

INSTITUTE OF SOFTWARE SYSTEMS ENGINEERING

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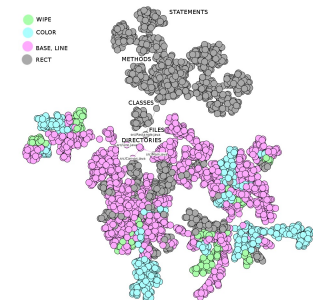
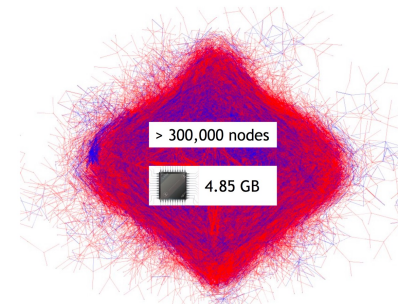
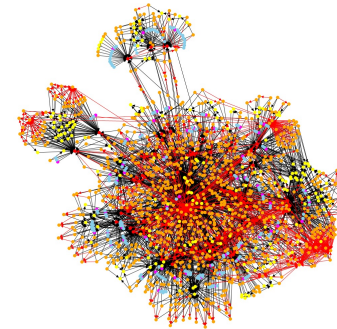


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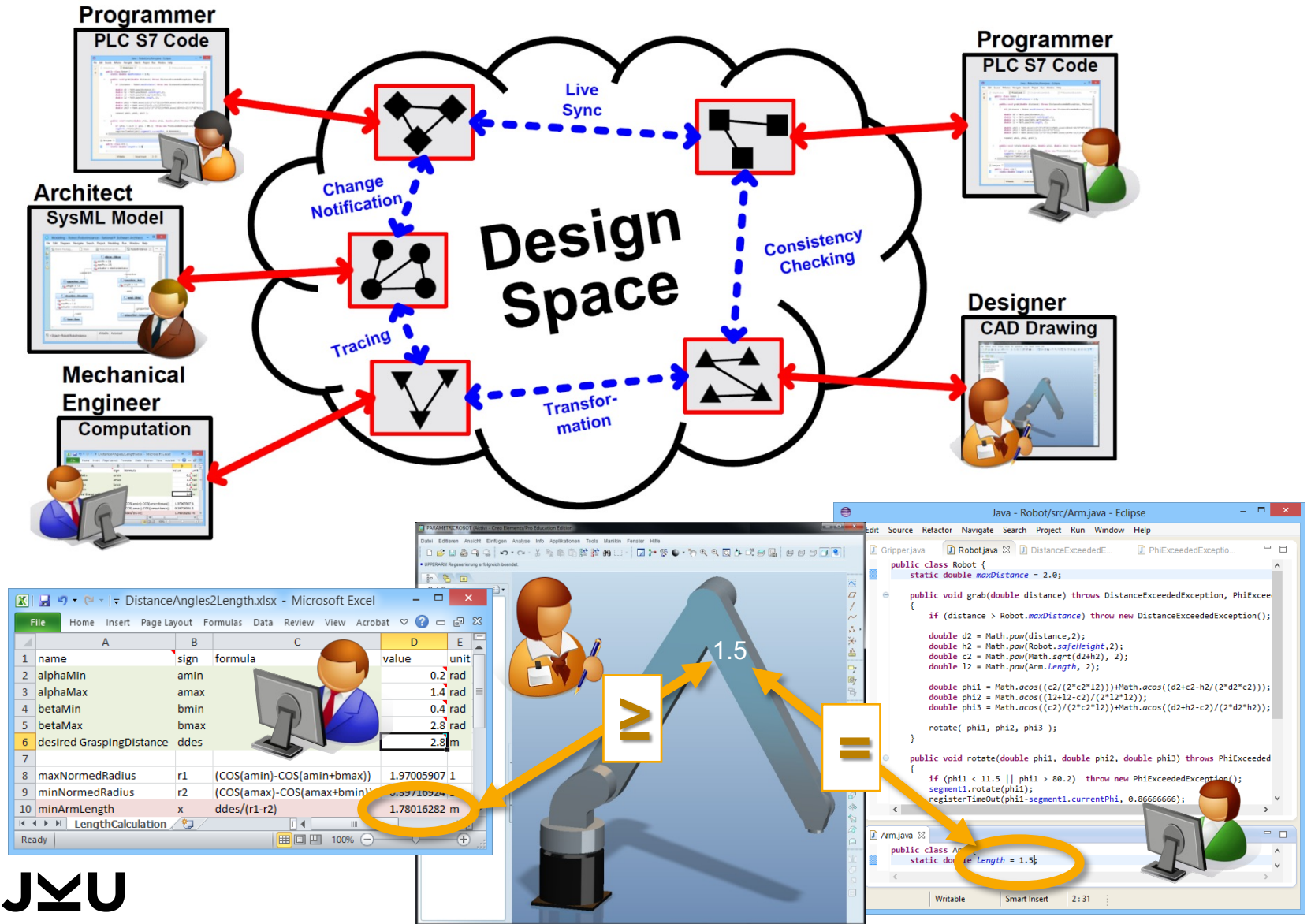
TOPICS OF INTEREST



