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CapsNets Continuing the Convolutional Quest

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Convolutional Neural Networks are an important tool for image classification both in and outside of particle physics. Capsule networks allow us to expand on the standard CNNs setup, both to increase the networks performance and to give insight into its decision making processes. We demonstrate the use of the Capsule Networks by separating a resonance decaying to top quarks from both, QCD di-jet and the top continuum backgrounds and benchmarking them against classical analysis methods as well as other machine learning approaches. Further, we show the capsules'ability to handle high activity environments such as associated top-Higgs production. Throughout all of this we find that the capsule structure allows us to interpret both the results and inner workings of the network. Finally, we present recent results of combining capsule networks with a Bayesian approach to uncertainty estimation.

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