

An Introduction to Semantic Rule Engine for Industrial Automation

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ABSTRACT - *Industrial automation is the use of hardware and software with IoT. Temperature dependent workplaces are the heart of industrial civilization. Energy consumption can be reduces the costings and increases the productivity of an industry. By the complete industrial automation only we can control the whole energy sources with the support of internet of things. The use of IoT, the connection to input devices (for detection and sensing) and to output devices (for command and control) is required and it is done by the help of semantic rule engine.*

Index Terms: Internet of Things, Industrial IoT, Gateway, Semantic Rule Engine, Energy Consumption.

I. INTRODUCTION

The first mechanical industrial revolution was influenced by steam powered manufacturing in the 19th century. The second industrial revolution was characterized by mass production in the 20th century. The third industrial revolution was changed our lives by using electronics and information technology into manufacturing in the second half of the 20th century and nowadays in the 21st century there is the fourth industrial revolution based on the connection between industry and Internet. The term Industry 4.0 was first used in 2011 at the Hannover Fair and can be defined as a collective term which introduces Internet technologies into industry, creating a Cyber-Physical Systems (CPS) environment. their own local intelligence. Added intelligence is used both during the manufacturing of a product as well as during subsequent handling, up to continuous monitoring of the product lifecycle. The integration of objects within networks requires a new and flexible industry oriented gateway.

In the vision of the IoT, network connectivity is extended where *anything* can be connected to the Internet. The term of *anything* is very broad and can be interpreted as various objects in the world. It also includes industrial objects such as programmable logic controllers (PLCs), sensors, SCADA, etc. Industrial objects, in particular PLC controllers, currently form an important technological basis for the automation of industrial processes; but they don't satisfy the majority of requirements posed by industry 4.0 or can only do a rudimentary basis at an extremely high expense. In order to cover the lack of connection protocols among industrial nodes and the IoT architecture, an IoT gateway in the industrial environment is required, to link different objects to the Internet. In this work, a distributed industrial gateway called MQTT is proposed in order to integrate industrial objects through queries to the Internet.

II. FRAMEWORK OF INDUSTRIAL AUTOMATION

Industrial automation is the use of control systems, such as computers or robots, and information technologies for handling different processes and machineries in an industry to replace a human

being. Utilizing hardware and software automation increases productivity, safety and profitability. Artificial Neural Network, Distributed Control System, Human Machine Interface, Supervisory Control and Data Acquisition, Programmable Logic Controller, Instrumentation, Motion control, Robotics are the types of automation used in the industrial field. They have some limitations and for the better analysis we propose semantic rule engine.

III. DIRECTION OF SEMANTIC QUERY BASED INDUSTRIAL AUTOMATION

In the work [1] the automatic control of devices in a smart building systems relies on matching the sensed environment information to customized rules. With development of Wireless Sensor and Actuator Networks (WSANs), low-cost and self-organized wireless sensors and actuators can enhance the smart building systems, but produce abundant sensing data. Therefore, a rule engine with ability of efficient rule matching is the foundation of WSANs based smart build systems. A data annotation architecture [4] is used for the semantic applications in virtualized heterogeneous WSNs. The architecture uses overlays as the cornerstone, and we have built a prototype in the cloud environment using Google App Engine. The early performance measurements are also presented. In industrial facilities, black-box devices are typically used to collect data from variety of devices like sensors, actuators, machines, plants, processes, and systems. Typically these gateways, sample, collect, and push data to a remote platform for further analysis [5] and may also send notifications for certain events. Semantic query engine for industrial internet-of-things gateways [7] they leverage a modular approach with a set of common and domain specific ontologies across the enterprise. For instance, a domain ontology capturing one of the industrial automation contexts, was used to annotate the device data with the contextual information, In the work [9] more dynamic solutions were required that by design offer more flexibility and better control to these gateways users. The issues like low bandwidth, latency, and security in the industrial domain are additional factors in this.

IV. CONCLUSION

We introduces the semantic rule engine that can be fully automated the industries. Using this engine we can control and monitor the whole industry. By make some queries we can also analyse the energy consumption done by an industry. It gives the better productivity of the industry. The internet of things plays a major role in the control of industry and the working of semantic rule engine.

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