

User Behavior Patterns in Social Networks Using Generalized Sequence Pattern

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Abstract- OSN's have turned into the real world of data and excitement for many clients because of the colossal increment of the availability alternatives. Portable web has altered the clients to get to long range interpersonal communication destinations effortlessly and furthermore permits to different social multimedia content whenever, anyplace and in the interest of any character. Thusly, the association behaviors amongst clients and MSNs are becoming more extensive and entangled. This makes the investigation of client cooperations and behaviors more muddled. This paper principally expanded and enhanced the situation examination system for the particular social area, named as SocialSitu, and further proposed a novel calculation for clients' intention serialization investigation in light of great Generalized Sequential Pattern (GSP). We utilized the enormous volume of client behaviors records to investigate the continuous arrangement mode that is important to foresee client intention. Our test chosen two general sorts of intentions: playing and sharing of multimedia, which are the most widely recognized in MSNs, in view of the intention serialization calculation under various minimum support limit (Min_Support). By utilizing the clients' tiny behaviors examination on intentions, we found that the ideal personal conduct standards of every client under the Min_Support, and a client's standards of conduct are diverse because of his/her character varieties in a huge volume of sessions information.

Keywords: Multimedia social networks, situation analytics, intention prediction, behavior pattern, big data.

I. Introduction

The fame of social systems administration locales has quickly expanded in the course of recent years. A multimedia social system [1] is a system in which a gathering of clients offer and trade multimedia content, and also different assets. It gives numerous sorts of administrations and advantages to its clients.

In social media networks, the individual is a mind boggling and open framework. The person's intention can change whenever, which additionally causes an adjustment in the client's needs. Additionally, the client's specific circumstance and conduct are dynamic. A client's intention can be reflected through the gaining properties of the client's situation awareness and criticism on assets. The framework can detail an opportune customized benefit for the client in view of client's intention, which will expand the client's administration encounter. In social media networks, the client has diverse parts in various gatherings [4]. The diverse recognizable pieces of proof that the client has may make the client's intention change. The difference in intention mirrors the adjustment in client's conduct.

The Situ hypothesis [2], [3] does not completely meet the investigation of the intention of clients with various characters in the social media condition. This present

paper's inspiration is to investigate the client's intention arrangement mode(s) in social media networks. The real commitments of this paper are two folds. One is to improve and broaden the Situ hypothesis exceeding for social space, that is the social media biological community, through recently and exhaustively thinking about client's alterable character (counting part and gathering), and the other is to propose a novel calculation for clients' standard of conduct examination and mining. The essential vision of the work is to additionally foresee clients' progressively and more profound intention and mental in light of an extensive volume of past activities.

II. Related Work

Chang contemplated the hugeness and impact of the situation investigation theory and Situ system on programming building, and also presented the Situ structure in detail, which could give clients customized benefit by recognizing the new intention of the client and the continuous refresh of administration [3]. Ming et al. raised a spatial situation examination in light of the Situ theory and the proposed (MR)² worldview advanced far reaching basic leadership which is helpful for the change of information, data, learning, and insight (DIKW) [5].

Rahman et al. expressed that, in a given situation, the client could impart information to companions in the social hover through the piece of the social administration which they are associated with. So they set forward a SenseFacen structure to suggest administrations for clients by utilizing perceptual information from the client sensor system and multimedia data [6]. Shen et al. set forward a calculation which thinks about the encompassing condition and social system relationship. This calculation could make utilization of client's perceived situation, inclination, and social system relationship to get client's closest neighbors through the estimation of the client's complete situation similitude, and anticipate the potential situation client inclination to make a proposal [7].

Tong et al. joined with the qualities of Internet of things, to talk about data obtaining, displaying and clever handling and so on by taking the situation awareness process as the fundamental line [8]. Consequently, it turns out to be increasingly imperative to utilize a novel situational awareness for registering administrations to give clients more customized capacities, including multimedia suggestion benefit [9], [10], tweaked security and protection one.

