Progress and challenges in quantum feature engineering

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Using kernel functions is a common method to extract important features from data sets. A quantum computer can be used to estimate kernel entries of quantum feature maps. While there are quantum kernels that cannot be computed classically due to computational hardness assumptions, it is still a challenge to find quantum kernels that offer an advantage in classifying real-world data. I will discuss potential approaches and challenges for quantum feature engineering, with a focus on problems where we can leverage some form of group structure. Additionally, I will explore how this approach to feature engineering could be relevant to practical problems.