Thibault Raffaillac

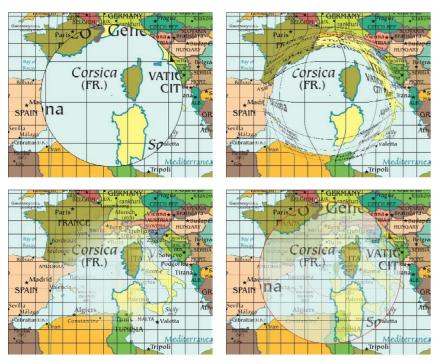
Language and System Support for Interaction

Supervised by Stéphane Huot and Stéphane Ducasse

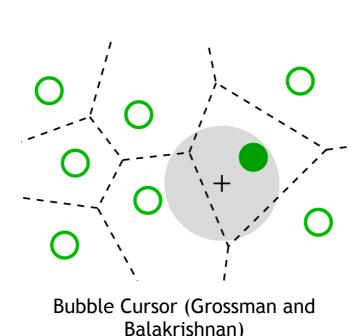




Prototyping interaction techniques



Sigma Lenses (Pietriga and Appert)





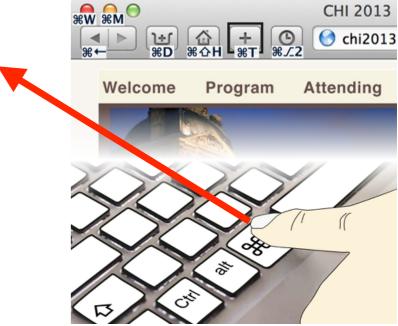
ExposeHK (Malacria et. al)

