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A new approach for CMS RPC current monitoring using Machine Learning techniques

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Monitoring the RPC current stability proves to be a tedious work in CMS experiment where one needs to deal with more than a thousand individual high voltage (HV) channels. The current depends from several parameters (applied voltage, luminosity, environmental parameters, etc.) and sometime it's not obvious if it changes due to variation of the external parameters or if it's due to a chamber malfunction.

We present a new Machine Learning (ML) approach to monitor and spot possible HV problems. A Generalized Linear Regression algorithm is trained to recognize the behavior of the HV current of a given chamber. Then the algorithm is used to predict the HV current at given data taking conditions and environmental parameters. The divergence between the predicted and the measured HV current is an indication for a problem.

The results for several chambers would be shown. The algorithm is trained and tested on 2017 and 2018 data. The software development is on "proof of concepts" level and the results are encouraging.

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