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ESTIMATION OF SPATIAL DENSITY USING BLUETOOTH SAMPLING

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Abstract:

Mobile computing is one of upcoming technologies with different models and methods. In wireless we have a lot of efficient technologies that are improved a lot day by day. In mobile communication they had implement different sensors for roaming device to watch map and play games multi touch etc. In this project we are trying to find spatial density of people with the help of Bluetooth radiation, which may be of big help in finding various applications in various fields. For example, in the field of urban analysis, estimating spatial density is important to create evacuation plan, to plan a new location for department store, business people can use it to find the flow of people crowd and calculate and start their business accordingly. The spatial density of population is measure of people present in different location within an area of interest. This process takes place with the help of probes; probes may be of any form, example mobile, person, cameras etc. If the total population of the area of the interest is known, then the non monitored density can be found by minus the number of spatial density in monitored area. However, if the population size is unknown then estimating spatial density becomes more challenging as people present in non monitored area is unknown, and here is where pattern-likelihood maximization and sequence probability estimation is implemented.

Index Terms: Population Size and Density Estimation, Opportunistic Sampling & Bluetooth Sampling

1. Introduction:

The foundation of our Bluetooth based spatial Density using blue tooth sampling technique is based on the general observation that many people have the Bluetooth transceivers of their mobile phone in the discoverable mode as default setting. The other data sets were collected for different purposes, such as inertial navigation and activity recognition. However all data sets include regular Bluetooth scans collected over periods of days by several volunteers walking through the area of the specific event during times of different crowd density. It can be seen that the median of the number of devices discovered per scan is between 8 and 13 with thousands of distinct devices having been recognized over the course of each experiment. This scenario shows that only less than 10% of the scans returned no discoverable devices and up to 50 devices were seen when in dense crowd.

We observed that most discoverable Bluetooth devices are smart phones and cell phones mostly manufactured by Samsung, Nokia and Sony Ericsson. While in a dense crowd with a few hundred people we may get a representative sample, in less crowded areas we are likely to see very strong variations between samples. Assuming the probability of any single user having a discoverable Bluetooth device to be 10% the probability that no device is seen when 20 people are within range is 0.9 20 = 0.12. Thus we may sometimes be in a group of people who do not even have activated mobile phones, while at other times we may be surrounded by a group where everyone has an active Bluetooth device for their details updation on common cloud storage system.

2. Related Work:

Most of the systems used where RFID tags, surveillance cameras, help from GSM operators etc. Another existing system where using manual work like giving printed tickets and counting the crowd in person. All the above systems need some sort of investment and permissions of some type.

Purpose System:

In the proposed system we implement Bluetooth which is found mostly in all phones commonly nowadays. It has no investment cost. In day today basis average men keep their Bluetooth activated on their phone accordingly to the areas of presence. Basic statistics is that at airport 12% of people keep Bluetooth discoverable, 17% at college campus, 9% of general crowd in most places and depends accordingly.

Feasibility Report:

Preliminary investigation examine project feasibility, the likelihood the system will be useful to the organization. The main objective of the feasibility study is to test the Technical, Operational and Economical feasibility for adding new modules and debugging old running system. All system is feasible if they are unlimited resources and infinite time. There are aspects in the feasibility study portion of the preliminary investigation:

A. Technical Feasibility:

The technical issue usually raised during the feasibility stage of the investigation includes the following:

- ✓ Does the necessary technology exist to do what is suggested?
- ✓ Do the proposed equipment's have the technical capacity to hold the data required to use the new system?
- ✓ Will the proposed system provide adequate response to inquiries, regardless of the number or location of users?
- ✓ Can the system be upgraded if developed?
- ✓ Are there technical guarantees of accuracy, reliability, ease of access and data security?

Earlier no system existed to cater to the needs of 'Secure Infrastructure Implementation System'. The current system developed is technically feasible. It is a browser based user interface for audit workflow. Thus it provides an easy access to the users. The database's purpose is to create, establish and maintain a workflow among various entities in order to facilitate all concerned users in their various capacities or roles. Permission to the users would be granted based on the roles specified. Therefore, it provides the technical guarantee of accuracy, reliability and security. The software and hard requirements for the development of this project are not many and are already available or are available as free as open source. The work for the project is done with the current equipment and existing software technology. Necessary bandwidth exists for providing a fast feedback to the users irrespective of the number of users using the system.

B. Operation Feasibility:

The analyst considers the extent the proposed system will fulfill his departments. That is whether the proposed system covers all aspects of the working system and whether it has considerable improvements. We have found that the proposed "Secure transaction" will certainly have considerable improvements over the existing system.

