

Harnessing customization in Web Annotation: A Software Product Line approach

PhD Candidate: Haritz Medina

Supervisors: Prof. Dr. Oscar Díaz & Dr. Maider Azanza



Outline

1. Context
2. Research methodology
3. Web Annotation for data extraction in SLRs
4. Web Annotation for assignment marking
5. Web Annotation for peer review
6. SPLs to harness heterogeneity in web annotation
7. Conclusions

1. Context

Web annotations and practice heterogeneity

polytheistic
and is just
sophistry
attempt to
gain us
by adding
harmony
with super-
natural.

thought. To speak of a soteriology, we must emphasize two points: it is a system (in the traditional sense) offering final salvation, and it is also a system of salvation (here in the sense that it makes it possible to live a polytheism of everyday life and its diversity). Of a single, hierarchically ordered experience diversity, we (may) think that the ultimate concern involves both what kind of rationalization the system provides and the image of the world: an integrated means of:

Traditional annotations



Web Annotations

This document is governed by the [1 September 2015 W3C Process Document](#).

1. Introduction

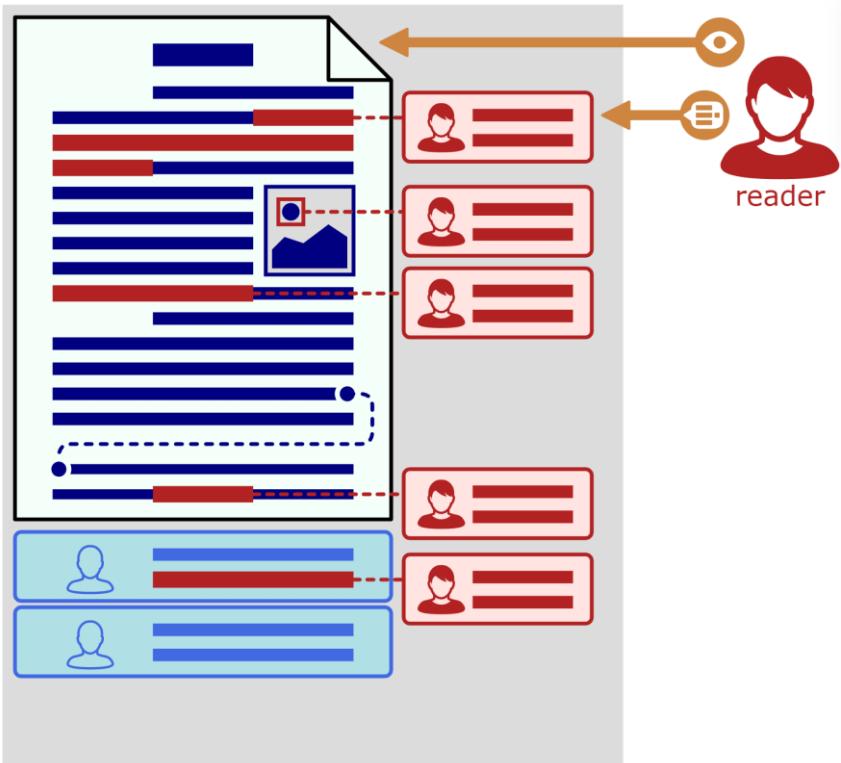
This section is non-normative.

Annotating, the act of creating associations between distinct pieces of information, is a pervasive activity online in many guises. Web citizens make comments about online resources using either tools built in to the hosting website, external web services, or the functionality of an annotation client. Comments about shared photos or videos, reviews of products, or even social network mentions of web resources could all be considered as annotations. In addition, there are a plethora of "sticky note" systems and stand-alone multimedia annotation systems. This specification describes a common approach to expressing these annotations, and more.

The Web Annotation Data Model provides an extensible, interoperable framework for expressing annotations such that they can easily be shared between platforms, with sufficient richness of expression to satisfy complex requirements while remaining simple enough to also allow for the most common use cases, such as attaching a piece of text to a single web resource.

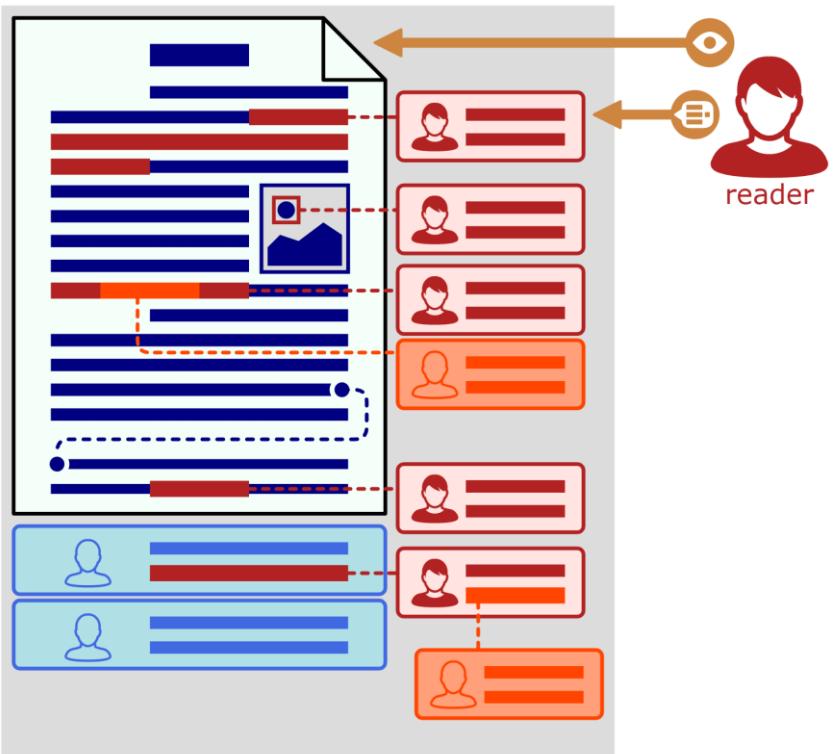
An annotation is considered to be a set of connected resources, typically including a body and target, and conveys that the body is related to the target. The exact nature of this relationship changes according to the intention of the annotation, but the body is most frequently somehow "about" the target. This perspective results in a basic model with three parts, depicted below. The full model supports additional functionality, enabling content to be embedded within the annotation, selecting arbitrary segments of resources, choosing the appropriate representation of a resource and providing styling hints to help clients render the annotation appropriately. Annotations created by or intended for machines are also possible, ensuring that the Data Web is not ignored in favor of only considering the human-oriented Document Web.

```
graph TD; annotation((annotation)) --> body((body)); annotation --> target((target));
```



Web Annotations

Anything on the web can be annotated (text excerpts, portions of images,...)

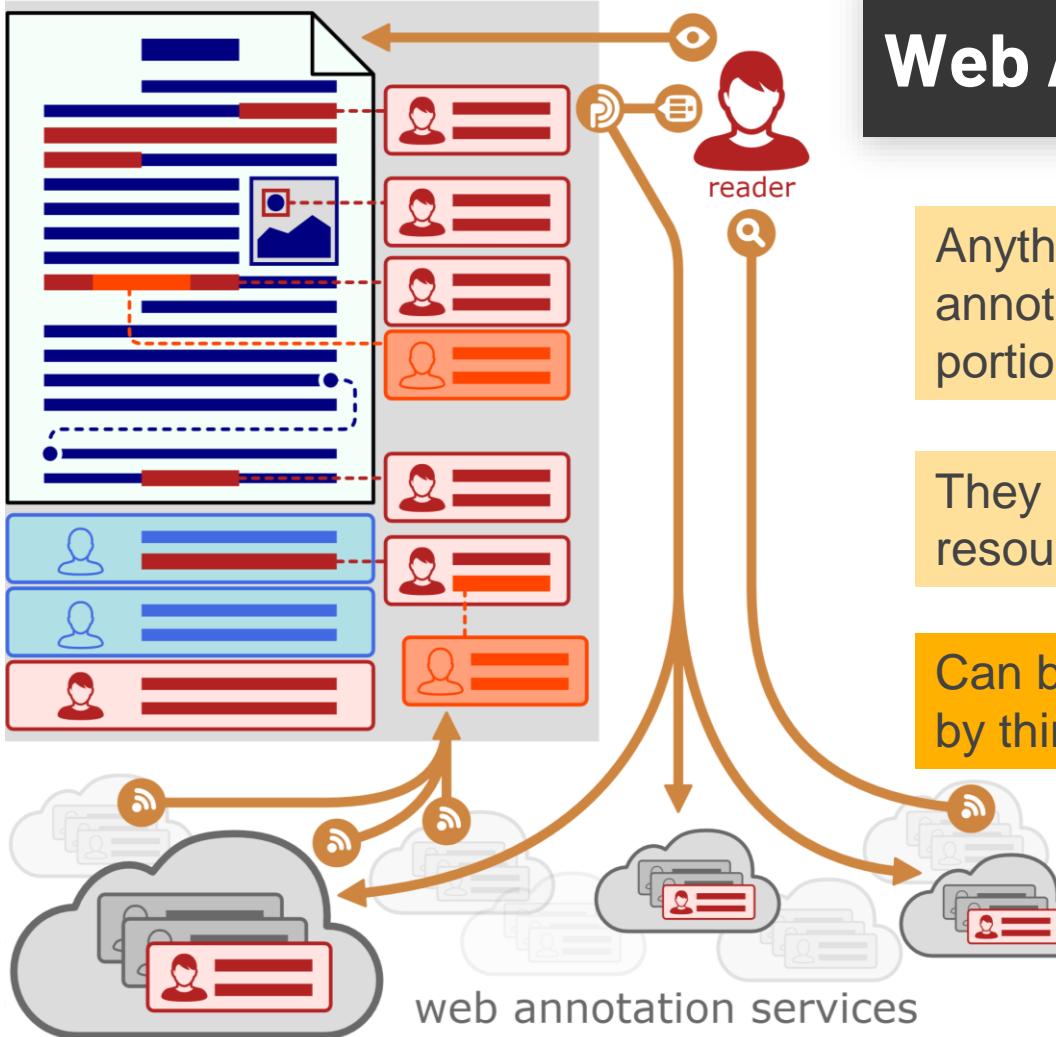


Web Annotations

Anything on the web can be annotated (text excerpts, portions of images,...)

They are referable web resources

Web Annotations



Anything on the web can be annotated (text excerpts, portions of images,...)

They are referable web resources

Can be shared and consumed by third parties or apps

The W3C Web Annotation recommendation



It was published in 2017 to make interoperable, shareable and distributed web annotations

Three recommendations:

- Protocol
- Data Model
- Vocabulary

Looking for a Research Question



W3C Web Annotation recommendation
standardizes how annotations are described
and transported...