- Requirements Engineering
- Product Lines and Reuse
- Multi-User Modeling
- Error Detection and Repair
- Domain-specific Languages
- Human Computer Interaction
- Modularization and Program Understanding
- Process Modeling
- Traceability and Maintenance
- Testing, Monitoring, and Debugging
- Simulation and Digital Twins
- ...



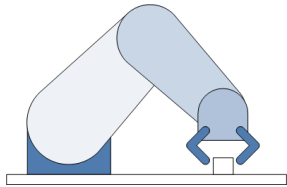
INTEGRATED AND COLLABORATIVE ENGINEERING



FEATURE-ORIENTED PRODUCT LINES

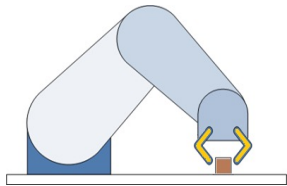
Existing Products

Robot 1



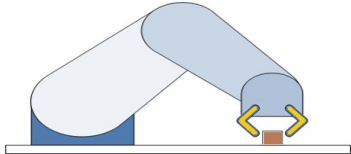
Short Upper Arm
Short Lower Arm
Blue Gripper

Robot 2



Short Upper Arm
Short Lower Arm
Yellow Gripper

Robot 3

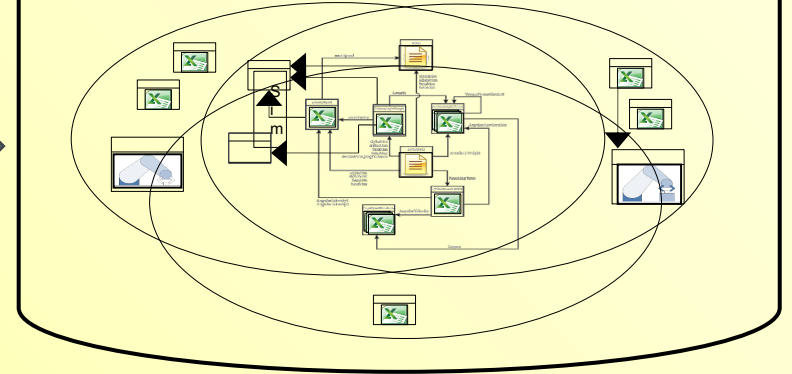


Long Upper Arm
Long Lower Arm
Yellow Gripper

Extraction

Compares products to identify commonalities and differences

ECCO Fragment Repository

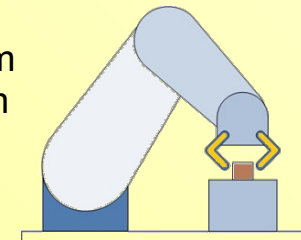


Commonalities and Differences are stored as Product Fragments

Composition

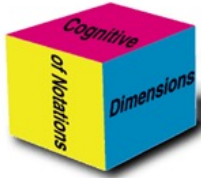
New Robot Composed from Existing Fragments

