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Social IOT: Trust Mechanism

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ABSTRACT–*In current scenario, Internet of Things (IOT) has become an emerging area. IOT has interconnected trillions of smart objets for sharing of ressources and data usingsensors and actuatorsas they are makingtechnicalavancementsin IOT by providingdifferent services. With the increase use of smart objects in our life and interaction of machine to machine or human to machine, theseobjectsare named as social objects. Theseobjects exchange data via internet,sosecurityalongwithintegrity of data is of highconcern. The interaction among social objectsisknown as Social IOT. This workfocuses on trust management in social objects. This workcovers social IOT, architecture of SIOT, basic block of SIOT, its applications in differentsectors, trust management in SIOT and its objectives.*

Keywords: SIOT, Smart objects, Architecture, Applications, Trust management.

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1. INTRODUCTION

From last few years, there has been increased usage of powerful technologies known as Internet of Things (IOT). In these days, the various virtual objects are linked to each other via internet using actuators which are the devices that cause machine to operate and sensors making it more advanced version and helping them in taking their own decision without need of any intervention [1]. Recently, IOT concept has been extended to social IOT where the smart objects act as an autonomous objects having ability to sense, process and interpret collected information. In other terms, we can say that SIOT is a collection of various smart objects having social relationship with their owners and are interconnected with each other via technologies. Thus, forming some kind of relationship among smart devices for the purpose of providing various services and trust management [2].

2. ARCHITECTURE OF SIOT

The architecture of SIOT includes four major components which are as follows:

a) *Actors*: The owners and their devices act as actors. The main aim of SIOT is to provide open environment to owners and their devices so that they can interact with each other openly which can be in the form of producing or sharing data pertaining to management of generated data.

b) *Intelligent System*: It consists of various subsystems which has to be maintained, arranged and coordinate in such a way so that they can interact with each other properly which is undertaken by actors.

c) *Interfaces*: It is a medium of interaction among various actors. Interface receives queries as an input and generates signals and services as an output [3].

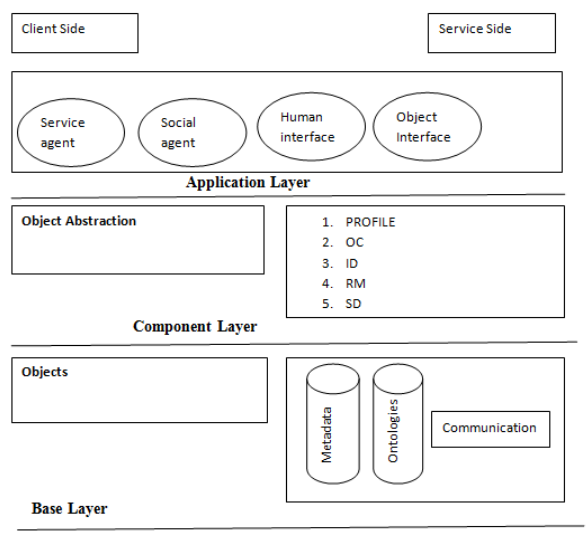

Figure 1.Three Layer Architecture

d) *Internet*: It is medium of communication between all the actors.

3. BASIC BUILDING BLOCK OF SIOT

It presents three models for solving various challenges through three main layers which are as follows:

a) *Base layer:* It contains the database which contains object profile, object owner, task of objects and their social relationship. It is composed of services for databases, semantic engines such as communications.

b) *Component layer:* It is a middle layer which is used as host tool for satellite component implementation. The module in this layer includes Profiling, Owner Control, Relationship Management, Service Discovery, Trustworthiness Management etc. [4].

c) *Application layer:* This layer acts as an interface between humans and objects by providing the connection services.

4. APPLICATIONS OF SIOT

The applications of SIOT in various sectors are as follows:

a) *Education:* IOT in schools/institutions means better connection and good quality of education. These devices help students in having better access to learning materials by using good communication channels and also help teachers to measure the learning ability of their students in real time.

b) *Industry*: If a person who runs an industry is having some technical problem in one of his machinery. He can find the solution by using the co-work relationship by contacting devices of other similar industry owner who have already faced the same problem. Here, devices of various industries can work together to provide troubleshooting services.

c) *Farming*: An agriculturist who owns a vegetable farm needs help about a new crop. He can use the social relationship to solvehis problem by consulting fellow farmer who have experience with the same crop.

d) *Retail Management*: The owner of retail store can keep track of his store items by connecting to his/her smart devices of the warehouse.

e) *Health*: The application of SIOT in health industry is as if a person is facing a health issue and he doesn't have knowledge about good health specialist nearby him. He can consult a specialist by making his device to request his friend device to find the doctor. In this case, he is using co-location and social relationship [5, 6].

