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Design of IoT Centric Algorithms: Selection & Performance Assessment

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INTRODUCTION

Internet of Things (IoT) has become an emerging technology for sensors based applications. However, due to diversified cyber physical systems, the structure of IoT could be more versatile. This phenomena drives the different parameters in combinatorial schema, which must be optimal from the design point of view. This presentation is an initiative to introduce formal model of connected graph for the artefact of IoT. It Is also proposed to develop a learning paradigm, to feed the parameters and component of IoT. Hence, as a tool, the system could identify those similar parameters and will contribute in optimal design.

IoT Centric Algorithm

Definitions :

Internet of Things (IoT) is a new paradigm that refers to a world-wide network of interconnected physical things using standardised communication protocols to provide human useful services such as personal health care and green energy monitoring. At present, many third party service providers are providing a large number of IoT services. Selection of IoT services to users, based on their owned objects, has become very crucial for the success of IoT. Hence, selection of suitable algorithms also is a prime factor. Especially selection of graph-based algorithms is popular to IoT applications. We analyse a 2nd order hyper-graph model for IoT systems, in which each hyper-edge connects users, objects, and services.

Parameters :

- Users, objects, and services can be modelled as a tripartite graph with hyperedges.
- Any IoT system can be defined as a topple that describes the users U, services S, objects O, and the ternary relation between them.
- Introducing distributed 2nd order optimization for learning IoT objects, timestamps and locations.
- Possibility of Weighted Hypergraph for interaction layer.

Challenges

- Uncertainity in Design of IoT layers with diversified components from 3rd parties
- Effective Scheduling time

Design Optimization Objectives:

- QoS, load balancing, self organized or adaptive learning of similar design
- Maximizing the benefits

Optimization strategy:

Designing of IoT algorithm is hard problem, hence to use Machine learning based models to train better design perspectives towards similar IoT structures.

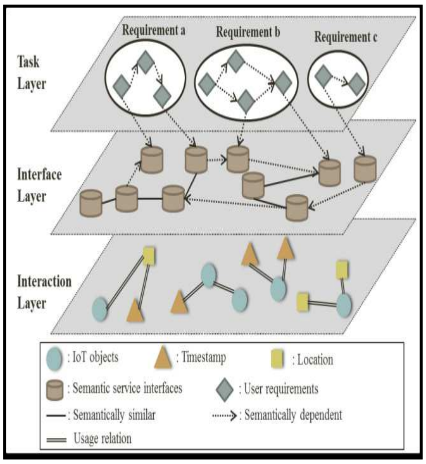

Figure 1. Working scheme

Current work

Phase I: Identification of immediate neighbouring components in IoT design space.

Phase II: Compute the position between IoT objects, locations, time stamps, relation and community

Phase III: Evaluate new position of components Optimally (Hard problem) with dynamic weights amount them.

Phase IV: To find out dynamic connectivity (Lapacian Matrix)

Phase V: Deployment through distributed 2nd order optimization for learning maximum IoT design parameters.

Effort is given to foster an automated off-line and learning based scheme, which finally can be converted as a generic tool of IoT and cyber space design at least to satisfy maximum numbers of design constraints.

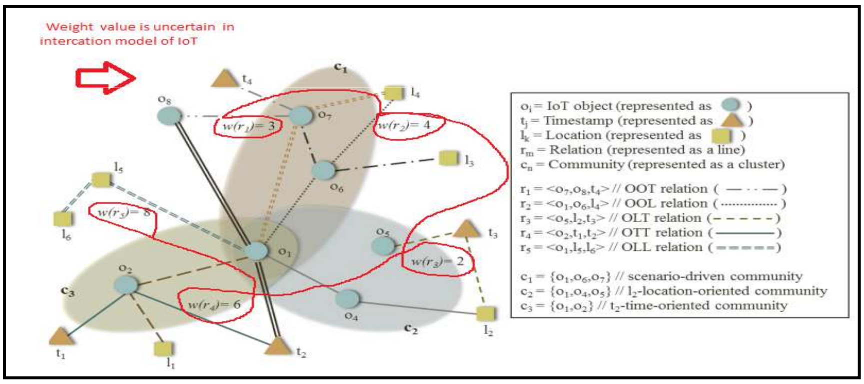

Figure 2. Interaction layer

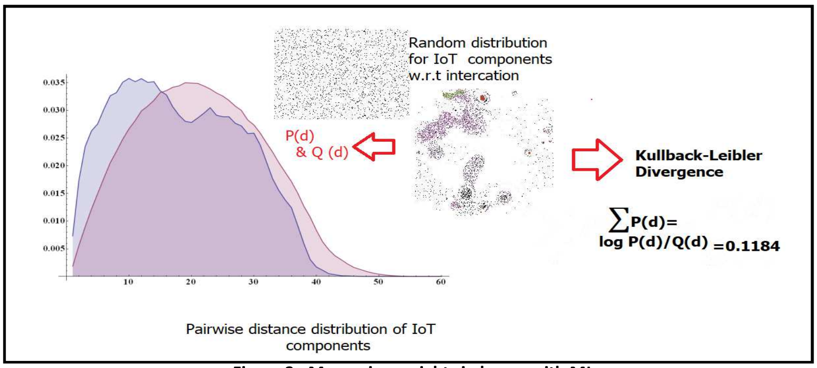

Figure 3. Measuring weights in layers with ML

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