

Fem-Scale: A Data-Driven Approach for Quantifying Degree of Individual Feminism Perspective

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Abstract— Abuse of women is widespread in underdeveloped nations like Bangladesh, where women are still afraid to assert their rights, and this trend persists. Even though significant changes are apparent, they have not entirely disappeared from society. On the other hand, there are some negative notions of feminism prevailing in our community. The lack of proper classification of the individual feminism perspective in relevant degrees is a significant concern while developing effective policies against this phenomenon. In this work, we develop a data-driven approach to quantify the degree of the individual feminist standpoint. We collected data from a selected crowd using survey questionnaires and analyzed the responses to segregate the participants into a *Fem-Scale* with five distinct classes: Sexist, Partial Sexist, Moderate, Feminist, and Radical feminist. We also validated the proposed *Fem-Scale* with real-life data generating an accuracy of 97.67% and highlighted the critical insights of the qualitative analysis of the collected data. To the best of the authors' knowledge, this is the first attempt to introduce the degree of individual feminism standpoint. The proposed method can be beneficial in future research, including justifying the standpoint regarding feminism using public data from an individual's social networking site (SNS).

Keywords—*Feminism, Qualitative Analysis, Classification, Social Analytics, Data-driven algorithm*

I. INTRODUCTION

Detecting the degree of feminism can help understand the prevailing social attitudes and beliefs toward gender equality, woman rights, and related issues. While sexism and misogyny detection and classification are popular study topics, quantifying feminism is relatively uncommon, if not completely absent in the field of research. Parikh et. al. [1] investigate the use of neural networks for identifying the sexist and misogynistic language in online text. This is the closest research study to feminism in which only sexism is identified and categorized, however, it is equally important to quantify proper feminism standpoint. Feminist self-identifications reflect an individual attitude to distinguish themselves as having goals and views that align with feminism, broadly defined as a movement to end sexism, sexist exploitation, and

oppression. [2] The group of discriminators who fundamentally differentiate men and women have a large impact of depriving of the rights of women; almost 2.4 billion women of working age are not afforded the equal economic opportunity. [3] The journey for woman's rights emerged 175 years ago in 1848, but it could not change women's condition and position effectively in the world. [4] On the other hand, it creates some different individual perspectives among people towards feminism. Feminism has been the subject of extensive research for many decades and various research papers on feminism have covered a variety of topics, including the history of the feminist movement, the intersectionality of gender, race, and class, the impact of feminism on society, politics, and policy, the challenges faced by feminists, the role of feminism in shaping modern culture and media and so on. Individual perspective is important because it provides unique insights and experiences. It contributes to diverse thoughts and ideas, leading to more creative solutions.

In this study, we introduce *Fem-Scale*, a data-driven approach to quantify the degree of an individual's perspective regarding feminism. We collected survey questionnaires to gather information from a selected group of people, and then we deduced *Fem-Scale* using qualitative analysis and segregated the participants into five groups: sexist, partial sexist, moderate, feminist, and radical feminist. Furthermore, we validated the proposed *Fem-Scale* using real-life data, which generated an accurate classification of 97.67% of samples. Additionally, we highlighted some of the crucial and intriguing findings from the qualitative analysis of the survey data. For example, we found that women are more likely to identify as feminists than men, and individuals with higher levels of education and income are more likely to identify as feminists. Similarly, we found that individuals who have experienced discrimination and oppression based on their gender, race, or sexual orientation are more likely to identify as feminists.

The degree of individual feminism stance is introduced for the first time in this study according to the best of the author's knowledge. Our suggested approach may help to explain a person's personality using publicly available information from

their social networking profile (SNS), which can be utilized in future research works. Our study may contribute to existing discussions and debates about the future of feminism as well as other areas of research. Our study can also be used to focus on issues such as gender-based violence and harassment, intersectionality, media representation, global feminism, the mental and physical health of women, economic and political power, and many more.

The rest of the paper is discussed as follows: Section II includes the background study and related work, Section III describes the methodology, Section IV discusses the experimental result, and Section V concludes and discusses the future scopes of the research.