Zhang et al. exhibited an enhanced N-gram forecast model to anticipate the conceivable future web get to demand of the client through the server log information [11]. Bar-David et al. expressed that current innovation made an endeavor to anticipate the area of moving client as indicated by recorded direction of moving items, while overlooking the way that the dynamic idea of the moving conduct may prompt mistakes in forecast. They proposed a sort of setting aware position forecast calculation in light of different settings to foresee the future position of a vehicle [12]. So as to permit advanced mobile phone clients to get to the administration effortlessly and opportune, Lee [13] et al. planned a suggestion component to anticipate client's intention and initiate fitting administration; an occasion condition-conduct display and a control enlistment calculation was utilized to discover standards of conduct of PDA clients, and after that, influenced utilization of their conduct to pattern to foresee and prescribe the proper administration for the clients. With a specific end goal to better comprehend client's intention in MSNs, we enormously need to investigate clients' online social standards of conduct [14]. Client's information are high clamor and discrete in MSNs, particularly portable social networks [15], [16], and these information can't be utilized for examination and mining in time. In this way, there is a need to gather and preprocess clients' information before our next work.

Chang's situation investigation theory [2], [3] is arranged toward the field of programming designing, not totally fitting for the rising application situation of multimedia social networks. To aggregate up, so as to furnish clients with more customized benefits in the multimedia social

networks, this paper built up a SocialSitu system based on Situ-investigation theory [2], [3] through completely thinking about clients' unique situation and situation in MSNs. To acquire client's intention succession, we proposed a novel calculation for breaking down on SocialSitu(t) groupings of clients through the enhanced GSP.

III. Situation Analytics

Keeping in mind the end goal to permit advanced cell clients to get to the administration effectively and auspicious composed a suggestion component to anticipate client's intention and initiate proper administration. An occasion condition conduct show and administer was utilized to discover personal conduct standards of advanced mobile phone. We enormously need to investigate clients' online social personal conduct standards. Client's information are high commotion and discrete in MSNs, particularly portable social networks and these information cannot be utilized for examination and mining in time.

IV. Behavior Pattern

Insignificant information record from the log ought to be expelled. These log information are immaterial to this exploration. The blunder data can be found in the status code in web log, and erased. All information of the present client from an extensive amount of logs is distinguished. This paper is gone for enlisted clients. In this way, the client enlisted ID is utilized to distinguish the client. A session is an accumulation of pages got to by a client amid a specific timeframe. A client's total session is recognized from logging in to stopping.

V. Intention Sequence

In the figure, each point refers to SocialSitu(t) at a certain minute. The point begin j ($1 < j < n, j \in \mathbb{N}$) refers to the starting point of Intention(i). These starting points can be the same or different. End refers to the ending point of Intention(i). Each stripe of SocialSitu(t) grouping alludes to the arrangement created by different SocialSitu(t) that the client go from starting point to ending point. With the exception of the ending point, similar hubs may exist in each grouping of Intention(i). In the MSNs, there is no less than one arrangement which compares to the client's intention, specifically $i \in \mathbb{N}, i > 1$.

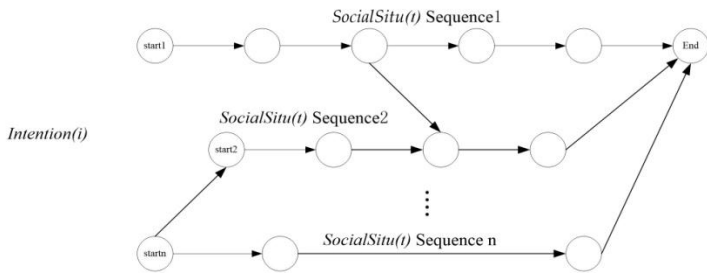


Figure: Intention sequence

Intention Serialization Algorithm of User

This algorithm could make utilization of client's recognized situation, inclination. Social system relationship to acquire client's closest neighbors through the calculation of the client's comprehensive situation similarity, and predict the potential situation client inclination to make a recommendation. Combined with the characteristics of Internet of things, to discuss information acquisition, modeling and intelligent processing and so forth by taking the situation awareness process as the main line. Henceforth, it turns out to be increasingly important to utilize a novel situational awareness for computing services to provide clients with more personalized functions.

