

## Design and Implementation of Collaboration Tourist Information System using Location-based SNS

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### Abstract.

Sharing context information on location-based tourist attractions help customize tourist information and reinforce the acquisition of other information. By referencing the information gained from visitors who already visited a site, various information on their location, their opinion, photos, essays, interactive media about the tourist destination and feedback on such information can be shared. This allows group visitors with the same purpose of visit to establish a collaborative model. This paper designed and implemented a collaborative tourist information system using location-based SNS. Individual users' experience is left in the database and replayed to promote more sharing and implementation of missions. This reinforces effective acquisition and reinforcement of the information.

**Keywords:** Location-based SNS, space information, LBS, collaborative model, cultural convergence, cultural content

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### 1 Introduction

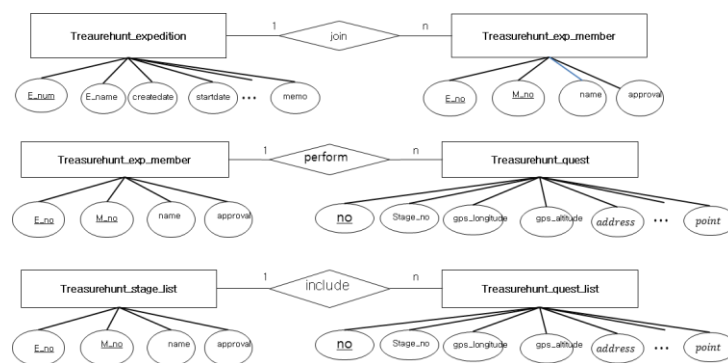
Space information that links the cyber space and real space is based on location-based communication, real-time information sharing and social participation. With SNS, new value is created from space information and processed for re-use[1][2]. The sharing of services and locations on social networking sites help form a common experience regardless of time and space, and thus has become an effective factor for promoting human relationships [3]. Location sharing and social media are observed to

maximize the effects of location-based social network if even one of the aspects are triggered from a relation-generating perspectives [4]. The maximized form of location information-sharing is the sharing of information on tourist destinations [5]. This ranges from the traditional method of information acquisition through offline information provided by the agent of tourist destination, such as maps, landmarks or guide posts, [6] to USN-based methods that are location-based and use QR, NFC, RFID sensors or GPS, Wi-Fi and BLE [7]. The sharing of location information or experience regarding services on social network is moving from simply sharing an individual's experience towards sharing context information to promote collaboration [8]. Such trends are again fed back into a sharing of experience regarding location and context to reinforce the function of sympathy on SNS [9].

This paper seeks to understand the process of acquiring tourist information through collaborative sharing of location and context-based information and to promote use of social media platforms as a way to reinforce the humanistic aspects of information and location-sharing. By suggesting and implementing this platform for social media networks, this paper seeks to verify the effectiveness.

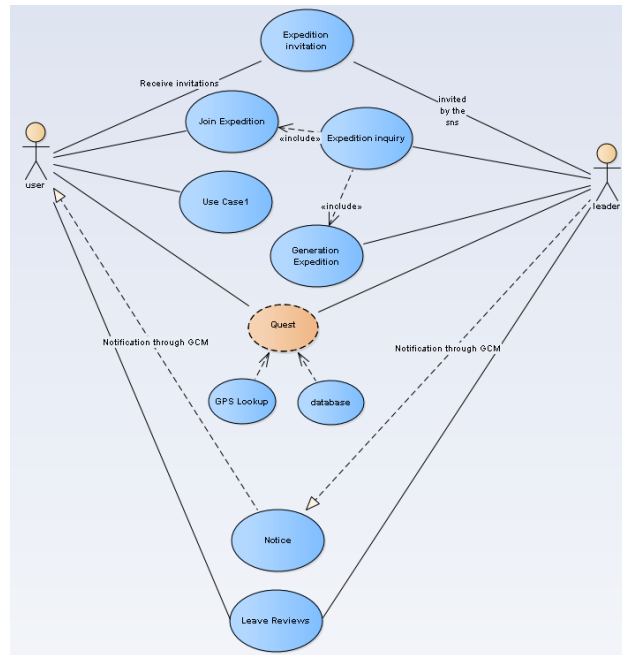
## 2 The design of a location-based collaborative tourist information system on SNS

One of the advantages of collaboration in acquiring or experiencing tourist information is that it helps drive a pre-determined mission rather than individual goals. By implementing missions through collaboration, we can expect the maximization of promotion effects for tourist resources and verification and reinforcement of acquired information. A collaborative mobile system was designed to enable site-based content development, quests for individual/collaborative missions, notification of goals through social networks for tourist information [10]. The following are major parts for the design of the data base to develop a location-based collaborative tourist system using SNS.



**Fig. 1. ER-Diagram for collaborative exploration**

The image below is a use case diagram for an expedition team.



**Fig. 2. Expedition Use Case Diagram**

The expedition team can receive new members or invite them through SNS. They organize an expedition team through SNS, and once formed, the head of the expedition team uses GCM (Google Cloud Messaging) to make notices to the members and carries out quests online or offline depending on the tourist destination. The quest determines whether the mission can be completed based on location information. The progress on the quest is saved in the DB to be used as material for the next mission or as history. Information gained through implementation of a quest can be left as posts on SNS to promote the sharing of stereotypical information, behind-the-scene stories and photos. This adds experiential factors by sharing other's experiences. The quest for collaborative tourism is done by each stage in the destination.