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5. TRUST MANAGEMENT SYSTEM

The life cycle of trust management consists of three different phases, which are as follows:

a) Creation of trust: This means creating the trust functions and defining its policies.

b) Negotiations of trust: This occurs when node joins.

c) Trust management: It includes trust computation, distribution, update and storage [7].

Basically, trust management takes place under two scenarios:

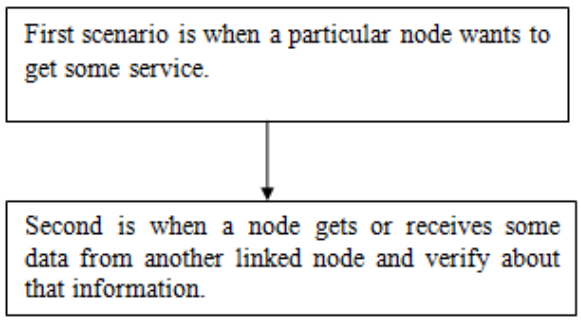

Figure 2.Flow Diagram of Scenarios

6. TRUST MANAGEMENT IN SIOT

Unauthorized release of information, unauthorized modification of information and denial of resources are the three categories of security violation.

Trust management is considered as one of the important challenge in SIOT. The information which is related to the trust management plays an important role in IOT for collection and monitoring of data from various kinds of devices.

The applications of SIOT those we have already discussed in pervious section of this paper are being released in the market. Since, in SIOT the various devices are connected with each other via internet therefore the reliability and security of transmitted data is under threat. This makes maintenance of SIOT security a difficult task [8,9]. Trust of an entity is a very complex concept and it can't be measured using single parameter as it is combination of different characteristics such as integrity, dependability, reliability, security etc. of an entity. Basically, trust is degree of confidence or we can say expectation of all these characteristics.

There are other essential trust characteristics which are transitivity, personification and comparability. Let's take an example of trust management in which a person named A trusts his friend B and B trusts his friend C then A can trust on C.

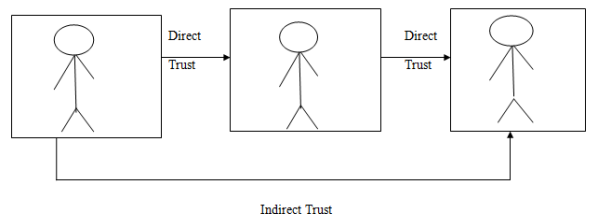

Figure 3. Trust Mechanism

In general, we can say that it's the desire to trust a person who doesn't know each other personally.

Another important characteristic that we will discuss is empathy which is used to locate adjacent entity by making social interactions between this items/objects/entities [10,11].

7. OBJECTIVES OF TRUST MANAGEMENT IN SIOT

The objectives of trust management system in SIOT are as follows:

a) The first objective of trust management in SIOT is trust relationship and decision which helps us to measure the SIOT entities trustworthiness and also helps in taking decision regarding which entities can communicate with other ones.

b) The second objective of trust management in SIOT is preservation of privacy which means that user's personal information should be preserved according to the policies of the system.

c) The third objective is data transmission trust which deals with the safe communication and data transmission so that no unauthorized user can gain access to user's personal data [12].

d) The next objective is security of system and robustness which refers to protection of system against attacks so that it can defend itself.

e) The fifth objective of trust management in SIOT is to identity trusts which are associated with each of the entities and managing them in an efficient manner is important for high trustworthiness SIOT [13, 14].

8. CONCLUSION

The most emerging technologies of these days are IOT and SIOT.In this work; we have discussed about the detailed information on these two and their role in trust management. It consists of different phases which include creation, negotiation and trust management. A node which has high value of trustworthiness is considered to provide better quality of service. In this work, we have discussed about the real life application of SIOT in the field of education, industry, agriculture, retail store etc. The trillion of virtual smart objects are connected to each other via internet which acts independently of their owners thus lead to creation of social network of these objects and taking decisions of their own by collecting information from their surroundings. This work will help researchers for further developments.

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