II. BACKGROUND STUDY AND RELATED WORKS



This section first outlines the background of the study and later on gives an overview of the related works

A. Background Study

One of the most intriguing topics to debate is feminism, which is still a topic of conversation today. The inequality between the sexes, women and men, is the issue with feminism that is always highlighted. It is necessary to comprehend the definition of feminism in order to understand it in more detail. Feminism is a fight to change the laws and cultural norms that keep women from experiencing complete equality with men in all spheres of private and public life. There are different types of feminism, but we are discussing 4 types of varieties: Radical, Cultural/Marxist, Liberal, and Postmodern in Figure 1.

Fig. 1: The co-relation among the categories of feminism

1) *Radical Feminism*: These Activists think that males are the ruling class. On the other hand, women are the subject class in a patriarchal society where men dominate and govern. Radical feminists have frequently taken a leading role in establishing and managing safe houses for women who have experienced male abuse.

Rosemarie Tong (1998) makes a distinction between two radical feminist groups:

- Radical-libertarian feminism
- Radical-cultural feminism

2) *Cultural/Marxist feminism*: Marxist feminists think that capitalism, not patriarchy, is the primary cause of women's exploitation, with capitalists serving as its primary beneficiaries. Working-class men and women may cooperate greatly, according to Marxist feminists, and both groups can achieve success.

3) *Liberal feminism*: Liberal feminists prefer to change to be made within the current framework; they do not demand radical change. Liberal feminists' primary goal is to create equal chances, as seen by laws like the Equal Pay Act and the Sex Discrimination Act. The greatest significant influence on women's lives has undoubtedly come from liberal feminism.

4) *Postmodern feminism*: Postmodern feminism is a later branch of feminism that combined post-modern and post-structuralist theory to criticize some of the premises of previous feminist thought. Essentialism, which holds that there must be a fundamental difference between men and women, is rejected by postmodern feminists.

There are a number of little movements that work together and reinforce one another. The history of feminism is outlined but not completely explained. There are five waves of feminism as follows:

The first wave of feminism started in the 19th century. The 1960s and 1970s are the eye-witnesses. The rise of second-wave feminism. Feminism was split into three main subgroups: liberal, radical, and cultural. Racial feminism grew immensely in third-wave feminism. Intersectionality remains a concern for fourth-wave feminism. In order to advance the case for gender equality, the fifth wave of feminism has developed into a multifaceted strategy that brings together the forces of politics, economics, culture, media, and sustainability.

B. Related Works

In recent decades, the field of "Feminism" has seen significant advancements, with numerous studies being conducted to shed light on various aspects of feminism. The interest in this field has increased due to its potential to contribute to woman's rights. Pringle et al. [5] found that feminism has commonly passed through some progressively destructive stages. Depending on where they reside, women's rights may vary. Commonly, the main restrictions on women are discrimination based on cultural factors and gender norms, as described in [6].

Scholars argue that the detection of feminism is necessary for a number of reasons. Butler [7] suggested that feminism provides a critical lens through which we can examine and comprehend how gender impacts our experiences, identities, and possibilities in life. The identification of feminism also aids in the challenge and transformation of prevailing cultural gender narratives and representations, as mentioned in a very earlier work [8]. Sánchez et al. [9] presents an empirical study on using automatic classification techniques to detect sexist content on social networks, specifically on Twitter.

In [10] authors explored the use of Convolutional Neural Networks (CNNs) for automatically detecting and categorizing sexist content. Similarly, in [1] the authors present a neural network-based approach for multilabel classification of sexism and misogynistic content, and evaluate its performance on a dataset of tweets.

[11] suggests non-feminist guys have a mindset, which fits more closely with traditionally gendered scripts that prioritize men's pleasure, where feminist men hold a range of views on masculinity and equality. [12] So, the correct choice of language is a must to spread out the thought and need for equality. Instead of feminist leadership, dynamic leadership can more accurately guarantee the rights of women [12]. Therefore, feminist scholars and activists feel that more men joining the feminist cause would strengthen feminism's capacity for collective action and provide men the chance to use their superior status to change damaging social gender norms [14].

