Introduction
Adaptation consists in transforming, according to the context, different aspects of a system, in different levels, in order to provide users an interaction of high usability level

Motivation
Most of the applications are often developed considering a pre-defined context of use, however, not only the contexts of use and users are heterogeneous, but users also interact with applications via different devices, platforms and means

Challenges and Shortcomings
Consider all context information to provide users adaptation with high usability level and transparency. The works reported so far are often limited to one dimension or platform at a time; the current approaches are not unified, inconsistencies, e.g. in terminology, are common

Goal
Develop a framework to support the implementation of adaptation considering different contexts of use, dimensions and levels of an application subject to adaptation, aiming a high usability level

Methodology
A Systematic Review to gather adaptation concepts (techniques, strategies, approaches, and models)
A template to define adaptation techniques regarding content (audio, image, text), presentation and navigation
UML diagrams to model the context information
An Algorithms Library to implement adaptation techniques
Advanced Logic Algorithms using Machine Learning techniques to provide context-aware adaptation (e.g. Decision Tree, Bayesian Network and Hidden Markov Model)
Iterative usability evaluations
Case studies to verify the feasibility

Systematic Review
Context: gathering and pre-processing data, instantiating models

Adaptation Engine (transformation rules)

Final Remarks
It is a challenge to provide users adaptation without disturbing and confusing them, user evaluation is, then, necessary to achieve a higher level of usability.
A wide approach is necessary to cover and try to unify the current knowledge about context-aware adaptation.

Results
A systematic review is being performed continuously: 89 techniques were documented with templates, detailed, analyzed and compared
Models are being created in UML to model the context (Use Case, Class Diagram, State Machine, Sequence Diagram)
An Algorithms Library is being developed with the techniques gathered
Machine learning algorithms are being investigated to combine information and provide adaptation

Future Work
Implement the machine learning techniques
Define precisely the evaluation plan, perform evaluation Perform the case studies

A Computational Framework for Multi-dimensional Context-aware Adaptation

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