Smart IoT Device

Problem Statement: A machine or structure is subjected to various factors that could affect the system's integrity or efficiency over time. Even the slightest deviation in the optimum working parameters could affect the health of the system leading it to get damaged or fail in the future. Detecting the origin of the fault before it has caused considerable damage will help prevent catastrophic machine failure. Of late, techniques of AI and Machine Learning are being applied to develop intelligent product development environments. Contemporary Manufacturing Engineering integrates multi-disciplinary concepts from Computational Science, Material Science, Mechanics, Thermal Science, Artificial Intelligence, Optimization and Data Science for a complete Product Development from inception through in-service. Thus, the researchers at IIT Bombay are developing a 'Smart IoT Device' as a self-contained IoT device capable of sensing various physical quantities and performing limited onboard analytics.

Uniqueness of the Solution: Even though IoT devices that measure external and internal parameters are available in the market today, a device that does continuous data sensing and performs onboard analytics is very rare. Moreover, the combination of onboard analytics and cloud AI gives this device an unparalleled edge over other such solutions. The Smart IoT Device is integrated with the following sensors: Accelerometer, Gyroscope, AC-current, AC-voltage, temperature, humidity, light/IR light, and magnetic field sensors.

Current Status of Technology: A limited set of devices has been demonstrated in the actual shop floor environment.

Societal Impact: Machinery in industries gives many telltale signs of its health condition and potential failure. Sensing these telltale signs and predicting when the machinery would fail in the future will have a direct effect on machine uptime and the cost of maintenance. Therefore, the device has immense applications in the smart manufacturing sector.

Patent(s): Nil

Relevant Industries: Manufacturing, IT.

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