



A Computational Framework for Multi-dimensional Context-aware Adaptation

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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

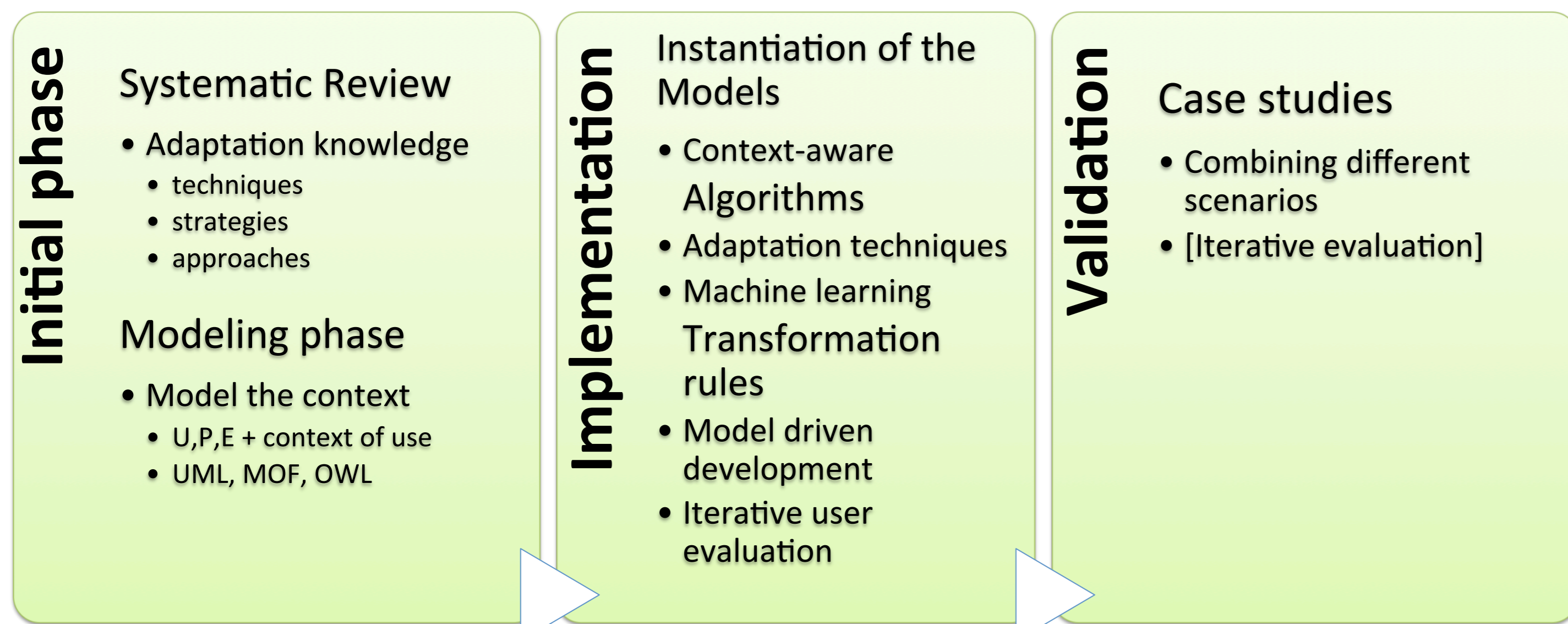
Challenges and Shortcomings

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