III. METHODOLOGY

This section describes our approaches for the tasks of classifying feminism using fem-scale. The sub-sections discuss the detailed process of data collection, our developed algorithm and its validation, and a brief comparison between the initially developed and fine-tuned algorithm where a visualization is shown in Figure 2.

A. Setup

Our data collection is the methodical process of gathering and analyzing data to answer particular research questions, test hypotheses, and evaluate outcomes. Our data collection process is based on some target audience. We get the individual's permission before initiating the data-gathering operation. We have discussed the problem, the study procedure, and what we will do with their information in terms of phone surveys and in-person surveys. We have also guaranteed their confidentiality by providing a consent form.

B. Data Collection

Our data collection cost and procedures are described in the following:

- Phone survey: As interviewers, we record the respondents' responses so that we may analyze the raw data.
- Mail survey: We mailed our target respondents to fill out surveys on Google Forms.
- In-person Interview: Participants had to answer various sorts of questions based on their experience and thoughts on feminism.
- Web/Online Survey: We invite participants and collect their individual responses via Google Forms.

It is difficult to identify a feminist without proper evidence. After evaluating more than 12 research publications, we prepared a series of questions based on feminism's basic beliefs. Based on the answers to these questions, we can determine if a person is a feminist or a sexist. Following the survey, we keep the data obtained and then analyze it. This provides a score for each individual which helps us to both quantify and categorize the feminism standpoint of the individuals. This precise system was given the moniker "Fem-scale" by us.

Table 1 is the demonstration of our data collection cost and procedures.

TABLE I. DATA COLLECTION

| <i>Survey Medium</i> | <i>Cost Per Response</i> | <i>Data Quality/ Integrity</i> | <i>Reach</i> |
|----------------------|--------------------------|--------------------------------|--------------|
| Phone | 10-20 | High | 25.00% |
| Mail | 0.25-0.5 | Medium | 5.00% |
| In-Person | 10-15 | Medium | 20.00% |
| Web/ Online | 0.25-0.5 | Low | 50.00% |

C. Description of the Algorithm and Validation

We devised a scale called the "Fem-scale" to classify individuals into one of five categories based on our algorithm. There are five sections to this scale:

- Derogatory or Sexist (Range: -1.00 to -0.75)
- Partial sexist (Range: -0.75 to -0.25)
- Reasonable or Moderate (Range: -0.25 to 0.25)
- Feminist (Range: 0.25 to 0.75)
- Radical feminist (Range: 0.75 to 1.00)

We prepared a questionnaire to analyze each individual's answers to assign them to any of the above-mentioned categories. Two separate questionnaires were prepared for both genders. Each question has five possible answers, each answer carrying one to five points. Our initial version of the algorithm determined the score by only finding the summation of the scores of answers, where each question carried the same weight. The score was normalized in order to range it between -1 to 1. This version of our algorithm performed moderately well.

Later, we fine-tuned the algorithm in order to find out a participant belongs to which category more precisely. We assigned additional weight to some questions. There are five levels of weight. The weight was defined in the range, 0 to 4. This weight is multiplied by the particular score of each individual's answer to each question, to calculate the final score. The score was normalized after that so that the range of the score is between -1 to 1. This modification brought a drastic change in the result of our experiment. The detailed algorithmic structure and equations are demonstrated in the following subsections.

1) *Algorithm Structure*: The participant's overall score will be determined by adding the participant's Mark on Each Question (MEQ). Here R is the score of each answer and W is the assigned weight to each question. The product of these two parameters is the resultant score or mark of each question.

Here,

$$\begin{aligned} R &= \text{Response} \\ W &= \text{Weight} \end{aligned}$$

$$\text{Mark of Each Question (MEQ)} = R * W \quad (1)$$

We then presume the participant's total score (PTS) as the new highest point (nX_a). After subtracting the highest point (nX_a) from the lowest one (X_b).

