Chapter 3

System Architecture

3.1 Proposed Model:

This section provides an overview for better detection of malicious social bots in online social networks. We analyze user behavior features and identify transition probability features between user click-streams Based on the transition probability features and time interval features, a semi-supervised social bots detection method based on space-time features is proposed.

SocialSitu(t) denotes the situational information at moment t. SocialSitu(t) is a four-tuple SocialSitu(t) = {ID, d, A, E}, where ID refers to the user's identity information (including the group to which the user belongs to and the role of user in the group), d refers to user's wishes at the t time, A refers to user operation corresponding to d at the particular moment (namely, behavior), and E refers to environmental information (e.g., terminal devices, equipment information and location information).

Clickstream is the order of clicks when users visit some websites or use the mobile terminals. The user's click event is a single point of operation. Click-stream is a series of point operations, and it refers to the SocialSitu(t) sequence of user from start point to target achievement. The sequence of the clickstream I = {SocialSitu(1), SocialSitu(2), . . . , SocialSitu(n)} , n $\in$ N , SocialSitu(1) refers to the user's first click behavior on the platform. SocialSitu(n) refers to the last click event that the user performs prior to exiting the platform.

The collection of user clickstream consists of many clickstream sequences, the collection of clickstreams, namely Click(s) = {I (1), I (2), . . . , I (m)}, s refers to the user id.

Transition probability between click steams: P (i,j) represents the probability that the click event is j at t + 1 moment when the click event is i at t moment.