

Augmented Visual Interfaces for Software Engineering (AVISE)



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WELLINGTON
TE HERENGA WAKA



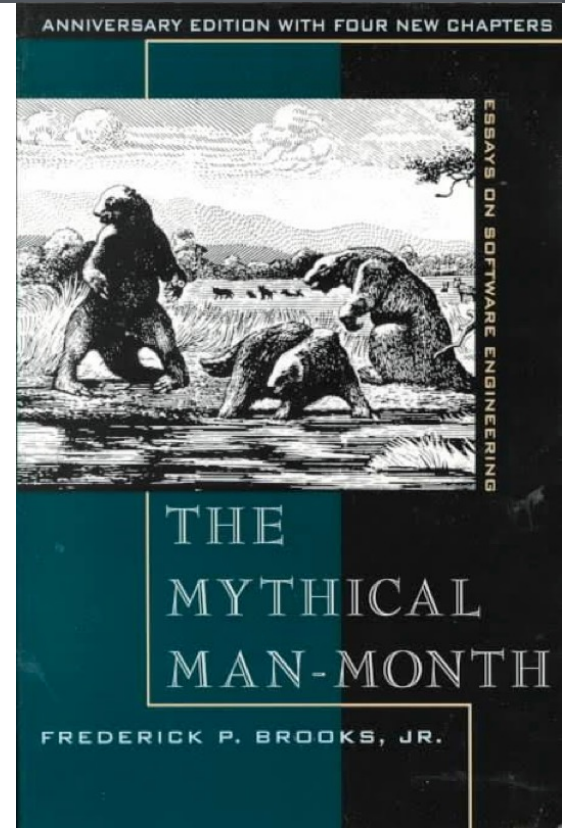
Motivation

British Airways says IT chaos was caused by human error

© 5 June 2017 | Business



The boss of British Airways' parent company says that human error caused an IT meltdown that led to travel chaos for 75,000 passengers.



Research Problem

- Most SoftEng tools **single** developer focused
- Lack of **communication** features
- Don't support **collaboration** and integration **workflow** aspects effectively

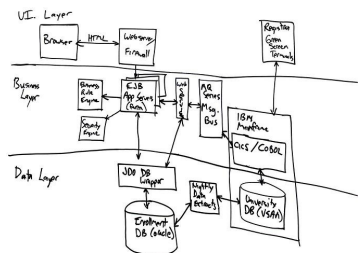
Software Visualization Tools for Agile Teams



Julia Paredes

Frank Maurer

Design



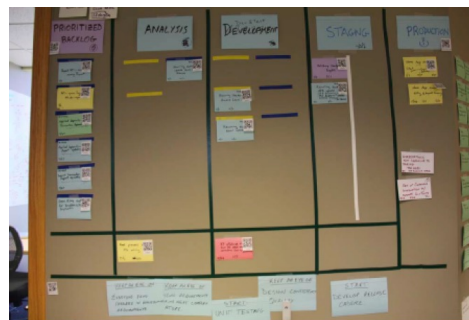
Development



Communication



Progress Tracking



Visual Analytics of Java API



Haowei Ruan Stuart Marshall James Noble

Document View

Edit View Bookmarks

Only Entities

Arity ArrayNode BitSet Block ByteList Callback CallbackFactory CallType ClassIndex Compiler Constructor DefaultRubyParser DynamicMethod DynamicScope

IRubyObject

Instruction IOHandler ISourcePosition Java JavaClass JavaObject JumpException LexState ListNode Matcher

MethodIndex Node NodeType NodeVisitor ObjectAllocator Pattern PatternSyntaxException RaiseException Ruby RubyArray RubyBignum RubyBoolean RubyClass RubyFixnum RubyFloat RubyHash RubyIO RubyKernel RubyModule RubyNumeric RubyObject RubyProc RubyRegexp RubyString RubySymbol

SinglyLinkedList StaticScope Term ThreadContext Token Tokens Ustr Visibility YARVInstructions YARVMachine

