DIGITAL QUESTIONNAIRE SYSTEM WITH EMOTIONAL RECOGNITION

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Motivation

The production of new game machines always carries the risk of failure. Testing is the golden rule. The final stages of production of a new product are the last chance to correct serious errors.

The acceptance of users defines the success. Since no simple formula for the measurement of success exists, companies invite a small sample of selected users to test new games and evaluate the created impressions.

We want
larger samples,
see **data mining** in action and
**automate** the routine work!

Target is to bring the evaluation 2 steps forward:

Digitize the process of creation and completion of evaluation (including asking questions when a special event in game occurs) and utilize the modern proceedings of emotional recognition.

Methodology

An editor (1) should allow the edition of questions and questionnaires. It should be able to create an XML-File out of a questionnaire. The XML-File will be transferred to a game machine with an USB-Stick.
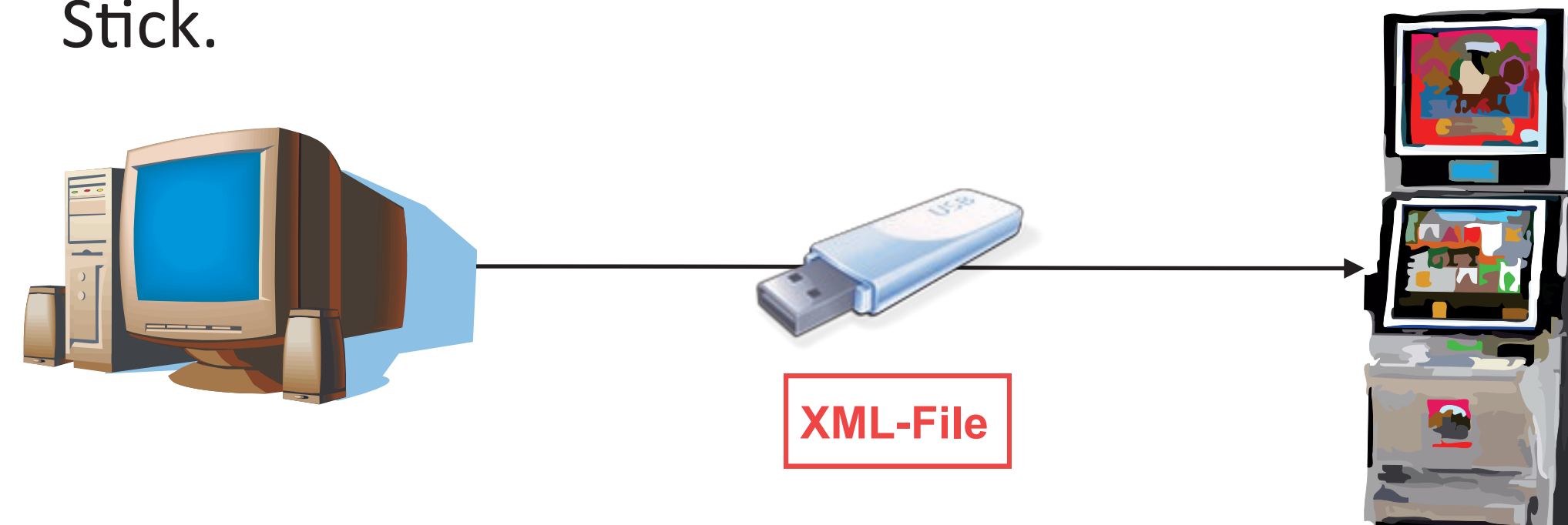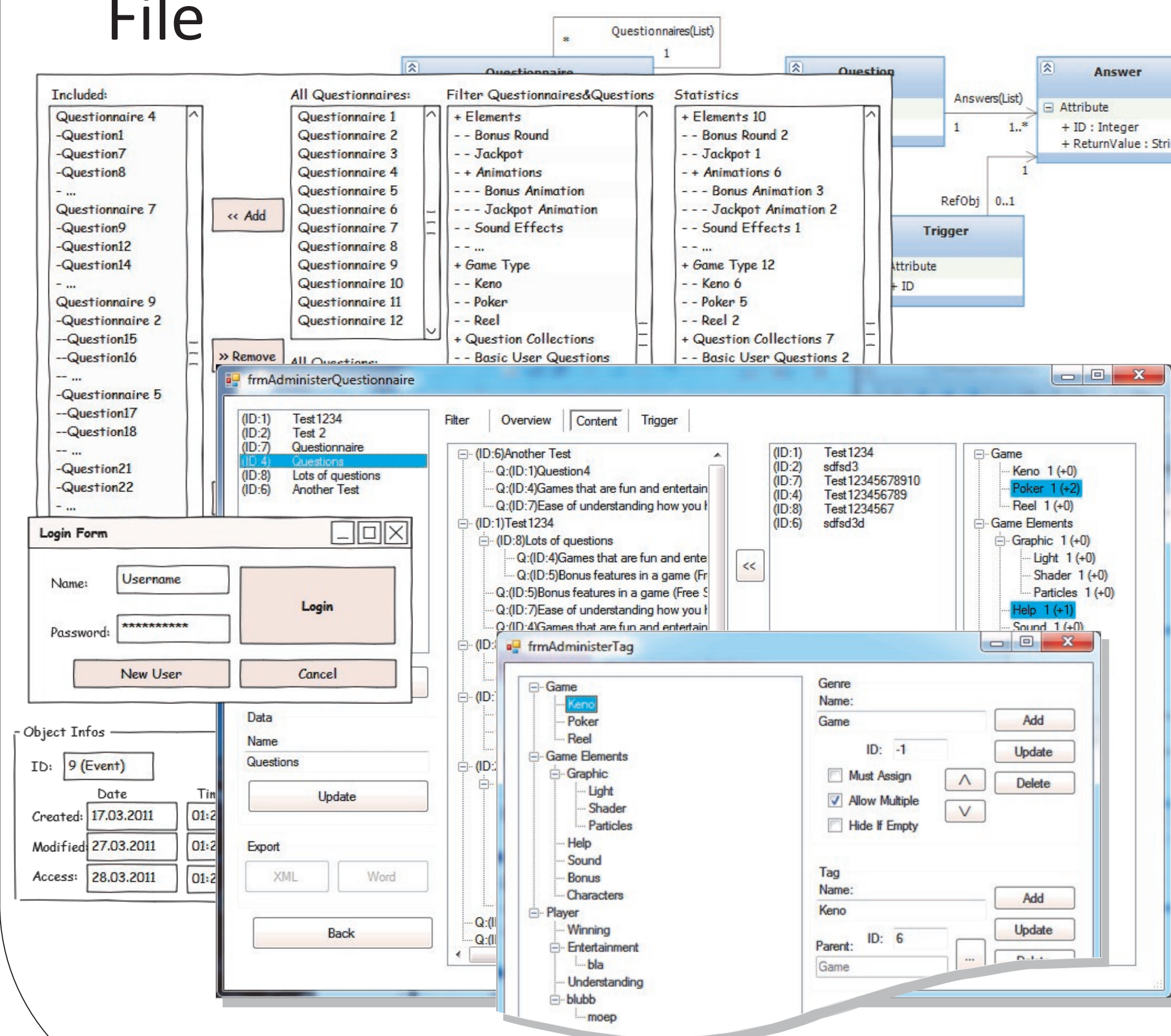
XML-File

