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PRIVACY AND SECURITY OF MULTI-AGENT SYSTEMS ON WSN

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***Abstract*— A wireless sensor network (WSN) (sometimes called a wireless sensor and actor network (WSAN)) are spatially distributed independent sensors to monitor physical o ecological conditions, such as temperature, sound, force ,etc. and to cooperatively pass their data through the network to a major location. The design of such application presents important challenges and requires the assistance of several methodologies and tools. Multi-Agent systems (MAS) have been recognized as one of the most suitable technologies to con- tribute to this domain due to their suitability for modeling distributed and independent complex systems. This work aims to contribute in the help of the design of wireless sensor social network applications. The future architecture exploits the advantages of MAS for modeling WSN services, network topologies and sensor device structural design.**

***Index Terms*— Privacy of social Network (PSN), Wireless Sensor Networks, Distributed System Design, Multi-Agents System, Centralized Base Station, Distributed Base Station**

I. INTRODUCTION

Wireless sensor networks (WSNs) are emerging as influential platforms for distributed embedded computing supporting a variety of high-impact applications such as disaster/crime avoidance and military applications, ecological applications, strength applications, and smart spaces [1]. These networks pose significant challenge for engineers working in the growth of such systems: possible high number of nodes, limited resources, sensor heterogeneity, undependable networks of changing topology, and some levels of data processing [2].

II. CONCEPT OF MULTI-AGENT SYSTEMS

Multi-agent system consists of agents and their condition. Typically multi-agent systems study refers to social network software agents. However, the agents in a multi-agent system could evenly well be robots,[6] human teams. A multi agents system may contain joint human-agent teams. Agents can be separated into dissimilar types ranging from easy to complex. Some categories recommended to describe these types include:

- **Passive agents**[7] or agent without goals(like obstacle, apple or key in any simple replication)
- **Active agents**[7] with simple goals
- **Cognitive agents**, which contain complex calculations

III. CHARACTERISTICS OF MAS

- **Autonomy:** the agents are at least partially autonomous, self-aware, self-directed
- **Local views:** no agent has a full worldwide view of the system, or the system is too complex for an agent to make sensible use of such information.
- **Decentralization:** there is no chosen controlling agent.

IV.ADVANTAGES OF A MAS

An MAS has the next advantages over a single agent approach[4]: An MAS distributes computational capabilities across a network of interconnected agents. Whereas a centralized system may be plagued by resource limits, presentation bottlenecks, or dangerous failures, an MAS is decentralized and thus does not undergo from the "single point of failures" difficulty associated with centralized systems.MAS allow for the interconnection and interoperation of multiple obtainable inheritance systems. By

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structure an agent wrapper around such systems, they can be incorporated into an agent society.

An MAS models problems in terms of independent interacting component-agents, which is proving to be a more normal way of representing task portion, team preparation, client preferences, open environments, and so on.

An MAS capably retrieves, filters, and internationally coordinates information from sources that are spatially distributed.

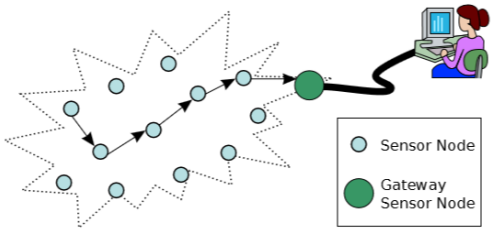
An MAS provide solutions in situation where expertise is spatially and temporally distributed[5].

An MAS enhance overall system presentation, specially along the scope of computational efficiency, dependability, extensibility, robustness, maintainability, receptiveness and suppleness,

V.WIRELESS SENSOR NETWORK (WSN)

A wireless sensor network (WSN) is a wireless network consisting of spatially distributed independent devices using sensors to watch physical or ecological situation[12].

