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Kartik Sharma and Sandeep Panda

A Mathematical Treatment of Feministic Literature for the Prediction of Social Trends

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Kartik Sharma and Sandeep Panda

Abstract

The paper mainly aims at presenting an analysis of feminism and the effect of feministic literature on the society by game theoretic model and Fuzzy control systems for different periods in history.

The inferences drawn from the paper extol some groundbreaking ideas which could help in the development of a feministic society in time to come. The game theoretic models for all the periods predict that the Nash equilibrium lies in both the players, viz., Male Chauvinists and Feminists staying with their dominant strategy of not changing.

This motivates us to believe that literature can provide that external effort to move the equilibrium to one where the whole society is feministic in its outlook.

No Single Feminist Belief System

Skeptics sometimes make the mistake of 'battling a straw man', by attributing to one feminist the beliefs of another. There is no single feminist belief system. In a 1986 Congressional exit poll conducted by ABC News, 57 percent of women who'd voted described themselves as "feminist", apparently in the generic sense. They weren't organized around any particular leader, nor buying into any particular ideological platform. Individual feminists tend to pick and choose among available ideas.

Women's Movement and Feminist Movement

The "feminist movement" these days is synonymous with the larger women's' movement, which is primarily a leaderless demographic movement into the workplace, and a pervasive cultural shift brought about by greater economic independence. Feminism originally meant "pro woman". Today it has come to mean a commitment to achieving equality. Feminist writings can be anything written from a woman's perspective, or anything written from a nonsexist perspective by women or men.

Thus, in spite of all the discussions about the feminist idea, there is no single feminist idea. However, feminism is affected by some common generic factors and pursues certain

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common ends. So even though the idea itself is an abstract one, its underlying factors can be understood to have a certain degree of objectivity. This objectivity allows us to quantify this concept to allow certain mathematical treatment.

Feminist Literature as Representative of the Degree of Feminism

We consider the amount of feminist literature both as a factor and a representative of the degree of feminism in the society. However, literature has an effect only on the literate sections of the society. This again, has a subtle division. While feminist literature has affected all that can read and does so, a survey conducted showed greater effect of such text on males than on females. The factor by which their perception differed was found to be 2.7 on a 10 point scale. Thus, both these factors had to be taken into account while quantifying feministic way of thought.

Definition of Feminism

Thus, we define a Feminism Index (I_f) as an index with a maximum value of 100 that determines the degree of prevalence of the feminist way of thought. The prevalence of feminism in the society at the end of a certain period of time can be understood to be a function of three variables.

- f = amount of feminist literature during a period
- l = the total literacy rate at the end of the period expressed as fraction
- l_m = literacy rate of males at the end of the period expressed as fraction

Calculating the Prevalence of Feminism

We vastly dwell on the assumption that females are intrinsically feministic. Hence, we discount 49.8% of the female population from these rigorous calculations. Thus among the male section of the society, the prevalence of feminism would directly be represented by the amount of feministic literature prevalent in the society. Thus, as a normalized index, we define the *femlit* index as

$f = (\text{Total number of feminist novels a period}) / (\text{Approximate number of novels during base period})$

Here, the base period can be assumed rationally. For our model, we have assumed the same as the period from 1950-2000. So now, the Feminism Index (I_f) is given by

$$I_f = [(f) + (f \times l) + (2.7 \times f \times l_m)] / 4.7 \times 100$$

The factor of 2.7 a measure of how much feminist literature affects the average Indian male. This has been determined by a survey amongst representatives of various factions of the society.

This index can also be used determine the percentage of feminists in the society (P_f) at a particular time as

$$P_f = 49.8 + (I_f/100) \times 50.2$$

Radical changes in the Indian society in terms of feminist attitude have taken place in the span of the last century. That is why this model has been applied to the Indian scenario.

Period	F	L	I_m	I_f	P_f
1850-1900	8/76 =0.1053	.0530	.0980	2.9519	51.2819
1900-1950	4/76 =0.0526	.1833	.2716	2.1450	50.8768
1950-2000	76/76 =1.0000	.6538	.7956	80.892	90.4078

Base Period: 1950-2000

Source: Wikipedia, Census of India

We analyze the whole situation using behavioral Game Theoretic modeling since the situation can easily be modeled as a game of conflicting objectives and ideologies of the two players, each wanting to maximize its payoff (index defined).

With the data and the basic formulae in hand, the application of game theory as a social interaction between the two factions of the society has been formulated in form of a model, namely,

1. Feminists
2. Male Chauvinists

Assumptions of the Model

- There are only two kinds of people – one who is male chauvinist and others who are feminists.
- If some people change from either group to the other, all will switch to the group

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- The game is considered to be static as the change would take a long time to take place
- Players are rational i.e. they want to maximize their payoff
- If a player chooses a strategy that is opposed to his natural strategy, we have to evaluate the reasons for the same.

Let us evaluate the If-Then algorithm of Fuzzy Logic for the scope of feminism in the future;

IF Feminist supporters continue to support feminism

Then situation will improve but chauvinist will not be happy and take steps to reduce the same i.e. there may be political/social unrest in country and this may result in more exploitation of women

IF Feminists give up the idea of feminism and adopt chauvinism

Then, the interests of whole women fraternity will be hurt and no equal rights could be achieved, the chauvinists will be happy

IF chauvinists start believing that the concept of feminism is right and adopt it

Then society will benefit and feminists will be happy. The women fraternity will be benefited and the situation is the one that is most desired.

Therefore we observe that the best way to support equal rights and status for women is to motivate chauvinists to support the cause of feminism. Now, that is a difficult task to be done and our research completely focuses on strategies that would increase the payoffs in the game theoretic model that encourages chauvinists to choose feminism as their long term strategy.

Period (1850-1900)

	Changes to chauvinism	Stays as feminist
Changes to feminism	1.48, 98.52	0, 100
Stays as chauvinist	50.2, 49.8	48.72, 51.28

Period (1900-1950)

	Changes to chauvinism	Stays as feminist
Changes to feminism	1.08, 98.92	0, 100
Stays as chauvinist	50.2, 49.8	49.12, 50.88

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Period (1950-2000)

	Changes to chauvinism	Stays as feminist
Changes to feminism	40.61, 59.39	0, 100
Stays as chauvinist	50.2, 49.8	9.59, 90.41

Thus, all the 3 models have an equilibrium point at the right bottom corner where both the players continue their state of mind as a feminist or chauvinist.

Conclusion

Thus, according to classical static model of game theory, no party has any incentive to defect from their social group. However history tells us that feminism way of thought has been on the rise. This can be explained only by the fact that while the chauvinists themselves have no incentive to defect, they are motivated by their contemporary feminists, who have an option to increase payoffs by turning male chauvinists into themselves. This is the way for asymptotic approach towards a perfect society with gender equality.

Another notable fact is that the situation did not change visibly in the period of 1900-1950. During the same period, we notice a decrease in feminist literature. So even though the rest of the factors increased about threefold, there was a net decrease in feminism thought in the society. This signifies the importance of feminist literature in bringing about equality of sexes; and on a broader outlook, social change.

Limitations of Study

There are some limitations of this whole mathematical approach:

1. The factors considered for the definition of the feminism index (I_f) are dominant, but not extensive. Hence, this is an approximate model. To construct a more accurate model, more factors have to be taken into account and rigorous calculations have to be employed.
2. While a time based change in feminist thought has been taken into account, fractional changes in a particular time frame has not been taken into account. However, this treatment is not possible in predicative logic and requires a more comprehensive fuzzy based approach.

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