Challenging the architectures of frameworks

Requiring developers to use non-standard code

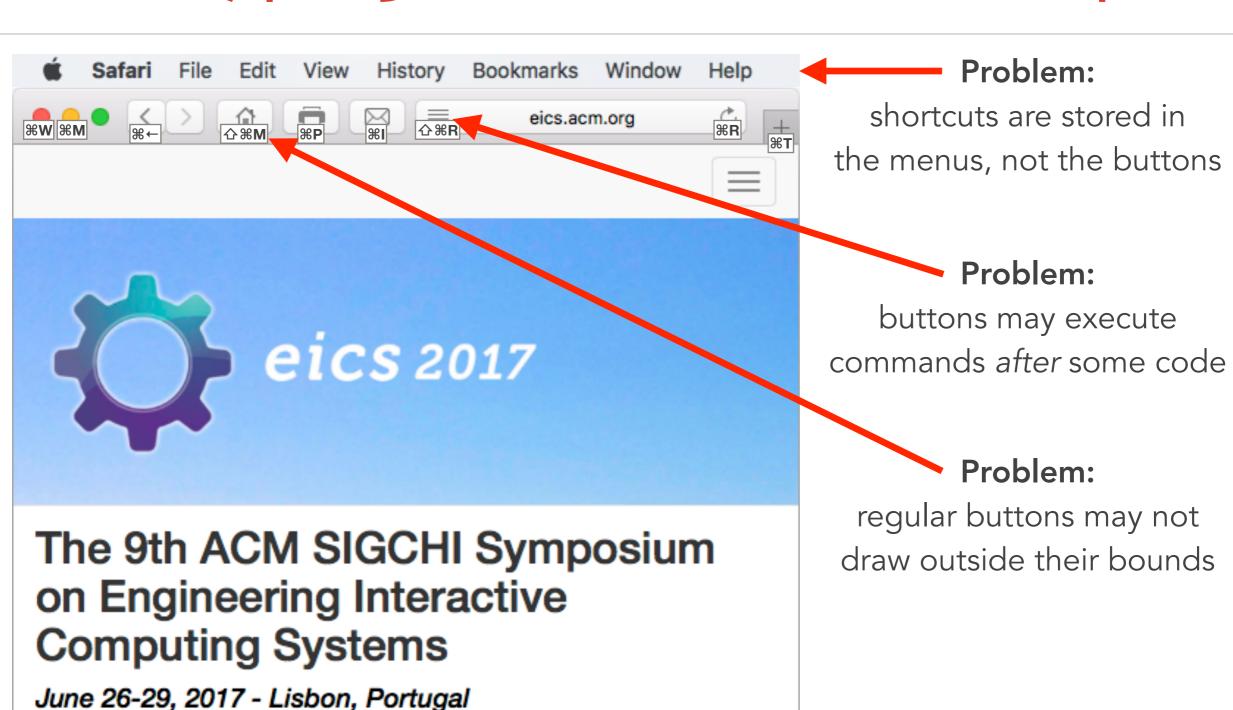
Prototyping interaction techniques





ExposeHK (Malacria et. al)

Prototyping interaction techniques



Problems

Simple interaction ideas are *not* simple to implement.

Frameworks describe interfaces rather than interaction.

Lack of tools to introspect and edit live interfaces.

Lack of knowledge on how users hack these systems.

Thesis context: Pharo Smalltalk

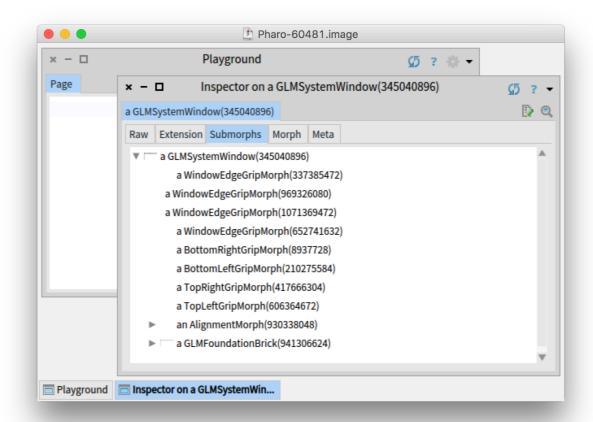
Live programming environment, pure object-oriented

Supports prototyping with introspection (inspect objects)

Ageing interface (Morphic)

Successor (Bloc) being developed *elsewhere*

Contribute indirectly



Thesis context: Pharo Smalltalk

Working on language and system below frameworks

Taking advantage of Pharo's reflectivity (access and modify language structures)

In close contact with its core developers

Framework(s)

Standard library

Interaction primitives

Programming language

Goal:

Improve the flexibility of interaction frameworks, indirectly

Plan

- 1. What can we add to languages to support interaction?
- 2. How can we make interaction a 1st class object?
- 3. What do designers of new techniques need?

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Creating language primitives

Cement and simplify established practices

Reduce frameworks' complexity

Remain consistent across applications

Evolve languages towards interactivity

Generative (unexpected uses)

Creating language primitives

```
[object property: value] during: 2 seconds
```

→ How do I validate it being "simpler"?

```
[mouse click] afterDo: [object doSomething]
```

→ What is a standard way to design this properly?

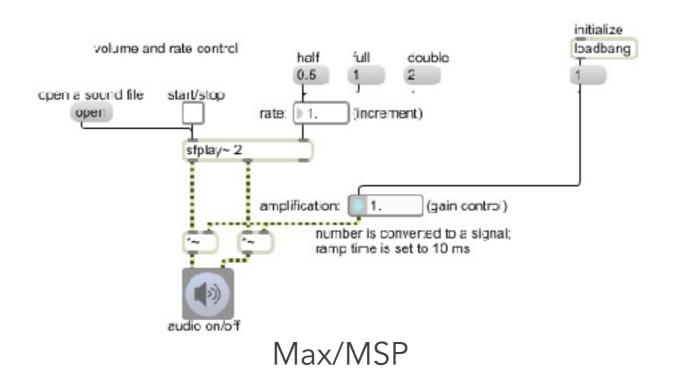
Plan

- 1. What can we add to languages to support interaction?
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First class objects

- In programming: first class citizens support common operations on variables (assignment, pass/return with function, modification)
- In HCI: open to interpretation

