Support for Hypothetical Initiation and Dynamic Exploration using History of Operation in ViennaTalk

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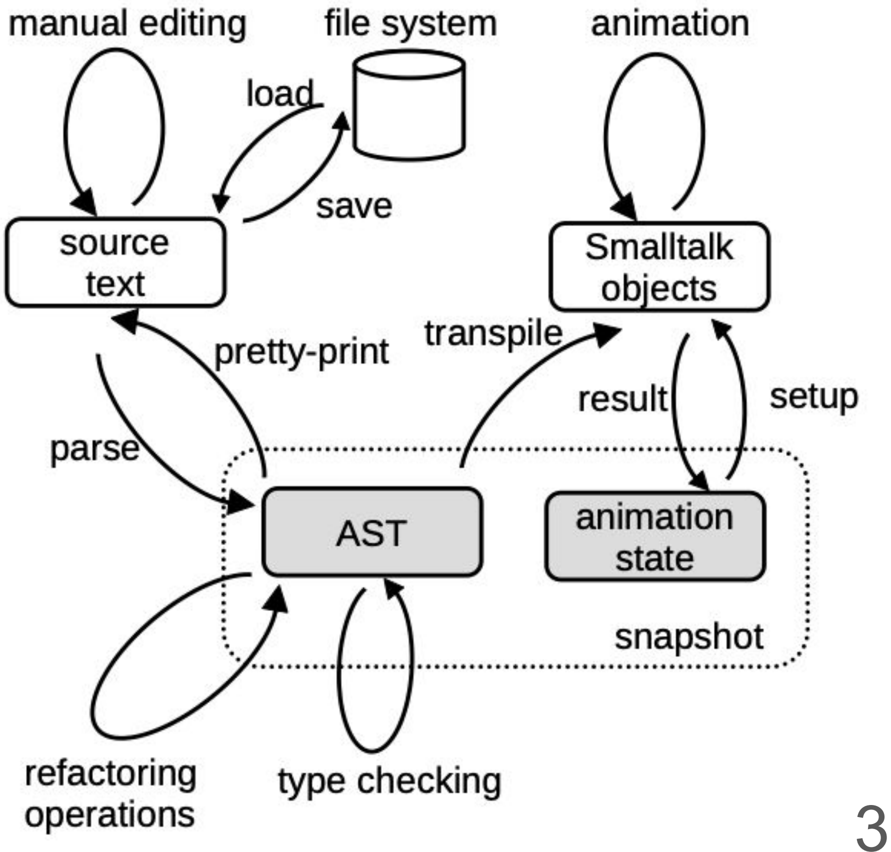
Agenda

1. Exploratory Specification
2. Why not Git?
3. Hi-De-Ho
4. Integration with ViennaTalk (demo)
5. Summary and Future Work

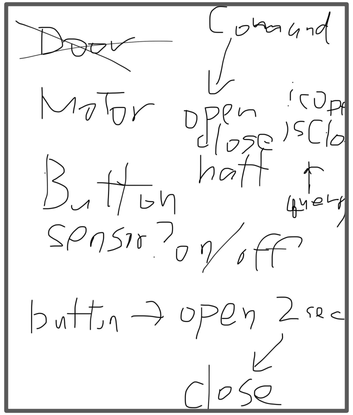
AST centric architecture

- Our design artifacts are MODELS
  - modules
  - types/values/functions/states/operations
- AST as a formal model
- animation as a dynamic model
- source text just for text editing and persistency



Exploratory Specification: theoretical background

Trial and error is an essential part of creative work.



reflection-in-action (Donald Schön)

- We don't only write our thoughts, but we also think through writing.

reflection-on-action (Donald Schön)

- We learn by looking back what we have written and improve future practices.

breakdowns as opportunities for creativity (Gerhard Fischer)

- Creative work moves back and forth, driven by trial and error.

What is a version management tool to support trial and error ?

Why not Git?

4 roles of version management tools in creative work (from Sarah Sterman)

- palette of materials: reuse a part from an old version
  - how to find the version?
- safety net
  - we can't foretell when it breaks, and it's too late to save a version when it's broken.
- lightweight snapshots
  - manual operations are too much burden
- records for long-time review/reuse
  - we can't foretell when is a turning point.

