



**Vinícius Costa Villas Bôas Segura**

**UISKEI: Sketching the User Interface and Its Behavior**

**DISSERTAÇÃO DE MESTRADO**

Dissertation presented to the Postgraduate Program in Informatics of the Departamento de Informática, PUC-Rio as partial fulfillment of the requirements for the degree of Mestre em Informática.

Advisor: Simone Diniz Junqueira Barbosa

Rio de Janeiro  
March 2011



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To my grandma, one of my first teachers.

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## Abstract

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During the early user interface design phase, different solutions should be explored and iteratively refined by the design team. In this rapidly evolving scenario, a tool that enables and facilitates changes is of great value. UISKEI takes the power of sketching, allowing the designer to convey his or her idea in a rough and more natural form of expression, and adds the power of computing, which makes manipulation and editing easier. More than an interface prototype drawing tool, UISKEI also features the definition of the prototype behavior, going beyond navigation between user interface containers (e.g. windows, web pages, screen shots) and allowing to define changes to the state of user interface elements and widgets (enabling/disabling widgets, for example).

This dissertation presents the main concepts underlying UISKEI and a study on how it compares to similar tools. The user interface drawing stage is detailed, explaining how the conversion of sketches to widgets is made by combining a sketch recognizer, which uses the Levenshtein distance as a similarity measure, and the interpretation of recognized sketches based on an evolution tree. Furthermore, it discusses the different solutions explored to address the issue of drawing an interaction, suggesting an innovative mind-map-like visualization approach that enables the user to express the event, conditions and actions of each interaction case while still keeping the pen-based interaction paradigm in mind.

## Keywords

Pen-based interaction; user interface sketching; ink; early prototyping; sketching user interface behavior

## Resumo

Segura, Vinícius Costa Villas Bôas; Barbosa, Simone Diniz Junqueira. **UISKEI: Desenhando a Interface e Seu Comportamento**. Rio de Janeiro, 2011. 95p. Dissertação de Mestrado – Departamento de Informática, Pontifícia Universidade Católica do Rio de Janeiro.

Durante o estágio inicial do design de uma interface com usuário, diferentes soluções devem ser exploradas e refinadas iterativamente pela equipe de design. Nesse cenário de mudanças rápidas e constantes, uma ferramenta que permita e facilite essas mudanças é de grande valia. UISKEI explora o poder do desenho, possibilitando ao designer transmitir sua ideia com uma forma de expressão mais natural, e adiciona o poder computacional, facilitando a manipulação e edição dos elementos. Mais do que uma ferramenta de desenho de protótipos de interface, UISKEI também permite a definição do comportamento da interface, indo além da navegação entre contêineres de interfaces (por exemplo, janelas, páginas web, capturas de telas) e possibilitando definir mudanças nos estados dos elementos de interface (habilitando e desabilitando-os, por exemplo).

Essa dissertação apresenta os conceitos principais por trás do UISKEI e um estudo de como ele se compara a ferramentas similares. A etapa de desenho da interface é detalhada, explicando como a conversão dos traços em *widgets* é feita através da combinação de um reconhecedor de traços, que usa a distância de Levenshtein como medida de similaridade, e a interpretação dos traços reconhecidos baseada em uma árvore de evoluções. Além disso, também são discutidas as diferentes soluções exploradas para endereçar o problema do desenho da interação, propondo uma visualização inovadora no estilo *mind-map* que possibilita ao usuário expressar o evento, as condições e ações de cada caso de interação, sem abandonar o paradigma da interação com caneta.

## Palavras-chave

Interação baseada em caneta; esboços de interface; prototipação no estágio inicial; desenho do comportamento da interface

# Contents

1	Introduction	14
2	Related work	16
2.1	Mouse-based prototyping software	16
2.1.1.	Microsoft Visio	16
2.1.2.	Balsamiq	17
2.1.3.	Axure RP Pro	18
2.2	Pen-based prototyping software	19
2.2.1.	DENIM	19
2.2.2.	SketchiXML	21
2.2.3.	CogTool	23
2.3	Summary	25
3	UISKEI	27
3.1	Early version study	30
3.2	New version requirements	31
4	Drawing the interface	32
4.1	Segments	32
4.2	Shapes	34
4.3	Element descriptors	35
4.4	Recognition	37
4.5	Element properties	38
5	Drawing the behavior	41
5.1	ECA	41
5.1.1.	Events (When)	42
5.1.2.	Conditions (If)	42
5.1.3.	Actions (Do)	43
5.1.4.	Valid ECAs	44
5.2	Drawing ECAs	44