C. Economic Feasibility:

The proposed system is economically feasible because the cost involved in purchasing the hardware and the software are within approachable. Working in this

system need not required a highly qualified professional. The operating-environment costs are marginal. The less time involved also helped in its economic feasibility.

System Design:

Software design sits at the technical kernel of the software engineering process and is applied regardless of the development paradigm and area of application. Design is the first step in the development phase for any engineered product or system. The designer's goal is to produce a model or representation of an entity that will later be built. Beginning, once system requirement have been specified and analyzed, system design is the first of the three technical activities -design, code and test that is required to build and verify software.

The importance can be stated with a single word "Quality". Design is the place where quality is fostered in software development. Design provides us with representations of software that can assess for quality. Design is the only way that we can accurately translate a customer's view into a finished software product or system. Software design serves as a foundation for all the software engineering steps that follow. Without a strong design we risk building an unstable system – one that will be difficult to test, one whose quality cannot be assessed until the last stage.

During design, progressive refinement of data structure, program structure, and procedural details are developed reviewed and documented. System design can be viewed from either technical or project management perspective. From the technical point of view, design is comprised of four activities – architectural design, data structure design, interface design and procedural design.

Normalization:

It is a process of converting a relation to a standard form. The process is used to handle the problems that can arise due to data redundancy i.e. repetition of data in the database, maintain data integrity as well as handling problems that can arise due to insertion, Updating, deletion anomalies.

- ✓ **Insertion Anomaly:** Inability to add data to the database due to absence of other data.
- ✓ **Deletion Anomaly:** Unintended loss of data due to deletion of other data.
- ✓ **Update Anomaly:** Data inconsistency resulting from data redundancy and partial update
- ✓ **Normal Forms:** These are the rules for structuring relations that eliminate anomalies.

First Normal Form:

A relation is said to be in first normal form if the values in the relation are atomic for every attribute in the relation. By this we mean simply that no attribute value can be a set of values or, as it is sometimes expressed, a repeating group.

Second Normal Form:

A relation is said to be in second Normal form is it is in first normal form and it should satisfy any one of the following rules.

- ✓ Primary key is a not a composite primary key
- ✓ No non key attributes are present
- ✓ Every non key attribute is fully functionally dependent on full set of primary key.

Third Normal Form:

A relation is said to be in third normal form if their exits no transitive dependencies.

Transitive Dependency: If two non-key attributes depend on each other as well as on the primary key then they are said to be transitively dependent. The above normalization principles were applied to decompose the data in multiple tables thereby making the data to be maintained in a consistent state.