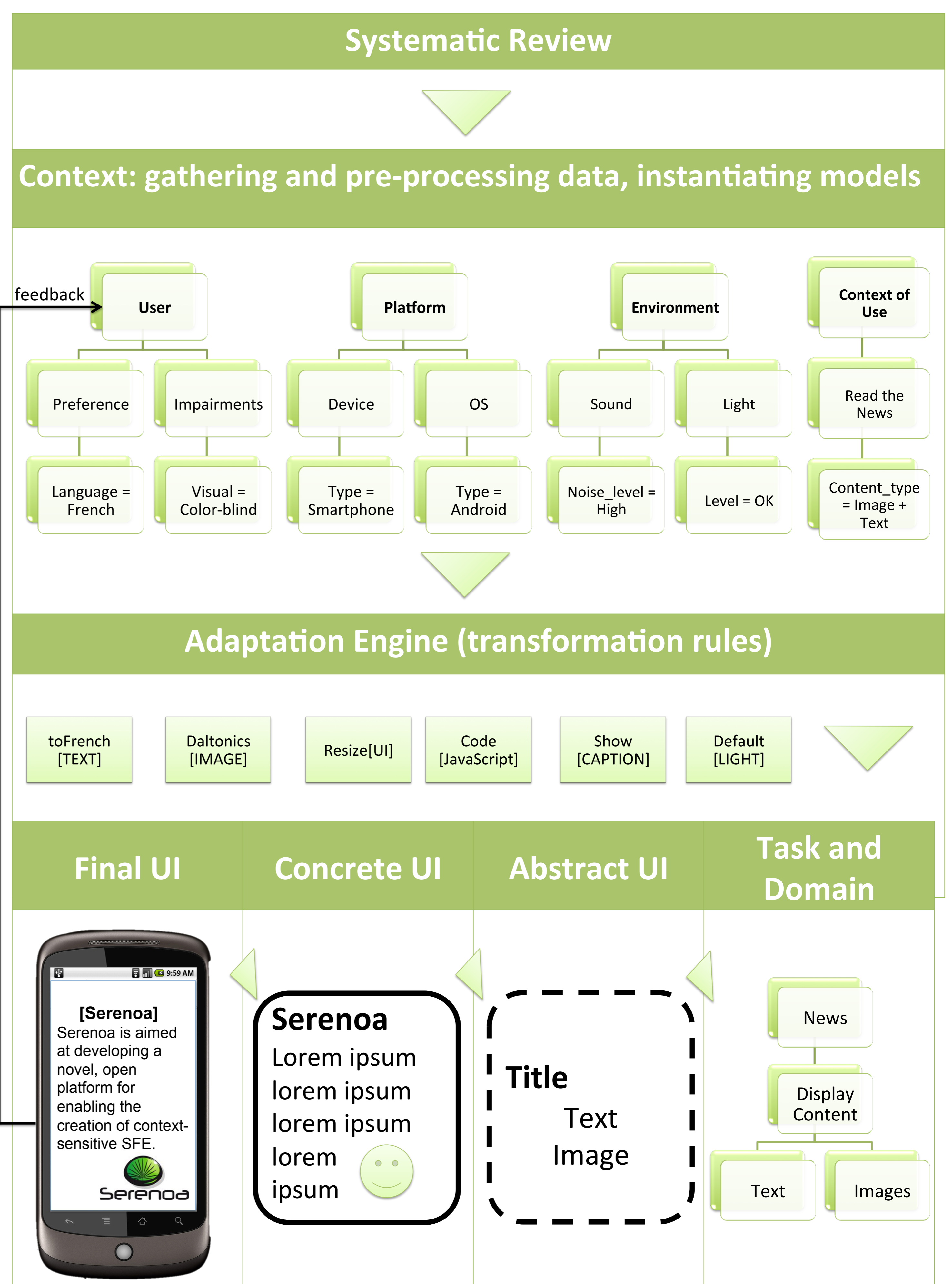
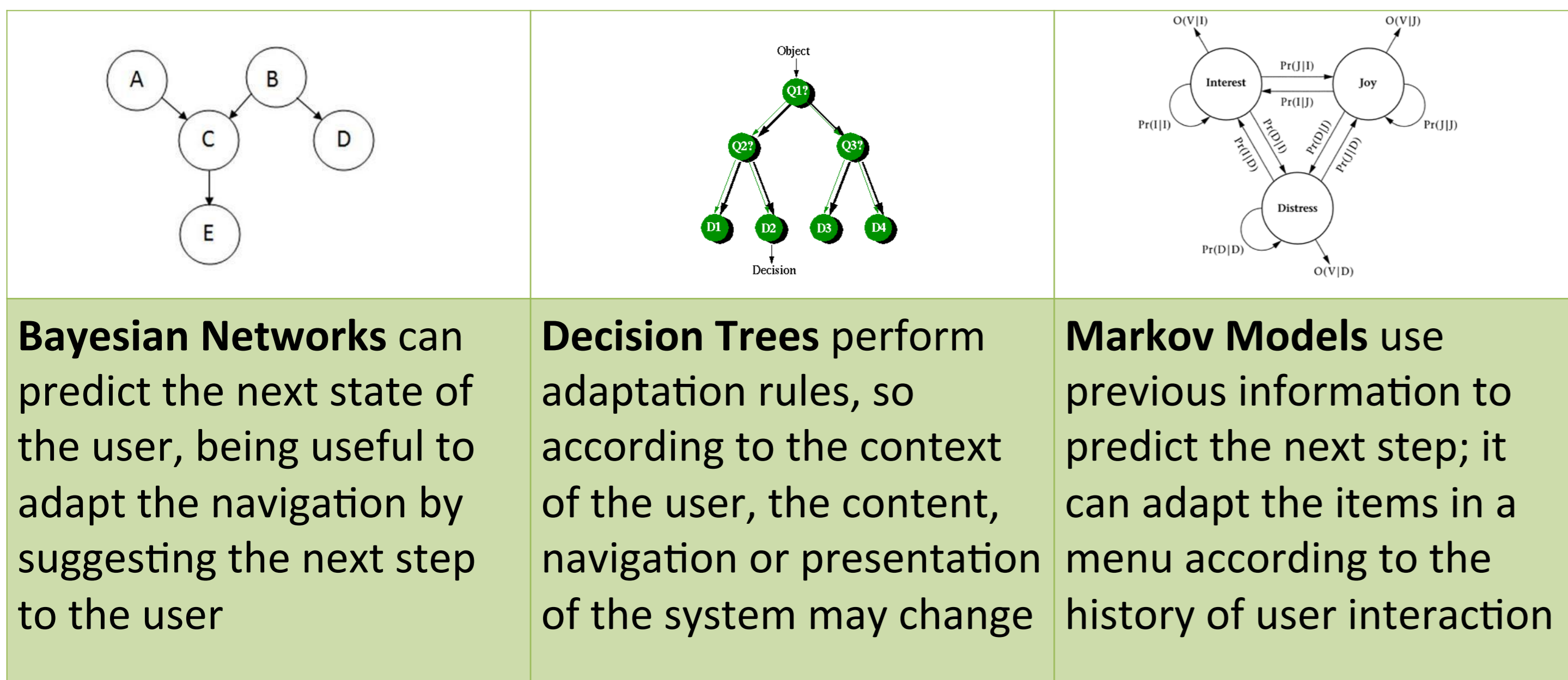
UML diagrams to model the context information

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



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

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.