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FLIERMEET: AN EXTENSION TO ONLINE SOCIAL NETWORKING SITE (OSNs)

T. Praveen*, K. Karthick, M. Thapasya, S. Sai Preethika

Dept of Computer Science and Engineering, Vel Tech High Tech Dr.Rangarajan Dr.Sakunthala Engineering College, Chennai, Tamilnadu, INDIA

ABSTRACT

Aim: *FlierMeet, a mobile crowd sourcing platform for cross space public information reposting, intelligent tagging and pervasive sharing has served an important function for public information in modern society. So the main aim of the proposal is to focuses on distributed public flier information collection, enhance the cross-space transferring, intelligent tagging and pervasive sharing of distributed fliers.* ***Materials and methods:*** *First we extract the text from flier images & for that we use optical character recognition (OCR). Then detecting fuzzy words & non-word characters in the extracted text, pre-processing is conducted using regular expressions & dictionary (Medinet) search & then we employ Natural Language Processing(NLP) for category tagging. We also enable pervasive sharing of distributed fliers.* ***Results:*** *To obtain manifold views and comments about our system, both data contributors (a total of 10) and new users (20) were invited to participate this study. They were asked to evaluate FlierMeet on its attractiveness (overall impression), prospect (the perspective and acceptability), and simplicity (is it easy to use) on the scale of 1 to 5. Overall, the results indicate that most people were excited about FlierMeet and felt that it was easy to use.* ***Conclusion:*** *All the drawbacks are overcome in our proposal by using the popularity of online social networking (OSN) sites such as Facebook, Google Plus, Twitter, etc. OSN provide an important platform for the dissemination of news, ideas, opinions, etc.*

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KEY WORDS

Crowdsourcing, Cross space transferring, OSNs, FlierMeet, OCR, NLP, STA algorithm, intelligent tagging

***Corresponding author:** **Email:** praveent738@gmail.com; **Tel.:** +91 9566330222

INTRODUCTION

Bulletin boards serve an important communication function within communities. They are usually placed in public settings, taking advantage of the movement of people through social spaces (on the streets, near to sport centers, in college campuses, at workplaces/cafes. The paper fliers posted on bulletin boards usually provide a means for people to seek and advertise local businesses, events (e.g., local art shows, gatherings), and services (e.g., bicycle wanted, lost object sought) the use of bulletin boards have proved its significance on community information sharing, socializing, viewpoint advertising, and marketing the usage of Bulletin boards have been part of the fabric of the social space and it presents an informal, nonintrusive, and inexpensive medium for mass communication[1-4]. The popularity of online social networks (OSNs) such as Facebook, Google Plus and Twitter has greatly increased in recent years. OSNs have become important platforms for the dissemination of news, ideas, opinions, etc.

Though the bulletin board has proved useful and significant in our daily lives, it suffers from several drawbacks. It has limited spatial-temporal coverage. For example, fliers on bulletin boards might quickly be covered by new fliers and are mainly visible to passers-by. Fliers on a board are often cluttered and lack order, making it a laboring task for people to identify the information needed. Therefore, there would be benefits to augment paper-based boards with digital techniques to facilitate information sharing and retrieval. There have been several techniques devoted to address this. For example, digital displays lead to a transformation from paper fliers to digital contents, but its deployment and publishing cost is high, thus creating barriers to average content providers. Though barcodes or RFID tags connect paper fliers with the Internet. The link is often directed to proprietary websites and thus making it difficult to have an open and universal platform for public information sharing. Due to their complementary features and merits, in the near future, we envision a co-existence of varied public information exchange mediums (paper fliers, digital contents, barcode-tagged fliers, etc.) and an effective and practical way is, however, to build an overlay above them for public information gathering and sharing. The consensus is that we should bridge the gap between these physical-space objects and their cyberspace counterparts to facilitate public information sharing, i.e., enabling cross-space content transferring and sharing [5].