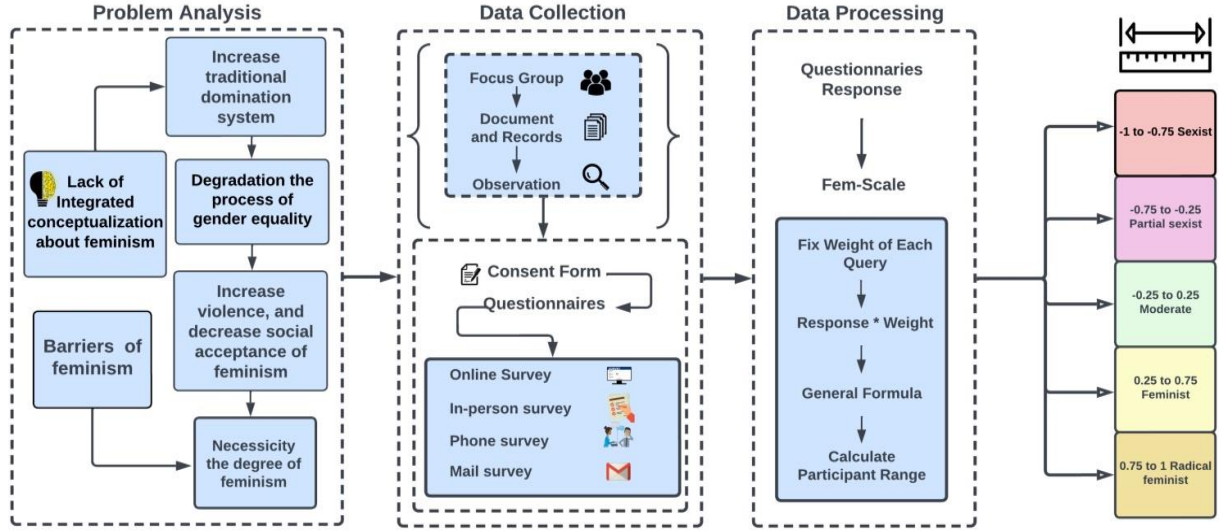


Fig. 2: Framework Methodology

We multiply the answer ($nX_a - X_b$) with 0.1, and divide the product by 1.12 (Actual Highest Point ($X_a = 280$) - Lowest Point ($X_b = 56$))/200 = 1.12). The value is again multiplied by 0.1, and finally, subtract 1 from the final answer.

Here,

X_a = Actual Highest Point

X_b = Lowest Point

nX_a = New Highest Point

$$\text{Participant Range} = [-1 + 0.1 \times \{\frac{0.1 \times (nX_a - X_b)}{(nX_a - X_b)}\}] \quad (2)$$

2) *Result*: From the collected data, we cross-checked the "Fem-scale" by comparing their responses to the results of our analytic system. We confirmed the approach after receiving the accuracy and ran it on our other participants. Before running this data into the fem-scale we were trying to get accurate results from our performed algorithm. Our initial algorithm produced an accuracy of 73.33%. Later, we changed the approach by assigning weight to individual questions depending on the impact and recalculate each participant's score. This modification brought a significant improvement to the accuracy of the algorithm and lead it to 97.67%.

