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Ad-Hoc Group Formation/Detection for Better Shopping Experience

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***Abstract*— This research is a conceptual analysis of application of Sensors, Mobiles and Social Network for real world usage scenarios impacting our quality of life and lifestyle. This paper presents enhancing a person or group's shopping experience in store powered by integration of mobiles, sensors and social network. Group formation/detection and matching profiles for better shopping experience.**

***Index Terms*:—Wireless Sensor Network, Personal Sensor Network, Social Network, Group Detection/Formation**

I. INTRODUCTION

Personal Sensor Network in a sense is a miniature form of a WSN related to a person and activities of that person that are of interest from a monitoring and management viewpoint. Typical PSN are monitoring vital signs for health, monitoring home appliances, temperature, automobiles, using proximity sensor to ensure that people don't lose their belongings etc. In this case the sensors are providing feedback to the person using the sensors [1][2]. Also, a completely new set of services are possible because Sensors around the person will provide many inputs in setting the context of person at the time, coupled with the Internet that enables the person to share the data to other Nodes in the network that wish to use the data for adding more value to person's life. This document focuses on these aspects to describe various uses of such a network, the challenges thereof for adaptation in real-world scenarios [3] [4].

Since people spend more hours on the social network, profiles can be mined using the stated profile, usage patterns, group patterns and many more. It is possible for individuals and marketers to get benefited from the information, provided the privacy and data security concerns are addressed [9]. We believe that meshing of these affordable sensors, computing capabilities of the mobile and relevant user and the group's profile data available in the Social network that can be securely accessed by the mobile and processed for delivering services tailored for users or group's preferences [7]. The application of enhanced shopping, using social data is applicable to groups too. When a bunch of friends go together for shopping to a store, a shopping application may detect the group and determine the group's preferences.

II. AIMS AND OBJECTIVES

A revolution in communication has been ushered in towards the end of the last century and it has given birth to a wide range of technologies been it the Internet, affordable computer, and off course the ubiquitous mobile phone.

- The objective of the research is to explore this paradigm of mobile device, Internet and sensor and identifying how the trio can improve our life in this complex world.
- With mobile phone internet, has proved desktop computer may have less future. User can surf, locate maps and make purchases online too.
- The convergence of the Internet and Mobile device and services to be created on those platforms.
- People routinely ignore or forget his requirements or family requirements or he may be not able to satisfy friends requirements due to lack of time.
- The technology (sixth sense)could not only help perceive the world around us better, but also use the technology to make decisions on the events and information we perceive.
- Group detection engine detected the location of an individual and detects who are around him/her.
- Shopping Assistant on the mobile communicates with social network and matches groups or an individual preferences .

Every person and business is now looking to develop profiles on social networking. However, there are certain technical features about setting up a business or personal presence on Social Networks. Social Networks are evolving to accommodate business pages and individual profiles. Some Social Network like Facebook has made a clear distinction between profiles and pages. The bottom line is profiles are now only for individuals and pages are for business. Profiles have different features:

- Access to the individual profile pages is limited.
- Individual profiles allow the ability to invite friends.
- Individual profile allow updating your status (which gets shared with your friends)

All personal sites feature, such as making friends and messaging, are also for personal use only and may not be used for professional promotion. If you add a user as a friend, for example, this person will be invited to be a friend of your profile. Using personal site features for professional promotion, or creating unauthorized Pages, may result in your account being warned or disabled. Students or employees build personal profiles, form groups, send status updates, and share information openly.

First application of this tailor made proposed system contacts the social network that is face book and gets friends profile and secondly this our system detects those friends

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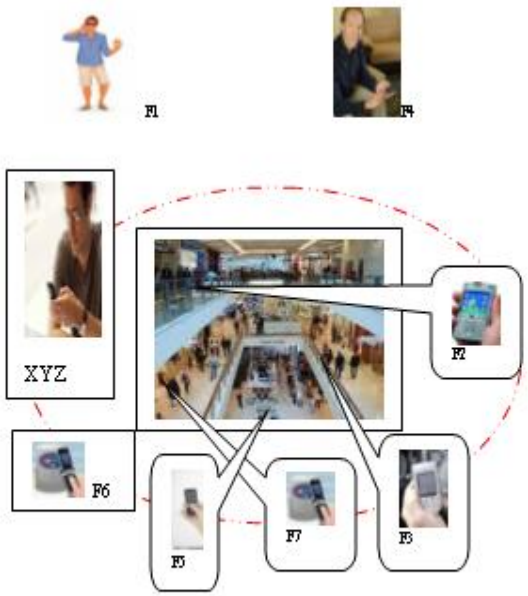
location who are around him/her using GPS. Third step is to detecting group and retrieves social friend's profile through social network.

