Intelligent Monitoring of Legacy Machines in Manufacturing Industries

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Abstract

Even though MTConnect has grown fast, a big hurdle is that the majority of machines in use today are legacy machines. They do not spew alarms, events or conditions as the relatively new MTConnect compatible machines do. It is equally important to provide meaningful insights for these machines. A quick and dirty way to achieve this can be to mount external sensors and retrieve data from the machine in MTConnect format. This way all machines, even the manually controlled ones can be brought under the aegis of MTConnect.

Keywords: mtconnect, legacy machines, manufacturing, in-situ analysis

1. Introduction

Questions: Why do I care? What did I do? Why did I do it? What did I find out? What does it mean? What next?

Manufacturing Industries are the unacclaimed giants supporting our present world built on the pillars of consumerism. They use up a great amount of our natural and human resources to produce sell-able products. It has always been important to keep the resources they use up in check. It has become more important today owing to the ever increasing cost of energy, raw materials and man power. Hence, it has become imminent that we make optimal use of all resources avaiable to us. But how do we optimize resources in a manufacturing industry. There are quite a few factors which hamper such attempts:

- Lack of Data: there exists very little data on the actual run time of machine.
- Lack of Standards: with thousands of manufacturers, any attempt of data acquisition gets right down into the bin.
- Lack of Awareness: manufacturers dont know if there is any other way out apart from the age old method of operations management.

Though awareness is bound to creep in sooner or later, the first two listed setbacks are ones which hamper the implementation of any optimization method on a large scale. Standardization would lead to development of better techniques to capture data, which in turn would lead to better avaiablility of data. If standardized, the act of data collection would be simpler and might lead to path breaking innovations in the manufacturing factor. In a past few years, this is what MTConnect[1] has been trying to achieve.

The advent and widespread acceptance of such a standard can open many new avenues in the field of manufacturing management. Apart from monitoring the machines, for the first time ever, it might be possible to make advancements in the not so well developed field of predictive quality and predictive maintenance. But for all this to materialize, it is important to bring most of our current machines under the aegis of a single standard. It is easy to write adapters for the new numerically computer controlled machines but getting meaningful data from old legacy machines still seems a task in distant future. We believe it might make a difference if we could provide some architecture to gather from these machines data that makes sense. Hence we tried to come up with a new pipeline to get data and generate information in-situ. The later sections explain it in detail.

[1] MTConnect is an upcoming manufacturing industry standard to facilitate the organized retrieval of process information from numerically controlled machine tools. It is a lightweight, open, and extensible protocol designed for the exchange of data between shop floor equipment and software applications. Defined as a read-only standard, it presents data from shop floor devices in XML format.