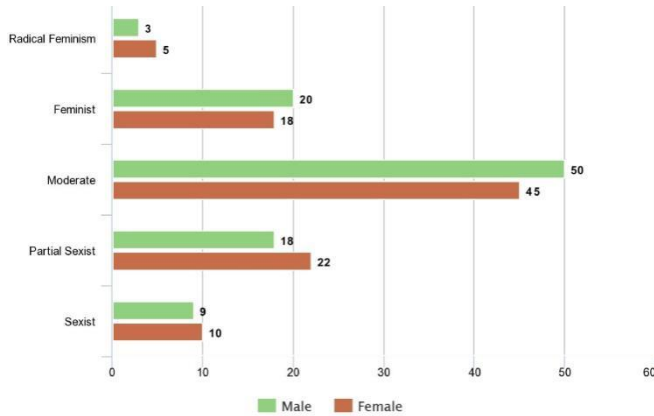


Fig. 3: Percentage of gender in fem-scale

The approach to feminism can vary among individuals, regardless of gender. A man's perspective on feminism may be shaped by a range of factors such as his personal experiences, cultural background, and exposure to different feminist ideas and perspectives. It is not accurate to say that women are necessarily more feminist than men as mentioned in Figure 3. Feminism is a movement for gender equality that seeks to challenge and address the systemic and cultural barriers that limit the opportunities and rights of all genders. Both men and women can be feminists and support feminist goals and principles. Table II is a data accuracy table that describes the algorithmic score from responses of 15 males and 15 females.

IV. EXPERIMENTAL RESULTS

This section provides both quantitative and qualitative analysis of the experimental results of the research with proper data and visualization.

A. Quantitative Analysis

The quantitative analysis of the research is represented by the confusion matrices of both the initial and fine-tuned version of the algorithm. Figure 4 is a visualization of both versions of algorithms' confusion matrices.

This section was aimed to analyze the results for classifying individuals into different groups based on their ideological views. The classification was done using five indexes: Feminist, Moderate, Partially Sexist, Radical Feminist, and Sexist. The analysis was performed using precision, recall, and F1-score metrics, which are commonly used to evaluate the performance of classification models. The results show that the classification model performed very well, with high scores for all five indexes. The Feminist index had a precision of 1, which means that all instances classified as Feminist were correctly classified. The recall score was 0.8, indicating that 80% of the instances that belonged to the Feminist group were correctly classified. The F1-score was 0.888, which is the weighted harmonic mean of precision and recall.

