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Selective background Monte Carlo simulation at Belle II

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The Belle II experiment, beginning data taking with the full detector in early 2019, is expected to produce a volume of data fifty times that of its predecessor. With this dramatic increase in data comes the opportunity for studies of rare previously inaccessible processes. The investigation of such rare processes in a high data volume environment requires a correspondingly high volume of Monte Carlo simulations to prepare analyses and gain a deep understanding of the contributing physics processes to each individual study. This presents a significant challenge in terms of computing resource requirements and calls for more intelligent methods of simulation, in particular background processes with very high rejection rates. This work presents a method of predicting in the early stages of the simulation process the likelihood of relevancy of an individual event to the target study using convolutional neural networks. The results show a robust training that is integrated natively into the existing Belle II analysis software framework.

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