All continuous SocialSitu(t) identified with a certain objective achievement in a client's historical access record consist of an intention arrangement. The client has no less than one objective in MSNs, and this relates to no less than one intention arrangement. The client's intention succession with a specific objective is spared to the database.

The present succession of a client is contrasted and intention arrangements of the client in the database to predict the present intention of the client to make a rapid and timely reaction to the client's demand and provide a personalized service, intention prediction flowchart is appeared in Fig. 2. A key issue in this paper is the manner by which to find out the client's Intention arrangement.

The association control which was proposed by Agrawal et al. in 1993 is utilized to find out the relationship among various items in a huge quantity of information. DS is a set which speaks to the entire transaction set where each attribute is called as an item. The set including all items in a DS is named as the information item set, $I = \{i_1, i_2, \dots, i_m\}$, $|I|=m$, refers to the quantity of items in DS.

Support: the quantity of item set R contained in the DS called as the supporting number of R, recorded as R Support. The quantity of support for administer $R \Rightarrow S$ refers to number that the item sets R and S coexisting in DS. In this manner, the support for run $R \Rightarrow S$ is $\text{Support}(R \Rightarrow S) = P(SUR)$.

Confidence: Confidence of lead $R \Rightarrow S$ refers to the probability that entire informational index DS that contains

R includes S meanwhile, recorded as Conf ($R \Rightarrow S$) = $P(S|R)$.

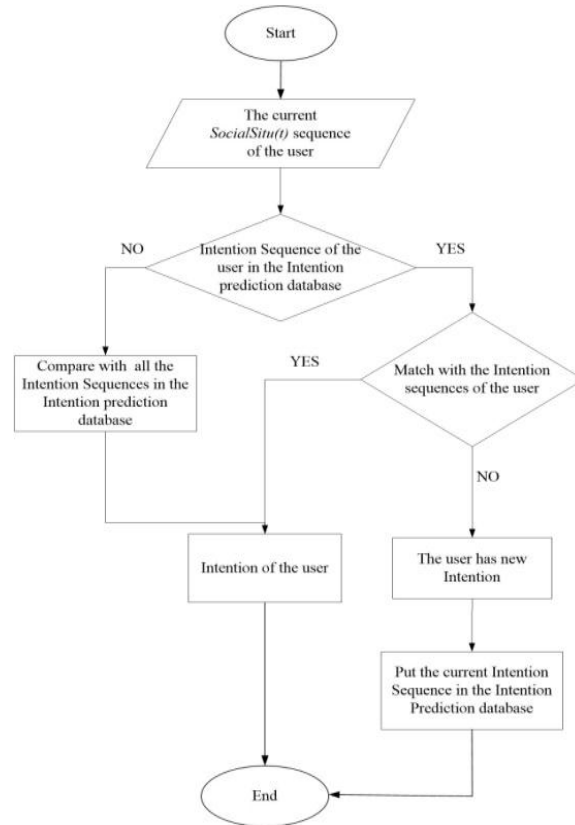


Figure : Intention prediction flowchart of the user.

The item set satisfying the Min_Support is known as the regular item set. The lead satisfying the Min_Support and the minimum confidence limit (Min_Conf) is the solid association run the show. The ending point of each Intention(i) arrangement is utilized as the aftereffect of association preclude to find each succession corresponding to the intention. The ending point of each intention(i) grouping is utilized as the aftereffect of every association lead ,and association run is utilized to obtain the precursor of association run the show.

