INSTITUTE OF SOFTWARE SYSTEMS ENGINEERING

Paul Grünbacher
paul.gruenbacher@jku.at

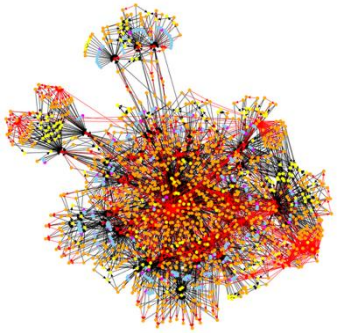
JOHANNES KEPLER
UNIVERSITÄT LINZ

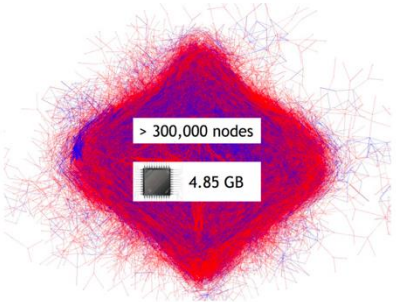
ISSE

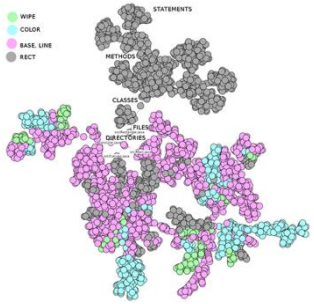
http://www.isse.jku.at

TOPICS OF INTEREST

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







AI FOR SOFTWARE ENGINEERING

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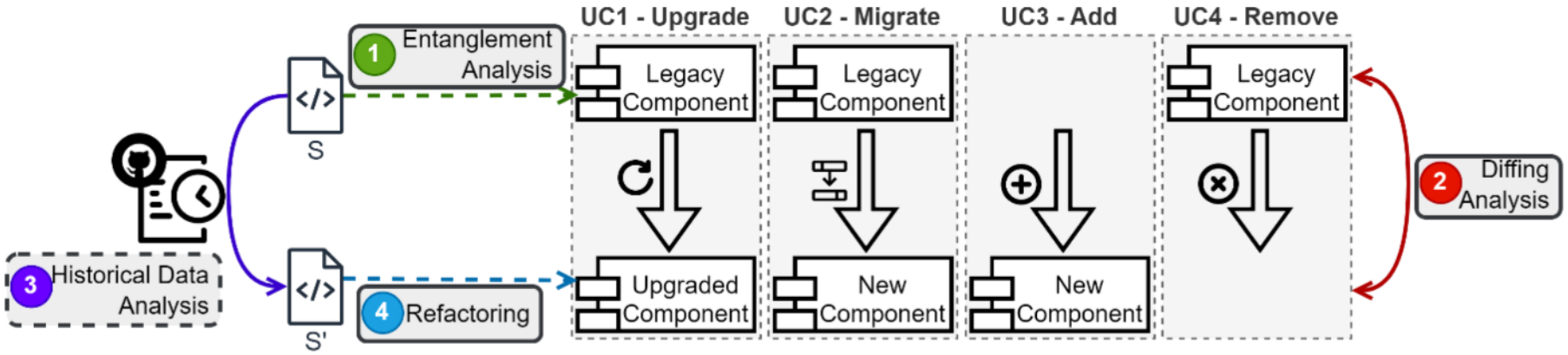
Pro²Future

