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Evaluation of POI Systems by Logfile Recording

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Abstract

Logfile recording is a valuable means for evaluation of point-of-information systems provided that logfiles can be analysed efficiently. An application for half automatic evaluation of logfiles having a certain format can be done using a standard database. This application has been used to evaluate logfiles of different POI systems in museums. Results of this evaluation have influenced the design of a new type of POI system.

1 Evaluation of POI systems

Companies or institutions operating point-of-information systems are interested in how people use the system. In order to determine the cost-benefit ratio of such a system, they have to know whether users actually get some information from the system, and which. Thus there are two issues for evaluation of POI systems, usability of the system as a prerequisite and selection of information as a clue to preferred contents.

1.1 Usability

The quality concept of usability of computer applications can be divided into the factors effectiveness, efficiency and satisfaction. Effectiveness and efficiency both normally refer to the user's task. In POI systems there is no given task. People using a POI system make up their goals and intentions by themselves. Whereas evaluation of office applications concentrates on effectiveness and efficiency, in POI systems we have to give priority to satisfaction.

Unfortunately, subjective evaluation methods which directly deal with satisfaction are rather expensive, like interviews and questionnaires which require a certain amount of personnel. On the other hand, it is a reasonable assumption that people won't use a system if they don't have to unless the use of the system is satisfying them. That means, the duration of use of a POI system can be a hint on satisfaction as long as the user doesn't have special needs for getting some information like the time of departure of a train, for example.

The duration of use can be recorded by technical means like logfiles or video recordings. Such objective methods may also be used to find out where users have problems and get stuck. Nevertheless, they require a certain amount of work to be evaluated. We shall discuss this further in chapter 2.2.

1.2 Contents

Objective methods like logfiles offer the opportunity to check which contents are preferred by users. On the other hand, such methods only do report that a user has called up a certain screen page, but they don't tell whether the user has read the information. Nevertheless, the duration of stay on a certain screen page can be a hint at reading behaviour.

2 Use of logfiles

We used logfiles as one of several means in evaluating POI systems at the German Salt Museum (Heinecke, 1995). Despite of some limitations they proved to be a valuable means with a good cost-benefit ratio.

2.1 Advantages and limits

Logfiles show how users actually interact with an application. They provide answers to questions concerning both navigation and content.

Regarding navigation we can get answers to questions like: Do users use links, or do they prefer turning pages in sequential order? Do they browse through pages, or do they search in tables of contents? How often do they click at locations where there is no means of interaction? By further analysis of the latter question we get hints at ergonomical improvements of the user interface, too.

Logfiles also provide answers to questions concerning contents: Which topics are called the most? How long do users stay at certain pages? Analysis of such topics shows the users' interests and can be used to make the system more attractive.

On the other hand, there are several limits. If logfiles indicate a certain duration on a screen page, we don't know whether the user has spent this time on reading

the page or on talking to friends. In fact, we even can't determine the number of users precisely. It is reasonable to assume that after a break of more than 60 seconds the next sequence of actions is performed by another user, but continuous sequences of actions may also have been performed by different users who have changed on the fly. Nevertheless, we think to have got a good overview of user behaviour, but this still has to be proved by additional observations of users.

Logfiles can't give any hints why people do certain interactions. If this question becomes crucial, there will be a need for interviews or, at least, questionnaires.

2.2 Practical needs

In order to make practical use of logfiles, analysis of recorded data must be easy and should require minimal amount of personnel. Providers of POI systems should be able to evaluate the use of their applications by themselves.

Therefore we developed an interactive database application for this purpose (Lösse & Stamm, 1999). This program imports logfile data into a database and provides several standard evaluations like duration of use per every single user and in total, number of interactions per every single user and in total, number of calls and duration of stay per page and so on. Such standard queries don't need database knowledge. On the other hand, special queries can be performed by use of SQL.

The evaluation program assumes that logfile data have a certain format. We tried to define this format in a most flexible way in order to allow logfile recording to be integrated in as many POI systems as possible. If standard authoring systems are used for a POI application, logfile recording will need about 5 to 10 per cent additional programming. Compared to other means of evaluation, logfile recording thus provides a good cost-benefit ratio.

