Option #2: Factory Machines Faults Detection

Scott Miner

Colorado State University – Global Campus

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The instructions ask the student to propose a secure and scalable BI solution system that will detect potential flaws in an assembly line before they occur and reduce infrastructure costs for a factory that produces auto parts for several major automobile manufacturers.

Alexopoulos et al. (2016) propose a BI architecture for the factory environment comprising several layers: (a) sensor data retrieval, (b) pre-processing, (c) data storage/management, and (d) application. A factory that produces washing machines (WMs) implemented this architecture in one of its assembly lines. The factory was able to improve the quality of finished results and reduce errors by 30% in a single workstation and by 10% in the overall sub-line by increasing data quality, availability, and accuracy. I plan to incorporate a similar structure in my architecture.

Hochmuch (2005) describes how factories use sensor technology to measure factors (e.g., machine vibrations, heat) to predict when a machine might fail or require service. A mesh network allows a factory to connect any device to any device, using the most optimal path, bypassing the need to tie all data back to only a few wireless access points. Such an architecture can save a factory 10% to 20% on production costs. Jiahao Wang et al. (2010) describe how Radio Frequency Identification (RFID) technology provides a wireless means to track moving objects for flexible manufacturing lines by using RFID readers as detecting sensors, leading to improvements in object accuracy tracking and reductions in costs.

Essentially, I plan to combine elements from the architectures proposed above. I plan to design a context-aware, multi-tiered, Cloud-based BI solution with sensor technology, capable of monitoring real-time production timely, handling production fluctuations dynamically, and making production decisions optimally (Yingfeng Zhang et al., 2018).

References

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