

## **Computer Vision Process Monitoring**

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Many manufacturers do not keep accurate track of throughput, often using “guesses” to identify bottlenecks or inefficiencies within a manufacturing process. To solve this problem, a system capable of reading the X,Y and Z positions of a moving bed in realtime could be produced and interfaced as an MTConnect Agent/Adapter, the X,Y, and Z positions could then be used to calculate the machine’s position within the G-code.

The solution proposed in this submission uses inexpensive cameras mounted such that they can view the bed of the machine. Computer vision techniques (e.g. SIFT) are then used to read rough estimates of the position of the bed. This position can then be viewed as a waveform over time and compared to a waveform derived from the known G-code a machine is running. Using signal analysis techniques, the minimum error phase between the two waveform can be identified, this minimum phase is the machine’s current point in time in the G-code. Given the point in time of the G-code, the throughput can be identified. The camera module should act as an MTConnect Adapter/Agent and provide an XML endpoint. Techniques using infrared distance sensors and accelerometers are also explored.