Documents

- 1 IRubyObject
- 0 MethodMethod
- 0 RubyBasicSocket
- 0 RubyFile
- 0 RubyThreadGro...
- 0 TestRuby
- 0 TextAreaReadline
- 0 AbstractVisitor
- 0 Adler32Ext

```
public interface IRubyObject {  
    /**  
     *  
     */  
    public static final IRubyObject[] NULL_ARRAY = new IRubyObject[0];  
    /**  
     * Return the ClassIndex value for the native type this object was  
     * constructed from. Particularly useful for determining marshalling  
     * format. All instances of subclasses of Hash, for example  
     * are of Java type RubyHash, and so should utilize RubyHash marshalling  
     * logic in addition to user-defined class marshalling logic.  
     */  
}
```

List View

Edit View Bookmarks Lists Options

Class Add all Clear Show all connections Document Add all Clear

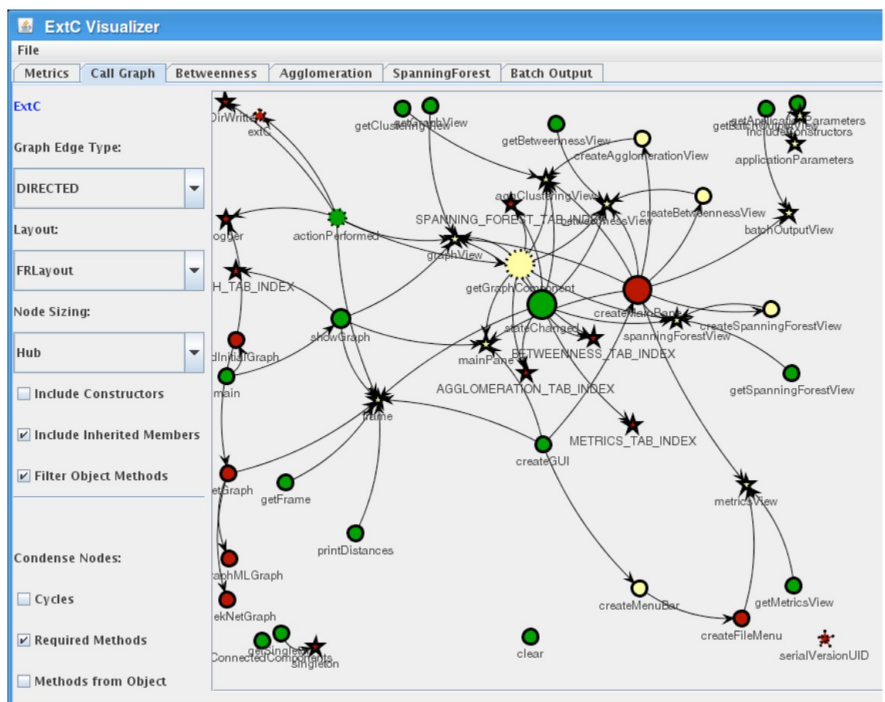
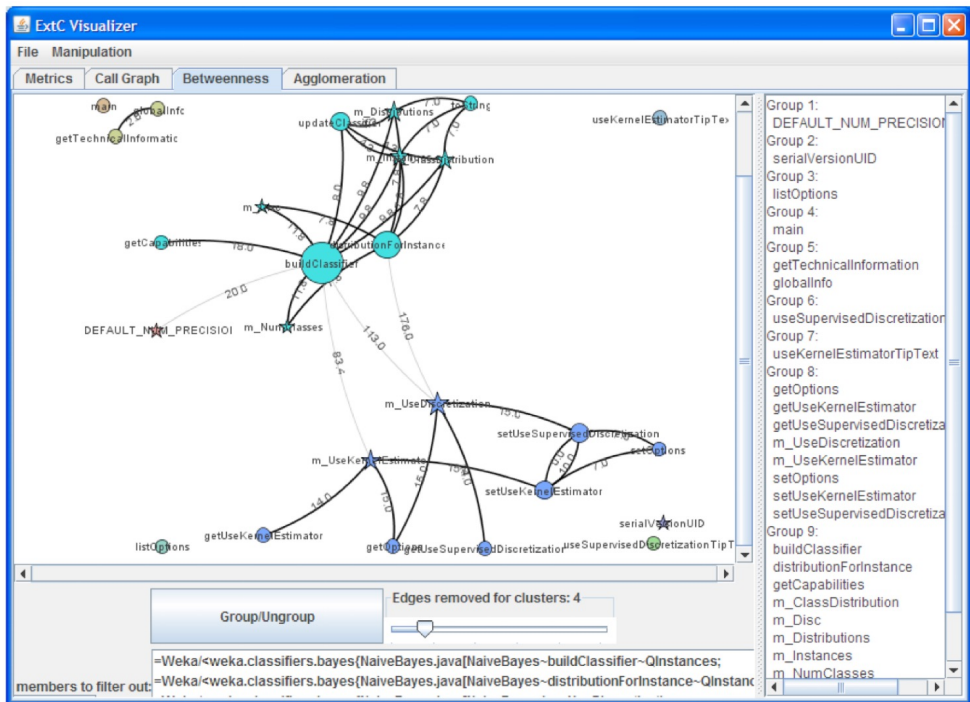
- IRubyObject
- IRubyObject
- ISourcePosition
- Block
- Instruction
- NodeTypes
- RubyModule
- RubyClass
- ThreadContext
- CallbackFactory
- ByteList
- RubyString
- Arity
- Compiler
- RubyArray
- Java
- NodeCompiler
- RubyFixnum
- ObjectAllocator
- RubyObject
- RubyKernel
- NodeCompilerFactory
- MethodIndex
- RaiseException
- RubyNumeric
- Pattern
- Visibility
- INode
- RubyBoolean
- StaticScope
- CallType
- DynamicMethod
- JumpException
- Constructor
- Matcher
- RubyFloat