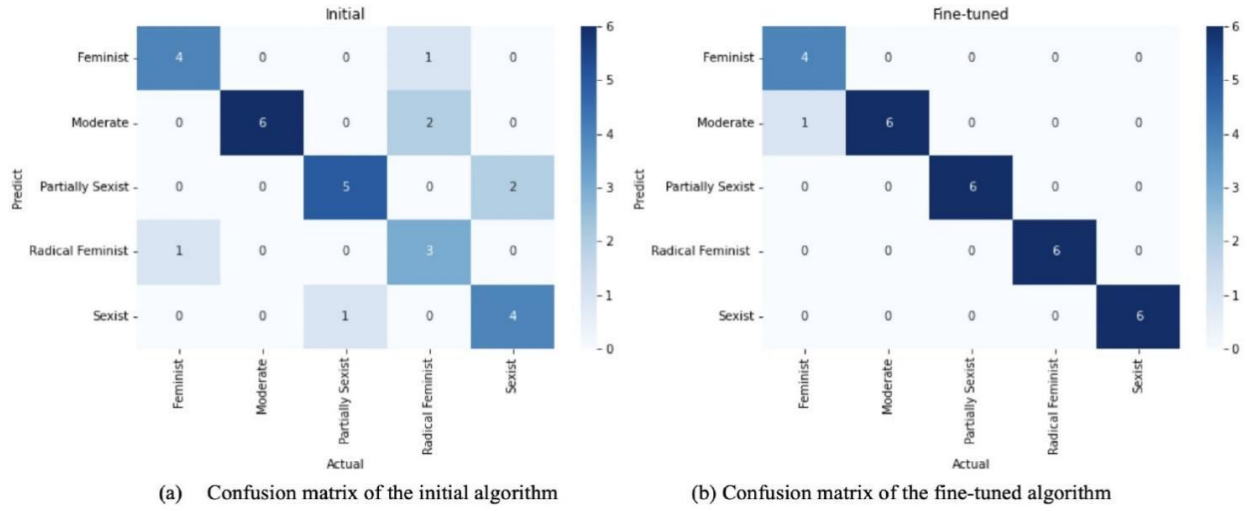


Fig. 4: Confusion matrices of initial and fine-tuned algorithm

TABLE II. DATA ACCURACY TABLE

| Sample | Actual Annotation | Algorithm Score | Algorithm Generated Annotation | Status |
|--------|-------------------|-----------------|--------------------------------|--------|
| M1 | Feminist | +ve 0.52 | Feminist | Right |
| F1 | Moderate | +ve 0.23 | Moderate | Right |
| M2 | Moderate | +ve 0.20 | Moderate | Right |
| F2 | Moderate | +ve 0.22 | Moderate | Right |
| M3 | Moderate | +ve 0.14 | Moderate | Right |
| F3 | Moderate | +ve 0.20 | Moderate | Right |
| M4 | Feminist | +ve 0.60 | Feminist | Right |
| F4 | Moderate | +ve 0.18 | Moderate | Right |
| M5 | Radical Feminist | +ve 0.81 | Radical Feminist | Right |
| F5 | Feminist | +ve 0.63 | Feminist | Right |
| M6 | Partially Sexist | -ve 0.71 | Partially Sexist | Right |
| F6 | Sexist | -ve 0.81 | Sexist | Right |
| M7 | Partially Sexist | -ve 0.70 | Partially Sexist | Right |
| F7 | Sexist | -ve 0.82 | Sexist | Right |
| M8 | Partially Sexist | -ve 0.65 | Partially Sexist | Right |
| F8 | Sexist | -ve 0.78 | Sexist | Right |
| M9 | Partially Sexist | -ve 0.50 | Partially Sexist | Right |
| F9 | Sexist | -ve 0.86 | Sexist | Right |
| M10 | Sexist | -ve 0.85 | Sexist | Right |
| F10 | Sexist | -ve 0.75 | Sexist | Right |
| M11 | Feminist | +ve 0.03 | Moderate | Wrong |
| F11 | Feminist | +ve 0.68 | Feminist | Right |
| M12 | Partially Sexist | -ve 0.55 | Partially Sexist | Right |
| F12 | Partially Sexist | -ve 0.58 | Partially Sexist | Right |
| M13 | Feminist | +ve 0.66 | Feminist | Right |
| F13 | Radical Feminist | +ve 0.79 | Radical Feminist | Right |
| M14 | Radical Feminist | +ve 0.84 | Radical Feminist | Right |
| F14 | Radical Feminist | +ve 0.87 | Radical Feminist | Right |
| M15 | Radical Feminist | +ve 0.83 | Radical Feminist | Right |
| F15 | Radical Feminist | +ve 0.94 | Radical Feminist | Right |

Similar high scores were obtained for the other indexes. Moderate had a precision of 0.857, recall of 1, and F1-score of 0.923. Partially Sexist, Radical Feminist, and Sexist all had perfect scores for all three metrics, indicating that all instances belonging to these groups were correctly classified.

The accuracy of the model was also high, with a score of 0.965. The macro and weighted averages of precision, recall, and F1-score were high as well. The support was nearly the same for every class as the data is almost evenly distributed for each class.

In summary, the presented quantitative analysis shows that the high precision, recall, and F1-score scores for all five indexes are an indication of the model's ability to accurately identify and quantify the feminist perspective of individuals.

B. Insights from Qualitative Analysis

Feminism is viewed differently by different groups of people based on their cultural, social, political, and personal beliefs. For example, many women and men who identify as feminists believe in promoting equal opportunities and challenging gender-based discrimination. However, some conservative groups may view feminism as promoting anti-family values or demonizing men. Some people of color may feel that mainstream feminism has failed to address issues specific to their communities, leading to the development of intersectional feminism. Additionally, views on feminism can also vary based on factors such as age, education, and socioeconomic status.

1) Response from educated community:

The response of educated people toward feminism varied on many factors such as their cultural, political, and personal beliefs. However, in general, education levels positively correlated with support for feminist ideals. Many highly educated individuals are aware of the historical and ongoing struggles for gender equality and the need for ongoing efforts to address gender-based discrimination and inequality. They may be well-versed in feminist theory and support policies and practices that promote gender equality. On the other hand, some highly educated individuals have a more nuanced or critical perspective on feminism. For example, they may support certain aspects of the movement but reject others or question certain strategies or approaches used by feminists as in Figure 5.