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With the recent surge of sensor-rich (e.g., accelerometer, GPS, camera, etc.) mobile phones and the prevalence of GPS-equipped cars, taxis, and buses, mobile crowd sensing (MCS) However, no existing method focuses on distributed public flier information collection and cross-space sharing. With the help online social networking sites we help the user to find a common place to search, share and retrieve their needs without moving from place to place and without navigating to different websites.

SCOPE

The main aim of this project is to focuses on distributed public flier information collection, enhance the cross-space transferring, intelligent tagging and pervasive sharing of distributed fliers.

Besides the public information sharing service developed, FlierMeet can nurture numerous novel applications, some of which are listed below.

1. **Community Memory**: The usage of FlierMeet provides a community repository or memory of postings that may be browsed when their public shows are expired. For instance, we can send a reminiscence message to local residents about the popular events in the past year
2. **Peer-Enhanced Marketing**: For commercial-related fliers, we can build an economic model that motivates reposting activities and facilitates ad dissemination. User preferences can be learned from their reposting behaviors, enabling target advertising
3. **Cross-Space Lifelong Activity Management**: Activities in our daily life often follow a generic lifecycle that contains several stages: activity initiation, activity running, and activity completion. The current system focuses on the activity initiation process, which addresses the challenges on activity information advertising. Following the suggestions obtained during the user study, we can also leverage MCS to record the running activity information and share crowdsourced activity summaries after activity completion. Therefore, a doubled offline-online interaction (activity flier reposting, running activity recording and sharing) application will be developed, which allows lifelong crowdsourced activity management
4. **Pervasive Usage:** Since we are using online social networking sites to improve the efficiency, we develop it as a mobile application having its own timeline. Thus all the information needed are obtained in a single pervasive environment, making it easy for the users

EXISTING SYSTEM

1. **Bulletin Board:**The bulletin board has proved useful and significant in our daily lives. It is a traditional way of sharing information through a board on any public space. All it needs is a pen and sticky note which makes it cheap and easy to use. It doesn't have any structured rules to be followed. It is the most informal of sharing the information [6].
   It suffers from several drawbacks like limited spatial-temporal coverage. For example, fliers on bulletin boards might quickly be covered by new fliers and are mainly visible to passers-by. Fliers on a board are often cluttered and lack order, making it a laboring task for people to identify the information needed.
2. **Digital Displays:** Digital display leads to benefit of augment paper-based boards with digital techniques to facilitate information sharing and retrieval. Digital display leads to a transformation from paper fliers to digital contents. Here the information appears one after the other making it systematic and readable. But this limits the information shown at a point of time. It suffers from the drawback of hiding information from the viewers. There have been several techniques devoted to address this. For example, digital displays lead to a transformation from paper fliers to digital contents, but its deployment and publishing cost is high, thus creating barriers to average content providers [7].
3. **Bar codes/ RFID tags:** The barcodes or RFID tags used to connect paper fliers with the internet connecting to proprietary websites but with a backdrop. Trying to give a more specific & detailed view of the flier we get disconnected from the universal platform for public information sharing. Due to their complementary features & merits, in the near future, we envision a co-existence of gathering & sharing. The consensus is that we should bridge the gap between these physical space objects & cyberspace counterparts [8-10].

PROBLEM DEFINITION

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***Limited spatial-temporal coverage fliers**:* The flier boards are fixed to a particular point of place, thus making it reachable only to the passers-by. This takes advantage of the movement of people. Thus people are look out information, a cumbersome process within, instead of the information reaching the user directly.

***Cost is high**:* Setting digital displays & using bar codes & RFID tags makes it construction complex which directly influences the price of the system. The alternative used must be efficient enough & at the same time economical in nature.

***Existing Gap between physical and cyberspace*:** These systems proposed earlier have a gap that exists between physical space objects & their cyberspace. This decreases efficiency in information sharing to public which directly affects the cross space content transferring and sharing.

***Incentives**:* To male FlierMeet a success, we should have numerous participants who are willing to share data. Since, it costs computational & communication resources for data capture & publicizing, how to motivate users to participate is challenging. Interest &reputation can be motivations but further mechanisms are needed. There are three stakeholders in the system: flier publishers, re-posters & publishers want to disseminate their information among a wide range of community & they are willing to pay to be well-informed re-posters.