AliasMethod
ArgsUtil
Arity
AssignmentVisitor
BlockCallback
Callback
CallBlock
CompiledBlock
CompiledBlockCallback
CompiledMethod
Compiler
CompilerHelpers
ConversionIterator
DefaultMethod
DumpingInvocationCallbac...
DumpingInvocationMethodFact...
DynamicMethod
DynamicScope
EvaluationState
EventHook
FastInvocationCallback
Frame
FullFunctionCallbackMethod
FullFunctionReflectedMethod
FullInvocationMethod
Generator
GlobalVariable
GlobalVariables
IAccessor
IAutoloadMethod
InvocationCallback
InvocationCallbackFactory
IOInputStream
IOOutputStream
IOReader

Visualizing the Refactoring of Classes via Clustering



Keith Cassell

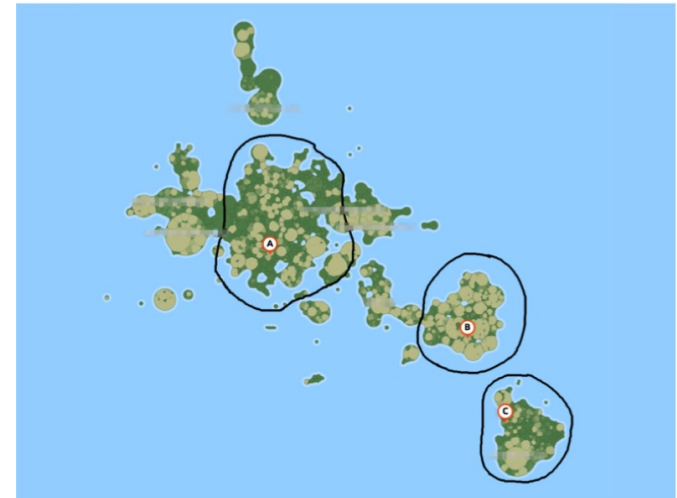
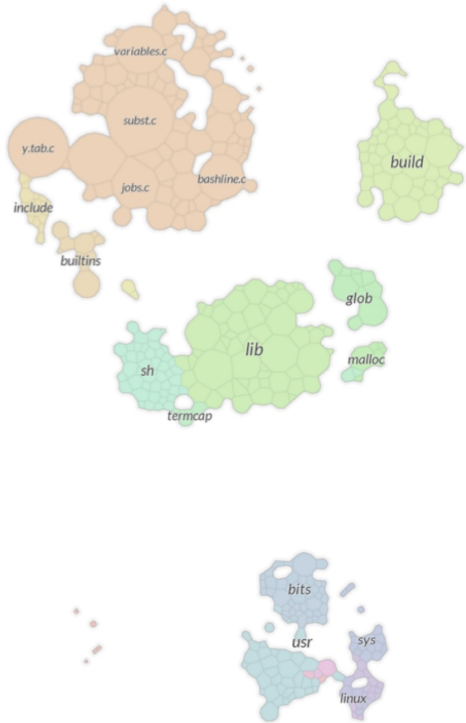


Code Surveyor



Nathan
Hawes

Stuart
Marshall



Visualization Design Erosion: How Big Balls of Mud are Made



David
Baum



Jens
Dietrich

Welcome to the Getaviz tutorial

Getaviz is an application for exploring three-dimensional software visualizations. This tutorial will explain you these visualizations and how to interact with them.

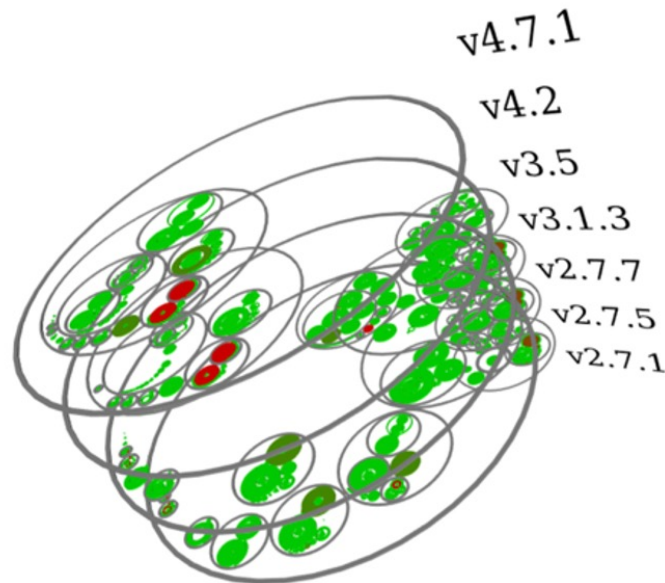
Press Done to go to the next step.

Done

View Systems About

Antipattern Explorer

- > Circular Dependency
- > Subtype Knowledge



Version Selector

- 2.7.1
- 2.7.5
- 2.7.7
- 3.1.3
- 3.5
- 4.2
- 4.7.1

Configuration

Visibility Level of Circular Dependencies

- Show all dependencies
- Only show critical dependencies
- Only show very critical dependencies
- Bundle dependencies

Legend

- Selection
- Package
- Class
- Importance for Subtype Knowledge
- Importance for Circular Dependency