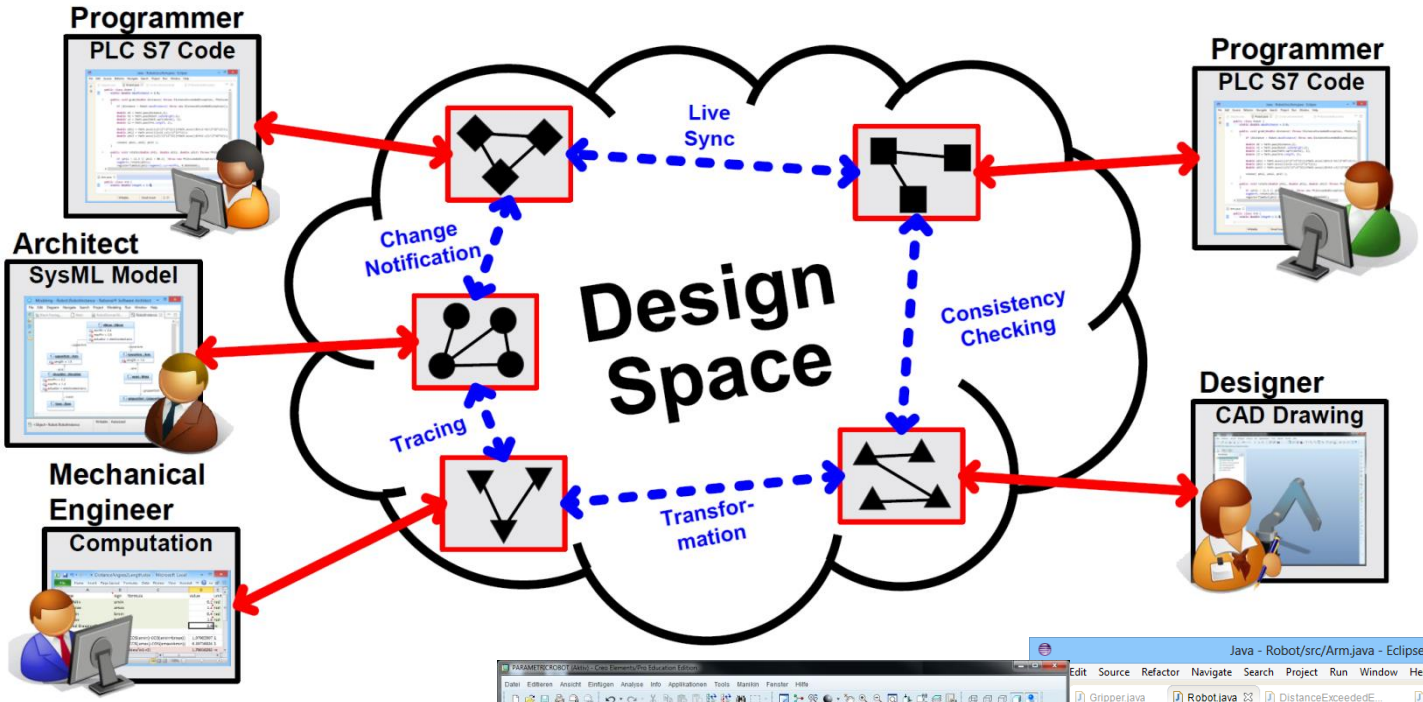
- Ongoing Project: RefactorAI
  - AI-integrated methodology and tools to assist developers in refactoring tasks associated with legacy systems.
- Maintaining legacy systems
  - Outdated technologies, architectural degradation, high costs, barriers to modernization.