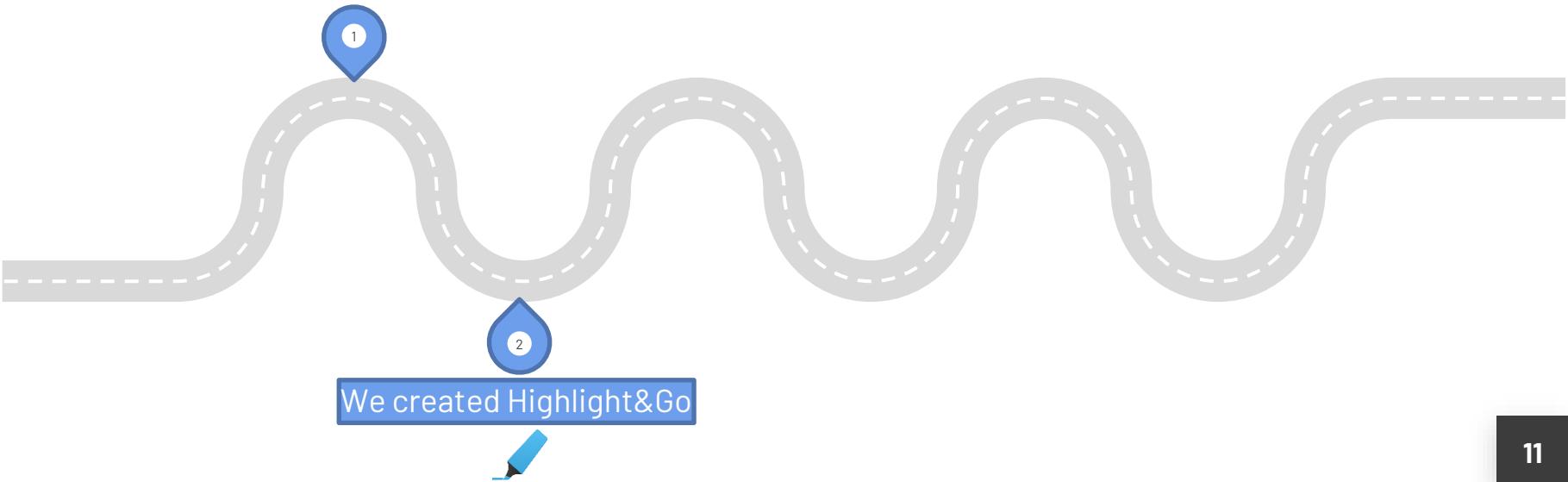
...but it leaves undefined how are created,
rendered or managed

Looking for a Research Question

Our web annotation tools journey



Investigating a web
annotation use case for
data extraction in SLRs



Looking for a Research Question

Our web annotation tools journey - Highlight&Go



The screenshot shows a web browser window with the title 'SPLemma: A Generic Framework for SPL Evolution'. The page content discusses the evolution of SPLs and the challenges of ensuring consistency and controlling impact during evolution. The 'Highlight&Go' extension is active, with several annotations overlaid on the text. Annotations include:

- A red box highlights the first sentence: "on the SPL definition. Thus, a framework that enables a controlled SPL evolution is required."
- A red box highlights the section heading "3. REQUIREMENTS".
- A red box highlights the first bullet point under "3.1 Ensuring SPL consistency": "1. Assets' consistency. When assets are added or updated, they should behave properly. In general, the definition of a correct behaviour depends on each SPL. Therefore, according to its domain, a SPL will define suitable tests to verify the behavior of its assets."
- A red box highlights the first sentence of the second bullet point: "As YOURCAST evolution is driven by a community, each new asset has to be automatically tested before a complete integration in the SPL. Currently, as soon as we let anyone contributing, we have to ensure the correctness of the code through continuous integration services."
- A red box highlights the first sentence of the third bullet point: "2. FMI consistency. In the literature, several operations are defined to anomaly detection such as void FMI, dead features, false optional features, wrong cardinalities and redundancies [3]. Besides these anomalies, we can find problems related to the concrete domain of SPLs. For example, in YOURCAST, the addition of a new configuration can introduce features that are semantically equivalent. The addition of a new service for weather predictions by using a *forecast* feature instead of a *weather* feature will cause the creation of two different features with the same semantics. In
- A red box highlights the last sentence of the text: "metamodel, but their denotation has several concepts."
- A red box highlights the first sentence of the next paragraph: "4. Co-Evolution Several studies changes on evolvable element changes on elements from 'P' containing feature models, ca on the 'Configuration Know and the Solution Space (SS)'".
- A red box highlights the first sentence of the following paragraph: "An evolution can then be *In* of the same space are modified *gree* (the mapping and one of or *Interspatial Second Degree* spaces are modified) [17]. Th for different element of SPLs".
- A red box highlights the first sentence of the next paragraph: "In YOURCAST and SALOON guaranteed when a new prod to provide both the new asset. Then, several validation checking assets consistency, model consistency, checking tional way to keep the consis of the validation fails, all the celled and problems notified".
- A red box highlights the first sentence of the final paragraph: "3.2 Controlling the impact".
- A red box highlights the first sentence of the next paragraph: "In order to control the impact, we According to the literature, an ev kinds of impact on the family of pation, specialization, refactoring a tions, we can still derive the set we add new ones. On the contr can only derive a subset of the o lorings improve the cohesion betw out changing the product family avoided. and should be avoided. refers to the automatic detection of regresions during the evolution".
- A red box highlights the last sentence of the text: "In YOURCAST, contributors are generalizations. This means that".

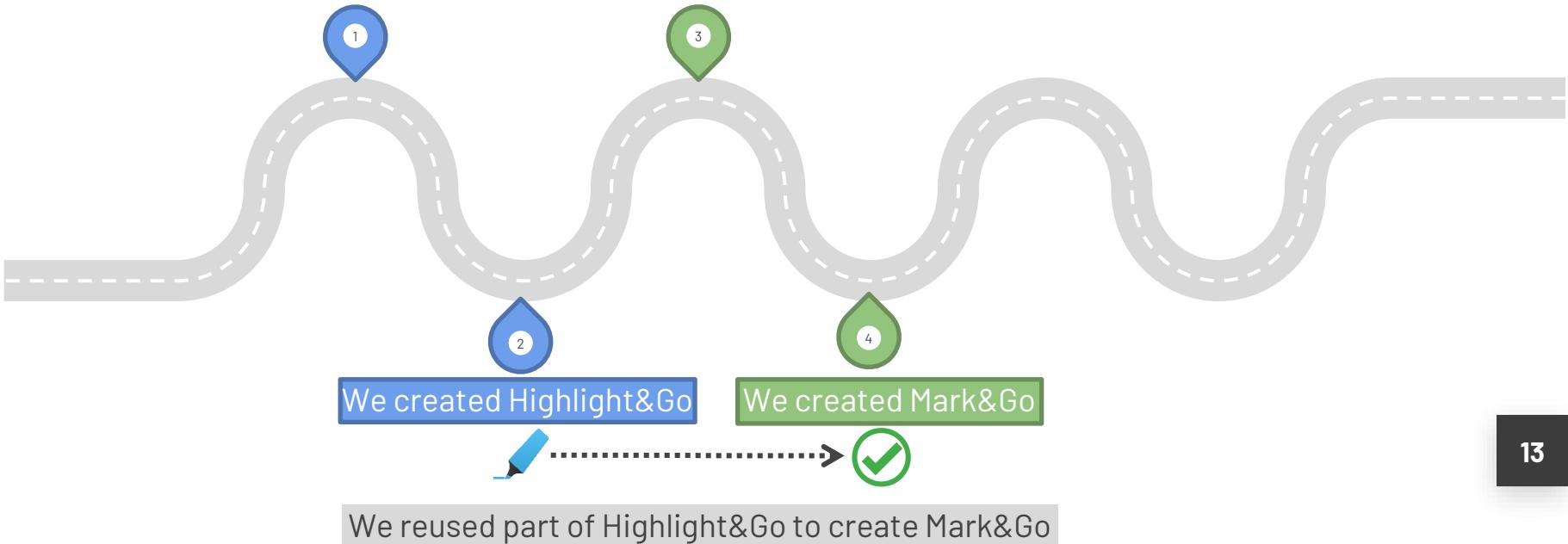
Looking for a Research Question

Our web annotation tools journey



Investigating a web annotation use case for data extraction in SLRs

We realized that web annotations can be used for assignments marking



Looking for a Research Question

Web annotation tools journey: Highlight&Go + Mark&Go



on the SPL definition. Thus, a framework that enables a controlled SPL evolution is required.

3. REQUIREMENTS

Evolution in SPLs has been a challenge for many years [13]. Though several works exist on feature models evolution [3, 9], we identify three challenges to provide a generic evolution framework able to guarantee some properties: 1) how to ensure SPL consistency during evolution, 2) how to control the impact on the family of products and 3) how to deal with SPL heterogeneity.

3.1 Ensuring SPL consistency

In order to ensure the consistency of a SPL, the correctness and co-evolution of impacted elements have to be checked:

- Assets' consistency.** When assets are added or updated, they should behave properly. In general, the definition of a correct behaviour depends on each SPL. Therefore, according to its domain, a SPL will define suitable tests to verify the behavior of its assets.

As YOURCAST evolution is driven by a community, each new asset has to be automatically tested before a complete integration in the SPL. Currently, as soon as we let anyone contributing, we have to ensure the correctness of the code through continuous integration services. In SALOON, tests on assets are lighter since contributors are the cloud experts and each PaaS defines its own set of fixed instructions (which are the assets in SALOON) for its configuration.

2. FM consistency. In the literature, several operations are defined to anomaly detection such as void FM, dead features, false optional features, wrong cardinalities and redundancies [3]. Besides these anomalies, we can find problems related to the concrete domain of SPLs. For example, in YOURCAST, the addition of a new configuration can introduce features that are semantically equivalent. The addition of a new service for weather predictions by using a *forecast* feature instead of a *weather* feature will cause the creation of two different features with the same semantics. In

```
java.util.ArrayList;
import java.util.Comparator;
public class genericheap<T> { // create a generic heap class <T> , where T can be of any type.
    private ArrayList<T> data = new ArrayList<T>();
    private Comparator<T> ctor;
    public genericheap(Comparator<T> ctor) { // constructor to initializing the generic comparator
        this.ctor = ctor;
    }
    public void add(T item) {
        data.add(item);
    }
    public void remove(T item) {
        data.remove(item);
    }
    public void sort() {
        Collections.sort(data, ctor);
    }
    public T getMin() {
        return data.get(0);
    }
    public void decreaseKey(T item, T value) {
        int index = data.indexOf(item);
        if (index != -1) {
            data.set(index, value);
            siftUp(index);
        }
    }
    private void siftUp(int index) {
        while (index > 0) {
            int parentIndex = (index - 1) / 2;
            if (data.get(index).compareTo(data.get(parentIndex)) <= 0) break;
            swap(index, parentIndex);
            index = parentIndex;
        }
    }
    private void swap(int i, int j) {
        T ith = data.get(i);
        T jth = data.get(j);
        data.set(i, jth);
        data.set(j, ith);
    }
}
```

The defined data structure does not correspond to your design in the previous assignment:

<https://moodle.moodlecloud.com/mod/assign/view.php?id=8>

OK

Cancel



Looking for a Research Question

Web annotation tools journey: Highlight&Go + Mark&Go



SPLEMMMA: A Generic Framework for SPL Evolution

Highlight&Go | chrome-extension://bihmalpgnlomidipekdnoohieppfmo/content/pdfjs/

4 of 9

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file:///Users/teacher/Downloads/genericheap%20(21).java

Mark&Go - 0h0m0s

```
private ArrayList<T> data = new ArrayList<T>();
private Comparator<T> ctor;
```

The defined data structure does not correspond to your design in the previous assignment:

<https://moodle.moodlecloud.com/mod/assign/view.php?id=8>

OK Cancel

Commonalities



Looking for a Research Question

Web annotation tools journey: Highlight&Go + Mark&Go



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file:///Users/teacher/Downloads/genericheap%20(21).java

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private ArrayList<T> data = new ArrayList<T>();  
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```

The defined data structure does not correspond to your design in the previous assignment:

<https://moodle.moodlecloud.com/mod/assign/view.php?id=8>

OK Cancel

16

Looking for a Research Question

Our web annotation tools journey



Investigating a web annotation use case for data extraction in SLRs

We realized that web annotations can be used for assignments marking

Our third annotation use case is peer-reviewing for scholarly papers in conferences



Our web annotation tools journey

Highlight&Go + Mark&Go + Review&Go



Commonalities

Variabilities

SPLEMMMA: A Generic Framework

Highlight&Go

4 of 9

on the SPL definition, controlled SPL evolution

3. REQUIREMENTS

Evolution in SPLs has Though several works [9], we identify three char framework able to gu ensure *SPL consistenc* the impact on the fami *SPL heterogeneity*.