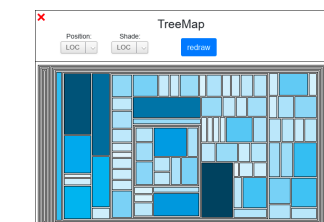
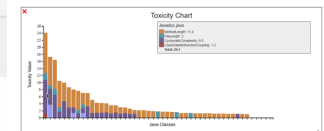
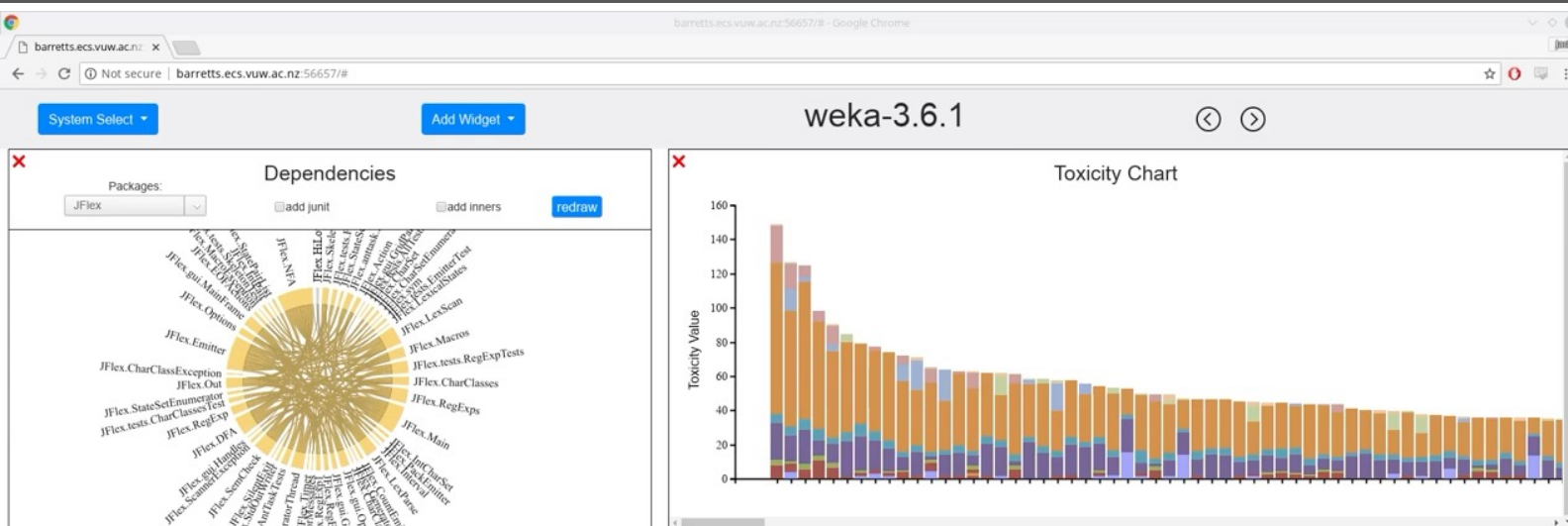
Info

System antlr
Web <http://www.antlr.org>
page

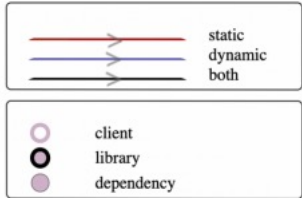
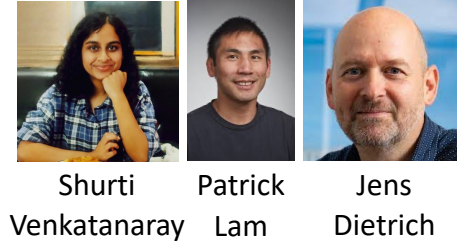
Visualizing Toxic Code



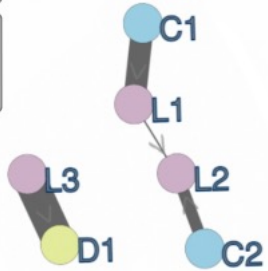
Jack Slater Leonel Merino Jens Dietrich



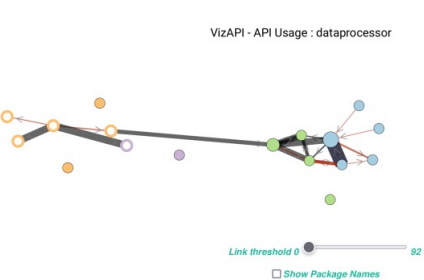
Visualizing Interactions between Java Libraries and Clients