Ad-hoc Group Detection / Formation:

In the context of a group of people shopping together, it is first necessary to identify the group. The dynamic identification of a group can be done by using GPS and many schemes have been suggested for this. In this specific context, the group detection can be much more simplified as the mobile with a person is capable of computation as it has the necessary sensor and connectivity for social network to determine the group. Mobile device logged onto the social networking can either query the locations of the friends or ask the social network to identify the friends near its current location. In this case, the mobile device queries only locations, a simple location and movement together can be used to detect the group. The model can be extended to include multiple social networks.

Consider the scenario in (Fig. 4.1) Mr. XYZ is a person and his mobile is enabled with GPS location sensor, internet, social network and proximity sensors or Near Field Communication (NFC) devices like Bluetooth, RFID or Wi-Fi. Mr. XYZ wants to present a valuable gift to his girl friend, a gift that would be of interest to her or of her preference. Since her profile is available on social network i.e. Facebook, Twitter or Orkut, he knows of her interests or preferences. Before he buys a gift article, he wants to take some one's opinion or group of friends' opinion regarding the product, so he wants to locate his friends who are around him. His mobile social network has detected so many friends, some are moving in and around the shop and some others are not. In the picture, GPS has determined F1 and F4 are not in the group and rests of others are in the group.



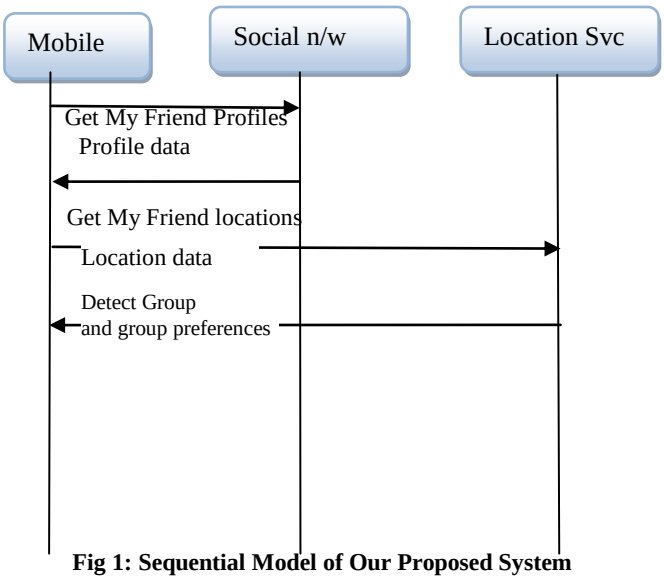


Fig 1: Sequential Model of Our Proposed System

III. IMPLEMENTATION

Detecting location of mobile PC and detecting group is very important. The above said code successfully locates the location of mobile PC. To detect the location of the mobile computer we have used predefined equation. Equation calculates latitude and longitude and represents it in graphically [8]. Code detects user's location.

```
var myRadius = 500; // Meters
    var startPos;
      window.onload = function() {
        if (navigator.geolocation) {

  navigator.geolocation.getCurrentPosit
ion(function(position) {
            startPos = position;

document.getElementById("startLat").in
nerHTML = startPos.coords.latitude;

document.getElementById("startLon").in
nerHTML = startPos.coords.longitude;
          }, function(error) {
              alert("Error occurred.
Error code: " + error.code);
        });        }
      }
   function calculateDistance(lat1,
lon1, lat2, lon2) {
        var R = 6371; // km
        var dLat = (lat2-
lat1).toRad();
        var dLon = (lon2-
lon1).toRad();
        var a = Math.sin(dLat/2) *
Math.sin(dLat/2) +
                Math.cos(lat1.toRad())
* Math.cos(lat2.toRad()) *
```

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Output is shown below:

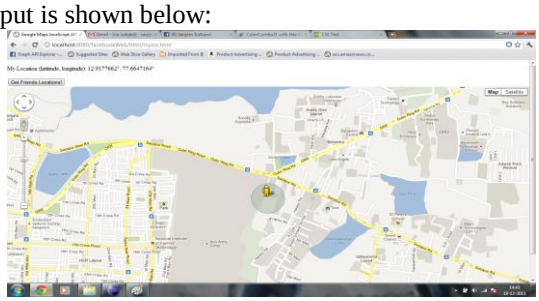

Fig. 2: Location of the user

Code for Detecting Group:

```
    function getFriendsLocation () {
        var xmlhttp;

      if (window.XMLHttpRequest) {
        // code for IE7+, Firefox,
Chrome, Opera, Safari
        xmlhttp = new
XMLHttpRequest();

      } else {
        // code for IE6, IE5
        xmlhttp = new
ActiveXObject("Microsoft.XMLHTTP");
      }
      xmlhttp.onreadystatechange =
function() {
        if (xmlhttp.readyState == 4
&& xmlhttp.status == 200) {

  friendsLocationJSON = eval('(' +
xmlhttp.responseText + ')');

        var i=0;
          for (i=0; i <= 100; i++ )
{
          var friendId =
friendsLocationJSON.locations[i].Id
;
          if (friendId == null)
              break;


(friendsLocationJSON.locations[i].l
attitude + ", " +
friendsLocationJSON.locations[i].lo
ngitude);
              var frndLat =
Number(friendsLocationJSON.location
s[i].lattitude);

            var frndLongitude =
Number(friendsLocationJSON.location
s[i].longitude);

            var distance =
calculateDistance(startPos.coords.l
atitude, startPos.coords.longitude,
                frndLat,
frndLongitude);
```

```
if (distance < (myRadius/1000)) {
var idx;
  for (idx=0; idx <100; idx++) {
    var chkBoxElem =
document.getElementById('myfriend'+
idx);
      if (chkBoxElem == null)
        break;
        var id1 = chkBoxElem.value;
          if (id1 == friendId) {
         var fName =
document.getElementById(friendId).v
alue;
    alert ("Friend Detected in
group: " + fName + " ID=" +
friendId);

  chkBoxElem.checked=true;
        break;
          }
        }

      }
      xmlhttp.open("GET",
"/facebookWeb/data/geo_data.json?da
te='new Date().getTime()'", true);
      xmlhttp.send();
    }
```

Above code generates group detection, after detecting the location of smart phone or mobile PC, first we have to find out who are around us and how many friends are in the given range, if they in the given range then we say they in the group. The above code represents group graphically as well as it gives the data representation. Whose name is checked, it is assumed that they are in the group. Output of above code is shown below:

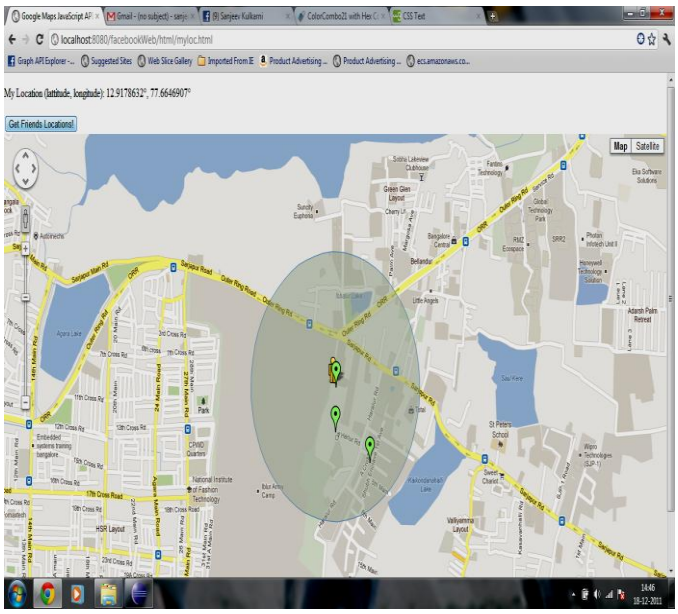

Fig. 3: Graphical representation of group detection

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Fig. 4: Group Detection

Since user's profile is available in the social network, the profile can be used to enhance shopping application, after detecting group, next step is profile retrieval and matching. The above code explains how the profile of friends is matches. This application is able to access profiles of each member who is in the group and displays it on the smart phone or mobile PC.

Whoz That:

WhozThat achieves this vision of seamless social interaction through MoSoNet technology by implementing a basic two step protocol that first shares identities between any two nearby cellular smart phones (e.g., via Bluetooth or WiFi) and then consults an online social network with the identity to import the relevant social context into the local context to enrich local human interaction [4].

SocialFusion:

Social-Fusion is a system of collecting and managing the input data. As mentioned, the system collects mobile data from users' mobile devices, sensor data from static sensor networks and social networking data from online sites. There are a number of difficulties that need to be overcome to collect this data in an efficient manner. To collect data from users' mobile devices, a mobile application needs to be built that can identify the user's location and the phone's sensor values and pass on that information to Social Fusion [3].

Comparison Table:

	WhoZ That & Social Fusion	Our Proposed Solution
Group detection	Server can detect the group provided the location updates are available. It uses fuzzy algorithms collating location sensor and social data to do group detection. However, this requires that location has to be updated on the server thus leading to leakage of location data to a third party [2][4].	In our proposed project, group detection is done on the mobile. In social networking user's identity is more important. Since, mobile is being inter-mediatory device identification of the user is anonymised.

IV. Conclusion

In this work we have shown how mobile, sensors and social data can be fused together on-demand to enhance a class of applications that can benefit from matching an individual/groups needs with In-store shopping as a specific example. In this, we have presented that Mobile as an intermediary device for fusing Social Network's profile and an individual or group's profile with the help of sensors for effective shopping. Mobile device of the individual or an individual in the group can retrieve the profile and refers information from one or more social networks.

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