VI. Serialization algorithm

Step1: The web log database is filtered after information processing, the objective in identified in the database as the ending point of client in Intention(i), recorded as $G = \{g_1, g_2, \dots, g_m\}$, $1 \leq m \leq n$.

Step2: g_i obtained from Step (1) is utilized because of association run the show. Each SocialSitu(t) is utilized as the forerunner of the association lead to figure the Support of each administer, and find out the control satisfying the Min_Support.

Step3: The antecedents of the control obtained from Step (2) are utilized to build a set L1, for set Lk in the length of k, where the link operation and pruning operation are utilized to produce a candidate succession Ck+1 in the length of k+1. At that point, filter informational collection DS, compute the Support of every candidate grouping as the predecessor and gi as the aftereffect of the association lead to create succession Lk+1 in the length of k+1, and Lk+1 is utilized as the seed set of the precursor of new association run the show.

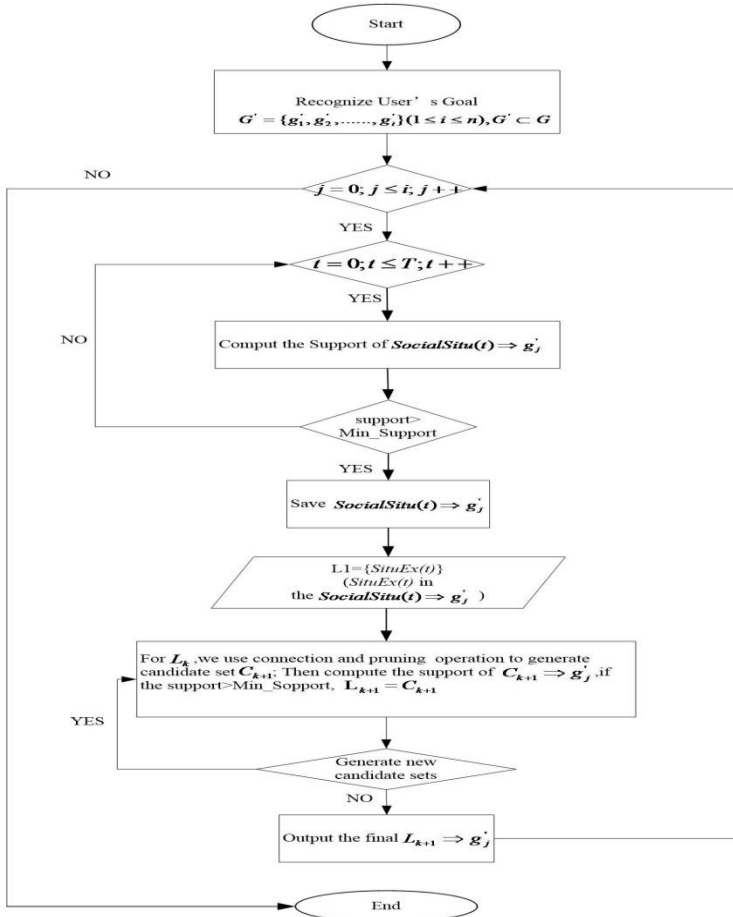


Figure: Flowchart of situational aware intention serialization algorithm.

Step4: Step (3) is reshaped until the new candidate arrangement can never again be produced, and all SocialSitu(t) successions related the objective gi of Intention(i) is obtained.

Step5: All SocialSitu(t) successions compared to target gi+1 are acquired and recorded as Intention(ip1). At that point, Steps (2), (3), and (4) are reshaped.

Step6: Until there is never again another objective, above intention arrangement.

Link Operation: Link operation: if the arrangement obtained in the wake of removing the first item of grouping pattern s1 is the same as the succession obtained in the wake of removing the last item of succession pattern s2, at that point s1 ought to be associated with s2. That is, the last item of s2 ought to be included into s1.

Pruning operation: if a certain sub-succession of a candidate grouping pattern is not an arrangement pattern, this candidate succession pattern is unlikely to be an arrangement pattern; subsequently, it is erased from the candidate arrangement pattern.

