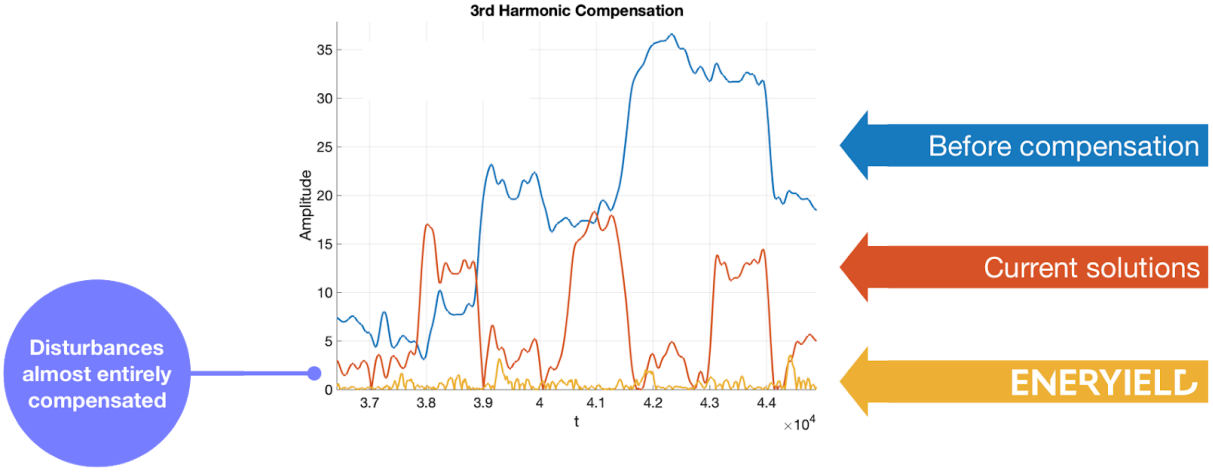
AI-based Power Electronics

Eneryield have created a new predictive method to control a wide range of Power Electronic Devices (PED's). It consists of unique machine learning algorithms which enable the utilization of big data and the possibility to predict power quality a few cycles ahead. The invention is a conceptually novel scheme for a class of power electronic devices which utilises machine learning to learn the optimal control strategy based on measurements of signals in the close vicinity of the device.

An applicable case for the predictive method are Active Power Filters. Briefly, the machine learning based component which monitors the ingoing voltage and/or current signal attempts to predict power disturbance within a short time horizon. The machine learning component can predict the amplitude of harmonics and interharmonics at different frequencies a few cycles ahead in time, giving sufficient time to pre-process the monitored signal, compute the prediction, and provide the prediction to the compensation device which can then inject the opposite harmonics and interharmonics signal, actively mitigating the disturbance.

Existing solutions on the market suffers from a 2-cycle delay in response time and 0,5 cycle in reaction time due to inefficient control methods. Below, the initial tests of comparing current solutions and Eneryield's control component can be seen, showcasing the potential of this technology.



Blue: Amplitude of harmonics before compensation
Red: Amplitude after compensating with existing solutions with a 2-cycle delay in response time and 0,5 cycle in reaction time
Yellow: Amplitude after compensating with Eneryield's predictive control component

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