3. System Architecture:

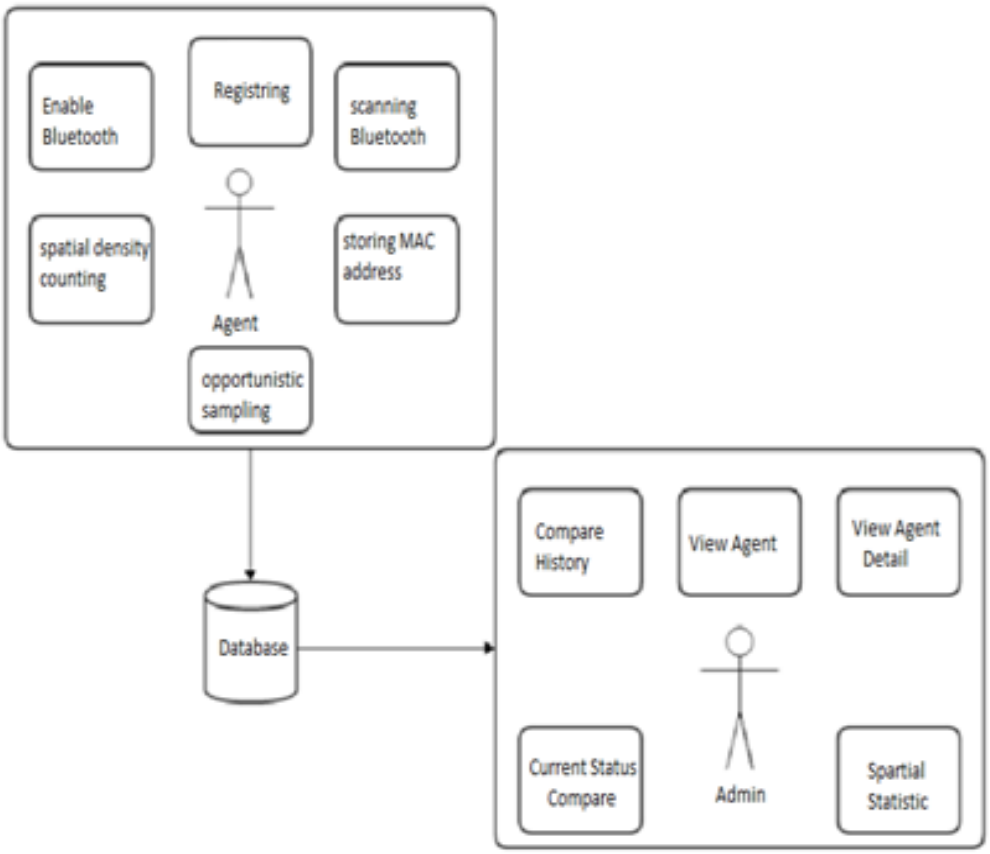

Figure 1: Data Flow Diagram

4. E – R Diagrams:

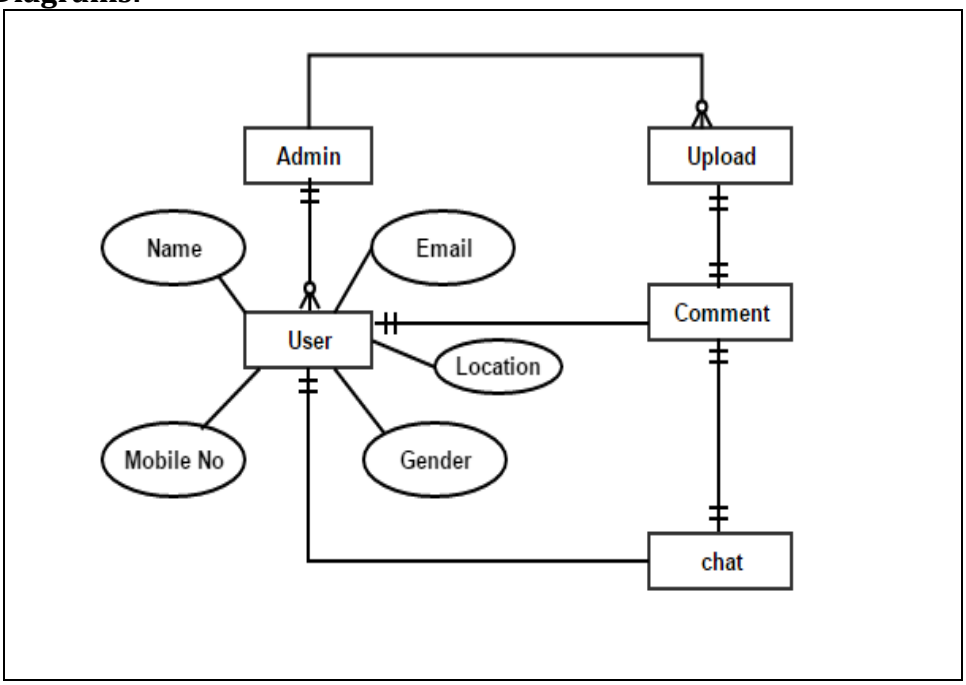

Figure 2: E-R Diagram

- ✓ The relation upon the system is structure through a conceptual ER-Diagram, which not only specifics the existential entities but also the standard relations through which the system exists and the cardinalities that are necessary for the system state to continue.
- ✓ The Entity Relationship Diagram (ERD) depicts the relationship between the data objects. The ERD is the notation that is used to conduct the date modeling activity the attributes of each data object noted is the ERD can be described resign a data object descriptions.
- ✓ The set of primary components that are identified by the ERD are
    - Data object
    - Relationships
    - Attributes
    - Various types of indicators.

The primary purpose of the ERD is to represent data objects and their relationships.