***User Privacy**:* Privacy is a major concern of crowd sensing system, since user locations, references & activity patterns can be revealed. This issue is alleviated in FlierMeet since data is captured in participatory manner & user can control their data.

Outdated: The temporal scope of flier vary with some of them are only relevant for a short period while others offer content that has ongoing relevance. Because of the presence of outdated materials, it is sometimes hard to tell what is still relevant and useful.

PROPOSED SYSTEM

We propose FlierMeet- An extension to online social networking (OSNs) site to provide efficient public information sharing. The FlierMeet system enables cross-space transferring which is used to build the connection between mobile clients & the back end server. Here the user can capture interested fliers & transmit them to back end server. This component is also to support the detection & location of bulletin boards. This also enables intelligent tagging to facilitate public information sharing retrieval which has two implementation phase. First we need to extract the text from flier images & for that we use optical character recognition (OCR). The second steps involve detecting fuzzy words & non-word characters in the extracted text, pre-processing is conducted using regular expressions & dictionary(Medinet) search & then we employ Natural Language Processing(NLP) for category tagging. We also enable pervasive sharing of distributed fliers. We leverage crowd sourced i.e. Taking a picture of the flier, to re-post fliers from physical space to cyberspace. Context sensitive approaches are proposed to group the distributed crowd sourced re-posts & evaluate their quality for data selection. The clustered re-posts groups are further processed to predict their category e.g. sales or recruitment activity, and semantic e.g., is it widely noted, does it meet my preference tags based on the features extracted from crowd-flier interaction. The system can be applied to a variety of application areas, such as public information collection and sharing, targeted advertising, mobile socializing, and so on. Specifically, our work makes the following research contributions: Develops a mobile platform for participatory public information reposting, intelligent tagging and sharing. This system is now extended to online social networking sites where it has its own timeline, posts, shares, viewers, posters, etc. Here we bringing everything in a single environment which makes viewing, sharing & retrieving easier. The posts are grouped in timeline based on the flier grouping done using STA algorithm. This enables to have a structured view.

SYSTEM ARCHITECTURE

The system architecture of FlierMeet has its major components such as explained below sections.

Cross Space Transferring

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In this module, Cross-space reposting builds the connection between mobile clients and the backend server. Using the application running at the mobile clients, users can capture interesting fliers from bulletin boards and transmit them to the backend server. Since prior knowledge about boards is often not available, this component also supports the detection and location of bulletin boards based on crowd reposting behaviors.

Flier Grouping

This module clusters fliers with duplicate reposts from different re posters into flier groups. A context-sensitive approach is proposed to improve group performance by repost grouping and high-quality repost selection, using a set of contexts such as spatio-temporal constraints, flier publishing behaviors, reposting behavior associated contexts (e.g., GPS Position) and so on.

Data Selection

FlierMeet chooses the best view of a flier in a flier group, which can be used for flier grouping and result display. The challenge is to design heuristics that can achieve reliable elimination and leave good candidates.

Intelligent Tagging

Category tags are categorized based on content analysis, and semantic tags are predicted using the features extracted from crowd-flier interaction.

User Interface

It displays the extracted information to users in a Multi view manner, e.g., browsing by categories or semantic tags.

Integration with Social Networks

The application gives the user the option to share the flier detail on social networking sites for wide range of recipient for the information. When the user selects the option of social networks, he/she either selects to share among friends on the site to the public as a whole. Along with the scope of sharing of flier, the user can add user-defined user tags along with the semantic tags and post it on the networking site. The flier posted can be liked, disliked and even commented upon on according to the user needs on their own networking site, making the use ease. These updates over the flier can be viewed in the “flier map view” option in the app, where the fliers can be searched location and tag accordingly as per information obtained with details of it.

In our implementation, we have hosted our own social networking site, similar to the widely used ones, from the local server. With suitable number of accounts on the social networking site, we chose all or few among it in friend list for sharing our fliers and getting response through the information shared.