Git is designed for collaborative work on a huge tree of text files.

ViennaTalk needs a lightweight and personal history tool for VDM-SL ASTs.

Hi-De-Ho

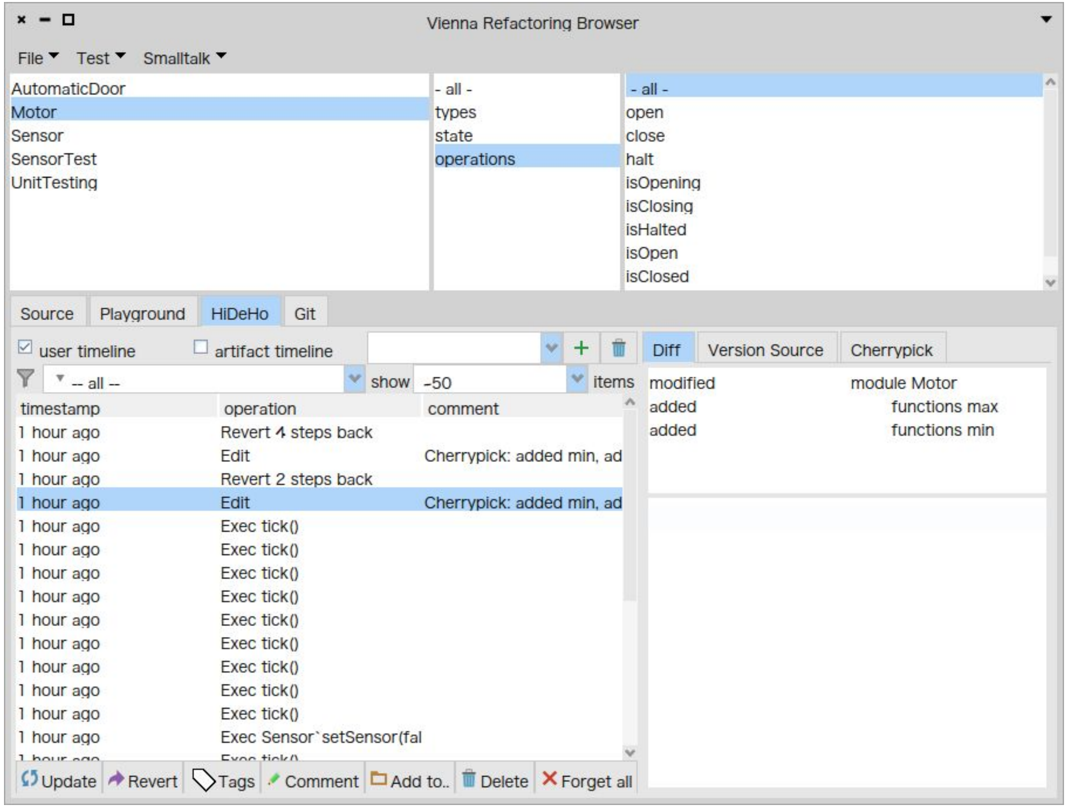
Hypothetical **I**nitiation and **D**ynamic **E**xploration using **H**istory of **O**perations

- automatically saves a snapshot
- automatically adds metadata to a snapshot
- provides API for searching / listing / editing / restoring

Not dedicated to ViennaTalk, but also integratetd with

- re:mobidyc ... multi-agent simulation for biologists
- gOLAP ... graph-based OLAP tool

Integration with ViennaTalk (demo)