Short Upper Arm
Long Lower Arm
Yellow Gripper
Pedestal **NEW!**



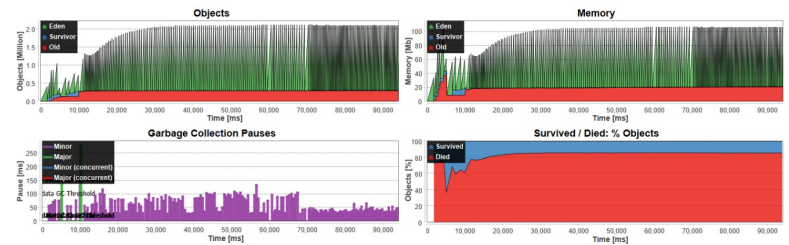
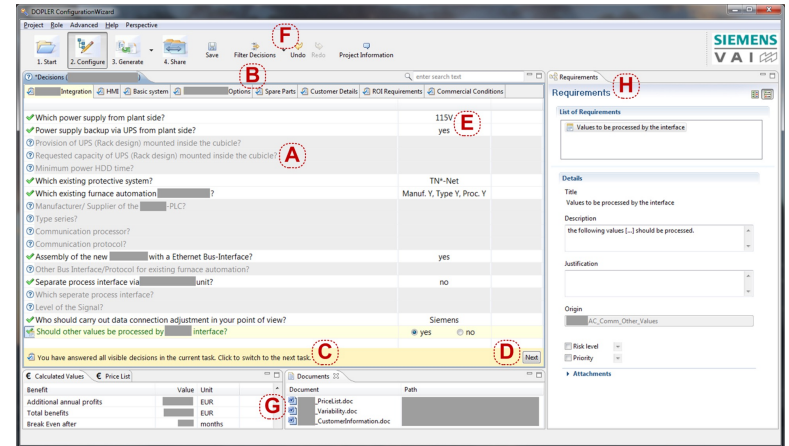
Completion

HUMAN COMPUTER INTERACTION IN SOFTWARE ENGINEERING

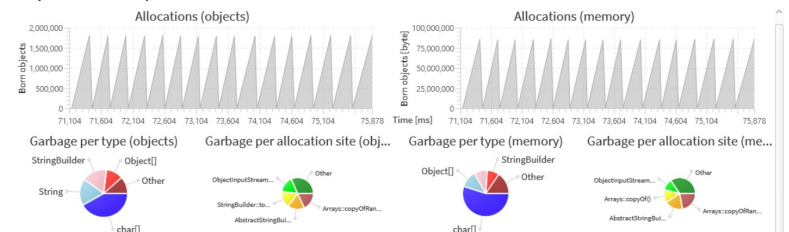


Example: Cognitive Walkthroughs

Task	Detection: Memory Growth	Inspection: Evolution over Time	Inspection: Single Point in Time	Inspection: Single Point in Time	Detection: Memory Churn	Inspection: Evolution over Time	Cross-Cutting
AntTracks View	Overview	TrendViz View	Heap State View	Graph View	Details View	Short-living Objects View	
Abstraction	Overview uses easy terminology.	Abstraction into chart series -> improve by ...	Maybe terminology?	Nodes represent groups of objects -> understandable? ...	GC chart	Is the content of the tree view clear?	Terminology, icons, etc.
Closeness of Mapping	GC chart	Drill-down feature may not be clear. The hierarchical ...	Data structure Dst ...	Tree visualized as hierarchical different elements (Objects, GC roots)	GC chart	Tree visualized as hierarchical TreeTableView	
Consistency	Evolution data is by default presented as charts in AntTracks.		Hierarchical data is by default presented as TreeTableView	To achieve immersion and closeness of ...		Other column names than on heap state view.	Are there annoying inconsistencies?
Diffuseness		Overcrowded classifier selection, also see viscosity.	Classifier selection is too complex. Highlight most ...	Test that not too many different notations are used, ...	Explanatory text is too long.	Many charts on overview - too many?	Unnecessary or unnecessarily complex views?
Error-proneness	Possible flaw: Chart interaction. Positive: Zoom ...		Operations in context menu clear? User-defined ...	Make sure that operations that would create ...	See Overview (Chart interactions)		
Hard Mental Operations	Do users recognize growing memory as problem?	See abstraction & closeness of mapping.	User is free to use any classifier com-bination. Certain ...	Even though users can inspect graphs, the detection of ...	Interpretation of charts hard?	Normal classification trees.	
Hidden Dependencies	Zoom is synced, selection is synced.	Highlight selection in parent chart better. Also display ...	BUG: New classification in heap state may ...			Link from pie chart to table clear?	Are there any dependencies that we did not find yet?
Premature Commitment		Time window has to be selected beforehand ...	Time has to be selected beforehand	Time has to be selected beforehand. Once nodes are ...			Order of operations, etc.
Progressive Evaluation	User can check how many of the suggested time ...	Selected value is shown for every level. The more levels, ...	Position withing classification tree determines progress.	User can always check the path he/she has already ...			
Provisionality	Can open a new heap state without problems, can ...	All settings can be changed arbitrarily.	Abortion of long running operations is possible. Future work: "What-if"-games	View is always resettable. Future work: "What-if"-games			
Role-expressiveness	Memory chart clear. GC chart probably not directly clear.	Is it clear what a single chart is showing?	Should be clear, ask if the tree table visualization was ...	Are the different types of nodes clear?	Charts maybe not clear, check if users understand what ...	Do users understand the charts?	
Secondary Notation							
Viscosity		Inflexibility of the classifier selection. Classifiers cannot ...	Order of classifiers cannot be changed using drag-and- ...	Graph grows rather fast.		Order of classifiers cannot be changed using drag-and- ...	
Visibility	New overview tab was implemented: Now Memory > GC ...	Drill-down feature has been improved (with table, etc.) ...	Should be clear, ask if the tree table visualization was ...	Legend was needed.	Many charts at once, may be overwhelming.		Tab system. Do users find out ...