3.1 Ensuring SP

In order to ensure the and co-evolution of im

1. Assets' consist dated, they shou definition of a co Therefore, accord suitable tests to v As YOURCAST e each new asset h a complete integr as we let anyone correctness of the services. In SALO contributors are t fines its own set assets in SALOC
2. FM consistenc are defined

Mark&Go - 0h0m0s

Code documentatio 0
1
3
5

Code efficiency 0
2
5
10

Code correction 0
1
3
4

Choice of dat... 0
7
15

Completeness... 0
1
3
5

Assig1: Requirements **Assig**

The defined data structu to your design in the prev

<https://moodle.moodlec ew.php?id=8>

OK



DefaultReview...

Toolset

Criteria

Create new theme

Design
Artifact
Evaluation
Novelty
Presentation
Typos
Relevance
Adoption
Relevance
Transferability
Rigor
Justificatory knowledge
Research methodology
Rigor

calls for assistance in reconciling efficiency and effectiveness in peer review.

Peer review limitations have been addressed with a revolutionary or evolutionary perspective. The former include: incentivize good peer reviewing by rewarding their best reviewers [4] or revealing reviewers' identities [26]. Alternatively, evolutionary solutions do not change current practices but provide some kind of support: online reviewing for reducing the workload and speeding the communications between au

Depth of analysis

Major weakness Minor weakness Strength

The problem should be analyzed in more detail

hevner theory

Design Science Research Contributions - Finding a Balance between Artifact and Theory. (2018)

Will Artificial Intelligence Automate Theory Building? Are there Lessons for Academic Practice? (2018)

Looking for a Research Question

Web annotation tools: Highlight&Go + Mark&Go + Review&Go



SPLEMMMA: A Generic Framework

Highlight&Go

Mark&Go

Reviewers

SPL Evolution

Asset type

Code assets

Products

SPL architecture

Variability model

Evolution activities

Analyze and plan

Identify

Implement

Verify change

Product-derivable

Annotation-based

Clone-based

Composition-based

Hybrid

Model-driven

4 of 9

on the SPL definition-controlled SPL evolution

3. REQUIREMENTS

Evolution in SPLs has been studied by several works [9], we identify three challenges to ensure SPL consistency: the impact on the family, SPL heterogeneity.

3.1 Ensuring SPL consistency

In order to ensure the consistency and co-evolution of the SPLs:

- Assets' consistency**: Assets must be consistent, they should have a common definition of a core concept. Therefore, according to the requirements suitable tests to verify consistency.
- Choice of data structures**: As YOURCAST evolves each new asset has to be integrated in a complete integrated system. As we let anyone to contribute to the system, the correctness of the system is guaranteed.
- Completeness**: In SALOON, contributors are allowed to define their own set of requirements.

OK

Assig1: Requirements

The defined data structures must be consistent with your design in the previous section.

<https://moodle.moodlecentral.edu.ec/weew.php?id=8>

DefaultReview... Toolset

Criteria

Create new theme

Design

Artefact

Evaluation

Novelty

Presentation

Typos

Relevance

Adoption

Relevance

Transferability

Rigor

Justificatory knowledge

Research methodology

Rigor

3 de 24

calls for assistance in reconciling efficiency and effectiveness in peer review.

Peer review limitations have been addressed with a revolutionary or evolutionary perspective. The former include: incentivize good peer reviewing by rewarding their best reviewers [4] or revealing reviewers' identities [26]. Alternatively, evolutionary solutions do not change current practices but provide some kind of support: online reviewing for reducing the workload and speeding the communications between authors, editors and reviewers [25]; training programmers for young scientists to develop

Depth of analysis

Major weakness **Minor weakness** **Strength**

The problem should be analyzed in more detail

hevner theory

Design Science Research Contributions - Finding a Balance between Artifact and Theory. (2018)

Will Artificial Intelligence Automate Theory Building? Are there Lessons for Academia from Practice? (2018)

19

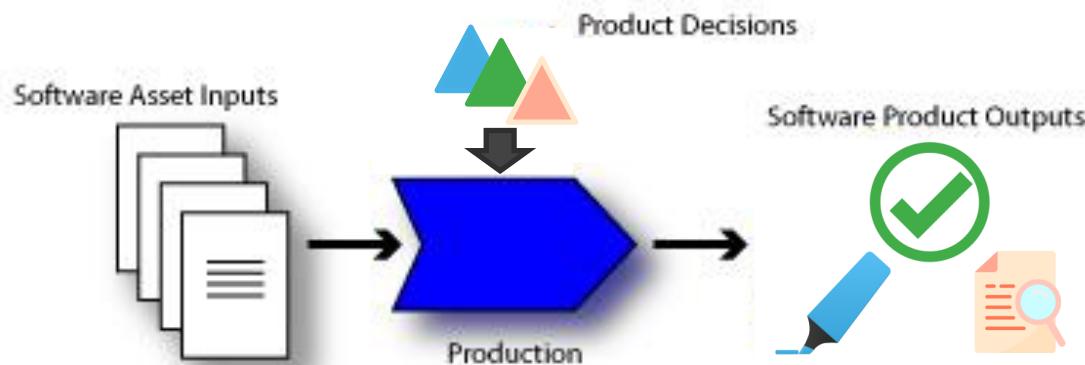
Looking for a Research Question

Our family of web annotation tools: Software Product Lines



**Supports the development
of a family of software
products**

Aims to support **systematic reuse** of shared assets through a whole **family of products** to **reduce development cost**





“

**How would a platform
for a family of web
annotation tools look
like?**

Our family of web annotation tool



- A family of tools needs to be **scoped**, as addressing any kind of annotation is too wide
- Requirements applied to annotation tools in our family:
 - ✖ How are they implemented?
 - ✖ Which is their context?

Web annotation tool family

How are implemented?



	Desktop application	Website	Browser extension
Support for web resources			
Support for non-web resources			
Support for easy extensibility			



Implementation as a browser extension

Web annotation tool family

Which one is our context?



- Annotation tools are used in very **varied context**

PREFUSION 2019-NCOV SPIKE GLYCOPROTEIN WITH A SINGLE RECEPTOR-BINDING DOMAIN UP
EMD-21375 PROTEINS IN THIS MODEL: A - S_Spike glycoprotein

S - Spike glycoprotein - Severe acute respiratory syndrome coronavirus 2 - PDDTC2

Functional mapping ppi

Domains & sites

Molecule processing

PTM

Structural features

3D models of proteins in biomedicine

eMargin

David Copperfield - Chapter 2 by Charles Dickens

Section 1

CHAPTER 2 **OBSERVE**

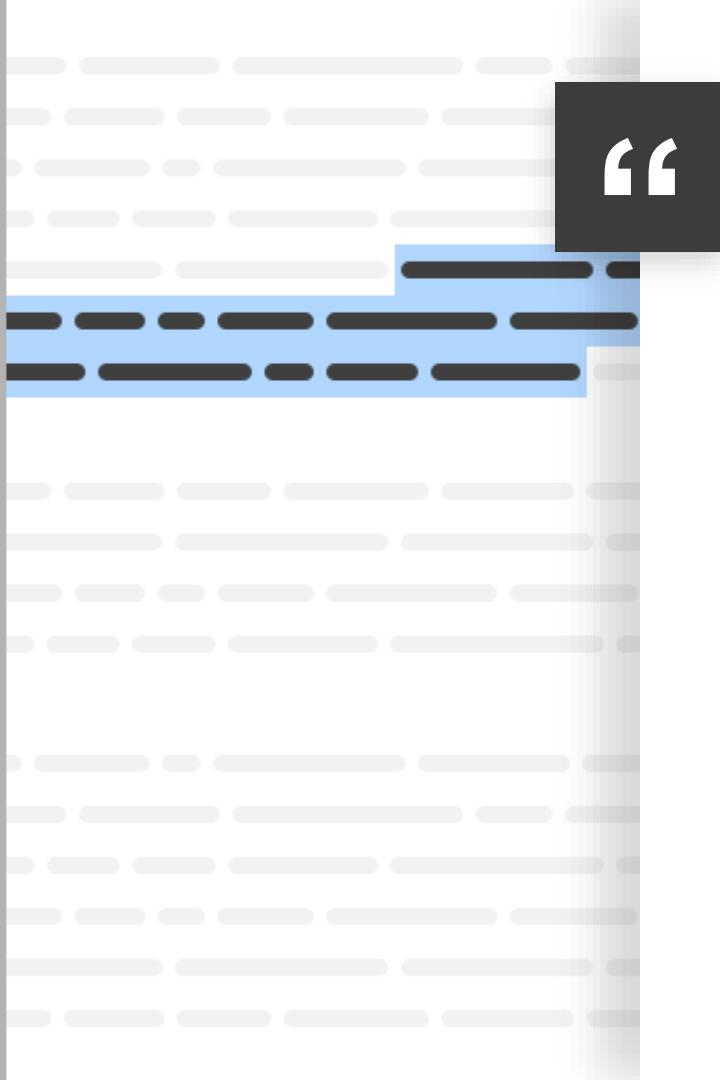
The first **object** that **assumes** a distinct **presence** before me, as far back, into the **blank of my infancy**, are **my mother with her hair** and **youthful shape**, and **Peggotty** with no shape at all, and **dark that they seemed to darken their whole neighbourhood in it** and **cheeks and arms so hard and red that I wondered the birds peck her in preference to apples**.

I believe I can **remember** these two at a little **distance apart**, **to my sight** by stopping down or kneeling on the floor, and I gain **unsteadily from the one to the other**. I have an impression on my which I cannot distinguish from actual remembrance, of the **touch**.