AutomaticDoor
Motor
Sensor
SensorTest
UnitTesting

- all -
types
state
operations

- all -
open
close
halt
isOpening
isClosing
isHalted
isOpen
isClosed

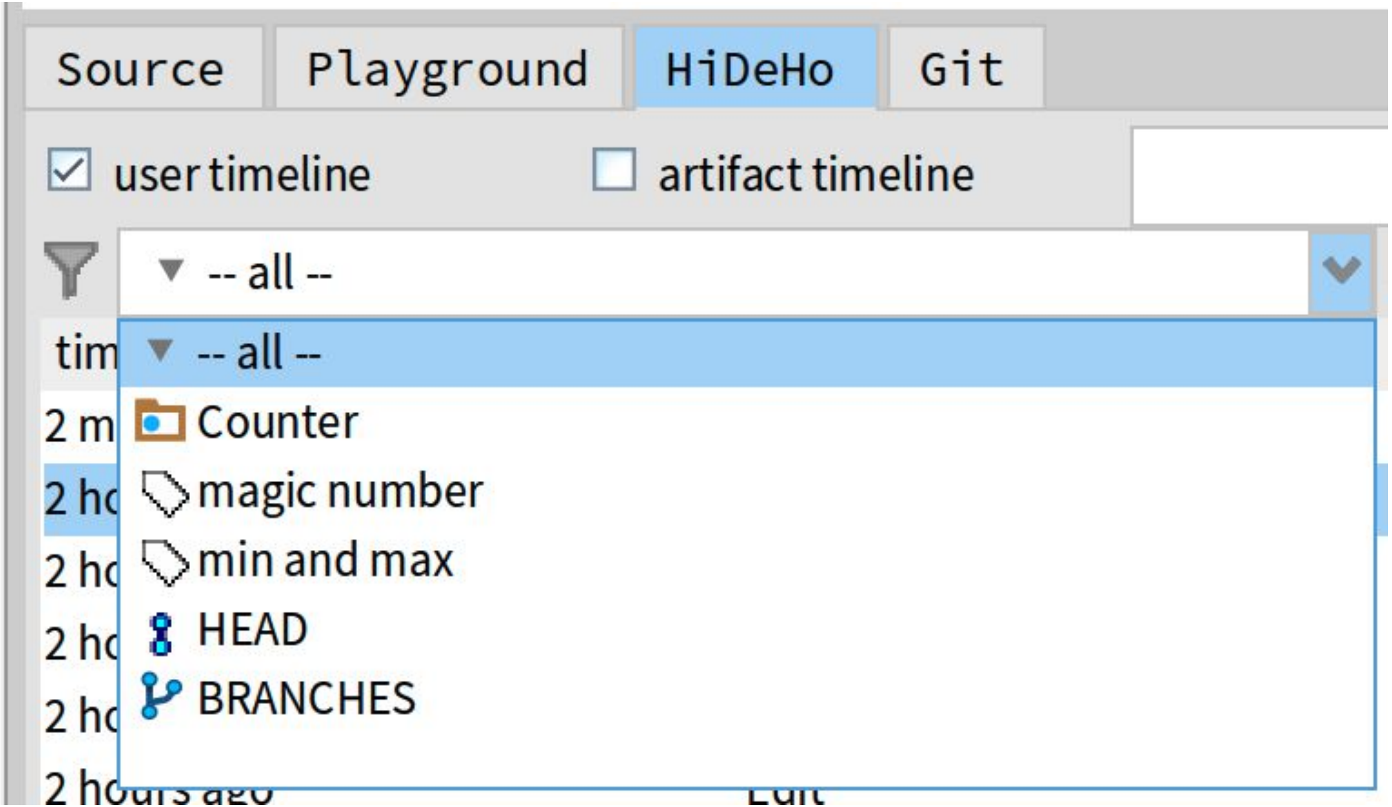
☑ user timeline □ artifact timeline

-- all -- show -50 items

timestamp	operation	comment
1 hour ago	Revert 4 steps back	
1 hour ago	Edit	Cherrypick: added min, ad
1 hour ago	Revert 2 steps back	
1 hour ago	Edit	Cherrypick: added min, ad
1 hour ago	Exec tick()	
1 hour ago	Exec tick()	
1 hour ago	Exec tick()	
1 hour ago	Exec tick()	
1 hour ago	Exec tick()	
1 hour ago	Exec tick()	
1 hour ago	Exec tick()	
1 hour ago	Exec tick()	
1 hour ago	Exec tick()	
1 hour ago	Exec Sensor`setSensor(fal	
1 hour ago	Exec tick()	