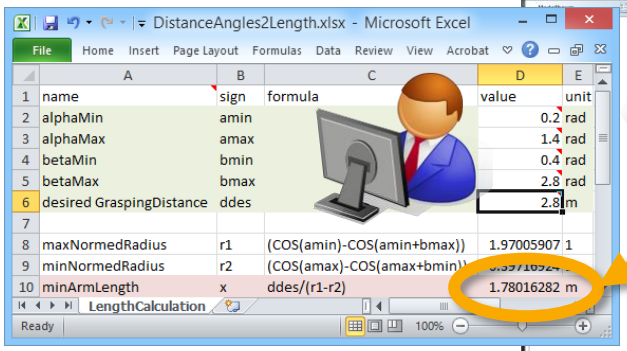
dynatrace

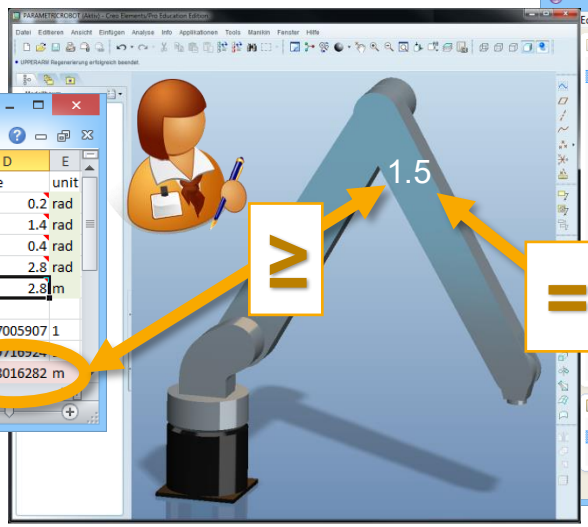
IT | PRO
Software die's einfach macht.

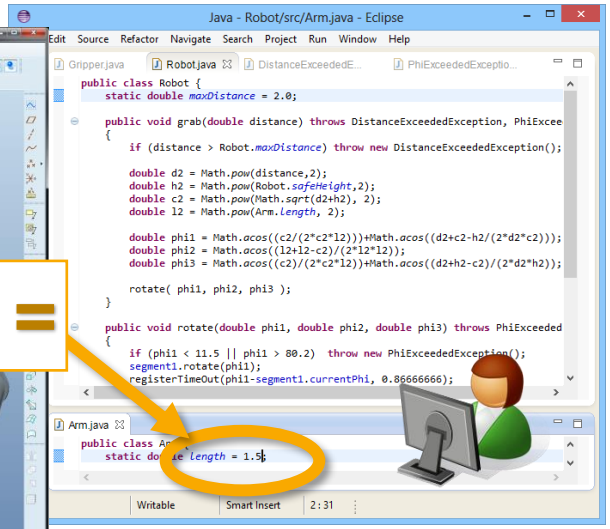


INTEGRATED AND COLLABORATIVE ENGINEERING









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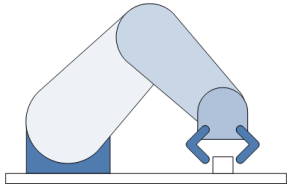
FEATURE-ORIENTED PRODUCT LINES

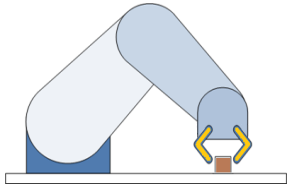
Existing Products

Robot 1



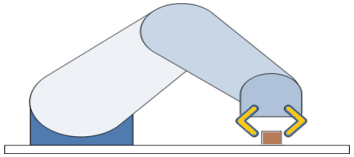
Short Upper Arm
Short Lower Arm
Blue Gripper

