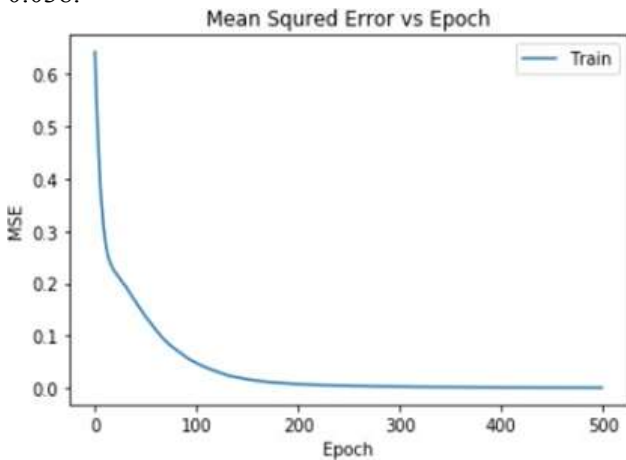


Fig 3: MSE with respect to number of epoch (500) of MLP network.

If we increase the epoch again and again for example in figure 4, mean squared error decreased. With 600, 800 at last in 1000 number epoch error decremented in 0.0299. It is clearly understood that the mean squared error of this model is gradually decreasing after the increasing number of epochs

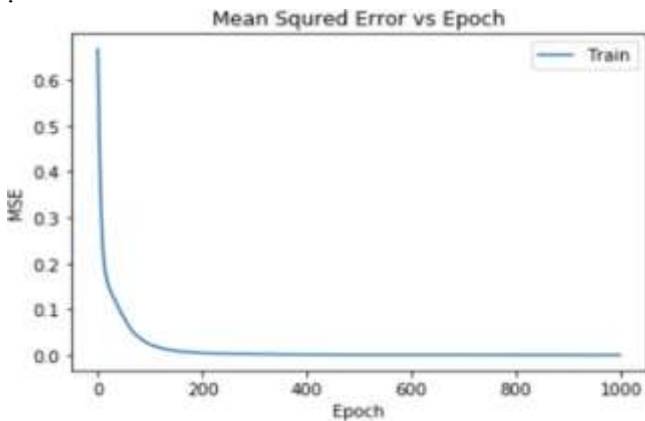


Fig 4: MSE with respect to number of epoch (1000) of MLP network.

The gradually decreasing mean squared error has made the model more accurate and the model accuracy is up to the 90% after 1000 epochs. The epochs are the iteration that is made in every instances when the neural network is building.
 Predictions: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]

Outcomes: [0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]

A correlation Heat map can be customized to improve its readability. A Heat map is a graphical representation of data where the individual values contained in a matrix are presented as colors which are shown in figure 5.

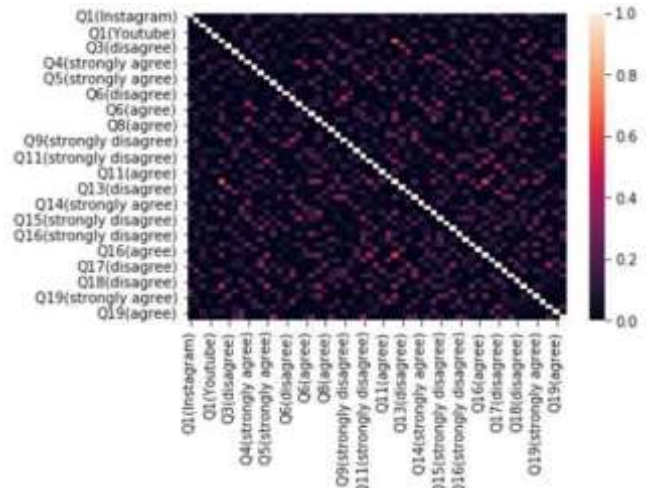


Fig 5: Correlation Visualizing using Heat map.

Here from below chart, we see that almost 90-95% percent students think social media has negative impact on female in society.

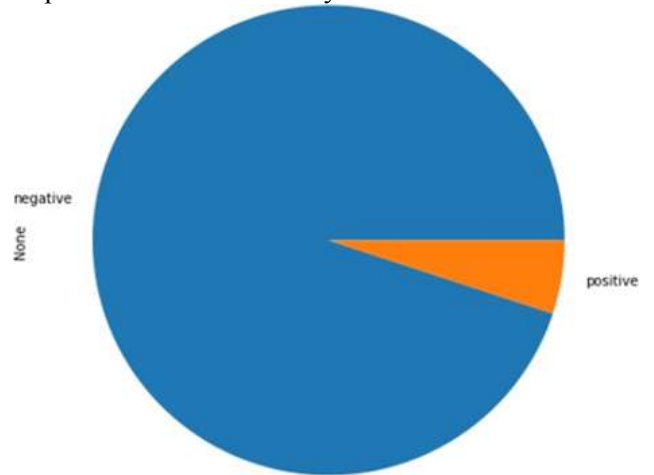


Fig 6: Pie chart of social media effect.

