**NetSpam: a Network-based Spam Detection Framework for Reviews in Online Social Media**

**NetSpam:** NetSpam is Application name and which is declared by the meaning of **Net**work **Spam** Detection.

**Spam Detection Framework:** A framework or methodology or procedure to detect spam’s.

**in Online Social Media:** detect spam’s in online social media where we can get reviews and ratings on a product publicly.

**a Network-based:** This application is not only based on the detect spam reviews but also detect the spam network features.

Mainly The network divided two types:

1. User Based
2. Review Based

In each and every network above mentioned categorized two sub modules.

1. User Based

* User-Behavioral (UB) based features
* User-Linguistic (UL) based features

1. Review Based

* Review-Behavioral (RB) based features.
* Review-Linguistic (RL) based features

Please verify sub modules of the network from the basepaer Table 1

***Calculations for detecting spam reviews in each module.***

**1) User Behavioral Based**

***i) Burstiness:***

Spammers, usually write their spam reviews in short period of time for two reasons:

First, because they want to impact readers and other users,

Second because they are temporal users, they have to write as much as reviews they can in short time.

|  |
| --- |
| Score = 1- ( Last Review of item Date - First Review of item Date) / 28;  Threshold value =0.5  Score > 0.5 → spam  Score < 0.5 → not spam  For Ex:  1 - [(14/09/17) - (13/ 09/17)]/28;  1 - (1/28) => 0.96 > 0.5  Spam. |

***ii) Negative Ratio:***

Collect user rating's of particular item.avg of rating score for more than two times is equal **(=)** or less than **(<)** 2 which is spam , more than 2 is not spam for: user-sajid gave for "prod**1**" ratings are

|  |
| --- |
| **2 & 1 & 1 => 2+1+1 / 3 => 1.33** which is less than **2.50** it is spam.  **note:** minimum  **2**  or more than **2** attempts are required. |

**2) User Linguistic Based**

**i) Average Content Similarity:**

First we need to check for a review if any other review if any other reviews are there for same product with same user then we need to check otherwise it is not spam.

Similarity content score

|  |
| --- |
| **0.4 > 0.5 => not spam.**  **0.7 > 0.5 => spam.** |

**3) Review Behavioral Based**

***i) Early Time Frame:***

Spammers try to write their reviews asap, in order to keep their review in the top reviews which other users visit them sooner.

|  |
| --- |
| sc = 1 - (Last Review Date - First Review Date)/7;  sc > 0.5 => spam  sc < 0.5 => not spam |

***ii) Rate Deviation***

|  |
| --- |
| Score = 1 - (User Rate of item - Avg Rate of item) / 4;  sc > 0.5 => not spam  sc < 0.5 => spam  For Ex:  1 - ( 5 - 1.5 )/4;  1 - (3.5 / 4)  0.125 > 0.5  false (spam) |

**4) Review Linguistic Based**

First, studies show that spammers use second personal pronouns much more than first personal pronouns. In addition, spammers put ’!’ in their sentences as much as they can to increase impression on users and highlight their reviews among other ones.