Pervasive Environment

We are extending the flier sharing and reposting system to online social networking (OSN) site by developing it as a mobile application having its own flier timeline to view the user’s timeline in chronological order. This way the system is used for information sharing in a pervasive environment to access from anywhere and anytime.

ARCHITECTURE DESCRIPTION

The architecture of flier meet system has three major components:

CLIENT: Which consists of a mobile phone and allow operations like user registration, login, capture flier, flier timeline, map view, sharing and reposting. All these involves the client side operations.

SERVER: The server side consists of Fliermeet server, grouping and intelligent tagging and a database. Updating, storing and processing requests are carried out in the server side.

FLIERMEET SERVER: This is the processing unit of the Fliermeet system which is connected to database and algorithms. This processes the algorithms according to the user needs by retrieving data from the database which is connected two ways. After processing the results are again updated to the database. The database holds updated value from the server.

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DATABASE: The database of the FlierMeet consists of all data such as the user information, credentials of the user, flier images, locations, groups, dictionary, posts, etc. All these are regularly updated by the operation updated by the operation carried out in the server which is the only input for database.

ALGORITHM: It contains the algorithms or steps used to carry out the process demanded. This is done by FlierMeet server, which retrieves necessary input data for the algorithm to lead the desired results. The appropriate algorithms are selected like grouping & intelligent tagging according to the need.

WEB SERVICES: Web services acts as the interface for the client & server communication which integrates the client request & server response. This decides where to send which process thus obtaining accurate results as needed.

WORKING: The client should first register in the applications which will be evaluated by the web service.
If already exiting user, then they can simply login using username and password. After a successful login, the user can capture flier which is against sent to web services, where the location, time and grouping is done and gets updated in the database.
The updated data is now posted in the flier timeline for public view. The flier timeline gives the map view of the post by retrieving location information from the database.
Then sharing the post or reposting is done accordingly to the user needs. This is again given to web services which updates the database.

MODULES

Our project, Fliermeet – an extension to online social networking sites (OSN) is made up of four modules. They are:

- Cross Space Transferring
- Flier Grouping
- Intelligent Tagging
- Flier Sharing. Reposting and Map view

MODULE DESCRIPTION

Cross Space Transferring

In this module, Cross-space reposting builds the connection between mobile clients and the backend server. Using the application running at the mobile clients, users can capture interesting fliers from bulletin boards and transmit them to the backend server. Since prior knowledge about boards is often not available, this component also supports the detection and location of bulletin boards based on crowd reposting behaviors.

Crowd-powered cross-space reposting is a novel method of public information collection. In this section we first describe the reposting infrastructure and then present the
flier grouping and selection methods.

Bulletin Boards detection: In FlierMeet, each repost is associated with a GPS point, which is captured during reposting at the mobile client side. Assuming that at a certain time t, there are n reposts in the system and the associated GPS points are

P ¼ fp1; p2; . . . ; png, and the detected board set is
B ¼ fb1; b2; . . . ; bmg. When a new repost from GPS point
pnþ1 arrives

- If the distance between pnþ1 and a board bj (0<j_m)

is within a given distance threshold (DisThres), the
new coordinate of board bj will be the midpoint of pi
and bj;

- _If the distances between pnþ1 and every board are all above DisThres, a new board bmþ1 is discovered andpnþ1 is set to the initial coordinate point of bmþ1.

