



Dynamic Cost-Sensitive Feature Acquisition Framework for Mobile Context-Aware Applications

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- The problem: determining a sampling policy for mobile context-aware applications
- Motivation: resource consumption (CPU and Memory), response time, context inference accuracy, communication transportations volumes, storage volumes and data manipulations capabilities
- Assumptions: features have fixed costs, features can be acquired sequentially at each sampling
- The framework: first, all of the features are fully acquired. Then, features are acquired according to an algorithm
- Experiments:
 - The framework was evaluated with four algorithms: pure random, cost-sensitive random, variance-sensitive random and cost-sensitive tree. In the cost-sensitive tree, the split criteria regarded the cost and the information gain of the feature.
 - Evaluation was based on two datasets: (1) Conjure - identifying real and fake SMSs based on mobile sensors. (2) HPAT - a UCI's dataset of Human Activity Recognition based on smartphone sensors.
- Results:
 - Approximately 80% sampling cost saving with less than 20% weighted precision loss in the Conjure dataset
 - Approximately 90% sampling cost saving with less than 12% weighted precision loss in the HPAT dataset