Text annotation in education

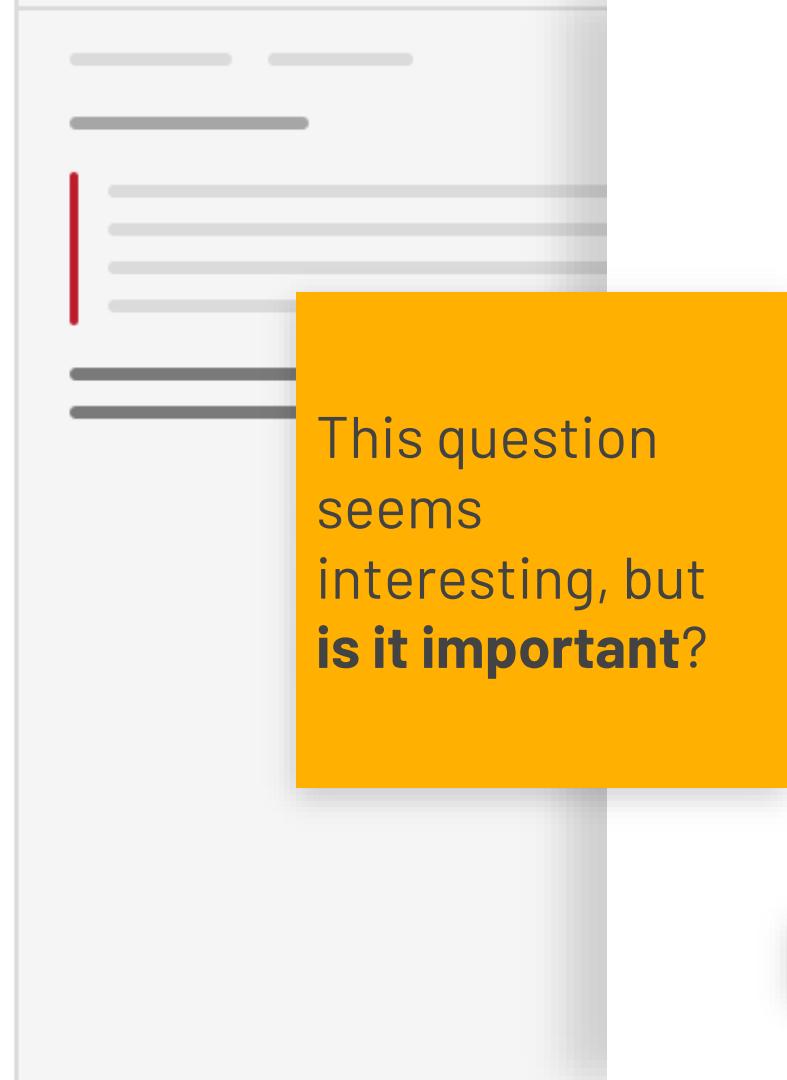


We will focus on review of textual documents



“

**How would a platform
for a family of
browser extensions
for reviewing using
web annotation tools
looks like?**



This question
seems
interesting, but
is it important?

Looking for an “important” Research Question



Q1: Is the **context** (annotation for review) relevant enough?

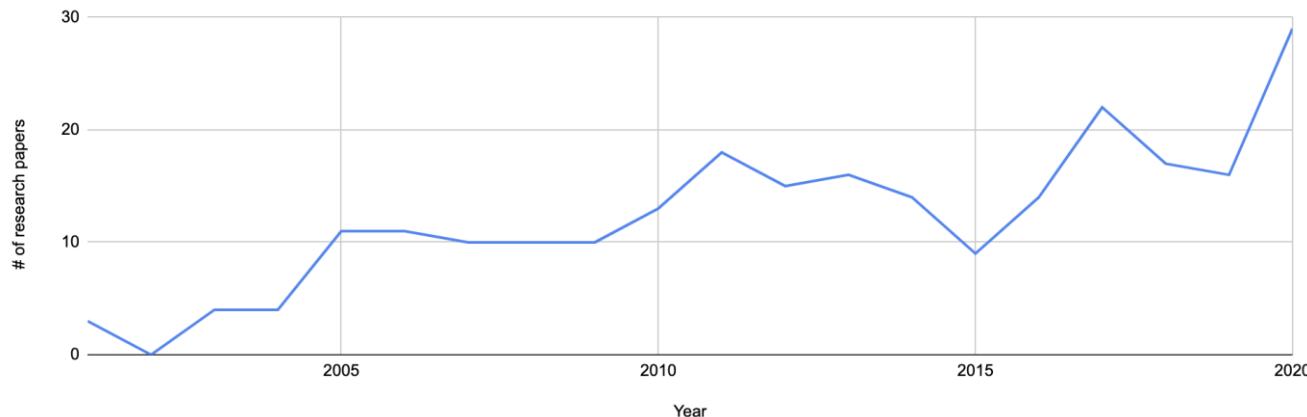
Q2: Is the **goal** (reduce development and maintenance) relevant enough?

Looking for an “important” Research Question

Q1: The context: annotation for review



Annotation tools are getting more relevant in the last 20 years in research in annotation tools



Data gathered from dimensions.ai. Search term: “web annotation tool”

Looking for an “important” Research Question

Q2: The goal: development cost



Tool	# of SLOC	TTM(months)*	# contributors	# commits
Hypothes.is	81,54K	60,67	7	8995
Recogito2	90,35K	8,57	1	3002
Annotation Press	91,70K	10,3	3	990
WAT-SL	5,82K	16,53	1	20
Annotation Studio	89,4K	6,8	3	2234
@note	154,73K	20,2	2	262
Dokie.li	35,72K	49,87	1	3278
Neonion	127,88K	9,9	6	842
CATMA	116,31K	13,03	3	1866
WebAnno	197,08K	8,93	2	5199
Mean	131,59K	18,7	2,85	2287

* Time to market (TTM): elapsed time to obtain the first stable version (v1.0) or published in stores

Looking for an “important” Research Question

Q2: The goal: maintenance cost



Tool	#commits +v1.0 *	Last update**
Hypothes.is	7041	Aug 2022
Recogito2	1879	Apr 2022
Annotation Press	475	Mar 2020
WAT-SL	35	Jul 2022
Annotation Studio	1968	Aug 2021
@note	6	Nov 2014
Dokie.li	1609	Jun 2022
Neonion	2	Feb 2019
CATMA	1914	Aug 2022
WebAnno	5298	Jun 2022
Mean	2023	

* Maintenance effort is captured through the number of commits since first stable release (# commits for maintenance)

The first stable release is dated from the so-labeled v1.0 release

** Checked in August 2022



“

How to design a platform to systematically reuse features

that satisfies heterogeneity and extensibility

so that developers reduce the development and maintenance costs

in the creation of web annotation extensions for reviewing?

Outline

1. Context
- 2. Research methodology**
3. Web Annotation for data extraction in SLRs
4. Web Annotation for assignment marking
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2. Research methodology

Action Design Research

Research methodology: Action Design Research

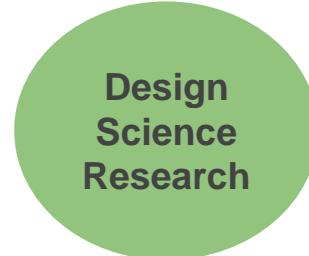


Research methodology: Action Design Research



Aims to contribute to practical concerns in an immediate problematic situation by collaborating with practitioners.

Research methodology: Action Design Research



Aims to contribute to practical concerns in an immediate problematic situation by collaborating with practitioners.

Scientific study and creation of artifacts to solve practical problems of general interest

Research methodology: Action Design Research



Aims to contribute to practical concerns in an immediate problematic situation by collaborating with practitioners.

Scientific study and creation of artifacts to solve practical problems of general interest

Generate prescriptive design knowledge by building and evaluating IT artifacts in an organizational environment

Action Design Research & frame for the web annotation use cases presented in this thesis



Outline

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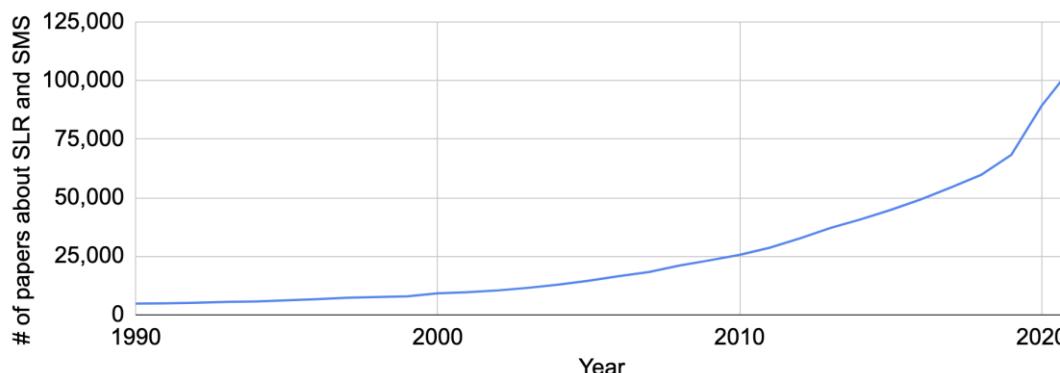
3. Web annotation for data extraction in SLRs

Highlight&Go

Are literature reviews relevant?



Number of literature reviews is increasing over the last 30 years. In the last year more than 100K literature reviews have been published



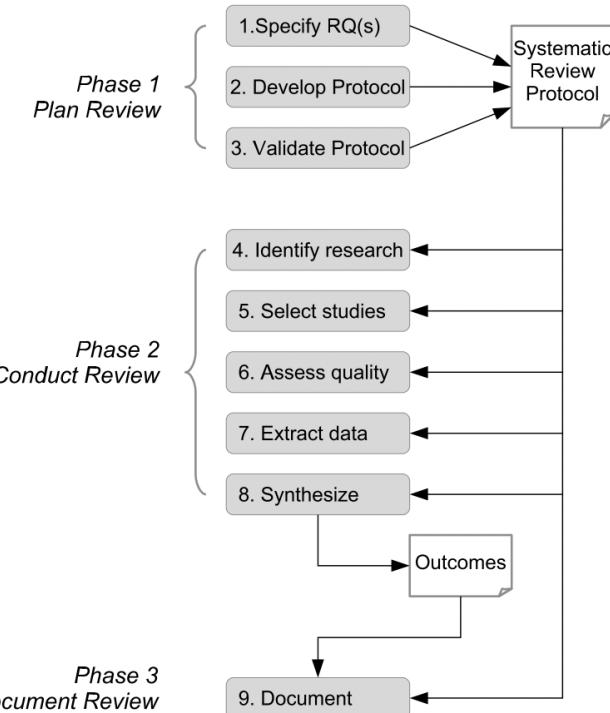
Data gathered from dimensions.ai. Search term: "literature review"

Practice



Systematic Literature Reviews (SLRs) and Systematic Mapping Studies (SMSs) are used to identify clusters of related studies and research gaps [KBB15]

- Conducted by more than one researcher
- Hundred of papers should be analyzed





Practice: Data extraction process

1.Read



Figure 2: Evolving Advanced Driver Assistant System

Each variant is derived from a specific ADAS evolution stage. The first *ADAS evolution 1.0* contains the *Europe luxury class 1.0* variant. Necessary changes in form of bug fixes, new user or customer requirements result in a novel ADAS evolution stage, like *ADAS evolution 2.0*. In this stage the variants *Europe luxury class 2.0* and *North America luxury class 2.0* are derived. In this case, the variant *Europe luxury class 1.0* and *Europe luxury class 2.0* have different behavior and properties. Therefore the safety artifacts from the stage *ADAS evolution 1.0* to the stage *ADAS evolution 2.0* might change, e.g. higher automation degrees resulting in reduced controllability and thus a higher ASIL rating. Moreover, the variant *Europe luxury class 1.0* can exist at once with the variant *Europe luxury class 2.0* and *Europe luxury class 3.0*. This situation is common in the automotive domain due to further development. Several car models and different functions are in the field. Consequently, the maintenance for the evolution stages has to be done in parallel. Due to bug fixes (a different architecture) and changes in the law, a new *ADAS evolution 2.1* stage is derived from the *ADAS evolution 2.0*. Development of new innovative functions and optimization of existing once resulted in the *ADAS evolution 3.0*.