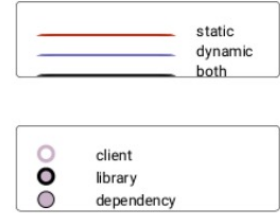
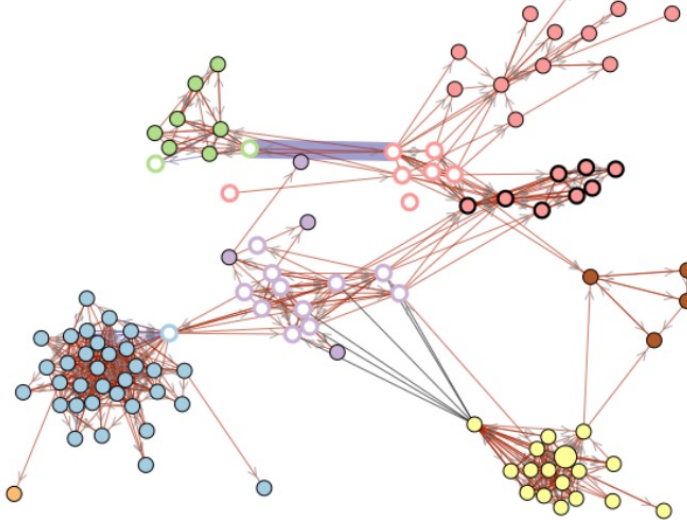
VizAPI - API Usage : Example



VizAPI - API Usage : dataprocessor



VizAPI - API Usage : JsoupXpath-jsoup-ez-vcard



Collaborative Software Visualization: *Large Displays*



Stuart
Marshall

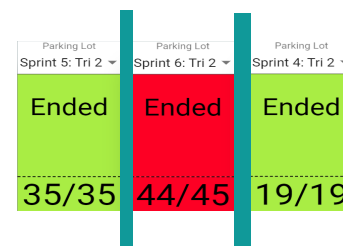
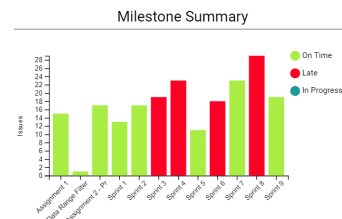
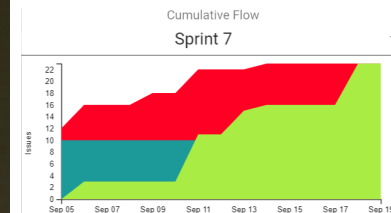
James
Noble