Robot 2



Short Upper Arm
Short Lower Arm
Yellow Gripper

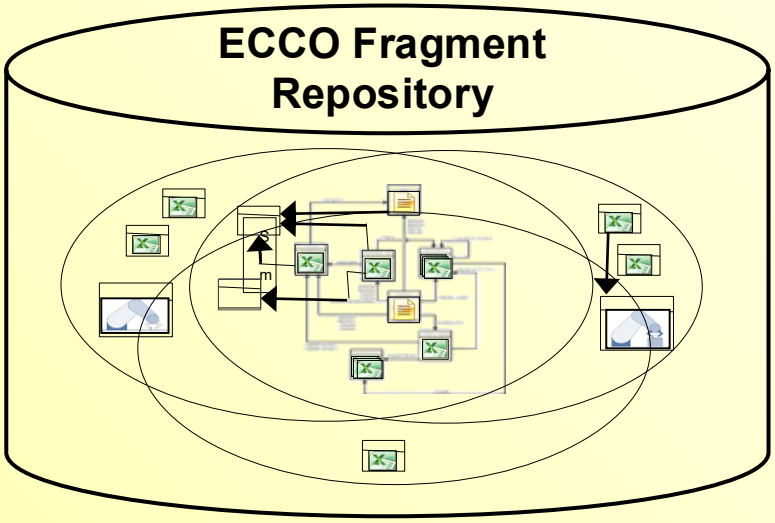
Robot 3



Long Upper Arm
Long Lower Arm
Yellow Gripper

Extraction

Compares products to identify commonalities and differences

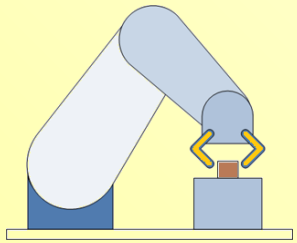


Commonalities and Differences are stored as Product Fragments

Composition

New Robot Composed from Existing Fragments

Short Upper Arm
Long Lower Arm
Yellow Gripper
Pedestal NEW!



Completion

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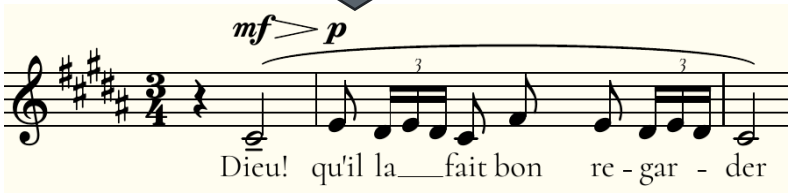
DOMAIN-SPECIFIC LANGUAGES MUSIC ENGRAVING AND MUSICOLOGY

ANTON BRUCKNER PRIVATE UNIVERSITY
Music Dance Drama

Music Engraving, e.g., LilyPond

```
AltoVoice = \relative c' {
  \global
  \clef "treble"
  \tempo "Très modéré soutenu et expressif" 4 = 96
  r4 cis2^- \mf \> \(
  e8 \p \times 2/3 { dis16 [ e16 dis16 ] } cis8 fis8 e8
  \times 2/3 { dis16 [ e16 dis16 ] }
  cis2 \) cis4 \< \( e8 e16 [ fis16 ] gis8
  \times 2/3 { fis16 [ gis16 fis16 ] }
  e8 \> dis8 \! cis4 cis4 \) r4
}

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	quarterbea
16	16	60
16	16	121/2
16	16	62

timesig	staff	voice	label
4/4	2	1	V(64)}
4/4	2	1	V|HC
4/4	2	1	{

globalkey	localkey
C	I
C	I
C	I

form	figbass	changes	relativeroot
		64	

cadence	phraseen
	}
HC	

chord_tones	added_tones	root	bass_note
1, 0, 4		1	1
1, 5, 2		1	1

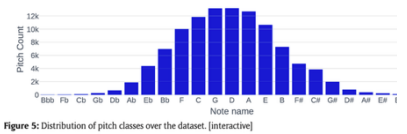
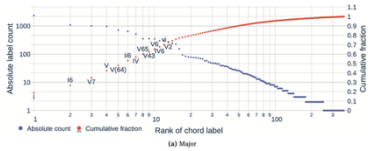
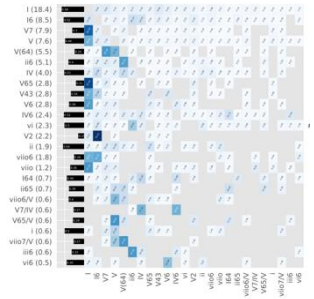


Figure 5: Distribution of pitch classes over the dataset. [interactive]





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 Pro2Future, the SCCH, and the ACCM
- FWF Projects
- FFG Projects
- LIT Secure and Correct Systems Lab

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

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CARRY OUT YOUR THESIS PROJECT IN COLLABORATION WITH AN INDUSTRY PARTNER

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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
- Claudio Di Sipio

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