4. Approach of an Integrated Change Impact Analysis

Safety artifacts do not support variability by themselves, which is also pointed out in [13]. A systematic approach to bring PLE and

2.Highlight



Figure 3: modeling concept with the safety perspective, feature models and the configuration and change management

main (*requirements*) with the solution domain (*functional, logical, and technical*). The requirement viewpoint supports the requirements engineering process. The *functional* viewpoint describes the functional structure of the system which is under development. The *logical* viewpoint gives a view onto the component structure. The *technical* viewpoint considers the software and the hardware architecture of the system. The goals of this framework are separation of the concerns, complexity reduction by abstraction and modularity.

Based on ISO 26262 the engineering framework is extended with the *safety perspective*. Moreover, safety artifacts are derived from existing model elements. Four safety engineering activities can be performed directly on the modeled function and system definition: hazard and risk analysis (*HaRa*), functional and technical safety concept development (*FSC, TSC*), and model-based *safety analysis*, e.g. component fault tree analysis [19].

The *HaRa* is performed on the *vehicle level*. An item definition is typically expected as input to start with a *HaRa*. Today, item definitions are often modeled in SysML/UML². The required artifacts have to be taken from the available item definition artifacts contained in the *requirement* and *functional* viewpoints.

3.Record

	C	D	E	F	G	H	I	J	K
1	Title	Abstract	Keywords	Venue	Year	Ref.	Source	Rationale	Evolution aspects
2	A process to support a syste		SPLC	2015	Michael Käßmey	Manual		change impact analysis	Analyze and R
3	A Case Study on Product lin object-ori	WICSA	2012	Heider, W. and V	IEEE			reports a case study wh	Analyze and R
4								Case study where auth	Analyze and R
5									Analyze and R
6	A Cost-Based Ap	The evoluti	IWSPM	2006	Schackmann, H.	IEEE		an approach to estimat	Analyze and R
7	A Cover-based A	Feature mc configurati	SPLC	2014	Barreiros, Jorge	ACM		optimize the options wi	Implement
8	A holistic approa	This paper marketing,	Engineer	1994	Murthy, K.R.S. ar	IEEE		A product marketability	Analyze and P
9	A mixed-method Backgroun	Mixed-me	JSS	2013	Anil Kumar Thuri	SCIENCEDIRE		Evaluation of issue-base	Analyze and P

Practice: Data extraction outcome



Papers

Code

44

Themes													
1	Title	Abstract	Keywords	Venue	Year	Ref.	Source	Rationale	Evolution activit	Evolution sub-ac	Asset type	Product-derivation appr.	Research type
2	A process to support a syste		SPLC	2015	Michael Käßmey	Manual		change impact analysis	Analyze and Plan	Change Impact	Products	Model-driven	Solution
3	A Case Study on Product lin object-ori	WICSA	2012	Heider, W. and V	IEEE			reports a case study wh	Analyze and Plan	Change Impact	Code assets	Composition	Experience
4									Analyze and Plan	Change Impact	SPL architecture		
5									Analyze and Plan	Change Impact	Variability model		
6	A Cost-Based Ap	The evolution of Application I	WSPM	2006	Schackmann, H.	IEEE		an approach to estimat	Analyze and Plan	Decision-making	Variability mode	NA	Conceptual
7	A Cover-based A	Feature m	configurat	SPLC	2014	Barreiros, Jorge	ACM	optimize the options w	Implement	Change synchron	Variability mode	NA	Validation
8	A holistic approa	This paper	marketing, Enginee	1994	Murthy, K.R.S.	IEEE		A product marketability	Analyze and Plan	Decision-making	Products	NA	Solution
9	A mixed-method Backgroun	Mixed-met	JSS	2013	Anil Kumar Thuri	SCIENCEDIREC		Evaluation of issue-bas	Analyze and Plan	Decision-making	Variability mode	NA	Evaluation
10	A Product Line of Theories fo		SPLC	2015	Leopoldo Teixeir	Manual		Checks whether SPL ch	Verify	Inconsistency ch	Variability mode	Hybrid	Solution
11	A Product Line of Theories fo		SPLC	2015	Leopoldo Teixeir	Manual		Checks whether SPL ch	Implement	Built-with-chang	SPL architecture	Hybrid	Solution
12									Implement	Built-with-chang	Code assets		
13	A quantitative ar	Abstract Fe	Variability	SCP	2014	Felipe Nunes Gai	SCIENCEDIREC	Assessment of "aspect	Implement	Built-for-change	Code assets	Composition	Evaluation
14	A requirements-l	describes characterist	EASST	2007	Klaus Schmid,	Hc	Manual	requirement-based tax	Identify	Monitoring the e	NA	NA	Conceptual
15	A theory of softw	To safely e!	Refactorin	Theoret	2012	Paulo Borba and	SCIENCEDIREC	Language independent	Verify	Inconsistency ch	Variability mode	Hybrid	Solution
16	A theory of softw	To safely e!	Refactorin	Theoret	2012	Paulo Borba and	SCIENCEDIREC	Language independent	Implement	Built-with-chang	Code assets	Hybrid	Solution
17	Addressing Domi	It is hard to develop ai	MoDELS	2006	Gan Deng 1 , Gur	Springer		A layered architecture	Implement	Built-for-change	SPL architecture	Model-driven	Solution
18	Agile product lin	Agile meth	Product lir	JSS	2008	Muhammad A. N	SCIENCEDIREC	Agile product line plan	Analyze and Plan	Planning	NA	NA	Validation
19	An Analysis of Change Oper		SPLC	2011	Chessman K. F.	C	ACM	change impact on interi	Implement	Change synchron	Code assets	Model-driven	Conceptual
20	An Analysis of Ef	Quantitative project n	SCSS	2008	Sarang, Nita and	Springer		Effort estimations for s	Analyze and Plan	Decision-making	Code assets	NA	Solution
21									Analyze and Plan	Decision-making	Variability model		
22									Analyze and Plan	Decision-making	SPL architecture		
23	An Approach for Software s	software n RE		2014	Le Minh Sang Tr	IEEE		decision making to impl	Analyze and Plan	Decision-making	Variability model	NA	Solu

Exploratory focus group: Results



Identified Problems

Efficiency

- Manually record codings in spreadsheets
- Manually trace codings back to primary studies

Proposed Solutions

- **Automation** of tasks: no manually record of codes or metadata from papers to the spreadsheet

Exploratory focus group: Results



Identified Problems

Effectiveness

- Forget classification criteria (i.e., codebook)
- Lose focus while reading
- Re-coding due to human errors

Proposed Solutions

- Increase **observability** of the process status (classified papers, mismatches among extractors,...)
- Make classification decisions **traceable**: trace back from spreadsheets to reading context
- Make classified data **consistent**

Web annotation data portability facilitates automation, observability, traceability and consistency

“

How to design a dedicated annotation tool

that satisfies portability

so that researchers conduct data extraction effectively and efficiently

in literature reviews?

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Highlight&Go

★★★★★ 0 ⓘ

Productivity | 75 users

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A Chrome Extension for data extraction in Systematic Reviews using highlights

Watch on YouTube



Building Highlight&Go

Writer: Highlighter

Filter annotations by extractor

Writer: Highlighter

SPLEMMMA: A Generic Framework for SPL Evolution

Highlight&Go | chrome-extension://bihmnlipgnlomidpekdnoohiejjppfmo/content/pdfjs/web/viewer.html?file=https%3A%2F%2Fhighlightandgo.com%2Fspl-evolution%2Fspl-evolution.pdf

4 of 9

Reviewers

- All
- haritzmedina

SPL Evolution

- Asset type
- Code assets
- Products
- SPL architecture
- Variability model

- Evolution acti...
- Analyze and plan
- Identify
- Implement
- Verify change

- Product-deriv...
- Annotation-based
- Clone-based
- Composition-based
- Hybrid
- Model-driven

- Research type
- Conceptual proposal
- Evaluation research
- Experience paper
- Solution proposal
- Validation research

on the SPL definition. Thus, a framework that enables a controlled SPL evolution is required.

3. REQUIREMENTS

Evolution in SPLs has been a challenge for many years [13]. Though several works exist on feature models evolution [3, 9], we identify three challenges to provide a generic evolution framework able to guarantee some properties: 1) *how to ensure SPL consistency during evolution*, 2) *how to control the impact on the family of products* and 3) *how to deal with SPL heterogeneity*.

3.1 Ensuring SPL consistency

In order to ensure the consistency of a SPL, the correctness and co-evolution of impacted elements have to be checked:

- Assets' consistency.** When assets are added or updated, they should behave properly. In general, the definition of a correct behaviour depends on each SPL. Therefore, according to its domain, a SPL will define suitable tests to verify the behavior of its assets.
- As YOURCAST evolution is driven by a community, each new asset has to be automatically tested before a complete integration in the SPL. Currently, as soon as we let anyone contributing, we have to ensure the correctness of the code through continuous integration services. In SALOON, tests on assets are lighter since contributors are the cloud experts and each PaaS defines its own set of fixed instructions (which are the assets in SALOON) for its configuration.

3.2 Controlling the impact

In order to control the impact, we can add new ones. On the contrary, we can only derive a subset of the original features to improve the cohesion between them without changing the product family. This refers to the automatic detection of regressions during the evolution.

In YOURCAST, contributors are encouraged to use generalizations. This means that

Supports annotation based on themes and codes

Filter annotations by extractor

Navigate through annotations

Building Highlight&Go



Write: Highlighter

SPLEMMA: A Generic Framework

Highlight&Go | chrome-extension://bihmalipgnlomidpekdnoohieppfmo/content/pdfjs/web/viewer.html?file=https://

Reviewers

- All
- haritzmedina

SPL Evolution

- Create new theme
- Asset type
- Code assets
- Products
- SPL architecture
- Variability model

Evolution activities

- Analyze and plan
- Identify
- Implement
- Verify change

Product-derivation approaches

- Annotation-based
- Clone-based
- Composition-based
- Hybrid
- Model-driven

Research types

- Conceptual proposal
- Evaluation research
- Experience paper
- Solution proposal
- Validation research

4 of 9

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- FM consistency.** In the literature, several operations are defined to anomaly detection such as void FM, dead features, false optional features, wrong cardinalities and redundancies [3]. Besides these anomalies, we can find problems of SPLs. For example, a new configuration is semantically equivalent for weather prediction instead of a weather forecast of two different featur

Code assets

Controlling

Evaluation research

Reader: Spreadsheet

	A	B	C	D	E	F	G
1	4 Primary Studies vv 4 Themes >>		Asset type	Evolution activity	Product-derivation approach	Research type	
2							
3							
4							
5							

A mixed-method approach for the empirical evaluation of the issue-based variability modeling | Journal of Systems and Software

A quantitative and qualitative assessment of aspectual feature modules for evolving software product lines | Science of Computer Programming

SPLEMMA: A Generic Framework for Controlled-Evolution of Software Product Lines

Agile product-line architecting in practice: A case study in smart grids

Code assets

Identify

"variability identification and instantiation"

Products

Variability model

Implement

"Open-Closed Principle than CC"

"They are components of the working architecture that are not able to support internal variability or extensions in the next iterations."