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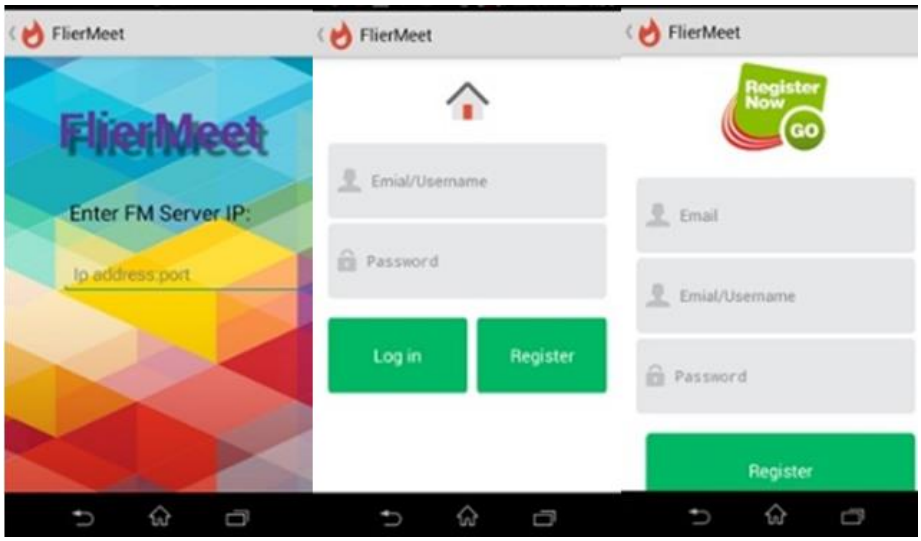

Fig. 1: The FlierMeet application interface for connecting to server from client side

Flier Grouping

This module clusters fliers with duplicate reposts from different re posters into flier groups. A context-sensitive approach is proposed to improve group performance by repost grouping and high-quality repost selection, using a set of contexts such as spatiotemporal constraints, flier publishing behaviors, reposting behavior associated contexts (e.g., GPS Position) and so on.

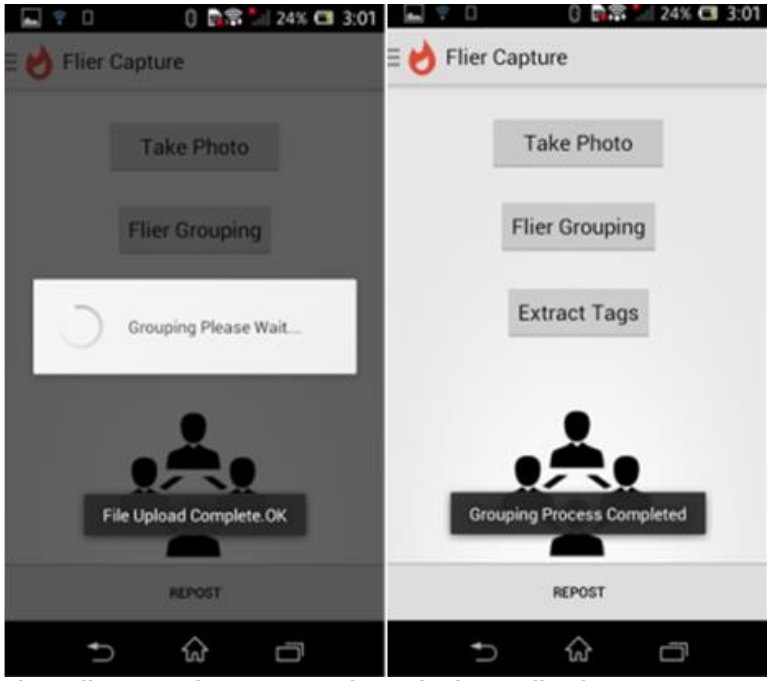

Fig 2.Flier Grouping process shown in the application

Similarity-Based Flier Grouping: The aim of flier grouping is to cluster similar reposts from different users. It can be framed as a near-duplicate (similar regions exist in two reposts) image detection problem. Grouping is challenging subject to two issues: (1) the reposts are transmitted to the server individually along the timeline, and thus dynamic clustering or matching should be conducted based on the new coming repost and existing records (in traditional clustering, the dataset is already there and thus it is not executed in a dynamic manner); (2) the

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high computational cost on duplicate repost matching (if the new repost and an existing repost in the server is duplicate),especially when the number of reposts is large. To achieve dynamic, resource- conserved flier grouping, we should limit the number of duplicate matches when a new repost comes (i.e., matching with a subset of existing reposts under certain constraints). The spatiotemporal-association (STA) based grouping algorithm is thus proposed.

