PMU Time Series Module Adapted for Reduction of Dark Data and the Ensuing Enhanced Analytics for Higher Quality Yields of Ethanol Fuel Production

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Abstract:
To maintain a positive energy balance (i.e. the process of producing ethanol fuel in a way that does not require more energy than the amount of energy contained in the fuel itself), it is crucial to have consistent ethanol quality and yield rates. This is predicated upon high-quality, real time measurement data for various parameters (e.g. moisture levels in the soil, temperature, etc). Our specialized Time Series Module (TSM), which initiates and captures IEEE C37.118 datastreams and writes them to a specialized time series database (with an ultra-low ratio of data to errors, ultra-low data transformation error rates, and ultra-low dropped and/or malformed frames) can facilitate the reduction of dark data (data that is unable to be used effectively due to data quality problems) by way of these value-added propositions: rolling window technique that allows for data being rewritten, as more ideal samples are found; a rolling aggregate technique that enhances raw sensor telemetry datasets with machine learning-driven feature engineering; and a rolling correlation technique for multiple time series. This segues to enhanced analytics in the ethanol production process, which leads to the required consistent qualitative controls and quantitative yields for a positive energy balance for ethanol.

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