"product-lines more flexible and adaptable to changes, several companies are adopting"

Verify change

Evaluation research

Evaluation research

Evaluation research

Solution proposal

Annotated content fills the spreadsheet automatically

Building Highlight&Go



Write: Highlighter

SPLEMMA: A Generic Framework x +

Highlight&Go | chrome-extension://bihmalipgnlomidpekdnoohieppfmo/content/pdfjs/web/viewer.html?file=https://

4 of 9

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- FM consistency.** In the literature, several operations are defined to anomaly detection such as void FM, dead features, false optional features, wrong cardinalities and redundancies [3]. Besides these anomalies, we can find problems related to the concrete domain of SPLs. For example, in YOURCAST, the addition of a new configuration can introduce features that are semantically equivalent. The addition of a new service for weather predictions by using a *forecast* feature instead of a *weather* feature will cause the creation of two different features with the same semantics. In

Reader: Spreadsheet

docs.google.com/spreadsheets/d/1s33TN8o2goCJAC6x41uc5cGlHBv4_Zs65RwgGa-iSmE/edit#gid=15...

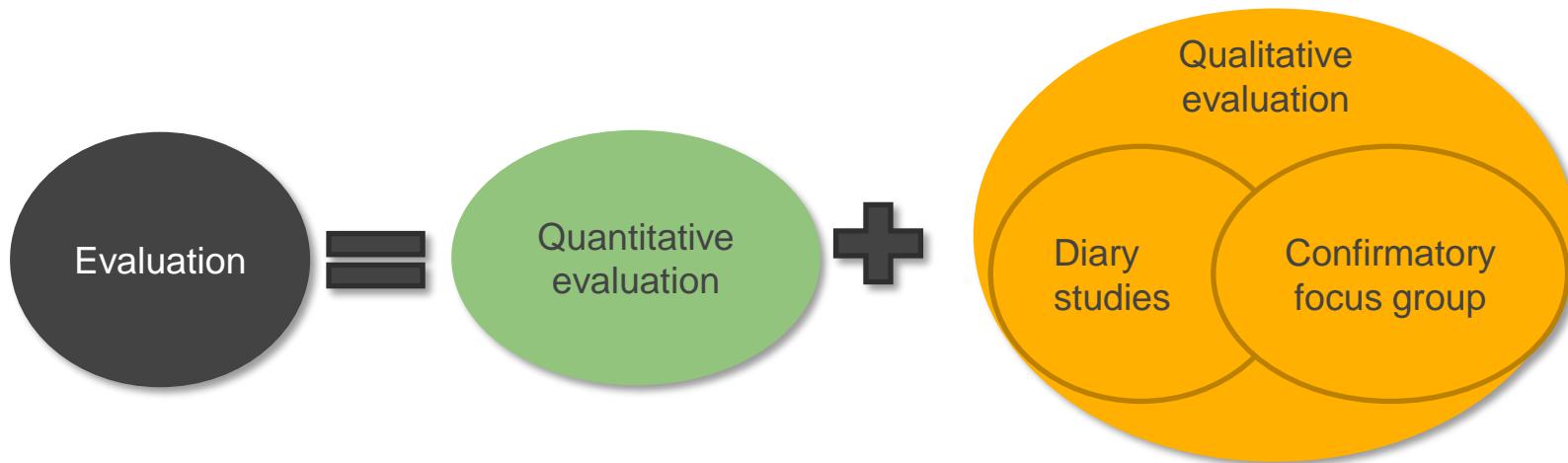
	A	B	C	D	E	F	G
1	4 Primary Studies vv 4 Themes >>		Asset type	Evolution activity	Product-derivation approach	Research type	
2			Code assets	Identify	"variability identification and instantiation"		Evaluation research
3			Products	Variability model	"Open-Closed Principle than CC"		Evaluation research
4			Variability model	Implement	"They are components of the working architecture that are not able to support internal variability or extensions in the next iterations."		Evaluation research
5			Code assets	SPL architecture	"If product-lines more flexible and adaptable to changes, several companies are adopting"		Solution proposal

SPLEMMA: A Generic Framework for Controlled-Evolution of Software Product Lines

Agile product-line architecting in practice: A case study in smart grids

Clicking on the cell opens the evidence in context

Intervention & Evaluation: Method



Goal: validate Highlight&Go's utility by improving data extraction efficiency and effectiveness

Evaluation main insights



Most positive aspects

Efficiency

- Quantitative study reveals between 40% and 50% of improvement in efficiency
- Participants valued positively data translation to the spreadsheet

Things to improve

- Highlight&Go not very convenient to conduct thematic analysis, no help in the reclassification of annotations

Evaluation main insights



Most positive aspects

Effectiveness

- Participants highly valued integration between spreadsheet and papers
- Tabular view is familiar and easy to understand and use
- No transcription errors thanks to sidebar annotation

Things to improve

- Papers need to be accessed online, what is not very convenient

Generalization of the problem



- The problem is identified in some studies [HCHAZ16, GF17] -> **Automation is a must** to increase efficiency and effectiveness
- Automation and **tool support** in data extraction is more limited [AZCHH17]

[HCHAZ16] Hassler, et al. (2016). Identification of SLR tool needs - Results of a community workshop. IST journal

[GF17] Garousi et al. (2017). Experience-based guidelines for effective and efficient data extraction in systematic reviews in software engineering. EASE'17

[AZCHH17] Al-Zubidy et al. (2017). Vision for SLR tooling infrastructure: Prioritizing value-added requirements. IST journal

Generalization of the solution



- Web annotation makes **data portable**, facilitating integration with spreadsheets
- Highlight&Go might be a solution for **efficient** and **effective** data extraction
- Highlight&Go accounts for **+70 users**, some of them contacted us (e.g., Utrecht institute of linguistics)

Outline

1. Context
2. Research methodology
3. Web Annotation for data extraction in SLRs
- 4. Web Annotation for assignment marking**
5. Web Annotation for peer review
6. SPLs to harness heterogeneity in web annotation
7. Conclusions



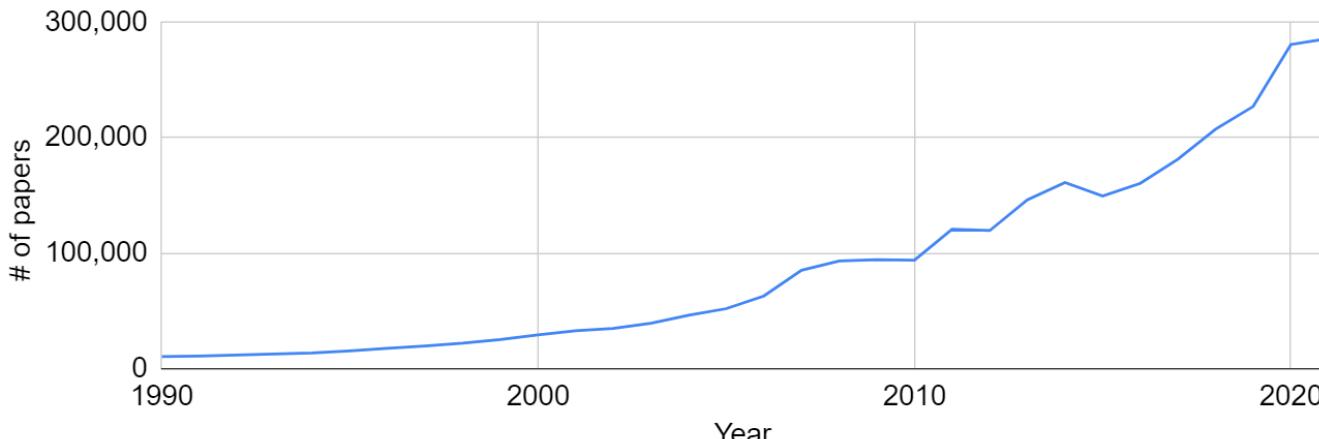
4. Web annotation for assignment marking

Mark&Go

Is feedback and continuous assessment relevant?



Number of papers about e-feedback and continuous assessment is increasing over the last 30 years. In the last year more than 250K papers



Data gathered from dimensions.ai. Search term: “continuous assessment” OR “e-feedback”

Practice: Setting the marking rubric



Completeness of values: are they complete?	You have not specified values 0 points	Many values are missing to be specified 1 points	The set of values is almost complete 3 points	The set of values is complete 5 points
Choice of data structure	The data structure is inadequate to implement all operations 0 points	The data structure is adequate to implement almost all operations 7 points	The data structure is adequate to implement all operations 15 points	
Code correction	It has a lot of repetitive execution errors, and slight compilation errors 0 points	It has a lot of repetitive execution errors 1 points	It has some repetitive execution error 3 points	It does not present any compilation or execution errors 4 points

Criteria

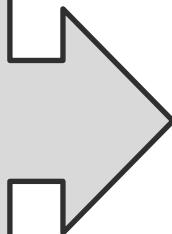
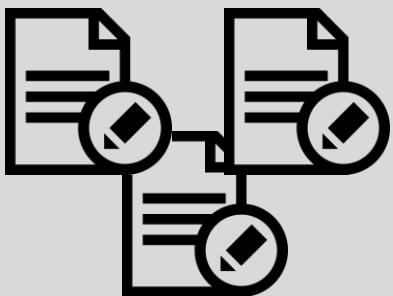
Levels

Descriptors

Practice: Marking assignments along rubric



Completeness of values: are they complete?	You have not specified values 0 points	Many values are missing to be specified 1 points	The set of values is almost complete 3 points	The set of values is complete 5 points
Choice of data structure	The data structure is inadequate to implement all operations 0 points	The data structure is adequate to implement almost all operations 7 points	The data structure is adequate to implement all operations 15 points	
Code correction	It has a lot of repetitive execution errors, and slight compilation errors 0 points	It has a lot of repetitive execution errors 1 points	It has some repetitive execution error 3 points	It does not present any compilation or execution errors 4 points



(1 puntos) 6.- Calcula:

a) $\text{mcm}(120 \vee 75) = 2^3 \cdot 3 \cdot 5^2 = 8 \cdot 3 \cdot 25 = 600$

b) $\text{mcd}(66, 99 \vee 33) = 3 \cdot 11 = 33$

(1 punto) 7.- Sin hacer divisiones, escribe en cada cuadro **Sí** o **No** según que el número de la fila superior sea divisible o no por el de la columna de la izquierda (los que están en negrita):

124	253	355	479	575	676	950	1.235	2.350
2	Sí	No	No	No	Sí	Sí	No	Sí
3	No							
5	No	No	Sí	No	Sí	No	Sí	Sí
11	No	Sí	No	No	No	No	No	No

(1 punto) 8.- Una familia ha comprado a plazos, un ordenador, una moto y un televisor. Por el ordenador tiene que pagar una cuota cada 3 meses, por la moto cada 4 meses y por el televisor cada 6 meses. Si ha pagado las tres cuotas juntas en el mes de enero, ¿qué mes tendrá que volver a pagar las tres cuotas a la vez?

