

Wrapper - An Application for Use in Information Searching Studies

Manual and Documentation

**Version 1.1
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**Part of the AI²RS Project
School of Information Sciences and Technology
The Pennsylvania State University**

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Wrapper Application: Part of the AI ² RS Project	Version: 1.2
User Manual and Documentation	Date: 03-29-2005

Revision History

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03/29/05	1.2	An Internet explorer based tool for real-time Web usage tracking and logging.	Raghavan Ramadoss
03/30/04	1.1	An Internet explorer based tool for real-time Web usage tracking and logging designed for updated AI ² RS system	Christopher R. Catalano
02/30/02	1.0	An Internet explorer based tool for real-time Web usage tracking and logging designed for updated AI ² RS system	George K. Kroner
05/30/00	0.0	An Internet explorer based tool for real-time Web usage tracking and logging designed for updated AI ² RS system	Bernard J. Jansen

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Disclaimer

The Wrapper is a freeware tool, with its source code readily available for noncommercial use. It thus provides researchers with the flexibility of modifying the Wrapper according to the research requirements and at the same time, using the Wrapper as is for immediate implementation in user studies.

The Wrapper is a freeware tool, with its source code readily available for noncommercial use. It thus provides researchers with the flexibility of modifying the Wrapper according to the research requirements and at the same time, using the Wrapper as the base for coding more powerful tools and features. It is requested that you acknowledge the efforts put in by the authors in any of the modified tools or publications that results from research where the tool is used.

An appropriate citation is:

Jansen, B. J. Forthcoming. *Search log analysis: What is it; what's been done; how to do it.* Library and Information Science Research.

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Preface

The *Agent Improved Information Retrieval System* (AI²RS) project began as the doctoral dissertation of Dr. Bernard J. (Jim) Jansen, currently Assistant Professor at the School of Information Sciences and Technology, The Pennsylvania State University. Some intensive research on the possible extensions of the AI²RS project gave birth to the tool called Wrapper. The motivation for the Wrapper was a need for user study tracking tools specifically tailored to the needs of the information research community.

Wrapper is a stand-alone tool, built on the Visual Basic platform, and employed for monitoring and reporting the interactions of searchers with Web information systems (i.e., any information system using a browser interface). These usage interaction statistics can then be used for research purposes, such as improving of the Web-based systems.

Currently, the Wrapper's capability is restricted to monitoring of the Internet Explorer browser user base, which constitutes more than 90% of users as of 2005, on the Windows platform. Naturally, one can extend the Wrapper to any browser that allows access to its Application Program Interface (API). We are undertaking plans to extend the Wrapper to Firefox and other browsers and operating systems.

A user study for the Wrapper was performed on Penn State undergraduate and graduate students as the test subjects, reported in:

Jansen, B. J. and McNeese, M. D. Forthcoming. *Evaluating the effectiveness of and patterns of interactions with automated assistance in IR systems*. Journal of the American Society for Information Science and Technology.

Screen shots of Wrapper in action are in [Appendix A](#).

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1. Introduction

The Wrapper is a state-of-art Web usage tracking system, with a user-friendly interface that maintains a transaction log for real-time Web interaction usage statistics. The interface application resides on the client side and works hand-in-hand with the Internet Explorer (IE) to provide feed back on the Web surfing style of the client. The Wrapper is aimed at the research community, who can utilize the Wrapper as a tool to study Web usage pattern and improve their Web-based applications based on studies of actual or in a general study of any particular user community.

The Wrapper works only with the Internet Explorer, on a Windows 9x/2k/XP platform as of the current date of this publication. We intend to extend its functionality into other browsers and operating systems.

The Wrapper is incapable of distinguishing secure and insecure submissions on the Internet, so it logs every user activity unbiased. In other words, the Wrapper will also log user passwords and other critical information about the user. But, we choose to discount this security issue because; the Wrapper is a tool that is purely intended to be used for research purposes in user studies, guided by appropriate IRB guidelines.

The Wrapper, as of now is a separate tool, which one can invoke as required by a particular user study. The Wrapper currently has the capability to start automatically the browser. However, the Wrapper is not started automatically with the browser.