2) Response from Religious group:

The response of religious individuals toward feminism is influenced by their religious beliefs, cultural background, and

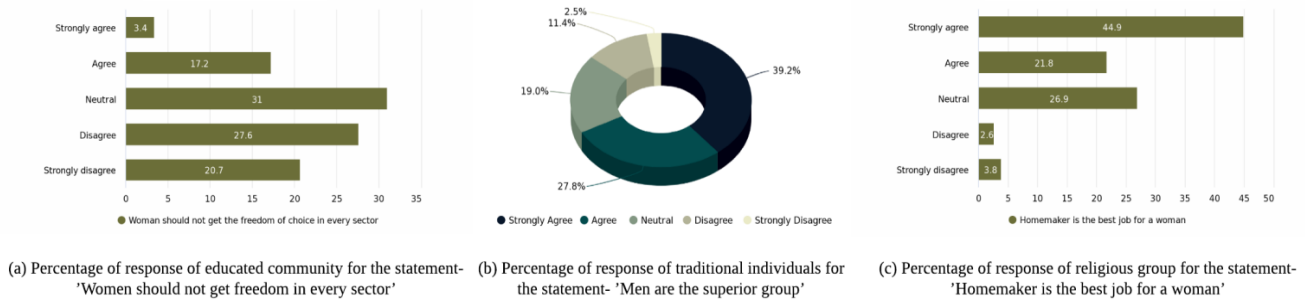


Fig. 5 : Qualitative insights from the conducted survey

personal experiences. Maximum religious individuals reject aspects of the feminist movement that they perceive as conflicting with their religious beliefs. For example, they believe that traditional gender roles and hierarchies are divinely ordained and that efforts to challenge these roles are contrary to their religious beliefs as mention in Figure 5.

3) *Response from conservative or traditional individuals:* Traditional or conservative individuals have a more critical or skeptical view of feminism, as they perceive the movement as challenging long-held cultural norms and values. They view the movement as promoting a radical agenda that seeks to undermine traditional social and cultural norms, particularly regarding gender roles and family structures as in Figure 5. For some traditional conservatives, the feminist emphasis on equality and women's rights conflict with their beliefs in maintaining traditional gender roles and the importance of the family unit.

In conclusion, we can say that the perspective of feminism is diverse and multi-faceted, shaped by a variety of individual and societal factors.

V. CONCLUSION

The survey's journey was not straightforward at all. We have had difficulties numerous times. It was challenging to choose the correct resources for our survey.

After gathering many research papers and some personal studies on the waves and forms of feminism, we finally began to formulate the questions. Creating a questionnaire was one of the real challenges. We have to research all thought processes of feminist and sexist characters. Data-collection was another challenging issue. People were uninterested in sharing their info with us. Not everyone in the target demographic has an email account or access to the internet. We had to persuade them multiple times before we received any data personally. Most individuals avoid using Google forms, which is one of the most significant data-collecting issues. Some did not read the form correctly and answered the questions without reading them. Such information was completely useless. Our data was like this in 1%-2% of cases. The in-person interview was far more flexible than the phone session although some respondents were uninterested in discussing feminism.

Even though almost every constitution includes a provision protecting women's rights, it has been violated a million times. To empower the world equally, we must

empower our half population so that they may work alongside men to ensure prosperity. By identifying the persons, who are obsessed with inequality, we can effectively counsel and inform them about the privileges and rights of a woman; they may comprehend the necessity of women. Feminism is essential for a woman to receive her rights fully and equitably, but not to control the other gender in any form. The developed Fem-Scale can be useful to prosper future research while justifying the standpoint regarding feminism using public data from an individual's social networking site (SNS). Developed algorithm of this study can be utilized while exploring various semantic analysis of social media data to find an individual feminism perspective.

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