IOT-Based Information System for Medical Application

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Abstract— Internet connects various smart objects and also provides data interoperability for application using IoT technology. This technology was used in information intensive industrial sectors like healthcare services. Heterogeneity problem caused by the diversity of object in Internet of Things (IoT). Information storage, accessing real time data is more difficult and challenging, but IoT makes it easy to access real time data. The project define semantic data model is used to interpret and store data. For improving the accessibility of IoT data, resource based data method is used to design, process acquire IoT data ubiquitously. By using an example emergency medical services which is based on IoT which can illustrate how to integrate, interoperate and collect data flexibly. Therefore IoT data accessing method based on resource is efficient in distributed heterogeneity data environment which supports to data access ubiquitously and timely. By using ontology in the data storage and accessing it focuses on semantic data and unified data model.

Key words: Internet of Things, Emergency Medical Services, Ubiquitous Data Accessing

I. INTRODUCTION

The technology which is called as IOT widely developed in health care services, enables technology doctors can able to access data resources which are different kinds. The discussion regarding concept and objective of IoT techniques are described [1]. The characteristics which are ordinary objects are instrumented, autonomic terminal can be interconnected and pervasive services are intelligent has been well explained. If an emergency event occurs, for accessing more data quickly is difficult is challenging and grouping activities among the organization is difficult. In [2] exchanging data among clinics using network protocol it provides application level standard as Health level 7. Researches have been made successful [3] toward internet of things technology for distribution of data wirelessly, processing data and ubiquitously in health care services. In [4] the Data is in decentralized which bring challenges in ubiquitous data accessing in medical services. The main obstacle in clinical data is heterogeneity, which makes difficult to access data in emergency services. Web services can be retrieved from uniform resources identifier [5] wireless communication. This project proposes the ubiquitous data accessing method (UDA-IoT) solves the problem for accessing distributed and heterogeneous data ubiquitously.

II. RELATED WORK

Health Care services mainly contain three types of main services namely pretreatment, processing, and post-treatment shown in Fig.1.

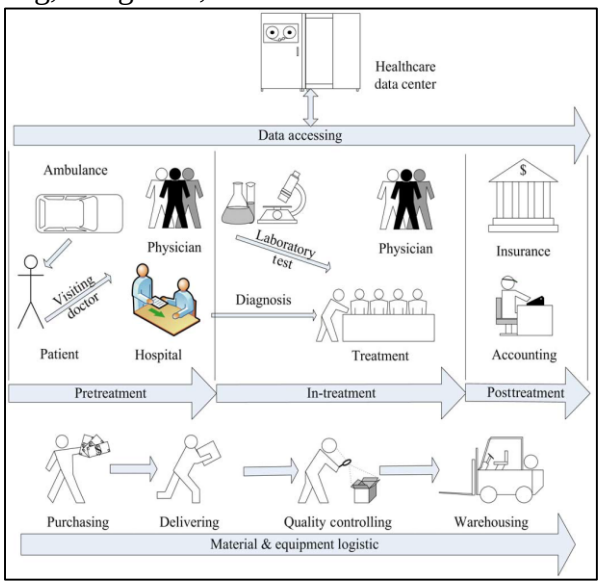

Fig. 1: Activities in Medical health Care.

In Fig.1. Health care activities include medicine, insurance document processing and equipment supplying. Patient history has to be maintaining in the records. Even Doctors may access to the data from equipments to know whether busy or in working state and location of each resources. IoT uses in [6] Pharmacogenomics data integration which proposes the service-based framework for enabling the queries across the distributed databases using mash up technology. Cyber physical system is proposed in [7] which uses middleware disseminate sensors data In order to assist doctors for accessing data resources efficiently. Semantic data model is proposed to support heterogeneous data sharing environment, expected to be self explaining for supporting distributed data storage sharing at anytime any place flexibly.

To make complex business requirements which need configurable and flexible IT architecture [8].Service Oriented Architecture is implemented for interoperability by using web services in [9]. Medium access control protocol is used for static scheduling and implementation has not done [10].

III. SYSTEM ARCHITECTURE

In Fig.2. Represents the system architecture of decision support system form emergency medical services, different modules works in different ways and when integrated it gives the working structure of the proposed system. Whenever an emergency event occurs, the decision maker click an emergency event button, once the emergency event happens it searches nearby hospital. Then it goes to the Independent model which is linked to the semantic data model. The semantic data model is extract the resources from the database which has status of dynamically configuring resources saved in it.

