ImitGraphs
Towards Faster Usability Tests of Graphical Model Manipulation Techniques

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MiSE’2017
Outline

- Introduction
- Motivation
- Goal
- Approach
- Conclusion
Introduction

How long ago was the 80s?

1983

2017
Introduction

1983

2017
Introduction

1983

2017
Introduction

1983

2017
With a more efficient tool, tasks can be fulfilled faster or with higher quality.
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Motivation

A usable UI interaction technique should be

Efficient and

Understandable

Reliable

Learnable

Flexible

Memorable

Easy to use
Motivation

An example of a UI technique
Motivation

**Testing at a late stage of software development**

- No need for creating a prototype that will be thrown away
- Incorporating the new technique is costly
- Optimizing it after the test is costly too

**Testing at an early stage of software development**

- Having an optimized UI before the modeling tool being implemented
- Creating a feature-full prototype is costly
- Creating a simple prototype makes the results of the test not generalizable
Motivation

Research Question

How to make testing of the UI interaction techniques possible at early stages by using a special type of graphs that are simple to implement but complex enough to represent graphical models?
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Goal

Complexity of the models

Cost of Creating a working prototype

- imitate the behavior of graphical models when being manipulated
- has the potential to represent a large group of graphical models
- be simple enough to allow quick implementation of new interaction techniques
- be easy to learn by the participants

Simplify the models that the prototype can handle
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**Task:** Before issuing the invoice, if the user is a member, the system applies a discount.
**Approach**

**Model-space operation**
The operation that modelers intend to perform on models in their mind and it does not depend on the tool.

**Tool-space operation**
Each model space operation is broken down depending on the features of the tool into tool-space operations.
Approach

Model-space Operation

Tool-space Operations
Behavior of the Models:

The mapping between model-space operations and the sets of tool-space operations that fulfill those model-space operations.
Definition of ImitGraphs

- Node
  - Color
  - Label
  - Size
  - Connection type
  - Joint type
  - Connection Point

- Joint
  - Color
  - Label

- Connection
  - First Joint
  - Second Joint
  - Orientation
  - Color

Approach
Approach

Examples of ImitGraphs and their equivalents:
Approach

ImitGraph Models

Model-space operation

ImitGraph Commands

Software Engineering Models

Model-space operation

• Another document
• An observation
• Result of thinking and reasoning

Do not suggest

• A specific layout
• Specific tool-space operations
• A specific order of operations
Approach

Create [Node]

Branch [node][connection][node]...[node]
Approach

Referenceable and non-referenceable nodes

The fork node after “Receive Order”
Approach

Find Node [Node]

1 2 3
Find Node 2

1 2 3
Insert [Node] [Node] [Connection] [Node] ...

1 2 3
Find Connection 2

1 2 3
Find Node

1 2 3
Current Node

1 2 3
Current Node

1 2 3
Insert
Sample Scenario

Task
Find Connection ②
Insert B ①
Branch Recent A ③
Recent ④

1 1 1 1 1 1 1 1 1
2 2 2 2 2 2 2 2 2

1 1 1 1 1 1 1 1 1
2 2 2 2 2 2 2 2 2

1 1 1 1 1 1 1 1 1
2 2 2 2 2 2 2 2 2

1 1 1 1 1 1 1 1 1
2 2 2 2 2 2 2 2 2

1 1 1 1 1 1 1 1 1
2 2 2 2 2 2 2 2 2

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2 2 2 2 2 2 2 2 2

1 1 1 1 1 1 1 1 1
2 2 2 2 2 2 2 2 2
Outline

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Activity Diagram

Simple Graph

ImitGraph

Receive Order
Issue Invoice
Receive Order
Issue Invoice
Receive Order
Issue Invoice
Receive Order
Issue Invoice
Receive Order
Issue Invoice
Receive Order
Issue Invoice
Receive Order
Issue Invoice
Receive Order
Issue Invoice
Receive Order
Issue Invoice
Receive Order
Issue Invoice
Receive Order
Issue Invoice
Receive Order
Issue Invoice
Receive Order
Issue Invoice

Apply Discount

Apply Discount
Conclusion

The benefits of using ImitGraphs:

- Fast development of a working prototype to evaluate new ideas
- Evaluating the effectiveness of the new ideas on a wider range of graphical models
- Possibility to recruit participants with no prior knowledge about the intended graphical models

In exchange for:

- Teaching ImitGraphs definition and its commands to the participants before their first experiment
- Developing a working prototype for ImitGraphs which is not a part of the final product
Conclusion

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Thank you!

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