modified	module Motor
added	functions max
added	functions min

Timelines and Filters

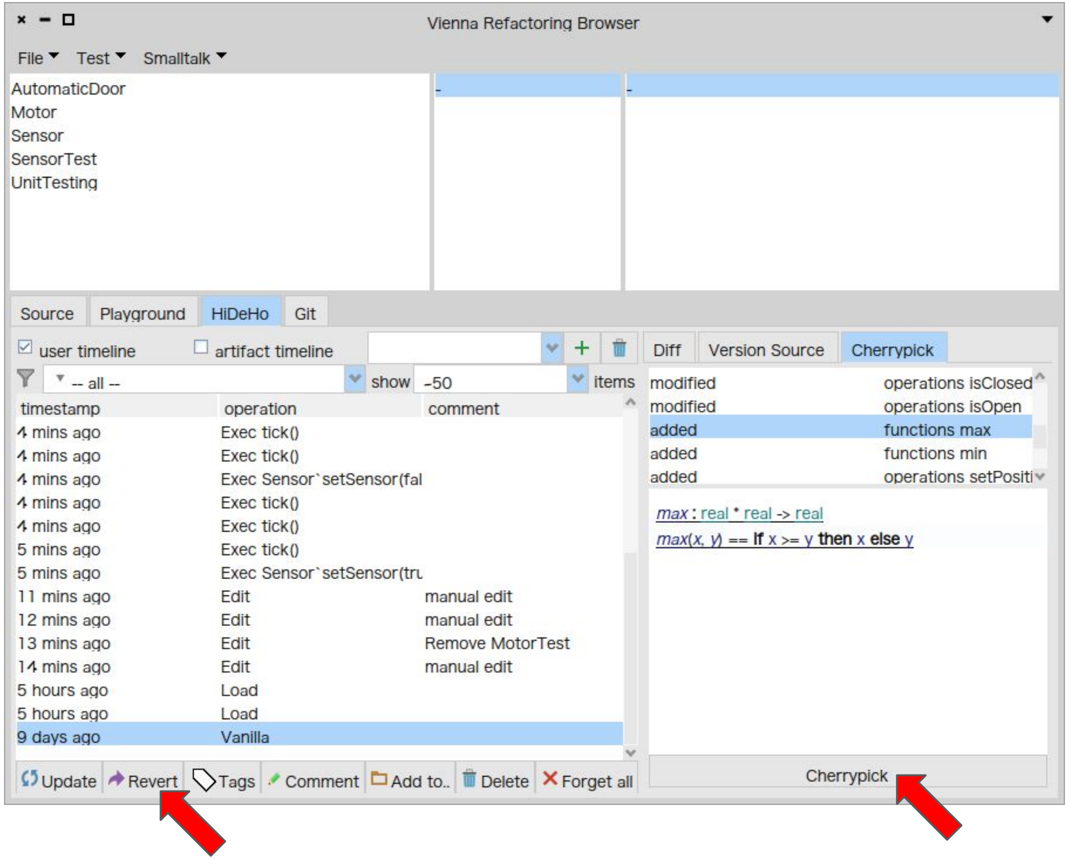


☑ user timeline

□ artifact timeline

▼ -- all --

Reverting and Cherry-picking



AutomaticDoor
Motor
Sensor
SensorTest
UnitTesting

☑ user timeline □ artifact timeline

-- all -- show -50 items

timestamp	operation	comment
4 mins ago	Exec tick()	
4 mins ago	Exec tick()	
4 mins ago	Exec Sensor`setSensor(fal	
4 mins ago	Exec tick()	
4 mins ago	Exec tick()	
5 mins ago	Exec tick()	
5 mins ago	Exec Sensor`setSensor(tru	
11 mins ago	Edit	manual edit
12 mins ago	Edit	manual edit
13 mins ago	Edit	Remove MotorTest
14 mins ago	Edit	manual edit
5 hours ago	Load	
5 hours ago	Load	
9 days ago	Vanilla	

modified	operations isClosed
modified	operations isOpen
added	functions max
added	functions min
added	operations setPositi

```
max : real * real -> real
max(x, y) == if x >= y then x else y
```

Summary and Future Work

More support for creativity!

- because formal specification is both **creative** and **systematic**.

Hi-De-Ho needs

- more metadata, e.g. test results
- more analysis, e.g. slicing
- more collaboration with Git
- more reliable and scalable storage, e.g. RDB

https://github.com/tomooda/ViennaTalk/

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