6	Prototype evaluation _____	50
7	Recognizer test _____	53
8	User evaluation study _____	59
	8.1 Evaluation method _____	60
	8.2 Evaluation results _____	62
	8.3 Participants' opinions _____	65
9	Conclusion and Future work _____	67
	9.1 Shapes and element descriptors _____	68
	9.2 Recognizer _____	69
	9.3 ECA _____	69
	9.4 Prototype evaluation _____	70
10	Bibliography _____	71
11	Appendix A: Implementing UISKEI _____	75
	11.1 uskModel _____	75
	11.2 uskRecognizer _____	78
	11.3 uskWizard _____	80
12	Appendix B: Evaluation study script _____	84
	12.1 Description _____	84
	12.2 Questionnaire _____	85
	12.3 First Cycle _____	87
	12.3.1. Scenario 01 _____	87
	12.3.2. Task 01 _____	87
	12.4 Second Cycle _____	88
	12.4.1. Scenario 02 _____	88
	12.4.2. Task 02 _____	88
	12.5 Third Cycle _____	89
	12.5.1. Scenario 03 _____	89
	12.5.2. Task 03 _____	90
13	Appendix B: Complete test results _____	91

## List of Figures

Figure 1: Microsoft Visio 2007.	17
Figure 2: Balsamiq.	18
Figure 3: Axure RP Pro.	18
Figure 4: Defining behavior with Axure RP Pro.	19
Figure 5: DENIM.	20
Figure 6: DENIM gesture system.	20
Figure 7: DENIM's representation of conditionals.	21
Figure 8: SketchiXML.	22
Figure 9: Different levels of representation in SketchiXML.	23
Figure 10: CogTool.	24
Figure 11: Simulation in CogTool.	24
Figure 12: A simple interaction design model.	27
Figure 13: Action Manager of UISKEI's early version.	30
Figure 14: Drawing a rectangle in three different ways.	32
Figure 15: Multiple strokes that should be grouped but not merged.	33
Figure 16: The directions compass rose.	34
Figure 17: The rectangle shape as a string.	34
Figure 18: Language to create elements.	36
Figure 19: Douglas Peucker algorithm	37
Figure 20: Labels.	39
Figure 21: ECAMan interface.	42
Figure 22: ECA buttons.	45
Figure 23: Pie menu allows a single stroke to define all parameters.	46
Figure 24: Element condition (left) and action (right) pie menus.	47
Figure 25: Presentation unit filmstrip.	47
Figure 26: DENIM combinatorial explosion.	48
Figure 27: ECA mind-map-like representation.	49
Figure 28: Prototype evaluation example.	51
Figure 29: The evolution of login screens through the cycles.	59

Figure 30: Average scores per question. _____	62
Figure 31: Average score per group of questions. _____	64
Figure 32: Summary of interview results. _____	64
Figure 33: Class diagram for uskModel. _____	75
Figure 34: ElementDescriptor class. _____	77
Figure 35: Operations enums. _____	78
Figure 36: Class diagram for uskRecognizer. _____	79
Figure 37: Class diagram for uskWizard. _____	81

## List of Tables

Table 1:	Software comparison. _____	25
Table 2:	Elements' states. _____	40
Table 3:	Condition and action creation. _____	45
Table 4:	Top 10 recognizer configuration results organized by success percentage. _____	55
Table 5:	Top 10 recognizer configuration results organized by average shape success percentage. _____	56
Table 6:	Shape analysis for best success percentage configuration. _	57
Table 7:	Shape analysis for best average success percentage configuration. _____	58
Table 8:	UISKEI comparison with related software. _____	68
Table 9:	Tools presentation order. _____	91
Table 10:	Questionnaire answers. _____	91
Table 11:	First cycle questionnaire answers and statistics. _____	92
Table 12:	Second cycle questionnaire answers and statistics. _____	93
Table 13:	Third cycle questionnaire answers and statistics. _____	94

*E como as esperanças têm esse fado que cumprir, nascer uma das outras, por isso é que, apesar de tantas decepções, ainda não se acabaram no mundo*

**José Saramago**, *As Intermittências Da Morte*

*I almost wish I hadn't gone down that rabbit hole - and yet - and yet - it's rather curious , you know, this sort of life.*

**Lewis Carrol**, *Alice's Adventures in Wonderland*