First class objects

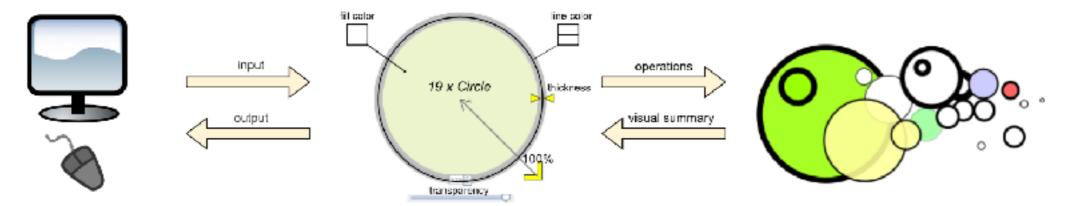




StickyLines (Ciolfi Felice et. al)



Google Spreadsheet



Surrogate Objects (Kwon et. al)

Characterizing "first-class"

Captures attention while in interaction

Revealed as normally invisible

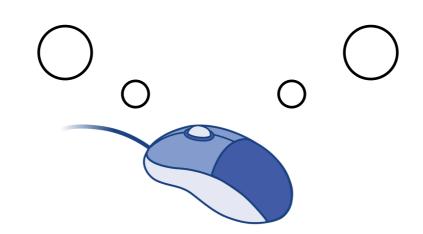
Available everywhere

Shifts the point of view to itself

Provides advanced functions

When programming interaction

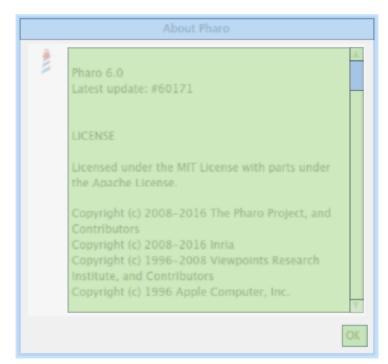
```
class Mouse {
  float dx, dy;
  bool[] buttons;
  float dpi;
};
```

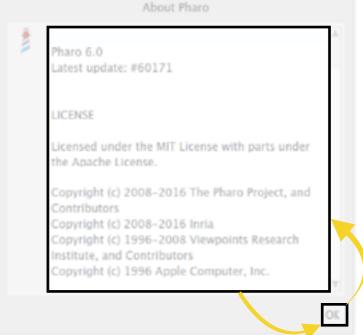


#W, #M, #←, ...

```
class Keyboard {
  bool[] keys;
  bool[] modifiers;
  float backlight;
};
```







Plan

- 1. What can we add to languages to support interaction?
- 2. How can we make interaction a 1st class object?
- 3. What do designers of new techniques need?

Interviews

8 semi-structured interviews of researchers who prototyped advanced interaction techniques

Feb - May 2016

8h of audio recordings

Questions seeking problems encountered at every stages of their projects

This interview is part of my PhD, where I look at the limits of GUI libraries and frameworks for Inis inserview is part or my PriD, where I slow at the limits of CUI libraries and trameworks for prototyping and building interactive applications, or advanced interaction techniques (CI, Cocoa, Swing, SDL, ...), and in particular how they are hacked around in actual projects, to get things done. I would like to backtrack with you a few of your past works, where the library could not do everything you intended, so you had to hack your way in, I selected some on the Internet already but we can review another one if it is more relevant to you. Languages/IDEs/frameworks of choice? 2. Which platform/language/IDE/framework(s) did you use, and why these choices many versions did you do. w.r.t. refactoring? What did it implement already? What was left to implement? What were your ambitions at the start of the project? Is there some of your ideas that yo 5. What was the most difficult thing you had to implement? Would you consider it hacking? 6. On a Likert scale (from 1 very dirty to 5 very clean), how "dirty" is it now? If you had the at pr intendina subject. s - Faculté publishen, accteut que liberarie , cassi euser documentatati Vise chardwars , altreal uno version shelle , dannes avec (AladeJS. opportunity to recode it, how different would it be? How did you learn the framework(s)? (official doc, book, tutorials, copy/paste ex State MX creations around the sound of sound the plus completes sont plus completed to subscription of placement. Les plus completes sont plus completes to make districted a maybenessing page on relations. How much time did you dedicate to it? Did you have to learn some additional API over the 8. With hindsight, what would have helped you best to complete the project? (excluding a code as Java se mathode classic per citisation dos mathodos, facilité contre Goverina. library done after) A better framework? A better tutorial? Now if you were to add this code to one of the libraries you used, which one would it be norsalinat de recompiler, ou liter en essai meur. Besein de manipolition de paraprete (higher/lower level, new library) Why? 10. How do you think the framework(s) should have been designed to best suit yo (may answer weeks later) 11. [Do you have any expectations about my work? :] can send you the results of this study later if you want. Also, it would be nice if we can schedule