5. Flow Diagrams:

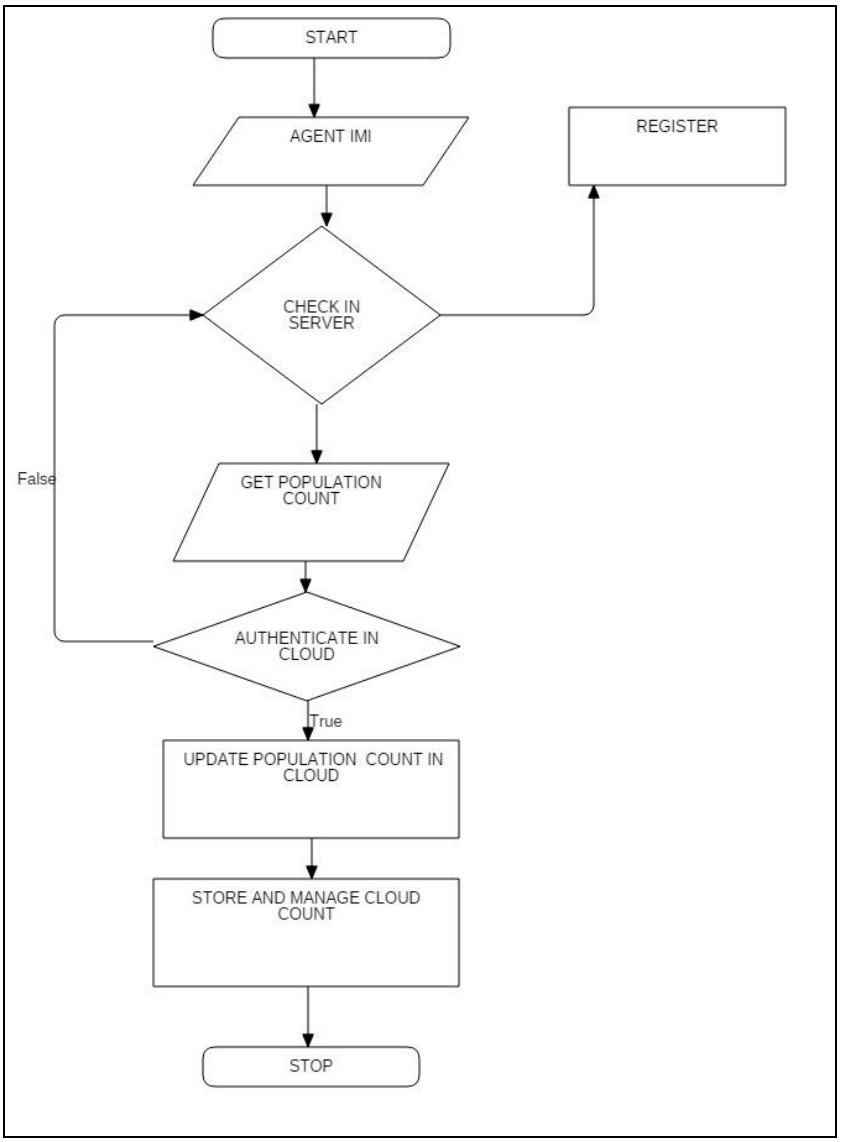

Figure 3: Data Flow Diagram

A data flow diagram is graphical tool used to describe and analyze movement of data through a system. These are the central tool and the basis from which the other

components are developed. The transformation of data from input to output, through processed, may be described logically and independently of physical components associated with the system. These are known as the logical data flow diagrams. The physical data flow diagrams show the actual implements and movement of data between people, departments and workstations. A full description of a system actually consists of a set of data flow diagrams. Using two familiar notations Yourdon, Gane and Sarson notation develops the data flow diagrams. Each component in a DFD is labeled with a descriptive name. Process is further identified with a number that will be used for identification purpose. The development of DFD'S is done in several levels. Each process in lower level diagrams can be broken down into a more detailed DFD in the next level. The lop-level diagram is often called context diagram. It consist a single process bit, which plays vital role in studying the current system. The process in the context level diagram is exploded into other process at the first level DFD.

The idea behind the explosion of a process into more process is that understanding at one level of detail is exploded into greater detail at the next level. This is done until further explosion is necessary and an adequate amount of detail is described for analyst to understand the process.

A DFD is also known as a "bubble Chart" has the purpose of clarifying system requirements and identifying major transformations that will become programs in system design. So it is the starting point of the design to the lowest level of detail. A DFD consists of a series of bubbles joined by data flows in the system.

6. Conclusion:

Here we implemented data integration with the combination of social and location data from different sources. As we insisted the implementation of Geo social collaboration is the task of identifying the groups and sharing information across different entity profiles. In this paper, we implement the Geo Social collaboration using spatial Computing. The splitting of user profiles by their name implies reducing duplication. In this system we enhance some features like we can able to chat with the users and can see others comments in the user part. Admin having privilege to delete that user account, etc.

7. Future Enhancement:

Then optimization of this chat System is portable to particular Chat service to convey the message. We have some additional features to deliver by more attractive to the user experience. To reduce the large space for doing Object Matching is time consuming. Our future enhancement is the evaluation of a system for location based social applications (LBSAs) while preserving user location privacy. It will provide location privacy for users without injecting uncertainty of the system, and does not rely on any trusted servers or components. And it will take a novel approach to provide location privacy while maintaining overall system efficiency, by leveraging the social data-sharing property of the target applications. And also users efficiently transform all their locations shared with the server and encrypt all location data stored on the server using inexpensive symmetric keys.. Overall, we will believe that this system will take a big step towards making location privacy practical for a large class of emerging geo-social applications.

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