



Fraunhofer

PORTUGAL

ADaFE

ADAPTIVE DATA COLLECTION FRONT-ENDS

Context

Changing business requirements have always been a big challenge in the software engineering world.

Whenever an application is developed there is a constant risk that it needs to be modified either midway through the process or after it is already running.

However, current models are not able to cope with the faster and faster pace at which this is happening.

Adaptive Object Modeling (AOM) is a quite innovative way of modeling a system that allows the abstraction of predicted changes and passing their control onto a business manager rather than a programmer.

ADaFE intends to prove the feasibility and usefulness of AOM-based applications (e.g. see Fig1.) taking mobile design into account.

Forces

Building AOM systems poses certain challenges that software developers are not used to: metaprogramming, predicting changes in design phase, flexibility vs. applicability issues and end-user control.

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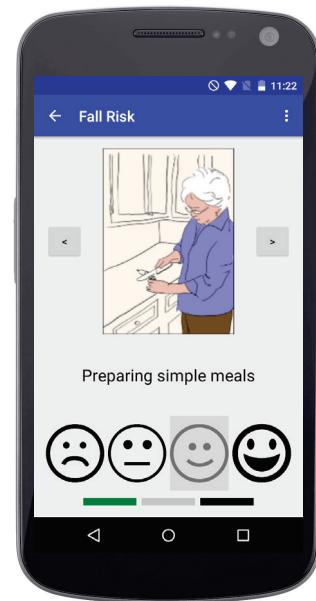


Fig1. Example app.

The added complexity resulting from these is the main reason why people have shied away from research on the field.

Artifacts

ADaFE's concrete products are a Ruby on Rails web platform and an Android library.

On the web platform a knowledgeable administrator can input the classes that make up the system, thus creating the application model. It becomes automatically available through an Application Programming Interface (API).

The Android library handles the connection to the server and parses the received data. It recreates the app model in Java and provides its own API to let the application it is installed on access the model (see Fig2.).

The solution

Fig2. shows a high-level overview of the ADaFE solution. A web platform that can automatically deploy changes to a running mobile app.

Project keywords

- Adaptive Object Modeling
- Design patterns
- Mobile Human-Computer Interaction (HCI)
- Data collection
- Agile
- Ruby on Rails platform
- Android library

Fig2. Solution diagram.

Questionnaires App

To show the applicability of ADaFE an example application about questionnaires was built, based on Fraunhofer Portugal AICOS' Sleep Behavior and Fall Risk projects.

The goal of the app is to gather user input from several questionnaires. Given that a number of things about them is prone to change (see Fig1.), ADaFE comes in handy.

Some extra features such as push notifications and saving the results to a CouchDB database were added.

The flowchart from Fig3. explains how the usage of this ADaFE-based application runs.

First a manager makes changes on the web platform (which has been adapted to suit this specific case), whether it is for example adding a questionnaire, changing task order or removing an answer option; then the user is notified that a change occurred and refreshes the mobile application; finally the updated model is fetched by the library and displayed.

The example shows how agile we can be since the developer is pretty much no longer needed from the moment the app is deployed.

The application is hence adaptable and controlled by its business manager.



Future Work

Understanding how ADaFE aims at being a generic framework that can be applied to numerous cases, the next step would be to plug it into an already running application, transforming it from a 'regular' app into one with adaptive features.

Hopefully the whole project can work as an inspiration to future developers who can extend it further than the data collection scope, so we can walk in the direction of having more and more apps with a reduced cost of change.

QUESTIONNAIRES APPLICATION WITH ADaFE

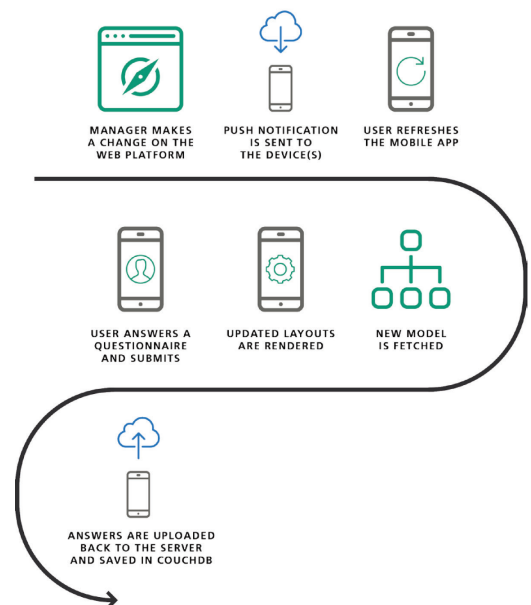


Fig3. ADaFE usage flowchart.