

# Automating Design Rationale Capture

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## ABSTRACT

By analyzing user data collected from a fully-observable design environment, this project hopes to develop a tool that will automatically capture design rationale. The project's current status leaves the experimental data represented as a directed graph, waiting for further developments.

## Introduction

Today's CAD models are excellent at capturing the end result of a design process, but they are poor at capturing the rationale and underlying intent of decisions made throughout the design process. These design decisions could be manually recorded by the engineers, but this process is time-consuming and distracting. The goal of this project is to automatically capture more of the process by which a particular design was reached (and the lessons learned by the designer during this process).

Some relevant work in this area include [1] in which the authors observe interface information along with metadata of opened files in order to provide the user with relevant documents while she undertakes a task. [2] uses a combination of user activity logs and data mining to automatically generate design activity knowledge. Even Amazon, Google, and Myspace are examples of implementations of automatic profile generation analyzing user activity with no time cost to the user.

## Data Collection

For this project, the CBBC BAMZOOKi application was chosen, as it emulates a real-world engineering environment while allowing for full observation of all design tasks. With a logging-enabled version of the CBBC BAMZOOKi Zook-kit, all modifications to the Zook creature and interactions with the interface are recorded and given a time stamp. During two major science fairs over one thousand log files have been collected, providing a large source of data that can be easily processed and manipulated.

## Data Manipulation

As shown in Figure 1 the XML logs can be represented in a directed graph structure. Patterns in the design process have become cycles in the graph.

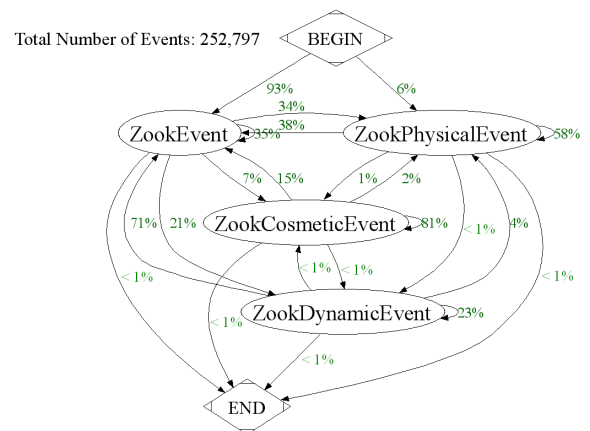


Figure 1: A directed graph portraying observed user behavior based upon data collected from the log files.

## Conclusion

The advantages of representing user activities as a directed graph include being able to leverage existing research into workflow systems. Additionally, training the trial data onto a neural network to classify a series of activities as progress towards a particular design goal seems plausible. Eventually, a clear design rationale process should be extracted from this user data, and placed into a tool that will be able to predict and record a user's current design goal, automatically.

## 1. REFERENCES

- [1] D. Campbell, S. Culley, C. McMahon, and P. Coleman. A methodology for profiling computer based design activities. In *International Conference on Engineering Design (ICED 05)*, 2005.
- [2] Y. Ishino and Y. Jin. *An Information Value Based Approach to Design Procedure Capture*, volume 20, pages 89–107. 2006.