Algorithm: The STA Grouping Algorithm

```
Input: New flier f
Output: group id gId for f
1:      bi ¼ GetBoard (f.gps)
2:      F ¼ GetFliers(bi, AgingThres)
        //F is the inner-board flier group set, ordered by flier
         groups' UpdateTime
3:       if MatchIn(F, f ,gId) then
4:         return gId;
5:       else
6:         B ¼ CRC(bi)
         //B is the board set found and ordered by CRC
7:         for each bi in B
8:           F ¼ GetFliers(bi, AgingThres)
              //F is the inter-board flier group set, ordered by
                flier groups' UpdateTime
9:           if MatchIn(F, f ,gId) then
10:            return gId;
11:          end if
12:        end for
13:     end if
14:     gId¼NewGroup(f)
15:     return
```

As illustrated in the above algorithm, STA will select the appropriate flier groups to match with. This is a filtering and ordering process based on spatiotemporal constraints and board associations, and f1 to f3 are selected accordingly. The selected flier groups are matched in order: f1has fliers coming from the same board (b1) as N, so the match happens first with f1; f2 and f3 come from the same associated board (b2), but because the Update Time of f2 is more recent, f2is placed ahead f3 in matching. Finally, f2 is matched with N.

Spatial Constraint

Spatial constraint is based on the fact that flier information is often related to local contexts (e.g., a school campus, a street block). We partition the city into 150 m_150 m region cells. When logging into the system, a user selects an interesting region, and only the reposts related to that region are displayed. It can significantly reduce the number of reposts to match with, considering that only the reposts within the same region of a new repost are matched for grouping.

Temporal Constraint

It is not needed to match a new repost with outdated reposts, but it is usually hard to recognize which of the validation time (e.g., the date of a workshop), most others do not. Nevertheless, it is known that information without attention for a period of time might be outdated or uninteresting. Therefore, in the current study, we introduce an aging factor called AgingThres (e.g., six hours or two days). The last update time of a flier group is defined as Update Time. A match process is triggered only when Eq. meets

CurrentTime _ UpdateTime < AgingThres

Match by Association

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We leverage the implicit association between fliers and boards to optimize the match order and the grouping performance. It is motivated by the fact that flier publishing behaviours often follow certain patterns. For example, due to the social preferences of boards, a certain type of flier is often posted in a similar set of boards within a social community. This implicitly reveals the logical connections among boards. We characterize the board-flier association at two levels

_ Inner-board association: Match within the flier group from current board.

_ Inter-board association: Match similar fliers from different boards.

Intelligent Tagging

This module chooses the best view of a flier in a flier group, which can be used for flier grouping and result display Flier category tagging is implemented in two steps. First, we need to extract the text from flier images. In this study, we use a commercial-grade optical character recognition (OCR) tool to recognize text.

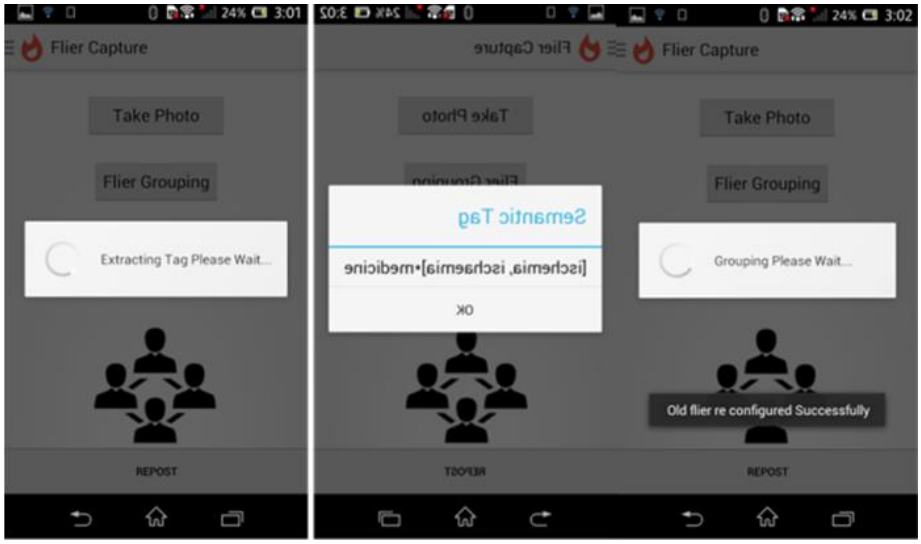

Fig.3 Extracting tags from the flier posted and re-posted

Since there will be fuzzy words and non-word characters in the extracted text, pre-processing is conducted using regular expressions and dictionary(Medinet) search and then we employ Natural Language Processing for category tagging.