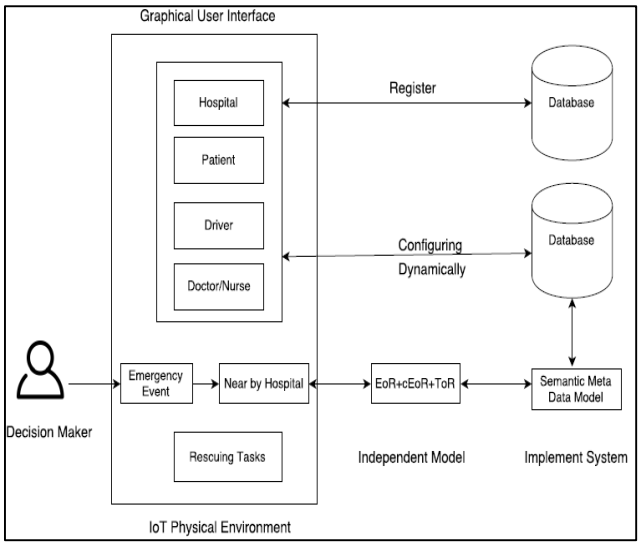

Fig. 2: Decision Support System for Emergency medical Service System Architecture

IV. PROPOSED METHOD

The unified metadata model is proposed to facilitate different kinds of format in data and sharing the data by semantic explanation. The functions which included in the proposed method for accessing data in heterogeneous formats. For real time application system. In Fig. 3. The model consists of three layers, which inludes anotation,semantic explaintion and value. Annotation refers as caption of the data. Value refers as range of data such as attributes of the patients. Semantic explanation refers as common definition of the data. In the metadata model compared with traditional data structures, such as relational data structures, data model emphasizes the self-explanation of data value for accessing data ubiquitously.

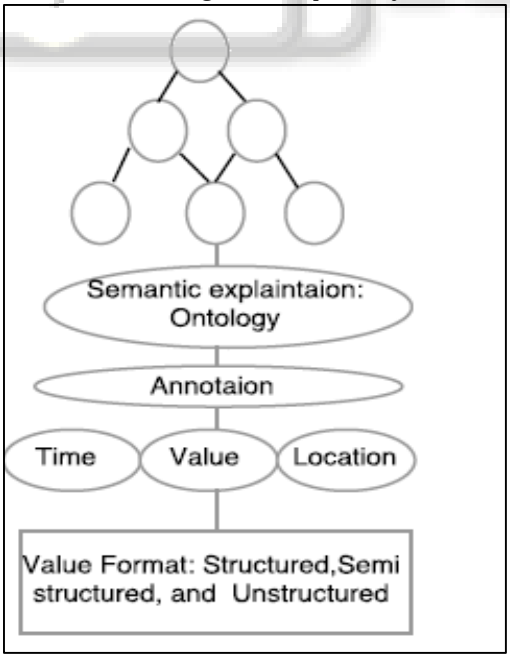

Fig. 3: Metadata model for IoT

Each noted IoT data defined in xml format, since it is self-described and can be accessed from Web. Because every item of data is defined with ontology, it can be explained in semantic level and shared with other instances related concepts.

V. ENTITY ORIENTED RESOURCES

The mapping between physical IoT data in information system does as follows physical entities are connected through sensors for representation in the information system. Entity oriented resources (EoR) are mirror image of physical entity which contains only non functional activities. The definition of EoR as follows.

EoR := <*URI, AttrSet :=* <*Attributes*>,*Persistence*
:= <*Driver, Address, Authentication*>>

Persistence refers to in which layer data should be stored. Attribute set of EoR refer as *AttrSet. URI* is unique address for each application system. The EoR can be composite entity, which include other entity, and composition can be done wither aggregation of by reference.

VI. TRANSITION ORIENTED RESOUCRES

Functional feature can be displayed in information system such as status of each equipment or resources whether its busy of in working status can be defined by following definition which called as Transition oriented resources (ToR).

ToR := < *URI, Input:=* < *EoR/cEoR* >,*Output*
:= < *EoRs/cEoRs* >, *Pre-condition, Effect*
:= <*ToRs*>>

Here the *URI* access the address of *ToR* which start by Post method through http protocol.

Input refers to entity activated by resources. Output refers to entity generated by transitive resources servicing. Precondition is demandable service for the physical entity. Effect refers the follow up resources. Example if one nurse is leaves the job other nurse should take care of that place.

VII. CONCLUSION

This project benefit for accessing heterogeneous data for doctors as well as managers in real time application which is based IoT. Especially it helps in emergency medical services. Any user can collect data which is important to medical application. By using semantic data model and unified data model, for data accessing and storage explained by ontology. It provide to access ubiquitously heterogeneous data in emergency medical services.

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