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2. Product Specifications

2.1 Functional specifications

The Wrapper records any functionality that can be of use from a researcher's point of view. Some of the most significant functionalities include:

1. Logging of all Websites visited by the user
2. The queries used for searching the Web
3. Adding and organizing bookmarks
4. Saving or printing the URL.
5. Using the search option in a Webpage, and its associated query.
6. Real time logging with entry accuracy in seconds.
7. Detection of mailing the link to a user.
8. Choice of destination folder for the log file.
9. Option of background tracking (making the application invisible).
10. Logging of clipboard usage.
11. A list of all running processes.
12. Auto informing user when, IE is not the default browser, and provides with the option of launching IE.
13. Provides user the location of the default browser in main window.
14. Main window provides user with all the information that is being logged.
15. Ensures uniqueness of log file created, by using current date + time as the log file name.
16. A preview of contents to be written onto the log file.

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2.2 Non-functional Specifications

2.2.1. Usability

We developed the Wrapper the users (i.e., the study moderators) in mind. We have created a very user-friendly system that is very intuitive (we hope!) to most, and the transaction log files created are very readable (ASCII text). The transaction log files provide a neat depiction of event occurrence in an orderly fashion.

When the Wrapper is set into invisible mode, it provides user with the information that the client can now be disabled only using the Windows task manager (invoked by <ctrl> + <alt> +). After the confirmation from the user, the tool becomes invisible. It is now up to the user to keep track of the running client, because it will be silently monitoring user activities in background, until the user explicitly disables it.

2.2.2. Reliability

The tool has stood the test of time, and has never crashed in the due course of the several user-studies. Other than this, we have also performed standard test procedures (unit, integration, stress, and user) testing on all the functionalities of the client. The tool performed to the expectations in each of these tests.

2.2.3. Performance

Response time of the system depends on variety of factors, ranging from the processor used by the client to the operating system. In a typical environment of Intel Pentium 4, with a Windows XP operating system, the tool required 6MB of effective memory throughout its life cycle. So effectively, any system with more than 6MB of available RAM can run the application comfortably.

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2.2.4. Design Constraints

The application is coded completely in Visual Basic v6.0, from the Microsoft Visual Studio suite.

3. System Overview

The Wrapper can be claimed to be a plug-and-play type of application (i.e. it requires no tedious installations), and can be run from any directory, without any pre-requisites. Further, the Wrapper comes in the form of a convenient single file, which one can invoke as per user requirement (all it takes is a double click).

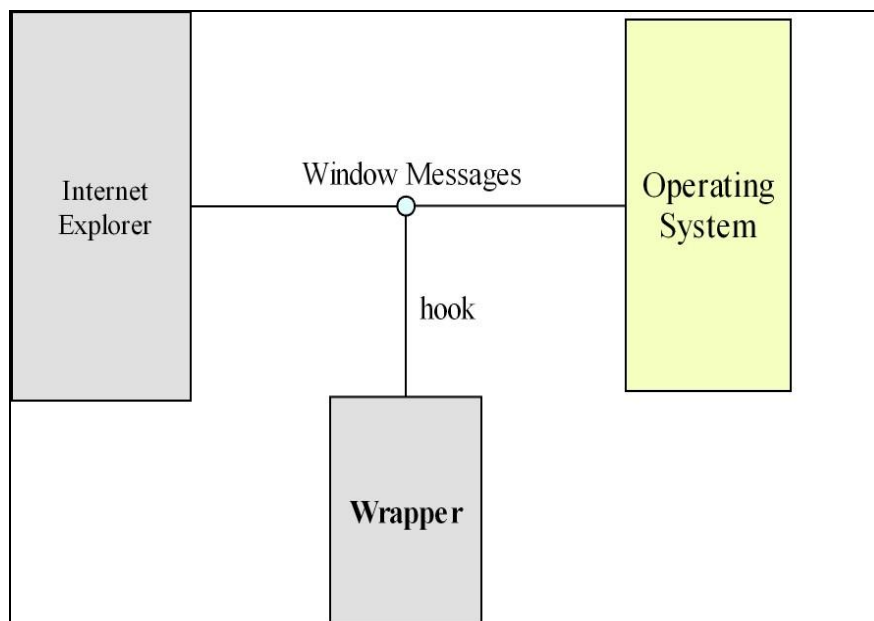


Figure 1: Operation of the Wrapper tool

The operation of the Wrapper is based on the fact that anytime you click on a window, move it, size it, or do anything at all to it; Windows generates one or more messages and sends them to the target window.