Flier Sharing, Reposting and Map view

In this Module, if the 'Flier timeline' button is pressed, a list of recently published fliers (e.g., the last six hours) will be displayed in a time order. 'Flier map' allows users to view the fliers on the map. Users can choose among different category or semantic tags and browse by 'tag' on the map. If the user clicks a repost on the map, detailed information about that repost, including its re-posters and user comments, will be listed.

LITERATURE SURVEY

Mobile Crowd sensing: Current State and Future Challenges

An emerging category of devices at the edge of the Internet are consumer centric mobile sensing and computing devices, such as smartphones, music players, and in-vehicle sensors. These devices will fuel the evolution of the Internet of Things as they feed sensor data to the Internet at a societal scale. In this paper, we will examine a category of applications that we term mobile crowd sensing, where individuals with sensing and computing devices collectively share data and extract information to measure and map phenomena of common interest. We will present a brief overview of existing mobile crowd sensing applications, explain their unique characteristics, illustrate various research challenges and discuss possible solutions. Finally we argue the need for a unified architecture and envision the requirements it must satisfy.

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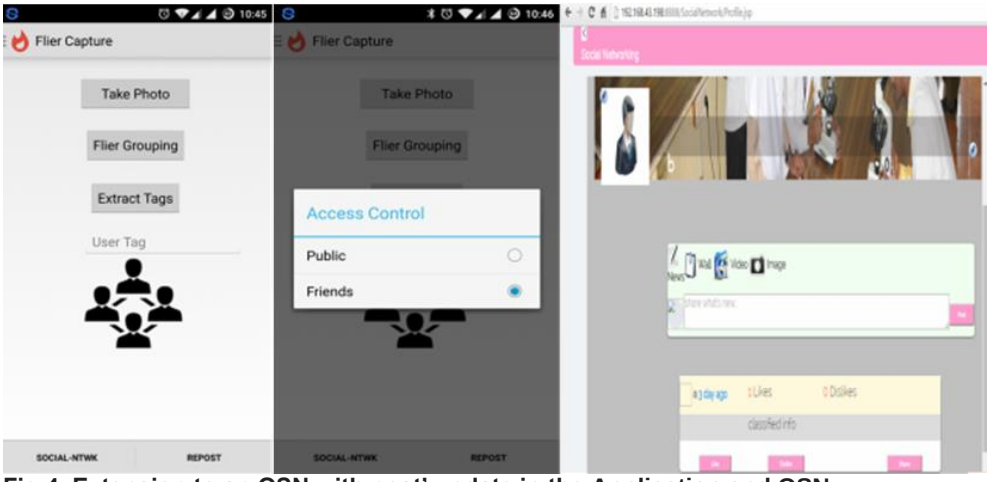

Fig.4. Extension to an OSN with post' update in the Application and OSN

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Supporting Mobile Service Usage through Physical Mobile Interaction

Although mobile services can be used ubiquitously, their employment and the interaction with them are still restricted by the constraints of mobile devices. In order to facilitate and leverage mobile interaction with services, we present a generic framework that combines Semantic Web Service technology and Physical Mobile Interaction. This interaction paradigm uses mobile devices to extract information from augmented physical objects and use it for a more intuitive and convenient invocation of associated services. For that purpose, the presented framework exploits Web Service descriptions for the automatic and dynamic generation of customizable user interfaces that support and facilitate Physical Mobile Interaction. This generic approach to mobile interaction with services through the interaction with physical objects promises to meet the complementary development of the Internet of Things. A user study with a prototype application for mobile ticketing confirms our concept and shows its limits

