An Approach to Automatic Performance Prediction for Cloud-enhanced Mobile Applications with Sparse Data

Wei-Qing Liu and Jing Li

Problem and Challenge

• Predict the performance of cloud-enhanced mobile applications under varies of environment and offloading schemes.

• The commonly existed data sparsity problem in mobile cloud computing (MCC) scenario is the major challenge to the prediction.
Approach

• A two-phase hybrid framework to predict performance for cloud-enhanced mobile applications, which is designed to be robust to the data sparsity.
  • By monitoring and collecting meaningful interactive parameters about the application execution, the prediction model is composed of several sub-models, which can be trained separately.
  • Deterministic algorithms are mixed in the prediction framework, which needs no historical recodes for training.
  • Inspired by word embedding in NLP, we also learn the “device embedding” and “module embedding” in this problem to further overcome the data sparsity problem.
Results

• Our approach is evaluated by using a real-world cloud-enhanced object recognition application in a realistic setting of MCC scenario and achieve good prediction accuracy even in data sparsity situations.