The game machine needs a custom component (2) to understand the XML-File and take pictures.

Finally another software (3) „reads" the stored pictures and calculates the most likely emotional state of the tester.

1. Digital Questionnaire Editor

. Simple User Management
. Keep Track of Changes
. Free Defineable Hierarchy (Tags)
. Manage Question, Question-Packs
. Export Questionnaires to an XML-File

## 2. Software-Component for the Game Machine

(Development will begin in May)

The Software-Component should...

. Read the XML-File
. Display questions, triggered!
. Record the answers
. Capture images
. Add Timestamps to recoreded data

3. Emotional Recognition Component

. Normalize picture
. Find the face
. Find fiducial points
. Measure distances
. Train HMM or Neural network
. Output of a floating point value for a scale from unhappy to happy

Facial muscles (1)

Fiducial Points (2)
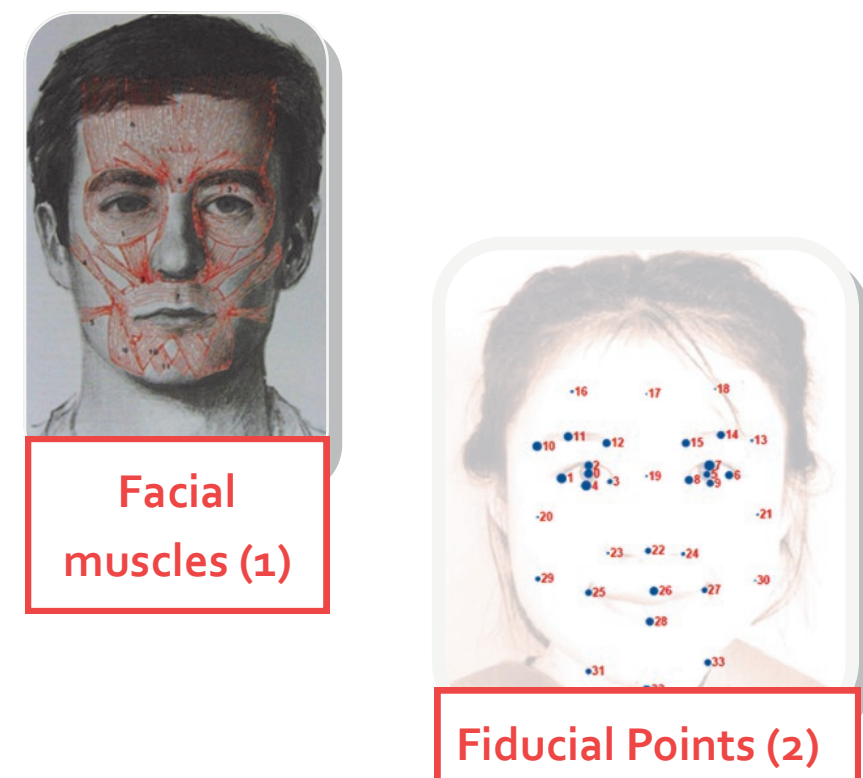
(1) Faigin, G. (1998). Mimikzeichnen leichtgemacht. Köln: Evergreen, Benedikt Taschen Verlag GmbH.

(2) Zhang, Z. (1998). Feature-Based Facial Expression Recognition: Sensitivity Analysis and Experiments With a Multi-Layer Perceptron. Redmond, USA: Microsoft Research.

Accuracy of Recognition

. There is no „ideal" method.
. Creation as external software -> changes are easy to implement.
. The fewer the dimensions, the higher the accuracy
. 7 emotions: 2003: 40-75% (3)
                        2006: 76-94% (4)
. 3 emotions should deliver 80-95%

(3) From Cohen, I., Sebe, N., Garg, A., Lew, M. S., & Huang, T. S. (2002). Facial Expression Recognition From Video Sequences. University of Illinois, USA and Leiden Institute of Advanced Computer Science, Netherlands.

(4) Guo, Y., & Gao, H. (2006). Emotion Recognition System in Images Based On Fuzzy Neural Network and HMM. IEEE, 5th Int. Conf. on Cognitive Informatics.