3 POI systems in museums

POI systems in museums differ from public information systems in train stations or at tourist information offices in such a way that the user has no need to use them. They have to attract the users and to keep them for a while in order to impart some facts on them which the providers of the system estimate to be important. If they are of poor usability or if they don't match the users' interests they will leave them at once.

3.1 Experience of two applications

Applied to the POI systems at the German Salt Museum the program for evaluation of logfiles provided

some interesting results on how visitors use POI systems in museums in general. For example, we found that most of the user actions have been pressing the forward button quite rapidly. The duration of stay per page has been rather short and the duration of use per visitor as well. That means, many people just turn some pages and leave. Nevertheless, there have been many questions whether the system could be bought on CD-ROM in order to use it at home. This type of behaviour is just the way we deal with new books to decide whether to buy and read them or not.

Application specific data concerning actions with no effect ("errors") like clicking on objects which aren't controls gave us some valuable hints at a re-design of the user interface of one of these applications. We soon shall compare logfile data of the original version to those of the re-designed version. A screenshot of the re-designed version of "Lüneburg - a large city around 1600" is shown in figure 1.



Fig. 1: Application "Lüneburg around 1600"

The re-designed version runs as a POI system with a trackball as input device. It is sold on CD-ROM, too. In fact, the application has a typical hypermedia structure of an electronic book with many controls and links. Operated as a POI system it may serve as an appetizer for the CD-ROM but can hardly impart a few of its many facts to the users. As a sole POI application it would be a waste of money.

3.2 Design of a new type of POI system

Based on the experience gained by the applications running at the German Salt Museum we tried to outline a new design for POI systems in museums. In order to overcome the typical browsing behaviour the application should have no forward button. In fact, it should have as few controls as possible. From the museums point of view the POI application should not dominate the objects on exhibition. So why shouldn't the user interact with a real object instead of using a terminal?

Thus we decided to put an engraving underneath a touch-sensitive plate of glass. Fig. 2 shows the installation at the Museum of Arts and Cultural History of the City of Dortmund. The user directly interacts with a map dating from 1610 (left). Output is projected onto the wall behind the model of the city (right).



Fig. 2: Installation “Dortmund around 1610”

As there is no touchscreen but a physical map for interaction, the users can only point at locations of their interest on the map. If this location is one of the 51 objects which provide information, a screen page with a caption, an animating question, a short text and two pictures is displayed on the wall (Fig. 2). There is one single control beneath the map marked with an *i* for information. Users can switch to a second page for each object by pressing the *i* control. The meaning of this control is explained at the bottom of the output projected onto the wall. If a user points to a location which contains no information a message is displayed. In this case the user gets a display of the map with red circles marking each touchable object by pressing the *i* control.

4 Evaluation of “Dortmund around 1610”

“Dortmund around 1610” has been installed in Summer 2000. The following chapter gives an overview of logfile data recorded in the first half year of operation.

4.1 Some results

About 2.000 visitors have used the system. On average each user performed about 22 interactions and spent about 5 minutes on the system. About 22.000 times users selected an object from the map, about 12.000 times they pointed at a location where there was no object. About 7.500 times they used the *i* control, thereof 6.000 times for getting the second page of information and 1.500 times for getting the information about clickable objects.

As expected, large and well-known objects like the main churches have been selected quite often. Differences between the numbers of selections of each object range from 3372 (steeple of St. Reinoldi) to 13 (Beetenstraße, a street which shows no remarkable attributes on the map).

The attractiveness of topics may be measured by the number of selections of the second page. The frequency of calls ranges from 18% to 56%. Assumed that not every user took notice of the fact that there is a second page to be called by the *i* control, these are rather high numbers. It may be an interesting hint at the attitudes of people using a POI system stating that the objects with most calls of the second page have been Hinrichtungsstätte (site of executions) and Galgen (gallows).

The average duration of stay at a page ranges from 12 to 30 seconds. Second pages generally have longer duration which indicates that people who are interested in calling the second page obviously read the text on it.

4.2 Comparison of both designs

At first glance it looks like the average duration of stay of visitors at the system is slightly higher at “Dortmund around 1610”. The average duration of stay per page is higher, too. The average number of actions per visitor is smaller. These results suggest that visitors make better use of a system with less means of interactions. Whether the differences are significant will soon be tested with a larger amount of data.

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6 References

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