Collaboration Software Visualization: *Large Touch Displays*



Brandon
Scott-Hill



Agile Business Process Modelling on Large Touch Displays



Alexander
Nolte

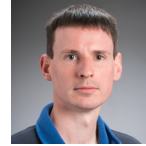
Ross
Brown



Collaborative Block-Based Programming Multi-Devices

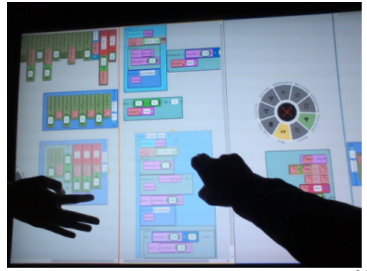
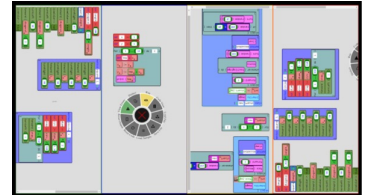
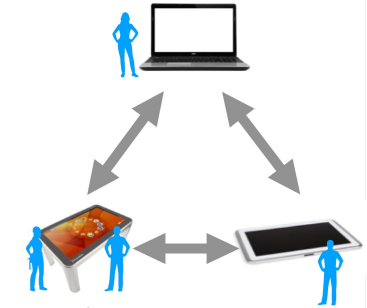
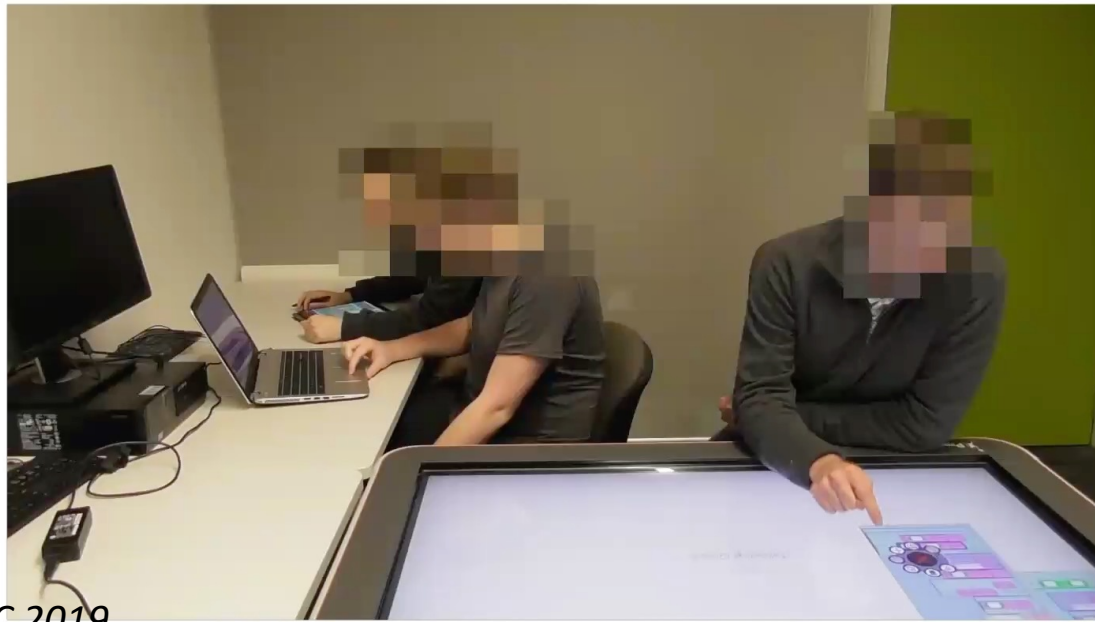


Ben Selwyn-Smith



Michael Homer

Collaborative Cross Device Block-Based Programming



Software Visualization in VR: *City VR*



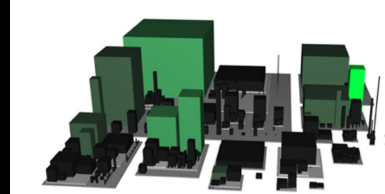
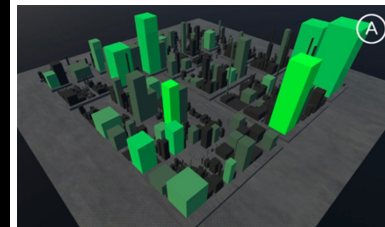
Leonel Merino