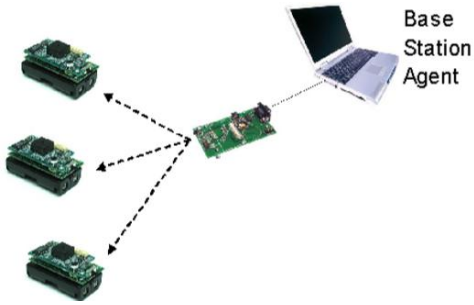
A WSN system incorporate a gateway that provide wireless connectivity back to the wired world and distributed nodes. The wireless protocol you select depends on your application supplies. Some of the obtainable standards include 2.4 GHz radios based on either IEEE 802.15.4 or IEEE 802.11 (Wi-Fi) standards or proprietary radios, which are typically 900 MHz [1].



Typical multi-hop wireless sensor network architecture

VI. CENTRALIZED BASE STATION

The base station is typically a device where debugging is a easy enough task, such as a laptop or desktop computers. The reason of this phase is to recognize and solve the idiosyncrasies of the problem.



Particular agent resides on base station to implement algorithm. dash lines correspond to wireless communication. Solid line represents wired communication among the base station and laptop[8].

VII.DISTRIBUTED BASE STATION

The second phase transforms this centralized[9] solution into a distributed agent-based execution again on the base station. Distributing an algorithm can prove hard and so the most amount of debugging information is typically essential at this point to ensure the rightness of the algorithm. The key point to this phase, and to the total methodology, is to have a mapping between the agents of the Multi-Agent System and the nodes in the last deployment. Many mappings exist, which are suitable for a variety of different applications[11].

Identified three common mappings:

One-to-One: In this case single agent on the base station maps openly to single of the nodes of the network. So if there are ten devices in the fixed network the there should be ten agents in the MAS. Every node as a preceptor of an agent on the base station. At the start of each agents thought cycle the agent will perceive its node and purposeful accordingly.

Many-to-One : For this mapping a lot of agents map to an person node. This is useful when, for model there may be one agent per sensory modalities. Every agent will recognize its connected sense on a given node.

One-to-Many: single agent on the base station may map to a neighborhood of a lot of nodes. The agent will recognize the senses it is attracted in, on the nodes in the neighborhood under its control. Inter-agent communication then abstractly corresponds to inter-neighborhood communication[10].

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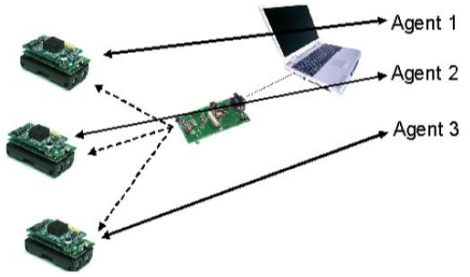

Multi Agent Systemon Base station implements algorithm in a distributed manner. Dashed lines representwireless communication. Solid line represents wired communication. Arrows represent virtual communication between WSN device and agent[10].

The main characteristics of a WSN include:

- Power consumption constraints for nodes using batteries or energy harvesting
- Aptitude to cope with node failures (resilience)
- Mobility of nodes
- Heterogeneity of nodes
- Scalability to large-scale of deployment
- skill to with stand harsh ecological conditions
- Ease of use
- Cross-layer design

VIII.ADVANTAGES OF WSN

- Network setups can be done without set infrastructure.
- Ideal for the non-reachable places such as across the sea, mountains, rural areas or deep forests.
- Flexible if there is ad hoc condition when extra workstation is required.
- Implementation cost is low.

IX.DISADVANTAGES WSNS:

- Fewer secure because hackers can enter the entrée point and get all the information.
- Lower speed compare to a wired network.
- Additional complex to configure than a wired network. Easily affected by surroundings (walls, microwave a, large distance due to signal reduction,etc.).

X.CONCLUSION

Despite the many and important contributions to the diverse research Topics, more research attempt is required to allow the application of social sensor networks to real-world problems. In what follows we analyze the most promising lines of research for MAS that pose open, demanding issues. Our future work on the subject MAS and WSN will be concerted on providing flexible and privacy social network agents.

XI.REFERENCES

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