VII. Data Preprocessing

Data cleaning: Irrelevant information record from the log ought to be expelled. For instance: browsing mistakes, server blunders, or client blunders. These log information are insignificant to this exploration. The mistake information can be found in the status code in weblog, and erased.

User's identification: All information of the present client from a vast quantity of logs is identified. This paper is aimed at registered clients. Along these lines, the client registered ID is utilized to identify the client.

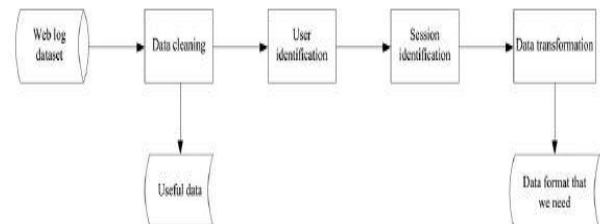


Figure4: Data preprocessing for intention serialization algorithm.

Session identification: A session is a collection of pages got to by a client during a certain period of time. A client's total session is identified from logging in to quitting.

Data transformation: Log information, which is continuous, is changed into the information write required in this paper. These information are divided into discrete information points according to the time stamp, that is, changed to be in the SocialSitu(t) four-tuple.

VIII. Experiment Evolution

A complete conversation from logging in to quitting SocialSitu(t) sequence is tracked. The four elements in SocialSitu(t) are acquired and enumerated below:

(1) **ID**: The user’s role and group are acquired in the database through the session information saved in the server. Users’ groups in CyVOD are the common registered user group and the advanced user group, which are corresponded with common users and VIP users, respectively. (2) **d**: A user’s behavior in MSNs is an observable vector. However, a user’s desire is concealed. User’s behaviors are reflected in various states by a probability density distribution. For example, when the user clicks into the login, the user’s desire is corresponded with the login behavior access to the system.

(3) **User’s behavior A**: In order to achieve d, the user’s behavior may be an atomic action or a compound action, mainly referring to user’s click and keyboard input behavior [16]. The user’s behavior can be obtained through

a web server log and the data change at a certain moment in the database.

(4) **e: terminal information (mobile terminal or PC)**: When Min_Support=50 percent, the support of the intention sequence pattern is high. However, the intention sequence consists of only two SocialSitu(t), this has a low effect on predicting the intention of the user. When Min_Support is 20, 30, or 40 percent, the support and confidence of the intention sequence is same. Also, the SocialSitu(t) of intention sequence is the same. Therefore, the Min_Support of User#161 can be 20, 30 or 40 percent. It can be seen in Table 3 that, when Min_Support is 10 or 20 percent, the confidence of the intention sequence is very high, but the support is very low. When Min_support is 30 percent, two intention sequence patterns are obtained, which includes the intention sequence patterns under the condition that Min_Support is 40 and 50 percent. Hence, the Min_Support of User #2 is 30 percent. Similarly, the intention sequence patterns of other users and final selection of Min_Support in MSNs can be concluded.