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Associated with every window is a message handling procedure, called a window procedure, which runs whenever a message is sent to it. In brief, a hook into the API allows an application, such as the Wrapper, to see all messages sent to an entire thread, regardless of the active window. When using hooks, you do not replace the window procedure with your own. Instead, you add your procedure to the top of a chain of procedures. Each hook procedure is responsible for calling the next procedure in the chain.

The Wrapper uses this concept of hooks to trap Windows messages, interprets them, and logs actions correspondingly (ignoring redundant entries). Using this feature, the Wrapper is capable of capturing all the events occurring in the Internet Explorer processing thread.

The source code for the Wrapper and a copy of the documentation are available at http://ist.psu.edu/faculty_pages/jjansen/academic/wrapper.htm.

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Appendix A

Screen Shots

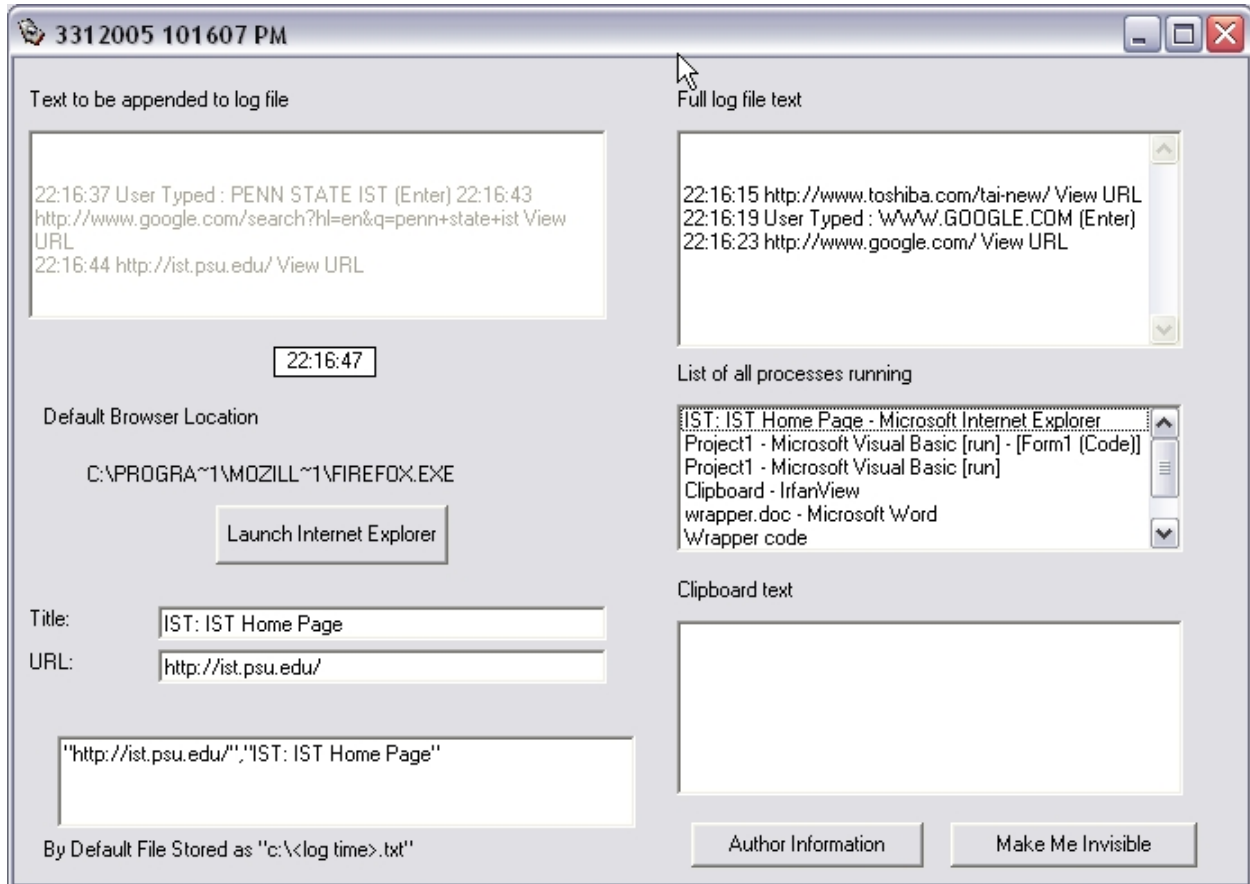
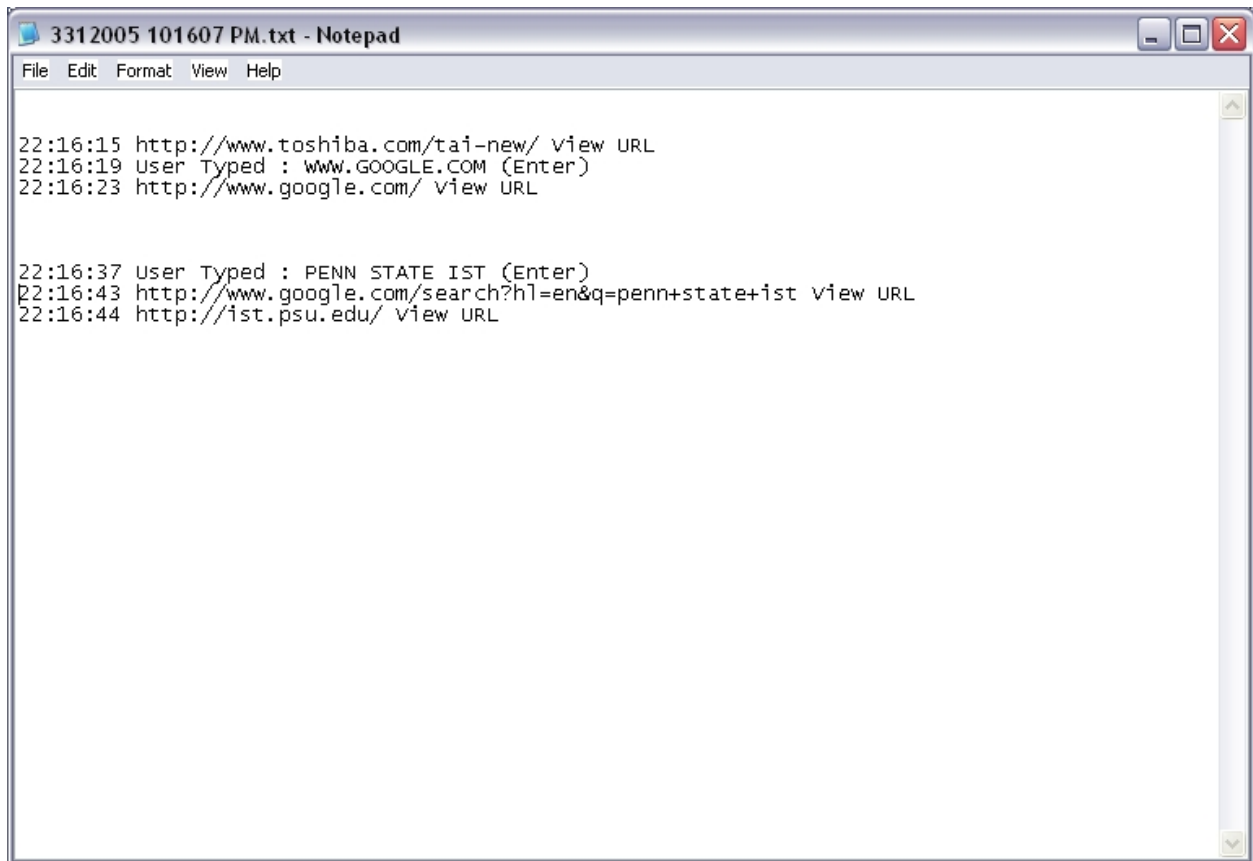


Figure 2: Screen of Wrapper in action

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The screenshot shows a Notepad window titled "3312005 101607 PM.txt - Notepad". The window contains the following text:

```
File Edit Format View Help

22:16:15 http://www.toshiba.com/tai-new/ view URL
22:16:19 User Typed : www.GOOGLE.COM (Enter)
22:16:23 http://www.google.com/ view URL

22:16:37 User Typed : PENN STATE IST (Enter)
22:16:43 http://www.google.com/search?hl=en&q=penn+state+ist view URL
22:16:44 http://ist.psu.edu/ view URL
```

Figure 3: Screenshot of the output txt file