SUMMARY: https://arxiv.org/pdf/1906.08158.pdf

The paper proposes a new function for Batch Acquisition in Active Learning models using Bayesian Neural Networks.

Active Learning aims to decrease the amount of labelled data needed to achieve high accuracy. This is achieved by iteratively acquiring data points and retraining the model, instead of labelling all data points before training. Individually acquiring labels for data points is expensive, so we acquire a batch of data points.

BALD is an acquisition function used in Bayesian Neural Networks. It uses Mutual Information to score points based on how well their label would inform us about the true model parameter distribution. The naive approach to using BALD for batch acquisition is taking 'b'(batch size) data points with the highest scores. These points may be informative independently, but they might not be jointly.

To solve this problem, the authors have proposed BatchBALD. BatchBALD jointly scores data points by estimating the mutual information between a joint of multiple data points and the model parameters. A greedy linear time (1-1/e) approximation algorithm is provided for BatchBALD.

Further, the authors have shown the efficiency of BatchBALD by showing how it outperforms existing batch selection methods on popular datasets like MNIST, CINIC-10 etc.