An Evaluation Framework for End-user Experience in Adaptive Systems

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Abstract.
The evaluation of adaptive and personalised systems is a difficult, complicated and very demanding endeavour due to the complex nature of these systems and the usability issues encountered. This demonstration introduces a web-based framework to support the evaluation of end-user experience in adaptive and personalised systems. This framework has been developed based upon advice from domain experts and a review of evaluation approaches, methodologies and techniques adopted by existing adaptive systems. The benefits of the framework include: i) the provision of an interactive reference and recommendation tool to encourage the evaluation of adaptive systems; ii) the collaborative nature of the framework facilitates the sharing of evaluation information among researchers from diverse communities; iii) the identification of pitfalls in the planning process as well as in data analysis; and iv) the translation of presented information into users language of choice.

Keywords: Evaluation, Adaptivity, Personalisation, Translation, Recommender.

I Introduction

The research field of adaptive systems has grown rapidly over the past 15 years and this has resulted in terms, models, methodologies, and a plethora of new systems. Adaptive systems are becoming more popular as tools for user-driven access to information [1]. This has led to the challenge of catering to a wide variety of users in differing environments and user trust issues. Therefore the effective and thorough evaluation of adaptive systems is of utmost importance. It is essential to not only evaluate but also to ensure that the evaluation uses the correct methods since an incorrect method can lead to wrong conclusions [2-3]. This demonstration introduces an interactive web-based framework for evaluating end-user experience in adaptive systems.

2 Demonstration System: An Evaluation Framework For End-user Experience in Adaptive Systems(EFEx)

2.1 Aim and Functions of EFEx

EFEx is designed as a web-based user interface which allows users to collaborate and supports the user to: i) search for related research material such as, user-centred evaluation (UCE) studies and papers detailing the evaluation of similar adaptive systems; ii) get recommendations on how to best combine different evaluation methods, metrics and measurement criteria in order to most effectively evaluate their

system; iii) identifying a UCE methodology which details how to apply existing UCE techniques; vi) translate the whole user interface into their native language. EFEx supports 49 different languages.

When searching for related research material or evaluation recommendations, the following characteristics of the system must be provided by the user: (system name, developer, evaluation approach used, evaluation purpose, system description, application area, evaluation methods(techniques) used, evaluation metrics, evaluation criteria, year the evaluation was conducted and what was improved by the adaptation).

2.2   Technical Implementation

EFEx is implemented by integrating current technologies and software: (**NetBeans 6.9** - platform, **Apache lucene -**Search engine, **Apache_OpenJPA** - To store and Retrieve data from database, **Apache-Tomcat** - server, **Myfaces-core** - Java Server Faces (JSF) used to display data in the Web, **MySql-win32** - MySql database server, **MySql-connector-java** - Connector for java to communicate to mySql, **Json** - To parse language translations) Google Translate – to translate presented information into users choice of language . EFEx is designed as a typical 3-tier architecture(refer to poster) which consists of: *i) the presentation layer, ii) The business logic layer* which is pulled out from the presentation tier ,it controls the EFEx functionality by performing detailed processing and *iii) the data persistence layer* which keeps data neutral and independent from application servers or business logic.

2.3   Target Audience

The end-users of the EFEx framework can be classified into two groups: i) people developing adaptive technologies/systems who wish to test out the effect of the adaptive technologies/systems on end-users; ii) people who are developing the adaptive experiences using the adaptive technologies/systems

2.4   Use-Case Scenario

A user who has developed an adaptive system wants to use EFEx framework to find out: i) how to combine and apply existing evaluation methods (techniques), metrics and measurement criteria in order to evaluate the adaptive system and the metadata models (i.e. user, domain, strategy, task, content, device, system, navigation and presentation models) used by this system; ii)recommendations on how to evaluate adaptive systems and the models; iii) any evaluations of similar adaptive systems, models and authoring tools which have been published between 2000 and today; iv) any studies describing user-centred evaluation approaches which have been published between 2000 and today. Finally, suppose this user only speaks French and cannot read English content. The EFEx framework provides Personalised information to suit the user's requirements based upon their interests and preferences. Dagger et al. [4] acknowledge that personalised e-learning employs an active learning strategy which empowers the learner to be in control of the context, pace and scope of their learning experience.

2.5 Potential Educational and Industrial Benefits of EFEx Framework

The authors acknowledge that the evaluation of adaptive systems is a difficult task. For example, one major problem is to understand the adaptation mechanism of the system. More specifically, what is improved by the adaptation and what might have been the situation had a different adaptation occurred. Furthermore, several researchers have emphasized the difficulties caused by the complexity of such systems and the usability issues they raise [5-8]. EFEx has been developed as part of PhD research which proposes a user-centred evaluation approach to adaptive systems.

The EFEx framework provides users with: i) a centralised repository which stores current UCE studies of these systems, models and authoring adaptive technologies. Currently it is very difficult for evaluators and researchers to find this information in a central place and reporting of these studies seems to be "sloppy"[9]; ii) Users also get personalised recommendations. These recommendations reduce the time spent and the cost incurred while evaluating these systems, models and technologies. Researchers can collaborate while globally distributed and learn faster.

3 Technical Requirements and Acknowledgement

For demonstration of the EFEx framework, the author's personal laptop will be used. Access to the Internet will be required. This research is based upon works supported by Science Foundation Ireland (Grant Number: 07/CE/I1142) as part of the Centre for Next Generation Localisation (www.cngl.ie).

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