Free Market of Crowd sourcing: Incentive Mechanism Design for Mobile Sensing

Off-the-shelf smartphones have boosted large scale participatory sensing applications as they are equipped with various functional sensors, possess powerful computation and communication capabilities, and proliferate at a breathtaking pace. Yet the low participation level of smartphone users due to various resource consumptions, such as time and power, remains a hurdle that prevents the enjoyment brought by sensing applications. Recently, some researchers have done pioneer works in motivating users to contribute their resources by designing incentive mechanisms, which are able to provide certain rewards for participation. However, none of these works considered smartphone users' nature of opportunistically occurring in the area of interest. Specifically, for a general smartphone sensing application, the platform would distribute tasks to each user on her arrival and has to make an immediate decision according to the user's reply. To accommodate this general setting, we design three online incentive mechanisms, named TBA, TOIM and TOIMAD, based on online reverse auction. TBA is designed to pursue platform utility maximization, while TOIM and TOIM-AD achieve the crucial property of truthfulness. All mechanisms possess the desired properties of computational efficiency, individual rationality, and profitability. Besides, they are highly competitive compared to the optimal offline solution. The extensive simulation results reveal the impact of the key parameters and show good approximation to the state-of-the-art offline mechanism.

Image Quality Assessment: From Error Visibility to Structural Similarity

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Objective methods for assessing perceptual image quality have traditionally attempted to quantify the visibility of errors between a distorted image and a reference image using a variety of known properties of the human visual system. Under the assumption that human visual perception is highly adapted for extracting structural information from a scene, we introduce an alternative framework for quality assessment based on the degradation of structural information. As a specific example of this concept, we develop a Structural Similarity Index and demonstrate its promise through a set of intuitive examples, as well as comparison to both subjective ratings and state-of-the-art objective methods on a database of images compressed with JPEG and JPEG2000.1

The WEKA Data Mining Software: An Update

More than twelve years have elapsed since the first public release of WEKA. In that time, the software has been rewritten entirely from scratch, evolved substantially and now accompanies a text on data mining [35]. These days, WEKA enjoys widespread acceptance in both academia and business, has an active community, and has been downloaded more than 1.4 million times since being placed on Source- Forge in April 2000. This paper provides an introduction to the WEKA workbench, reviews the history of the project, and, in light of the recent 3.6 stable release, briefly discusses what has been added since the last stable version (Weka 3.4) released in 2003.

EXPERIMENTATION RESULTS

We also made a user study to test the usability of our system. To obtain manifold views and comments about our system, both data contributors (a total of 10) and new users (20) were invited to participate this study. They were asked to evaluate FlierMeet on its attractiveness (overall impression), prospect (the perspective and acceptability), and simplicity (is it easy to use) on the scale of 1 to 5. As shown in Fig. 13, the average scores to the three system properties were 3.8, 3.6, and 3.9, respectively. Overall, the results indicate that most people were excited about FlierMeet and felt that it was easy to use. Only slight differences can be found to the evaluation results from data contributors and new users, where the data contributors felt the simplicity of the system could be improved. We also asked for their comments about the improvement of the system and presented the representative ones below. As a cross-space application, it is important to link online reposts with offline activity participation, such as allowing people to express their willingness to attend the activity and allowing people to crowdsource the important and interesting moments of running activities associated with the repost. By having crowdsourced activity information, a comprehensive characterization of the activity can be obtained and shared. It is useful to develop a 'view by activity place' function, because many people are interested about the activity place, while not the flier posting place. This can be achieved by analyzing the text extracted using named-entity recognition techniques.

CONCLUSION

Thus our project flier meet – an extension to online social networking site has been successfully developed to focus on distributed public flier information collection, enhance the cross-space transferring, intelligent tagging and pervasive sharing of distributed fliers with the popularity of online social networks (OSNs) such as Facebook, Google Plus and Twitter has greatly increased in recent years, OSNs have become important platforms for the dissemination of news, ideas, opinions, etc.

CONFLICT OF INTEREST

The authors declare no conflict of interests.

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FINANCIAL DISCLOSURE

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