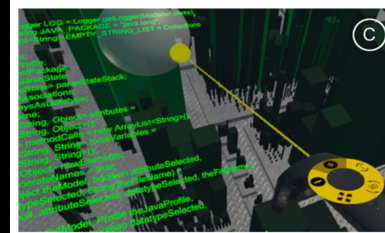
Mohammad Ghafari



Oscar Nierstrasz



NLOC: NOM: Height NOA: Width/Depth



MRMAC: Mixed Reality Multi-user Asymmetric Collaboration

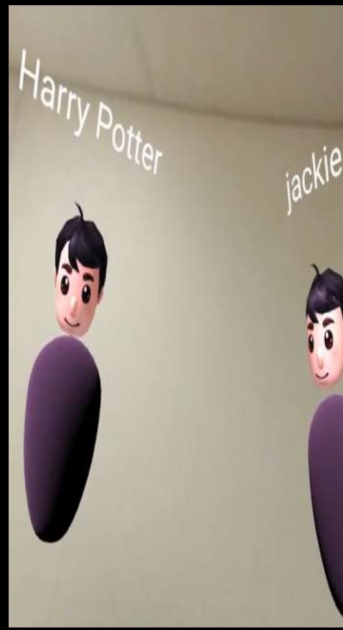


Faisal Zaman
Taehyun Rhee

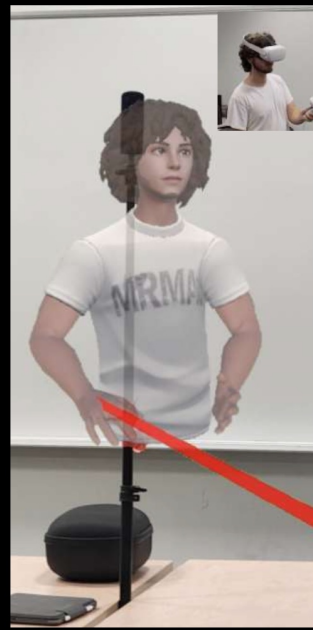
Viewpoint
Sharing



Multiple Avatar
Control



Personalised
Avatar



Spatial
Audio



Software Visualization in VR: *360 Degree Motion*

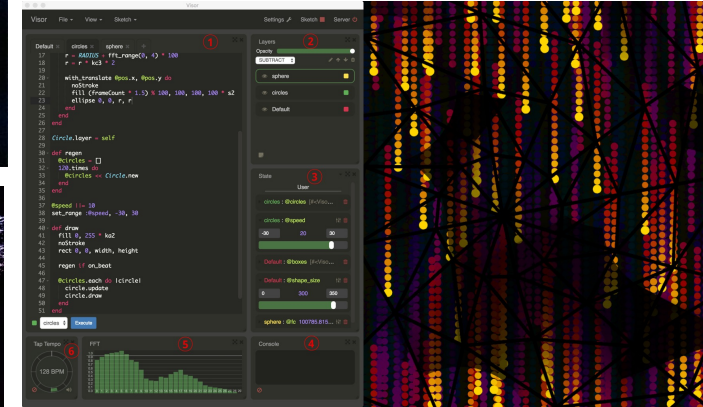
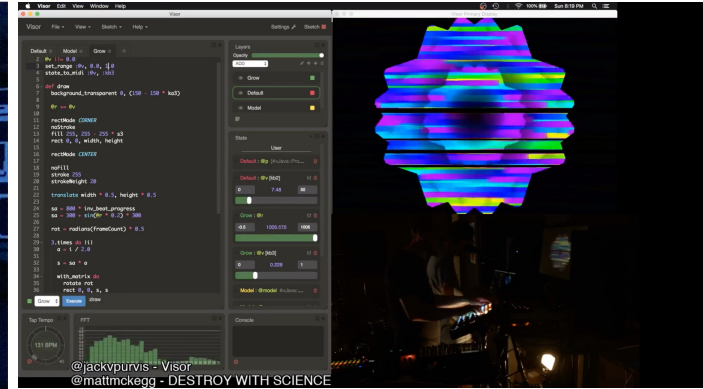


Live Coding for Visual Performance



Jack Purvis

James Noble



ICLC 2019 & 2020

<https://visor-live.github.io/>



Augmented Visual Interfaces for Software Engineering (AVISE)

- Most SoftEng / Vis tools/interfaces mainly **IDE** focused and **web**
- **Low adoption** rate from developers in general
 - Strategy: “Visualization under the covers”
- Beyond Desktop: challenging to develop and adopt -> lots to do!
- SoftEng / Vis Tools **need** to be:
 - **Collaborative, integrated**, and support **workflow** aspects
 - **Usable**, easy to install
 - Provide **effective** and **valuable** insight



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