### 3 System implementation

Based on this composition of necessary information, the function for an application that provides collaborative tourist information include guides on the tourist destination, quest data management for each stage of the destination, the management of threshold value and GPS information for the quest and destination, organization of an expedition team and the management of individual or group history. The UI that composes the mobile integrated application for collaboration is made up of guidelines on tourist destinations, quest pages for each stage, organization of expedition teams for the organization of teams and management of history for individual or group quests. Expedition reviews are shared on boards or SNS so that tourist information is

shared. Image 3 shows the implementation screen of the expedition-related application. The head of the expedition team notifies his members through GCM and can either invite or receive new members into the team. Sudden events during quest implementation that can flip the situation also add fun. For collaborative projects, a messaging system helps with communication.



Fig. 3. Implemented application

Image 4 shows part of the communication and map-related application. By using the API of the map, a location notification is implemented through GPS information. Overlay factor-drawing tools of map API and the markers are added so that companies in alliance are added to the map and tourist information is shared through SNS or boards.

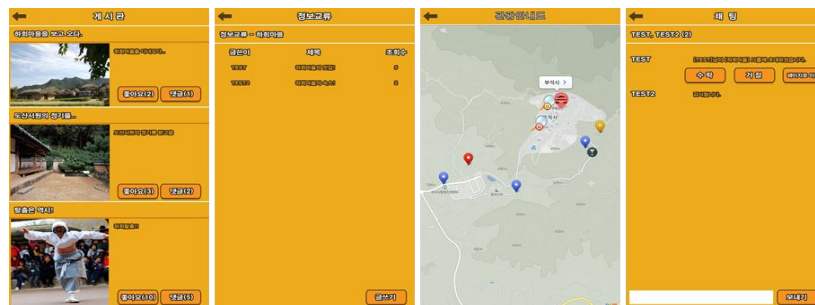


Fig. 4. Communications & map-related applications

Image 5 shows a part of the GPS-related program for mission implementation. When the location of the user comes into the threshold field, then it is checked whether the mission is implemented. If it has already been implemented, then the data base is renewed. If not, the quest is emitted as an alarm and whether the mission is implemented is added. The quest can be shown through automatic alarms based on GPS information, and quests can be carried out by using QR codes installed in specific locations. The QR code shows up as a mission when read by the QR reader in the app, but when read by a general reader, a description of the app is also added so that the app can be promoted.

```

gpsHandler.post(gpsRunnable = new Runnable() {
    @Override
    public void run() {
        String[][] gpsList = db.select_GpsList();
        for(int i = 0; i < gpsList.length; i++){
            if(getDistance(longitude, latitude) < Integer.valueOf(gpsList[i][4])){
                final String[][] questData = edb.accessHttpUrl("SELECT no, point, stage_no FROM treasurehunt_quest_list WHERE no = '"+gpsList[
                i][0]+"");
                edb.accessHttpUrl("IF NOT EXISTS (SELECT no FROM treasurehunt_quest_history WHERE user_no = '"+(App)getApplication().
                getUserNo()+"' AND quest_no = '"+gpsList[i][0]+"') INSERT INTO treasurehunt_quest_history (user_no, quest_no, state, answer,
                point, time) VALUES ('"+(App)getApplication().getUserNo()+"', '"+gpsList[i][0]+"', '1', '', '"+questData[0][1]+"',
                DATE_FORMAT(now(),GET_FORMAT(DATETIME,'ISO')) ELSE UPDATE treasurehunt_quest_history SET state = '1', answer = '', point = '"
                +questData[0][1]+"', time = DATE_FORMAT(now(),GET_FORMAT(DATETIME,'ISO')) WHERE user_no = '"+(App)getApplication().
                getUserNo()+"' && quest_no = '"+gpsList[i][0]+"");
                db.delete_GpsList(gpsList[i][0]);
                regNoti(gpsList[i][0], questData[0][2]);
            }
        }
    }
});
private int getDistance(double longitude, double latitude){
    Location myLocation = new Location("my Location");
    myLocation.setLongitude(longitude);
    myLocation.setLatitude(latitude);
    Location targetLocation = new Location("target Location");
    targetLocation.setLongitude(Double.valueOf(gpsList[i][2]));
    targetLocation.setLatitude(Double.valueOf(gpsList[i][3]));

    int distance = Math.round(myLocation.distanceTo(targetLocation));
    return distance;
}

```

**Fig. 5. Some GPS-related major programs**

#### 4 Conclusion

Tourist information is acquired not just with general information, but by referencing the information of those who had already visited the site to provide more various forms of information. Objective information on the tourist site is managed in the data base and the opinion, photos, essays or interactive media of past visitors are shared to provide feedback. By doing so, information and experience can be gained based on other's experience. Knowledge, hidden stories, history and fun aspects of the tourist destination can also be added to the general information for a more effective experience of cultural content.

By managing shared tourist information in the data base, future visitors can be provided with information. Moreover, if data are provided to allow collaborative quests for group visitors, more proactive acquisition of information that goes beyond time and space constraints can also be possible. To that end, this paper researched and developed a location-based collaborative tourist information system using SNS. Individual users store their experience as part of the data base and replay it to share even more information or to carry out missions. This helps with effective acquisition of information and reinforcement of such information.

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