Datos:
 Ordenador → Cada 3 meses
 Moto → 4 meses
 Tele → 6 meses
 Tres cuotas juntas en enero

$\text{mcm}(3, 4 \vee 6) = 2^2 \cdot 3 = 12$

3/3 4/2 6/2
 1/1 2/2 3/3
 3 = 3
 4 = 2
 6 = 2
 Sí dentro de 12 meses.
 En enero del próximo año.

Practice: Publish feedback in a Learning Management Software (LMS)



moodle



Completeness of values: are they complete?	You have not specified values	Many values are missing to be specified	The set of values is almost complete	The set of values is complete	
	0 puntos	1 puntos	3 puntos	5 puntos	
Choice of data structure	The data structure is inadequate to implement all operations	The data structure is adequate to implement almost all operations	The data structure is adequate to implement all operations	Great selection of the structure	
	0 puntos	7 puntos	15 puntos		
Code correction	It has a lot of repetitive execution errors, and slight	It has a lot of repetitive execution errors	It has some repetitive execution error	It does not present any compilation or execution errors	This is not correct
			3 puntos		

(1 punto) 6.- Calcula:

$$\text{a) } \text{lcm}(120, 75) = 2^3 \cdot 3 \cdot 5^2 = 8 \cdot 3 \cdot 25 = \boxed{600}$$

$$\text{b) } \text{mcd}(66, 99, 33) = 3 \cdot 11 = \boxed{33}$$

$$\begin{array}{r} 120 \\ 60 \\ 30 \\ 15 \\ 5 \\ 1 \end{array} \quad \begin{array}{r} 75 \\ 25 \\ 15 \\ 5 \\ 1 \end{array} \quad \begin{array}{r} 3 \\ 15 \\ 11 \\ 1 \end{array}$$

$$\begin{array}{r} 66 \\ 33 \\ 11 \\ 1 \end{array} \quad \begin{array}{r} 99 \\ 33 \\ 11 \\ 1 \end{array} \quad \begin{array}{r} 33 \\ 11 \\ 1 \end{array}$$

$$66 = 2 \cdot 3 \cdot 11$$

$$99 = 3^2 \cdot 11$$

$$33 = 3 \cdot 11$$

$$600 = 2^3 \cdot 3^2 \cdot 5^2$$

(1 punto) 7.- Si hacer divisiones, escriba en cada cuadro Sí o No dependiendo si el número de la fila superior sea divisible o no por el de la columna de la izquierda (los que están en negrita).

2	51	NO	NO	SI	SI	NO	SI
3	NO	NO	NO	NO	NO	NO	NO
5	NO	SI	NO	SI	SI	NO	SI
11	SI	NO	NO	NO	NO	NO	NO

(1 punto) 8.- Una familia ha comprado a plazos, un ordenador, una moto y un televisor. Por el ordenador tiene que pagar una cuota cada 3 meses, por la moto cada 4 meses y por el televisor cada 6 meses. Si han pagado las tres cuotas juntas en el mes de enero, ¿Qué más tendrá que volver a pagar a las tres cuotas a la vez?

Datos:

Ordenador → Cuota 3 meses	$\text{lcm}(3, 4, 6) = 2^2 \cdot 3 \cdot 4 \cdot 3 = \boxed{72}$
Ordenador → Cuota 3 meses	$3/3 \quad 4/2 \quad 6/2$
Moto → Cuota 4 meses	$3/1 \quad 4/2 \quad 6/2$
Moto → Cuota 4 meses	$1/1 \quad 2/2 \quad 3/3$
Televisor → Cuota 6 meses	$3/1 \quad 6/6 \quad 6/6$
Televisor → Cuota 6 meses	$1/1 \quad 1/1 \quad 1/1$

S/ Dentro de 12 meses.

En enero del próximo año.



```
import java.io.*;
import java.util.*;

public class MyFileWriter
{
    public static void main (String[] args) throws java.io.IOException
    {
        String first;
        String last;
        boolean cont = true;

        returnValues (array)
        {
            if (isEmpty(array))
                first = array[0]
        }

        // Print all the values
        for (int i = 0; i < array.length; i++)
        {
            String tempString = sanitize(array[i])
            System.out.println(tempString)
        }

        if (isEmpty(array))
            last = array[0]
    }

    while ( cont )
    {
        System.out.print("Enter a line: ");
        sl = br.readLine();

        System.out.println ("The line has " + sl.length() + " characters");
    }
}
```

The defined data structure does not correspond to your design in the previous activity "2. Design assignment"

The call to isEmpty is repeated. This affects to code efficiency, that's why you have a 5 in code efficiency criterion

Quality feedback

Feedback should have quality.
What does it mean? [Nicol10]

Specific

Contextualized

Personal

Timely

Problem identification



We conducted a **survey** with **30 lecturers** from the University of the Basque Country to **quantify cost** to provide feedback

53.3% of lecturers have 26-50 students

56.7% of lecturers mark 4 assignments in 90 minutes

Between 9h20 and 18h40 per assignment

7.8 assignments per course

Recommended timely feedback: 6-10 days

“

How to design a dedicated annotation tool

that satisfies seamless integration with LMSs

so that lecturers can increase the feedback quality

in higher education at scale?

[Home](#) > [Extensions](#) > [Mark&Go](#)

Mark&Go

★★★★★ 0 [i](#) | [Productivity](#) | 54 users

[Add to Chrome](#)[Overview](#)[Privacy practices](#)[Reviews](#)[Support](#)[Related](#)

0 MarkAndGo

Watch later Share

Mark&Go

Mark rubric-based students' assignments using annotations

{haritz.medina.oscar.diaz}@ehu.eus
Onekin group

Watch on [YouTube](#) University of the basque country (UPV/EHU)

66



Building Mark&Go

Rubric based color highlighter

<https://moodle.moodlecloud.com/grade/grading/form/rubric/edit.php?areaid=9&lang=en>

moodletest English (en) ▾

Rubric

✗ Completeness of values: are they complete?	You have not specified values 0 points	Many values are missing to be specified 1 points	The set of values is almost complete 3 points	The set of values is complete 5 points
↑ Choice of data structure	The data structure is inadequate to implement all operations 0 points	The data structure is adequate to implement almost all operations 7 points	The data structure is adequate to implement all operations 15 points	
↑ Code correction	It has a lot of repetitive execution errors, and slight compilation errors 0 points	It has a lot of repetitive execution errors 1 points	It has some repetitive execution error 3 points	It does not present any compilation or execution errors 4 points
↑ Code efficiency	The code is not optimized 0 points	The code is partially optimized 2 points	The code is almost completely optimized 5 points	The code is fully optimized 10 points
↑ Code documentation	Undocumented code 0 points	Code partially documented and poorly	Code partially documented and	Fully documented code: subprograms,

Mark&Go - 0h0m0s

private boolean isLarger(int i, int j) {
 T ith = data.get(i);
 T jth = data.get(j);
 if(ctor.compare(i, j) > 0)
 {
 return true;
 }
 else
 {
 return false;
 }
}

private void swap(int ci, int pi) { // swap function
 T ith = data.get(ci);
 T jth = data.get(pi);
 data.set(ci, jth);
 data.set(pi, ith);
}

public T getHP() {
 return data.get(0);
}

The data structure is adequate to implement most all operations

swap(0, data.size() - 1);
T rv = data.remove(data.size() - 1);
downheapify(0);
return rv;

private void downheapify(int pi) {

The highlighter is derived from rubric in Moodle



Building Mark&Go

Look back commenting

The screenshot shows the Mark&Go interface with a Java code editor. The code is as follows:

```
java.util.ArrayList;
import java.util.Comparator;

public class genericheap<T> { // create a generic heap class <T> , where T can be of any type.

    private ArrayList<T> data = new ArrayList<T>();
    private Comparator<T> ctor;

    public genericheap(Comparator<T> ctor) { // constructor to initialize the generic comparator
        this.ctor = ctor;
    }

    public void add(T value) {
        data.add(value);
    }

    public void remove(int index) {
        data.remove(index);
    }

    public T get(int index) {
        return data.get(index);
    }

    public int size() {
        return data.size();
    }

    public void sort() {
        Collections.sort(data, this.ctor);
    }

    public void print() {
        System.out.println(data);
    }
}
```

A modal window displays a message: "The defined data structure does not correspond to your design in the previous assignment: <https://moodle.moodlecloud.com/mod/assign/view.php?id=8>". There are "OK" and "Cancel" buttons at the bottom.

References to
previous
assignments

Comments reuse

Building Mark&Go

Grading facilities



Highlighter realm

file:///Users/teacher/Downloads/genericheap%20(21)%20(3).java

```

Mark&Go - 0h0m0s
java.util.ArrayList;
import java.util.Comparator;

2 Completeness... The set of values is complete 5 points
The set of values is complete 5 points
2 1 Chars 1 | C 15 points
The data structure is adequate to implement all operations 15 points
1 0
1 1
1 3
1 4
3 | Code efficiency 0
2 | Code docume... 0
2 1
2 3
2 5
3 | Code efficiency 0
2 | Code docume... 0
2 1
2 3
2 5

public class genericheap<T> { // create a generic heap class <T> , where T can be
    private ArrayList<T> data = new ArrayList<T>();
    private Comparator<T> ctor;
    public genericheap(Comparator<T> ctor) {
        this.ctor=ctor;
    }
    public int size() { // return the size of the list
        return data.size();
    }
    public boolean isEmpty() { // checks whether the list is empty or not :: return data.isEmpty();
    }
    public void display() { //displays the list
        System.out.println(this.data);
    }
    public void add(T integer) { // in this function we have added the element
        data.add(integer);
        upheapify(data.size() - 1);
    }
    private void upheapify(int ci) {
        if (ci == 0) {
            return;
        }
        int pi = (ci - 1) / 2;
        if (isLarger(ci,pi) == true) {
            swap(ci, pi);
            upheapify(pi);
        }
    }
    private boolean isLarger(int i, int j) {
        T ith = data.get(i);
        T jth = data.get(j);
        return ith.compareTo(jth) > 0;
    }
}

```

The defined data structure does not corresponds to your design in the previous activity

Rubric comment: Mark: 15 of 15. Feedback: correspond assignment https://moodleview.php?id=15

Annotations, comments and marks are automatically translated to Moodle

Moodle realm

Completeness of values: are they complete?	You have not specified values 0 points	Many values are missing to be specified 1 points	The set of values is almost complete 3 points	The set of values is complete 5 points	You should add "eee" to this test
Choice of data structure	The data structure is inadequate to implement all operations 0 points	The data structure is adequate to implement almost all operations 7 points	The data structure is adequate to implement all operations 15 points	The defined data structure does not corresponds to your design in the previous activity	The defined data structure does not corresponds to your design in the previous activity
Code correction	It has a lot of repetitive execution errors, and slight compilation errors 0 points	It has a lot of repetitive execution errors 1 points	It has some repetitive execution error 3 points	It does not present any compilation or execution errors 4 points	Good job, you can improve code correction using ESLint
Efficiency	The code is not optimized 0 points	The code is partially optimized 2 points	The code is almost completely optimized 5 points	The code is fully optimized 10 points	One of the calls is repeated in the t

Building Mark&Go Grading facilities



Student consulting feedback realm

← → C ⌂ File | file:///Users/haritz/Downloads/genericheap%20(21).java

Mark&Go - 0h0m0s

Code documentations (2)

- 0
- 1
- 3
- 5

Code efficiency (3)

Code correction (1)