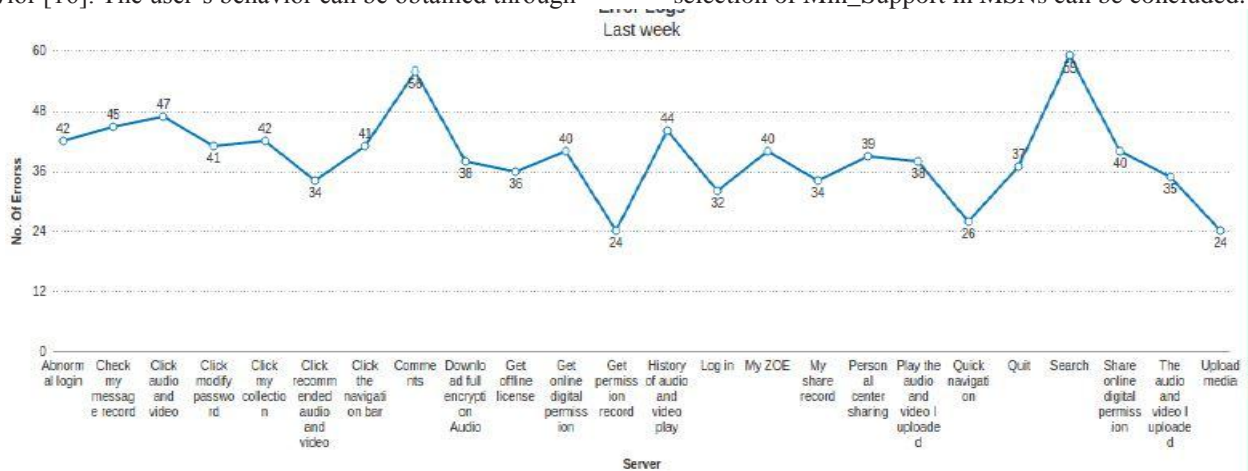


Figure: Number of situational analytics in line-graph representation

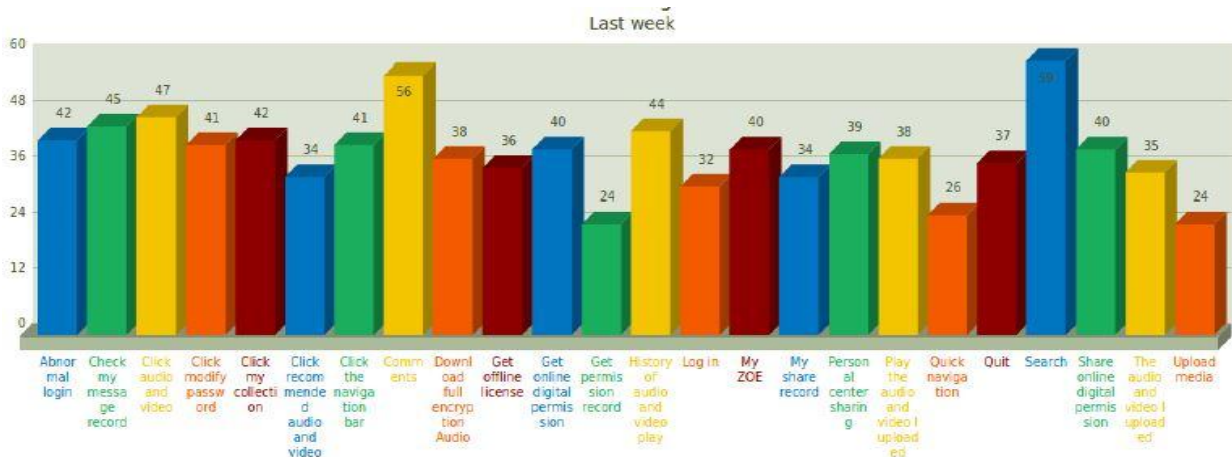


Figure: Number of situational analytics in Bar-graph representation

IX. Conclusion

The existing MSNs environment increasingly requires situation awareness. Clients' environment and behavior are dynamic, and an individual's intention is additionally to change. Keeping in mind the end goal to adjust to the dynamic changes of client identities in the social domain, this paper expands and enriches the Situ theory, and builds a SocialSitu structure for the social media networks. We design and achieve the intention serialization algorithm in multimedia social networks. The client's successive intention grouping mode is obtained through the intention serialization algorithm. At the point when the client's identify transforms, we finish up his behavior pattern with different ID, and demonstrate that different SocislSitu(t) successions are acquired in the same Min_Support with a similar intention when his part and gathering change. Later on works, the existing intention arrangement patterns of the client could be received to predict the client's increasingly and more profound intentions. Besides, we will utilize the SocialSitu and the proposed algorithm to improve multimedia recommendation framework and some killer applications in MSNs.

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