Interviews

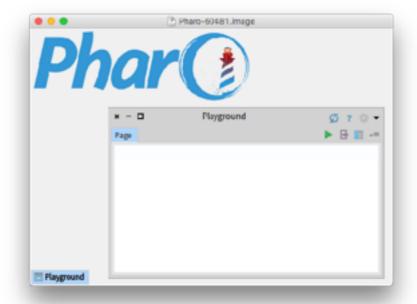
Initially could not make sense of the data (What to look for?) and gave up

After doing bibliography, committed to analyse along:

- Problems faced
- Explicit needs
- * Tools deemed useful
- Hacking strategies

Course of action

- July September: analysis of interviews
- October December: Validation of delay operator
- October April: Exploration of listener operator



[object property: value] during: 2 seconds

[mouse click] afterDo: [object doSomething]

Thank you for your attention!

Thibault Raffaillac

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```
class Mouse {
  float dx, dy;
  bool[] buttons;
  float dpi;
};
```

class Keyboard {
 bool[] keys;
 bool[] modifiers;
 float backlight;
};



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	the point trade through pipers, and con site was FAP.
ntroduction	111
This interview is part of my PID, where I look at the limit of DIS liberation and frameworks for condinging and fulfalling interviews applications, and advanced intervalent intervalingues (DI, Conce, leaving, DID,), and in particular loss they are haded around in actual projects, to get things, some in vacual last in particular loss they are haded at any one of the projects and on do everything you intervaled, also you lead to hadk your way in I satisfied across on the interval selvesty, and are can review are written or if it is more referent to jow.	1 I lignostico. 1 Ingras — Parl et Jacober. Effit felt C++, cottain, les resteus principe en manifer a fraisse mension. Of entire pers manifer. Intel 5the history filter giften en state since des sanctes of conjunter after feltere entire filter feltere entire filter feltere entire filtere feltere feltere entire filtere feltere entire entire feltere feltere feltere entire feltere entire feltere feltere entire feltere entire feltere entire feltere feltere entire entire feltere entire feltere entire feltere entire entire entire entire entire feltere entire ent
Questions	a Gordaniant sous tipor on symbols. Close affecting peoples a Design potent factories.
Questions 1. Ago? Years of experience? In main language? Prequency of programming? Languages/CSG intersection of choice? Languages/CSG intersection of choice? 2. Which jultiminating plans means from the project? New long did it say is not only a plans and many version and you on. x.r. infections? Approximationly how many lines of cools is the project? New long did it say is not only in these to cools if the project? The long did it say of a sourching software protriage? 3. As which point in the despiritorization processed of you get a sourching software protriage? 3. As which point in the despiritorization seed to irreplement? 3. As which point in the despiritorization processed of you do you consider from the province of your despiritorization of your finest fluid you consider in face fluid your despiritorization of your de	The his teams of the projection. One therefore proper story processing the teams of the his
(higher/lower level, new library) Wfty? 10. How do you think the framework(s) should have been designed to best suit your need?	
(may answer weeks later)	
11. [Do you have any expectations about my work? :]	
Final words	
hank you for your time! can seriel you the results of this study later if you went. Also, it would be nice if we can schedule a nort meeting in about two weeks, in case you have some more feedback for this study.	