(a) The *Details* view plots the application's detailed memory footprint and GC pauses and allows to select a suspicious memory churn time window.



DOMAIN-SPECIFIC LANGUAGES MUSIC ENGRAVING AND MUSICOLOGY

Engraving, e.g., LilyPond



```

\AltoVoice = \relative c' {
  \global
  \clef "treble"
  \tempo "Très modéré soutenu et expressif" 4 = 96
  r 4 cis 2 ^- \mf > \V
  e 8 \p \times 2/3 { dis 16 [ e 16 dis 16 ] } cis 8 fis 8 e 8 |
  \times 2/3 { dis 16 [ e 16 dis 16 ] }
  cis 2 \V cis 4 \< \V e 8 e 16 [ fis 16 ] gis 8 |
  \times 2/3 { fis 16 [ gis 16 fis 16 ] }
  e 8 \p dis 8 \V cis 4 cis 4 \V r 4 |
}

\verseAltoVoice = \lyricmode {
  Dieu! qu'il la__ fait bon re -- gar -- der
  La gra -- ci -- eu -- se__ bonne et bel -- le;
}
    
```



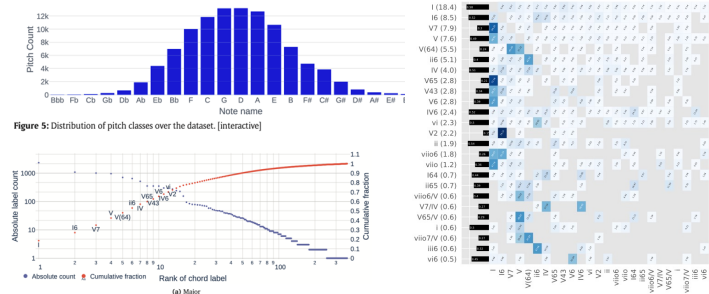
Musicology, e.g., DCML



Feature	Encoding	Examples
Global key	Name.	Ab. I, g#. i
Local key	RN.	v. i, bVII. I
Chordal root	RN	I, bII, #vii
Chord type	<NA>, +, o, %, M	viio, IV+
Chord inversion	<NA>, 6, 64, 7, 65, 43, 2	I6, ii%65
Replacing interval(s)	()	V(64), i(#74)
Added interval(s)	(+)	I(+6), V(+b9+4)
Lower-level reference	/RN	V7/V, #viio/ii
Phrase boundary	{, }, }{	V}, I6{
Pedal point	RN[]	I[V7/IV IV I]



mc	mn	quarterbeats	timesig	staff	voice	label
16	16	60	4/4	2	1	V(64)}
16	16	121/2	4/4	2	1	V HC
16	16	62	4/4	2	1	{
globalkey		localkey	form	figbass	changes	relativeroot
	C	I			64	
	C	I				
	C	I				
cadence	phraseend		chord_tones	added_tones	root	bass_note
		}	1, 0, 4		1	1
HC		}	1, 5, 2		1	1



YOUR BACHELOR THESIS: THREE OPTIONS

- Propose and pursue a topic of your interest
- Contribute to an ongoing research project
- Carry out thesis project in collaboration with an industry partner

CONTRIBUTE TO AN ONGOING ISSE RESEARCH PROJECT

- We are a partner of SCCH, ACCM, and Pro2Future
- FWF Projects
- EU Projects
- LIT Secure and Correct Systems Lab

- Visit www.isse.jku.at for more details

CARRY OUT YOUR THESIS PROJECT IN COLLABORATION WITH AN INDUSTRY PARTNER



PROPOSE AND PURSUE A TOPIC OF YOUR INTEREST

Please contact one of the supervisors at the institute to discuss your idea!

- Alexander Egyed
- Paul Grünbacher
- Christoph Mayr-Dorn