With 16 questions we analyzed data. So on which questions social media's effect are much or little, can be determined by this visualization. In figure 7, social media's effect on basis of each question is plotted in the range of -3 to 3. It is a density graph that contains the density of each question's effect on female students. From the graph we can visualize easily that questions 12 and 14 have the highest peak value then question 4 has less peak value than questions 12 and 14. Question 12 is 'does the use of social media promote borrowing of foreign culture and traditions' Question 14 is 'The use of social media like calling, chatting, sharing contents,

linking links and many more are time-consuming'. So we can understand that these two questions effect on female students is more which is negative. Question 4 is whether posting irrelevant, racist, anti-cultural, abusive content that creates hatred among racial groups in society. This question has also more effect on density which creates negative impact on society

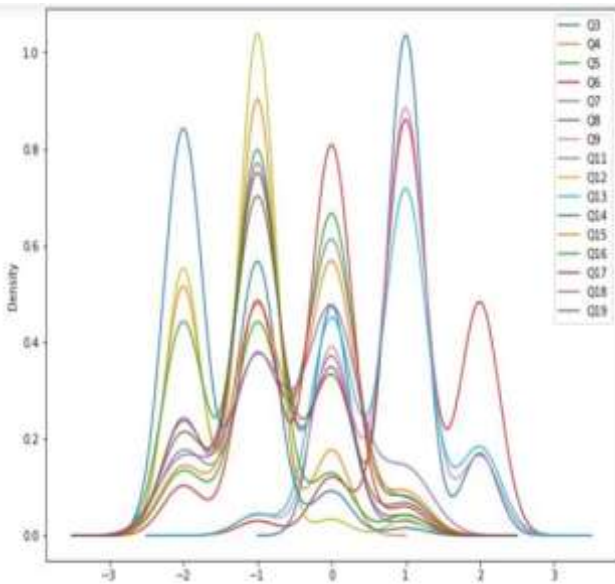


Fig 7: Social media effect's density graph

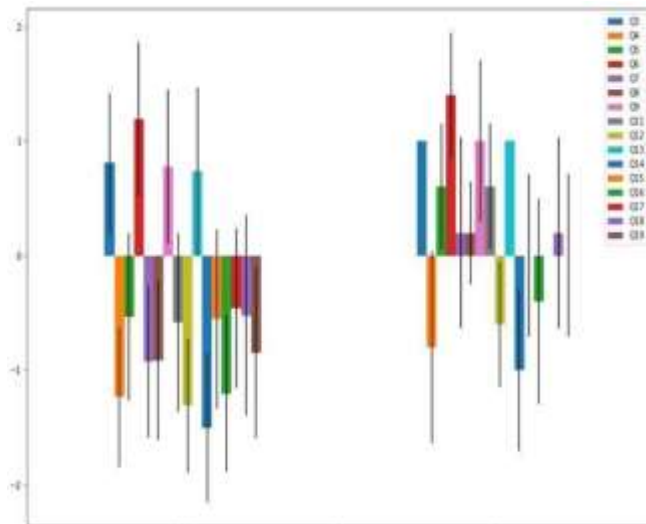


Fig 8: Positive and negative effect.

In the above figure on left-hand side negative effects are shown and on the right-hand side, positive effects are shown. For both effect, we can see that positive and negative value remains. Here for negative effect 4 values are positive and for positive effect 4 values are negative.

In table 1, we can see for each questions there are both positive and negative effect. But in some questions positive effects much, negative effect less.

Some questions have more negative effects and less positive effects.

Table 1: Positive and negative effect value

Questions name	Negative label	Positive label
Q3	0.808	1
Q4	-1.234	-0.8
Q5	-0.5319	0.6
Q6	1.191	1.4
Q7	-0.925	0.2
Q8	-0.914	0.2
Q9	0.776	1
Q11	-0.585	0.6
Q12	-1.308	-0.6
Q13	0.734	1
Q14	-1.5	-1
Q15	-0.553	0
Q16	-1.202	-0.4
Q17	-0.457	0
Q18	-0.5212	0.2
Q19	-0.8510	0

For understanding more easily and visualize effect of social media, positive and negative effect are shown with box chart where effects are shown in shape of box in figure 9..

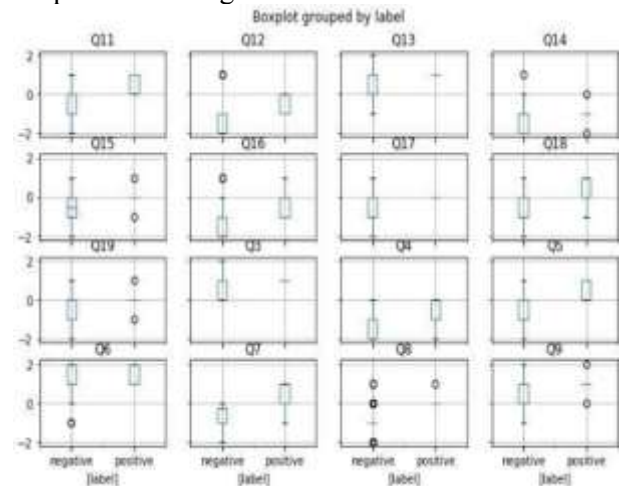


Fig 9: Boxplot of positive and negative effect.

4 Conclusion

The study discovers diverse impacts of social media usage both positive and negative which are result of advancement in modern technology. The findings highlights social media has more negative effects than positive effects on female social life. From our results, if we notice we can see that after training and testing dataset model's prediction is more accurate and accuracy is more than 90%. By using social

media, their attitude, perceptions, fashion style, communication way changes. Social media have negative impact on female student's Personal interaction. Though Bangladeshi female social media users have more negative perspective regarding to social media use, there are some positive views also. Most of the female student use social media as a communication tool (for keeping touch with friends, relatives, classmates), for the purpose of learning and teaching, keeping them updated. Besides it helps reducing gender inequality, promotes good norms, behavior, social values.

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