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Recommendation and Distillation of IoT Multi-Environments*

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Abstract. The Internet of Things enhances the quality of life by automating tasks and streamlining human-device interactions. However, manual device management remains time-consuming, especially in multiple or new environments that demand new settings and interactions. Learning systems aid in automating task management, but their learning times hinder personalization and struggle when the system has to interact with multiple IoT environments, impacting user experience. This work addresses the central research question: How can user information be utilized for real-time service recommendations in diverse environments? In this work, it is proposed a model-agnostic approach for knowledge sharing within a federation. Also, this approach enhances the system's adaptability to new situations by allowing participants to leverage knowledge from past experiences in similar environments. The key contributions include: establishing a requirement for knowledge reuse in learning models, introducing an environment recommendation system for optimal configurations, and facilitating efficient knowledge exchange among models. The proposed method achieves an overall accuracy of 93.15% with concise distillation, often surpassing the performance of the original model.

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