Choice of data structures (1)

- 0
- 7
- 15

Completeness (2)

- 0
- 1
- 3

```
java.util.ArrayList;
import java.util.Comparator;

public class genericheap<T> { // create a generic heap class <T> , where
    private ArrayList<T> data = new ArrayList<T>();
    private Comparator<T> ctor;

    public genericheap(Comparator<T> ctor) { // constructor to init:
        this.ctor=ctor;
    }

    public int size() { // returns the size of the arraylist data
        return data.size();
    }

    public boolean isEmpty() { // checks whether the list is empty
        return data.isEmpty();
    }

    public void display() { //displays the list
        System.out.println(this.data);
    }

    public void add(T integer) { // in this function we have added integer
        data.add(integer);
        upheapify(data.size() - 1);
    }
}
```

Students can navigate back to see the feedback in context

Moodle realm

Feedback comments

Criteria: Code documentation - Mark: 3

You must document more clearly which ones are the libraries used
[See in context](#)

Criteria: Code efficiency - Mark: 5

One of the calls is repeated in the text
[See in context](#)

Criteria: Code correction - Mark: 3

Good job, you can improve code correction using ESLint
[See in context](#)

Criteria: Choice of data structure - Mark: 15

The defined data structure does not corresponds to your design in the previous activity:
<https://moodle.moodlecloud.com/mod/assign/view.php?id=8&rownum=0&useridlistid=5c49948cd873a8c>
[See in context](#)

Results of the evaluation using focus group

Positive aspects



- **Automatic transcription and comments reuse** as most positive feature, **saving a lot of time**
- Created **feedback report** in Moodle with annotated assignments is **appropriate for students**
- **Polyvalent tool:** Possibility to conduct **different assessment strategies**
- **Time estimations** useful to **plan correction time** before moving to other activities (e.g. research, classes)

Evaluation main insights

Things to improve



- Current functionality does **not facilitate spotting mistakes to decide the final grade**: marking annotations as positive or mistakes and filtering by them could help
- Mark&Go **doesn't facilitate assessment** that involve **source code** that should be executed to check if student assignment works or not

Generalization of the problem and solution



- **Problem of providing quality feedback** in higher education is identified in several studies [RFK19, SM15]
- We propose the use of **Web annotations to facilitate feedback production** and students feedback consumption
- **Mark&Go** might be a solution to have **timely feedback while keeping quality**. It has **+50 installations** in the Chrome Store

Outline

1. Context
2. Research methodology
3. Web Annotation for data extraction in SLRs
4. Web Annotation for assignment marking
5. **Web Annotation for peer review**
6. SPLs to harness heterogeneity in web annotation
7. Conclusions

5. Web annotation for peer review

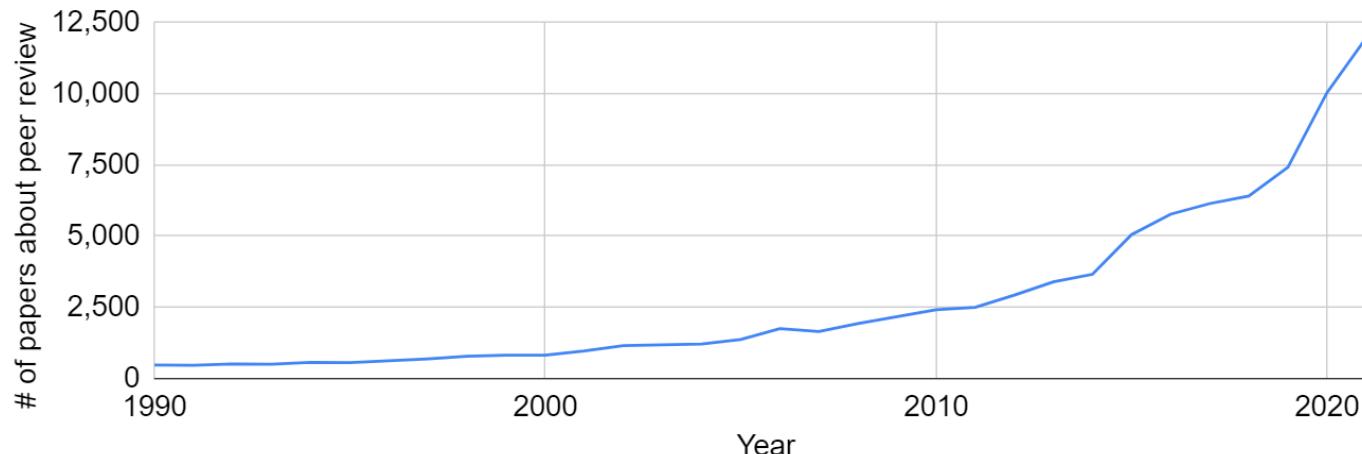
Review&Go

Practice

Activities involved in peer review



Number of papers about peer review is increasing over the last 30 years. In the last year more than 12K papers have been published



Data gathered from dimensions.ai research portal. Search term: "peer review"

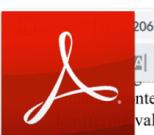
Practice

Activities involved in peer review



Critical reading

Critical reading accompanied by note-taking in printed papers or PDF readers



206% Annotations Search Download Settings

No Presets

Search comments

Comments (1)

Sort: Position

Page 1

Guest Sep 6, 4:03 PM
"Readers consume sub-standard papers, and, in the worst cases, fraudulent or incorrect work is published due to gatekeeping errors [6,20]. Finally, journals have their *raison d'être* undermined, i.e. the prompt dissemination and recognition of knowledge advances [6]. Different causes can be blamed for this situation: (1) lack of transparency in the process [6,20], (2) lack of agreement about what constitutes good

Keywords. Peer Review, Annotation, Design Science Research

1 Introduction

Peer review is under scrutiny [9]. Although widely supported by researchers [17] reviewing is not without opponents who claim current reviewing to be "slow, costly ineffective, biased, easily abusable, anti-innovatory or largely a lottery" [18]. Three stakeholders are impacted: authors, readers and journals. Authors are deprived from getting useful advice to improve their research [7,13], often leading to further submissions without modifying manuscripts, and as a result, to a waste of reviewers' effort [9,26]. Readers consume sub-standard papers, and, in the worst cases, fraudulent or incorrect work is published due to gatekeeping errors [6,20]. Finally, journals have their *raison d'être* undermined, i.e. the prompt dissemination and recognition of knowledge advances [6]. Different causes can be blamed for this situation: (1) lack of transparency in the process [6,20], (2) lack of agreement about what constitutes good



Writing a report

- Assessment of strengths and weaknesses
- Provide feedback to authors to improve
- Confidential comments to editors



<Summarize the work>

STRENGTHS:

- the proposed solution is clear and convincing.
- * (Page 6): "It is available for download at the Chrome Web Store".
- The availability of the artifact is a plus.
- the artifact has been compared with extant solutions.
- * (Page 12): "Is Review&Go perceived to be better than conducting the review through Acrobat Reader? The

Practice and problem

Peer review's roles



Quality standard

Gives a “seal of approval” ensuring trustworthiness of published research [Ware11]

Gatekeeping

Filtering out research that does not meet quality thresholds [Ware11]

Improving works

Provides feedback (e.g., comments) that make the published manuscript better [Ware09]

Problems in peer review



Lack of transparency

Impossible to trace discussions or reviewers' decisions
[TDG+17]

Lack of consensus in quality feedback

Each conference, journal and reviewer has its own criteria to evaluate [TDG+17]

Lack of skills and experience

specially in novice researchers that required training [LRF11]

Lack of time

is highly demanding and time consuming (about 8.5 hours)
[Cla10]

[TDG+17] J.P. Tennant et al. A multi-disciplinary perspective on emergent and future innovations in peer review. 2017.

[LRF11] T. I. Lovejoy et al. Reviewing manuscripts for peer-review journals: A primer for novice and seasoned reviewers. 2011

[Cla10] Maxine Clarke. Reducing the peer-reviewer's burden, 2010.

“

How to design a dedicated annotation tool

that provides guidance

so that reviewers can increase the feedback quality

in scholarly peer review?



Review&Go

★★★★★ 2 i | Productivity | 23 users[Add to Chrome](#)[Overview](#)[Privacy practices](#)[Reviews](#)[Support](#)[Related](#)

0 Review&Go: a dedicated highlighter for manuscri...

Watch later Share

Abstract Peer review is under pressure. Demand for reviews is outstripping supply where reviewers tend to be busy people who contribute voluntarily. Authors highly value reviews, yet complain about the time it takes to get feedback from them. In the past, the process of reviewing manuscripts has been conducted via post, email or telephone. Now, the review itself is increasingly conducted with the only help of a yellow highlighter, physical or digital. This work looks further into the potentialities of this new way of reviewing. While this review does not stop at spotting the manuscript (defects), it also strives for manuscript improvement and groundbreaking. These facilities are conducted within an open access environment, which is a more transparent and democratic way. Unfortunately, when it comes to support review practices, current facilities fall short. This work introduces a set of requirements for review-dedicated highlighting tools, and presents the first prototype of such tool: Review&Go, a color-coding highlighter that generates a review draft out of the reviewer highlighting activities. The aim is to offer representative guidance to enhance the peer review process so that reviewers can exert less effort while offering valuable and transparent reviews.

Keywords: Peer Review, Manuscript, Highlighter, Research

1 Introduction

Peer review is under scrutiny [9]. Although widely supported by researchers [17], reviewing is not without opponents who claim current reviewing to be "slow, costly, ineffective, biased, easily absolved, anti-innovative or largely a lottery" [18]. These negative perceptions have led to a search for alternative ways of reviewing, from getting useful advice to improve their research [7,13], when leading to further submissions without modifying manuscripts, and as a result, to a waste of reviewer effort [9,20]. In addition, manuscripts published in the most prestigious journals or incorrect work is published due to peer-reviewing errors [6,20]. Finally, journals have their *raison d'être* undermined, i.e. the prompt dissemination and recognition of knowledge advances [6]. Different causes can be blamed for this situation: (1) lack of transparency in the process [6,20]; (2) lack of agreement about what constitutes good

Next, it is time to provide feedback. Right click on the highlighting and select "Comment" to open the comment box

Watch on YouTube

81

Building Review-framework-based color-coding highlighter



Supports import
and creation of
criteria at any time

The screenshot shows the Review&Go application interface. On the left, a sidebar titled "DefaultReview..." displays a "Toolset" section with icons for camera, file, clipboard, trash, and a clock. Below this is a "Criteria" section with a "Create new theme" button. A list of criteria categories is shown in colored boxes: Design (pink), Artefact, Evaluation, Novelty, Presentation (yellow), Typos, Relevance (light blue), Adoption, Relevance, Transferability, Rigor (purple), Justificatory knowledge, Research methodology, and Rigor. The main window shows a document with several paragraphs of text. Some words and phrases are highlighted with colors corresponding to the criteria categories. A callout box labeled "Relevance" points to a highlighted section of text. A red annotation "dd" is visible in the bottom right corner of the main window.

exist some approaches to components or common features.

Hypothes.is forks. Hypothes.is is an annotation tool which is used to develop new annotation features. It has a minimum configuration aspect. It supports different styles of the client sidebars and server connection. However, in the cases, so developers can implement them in their implementation they follow the documentation. Hypothes.is is a good guide for developers [http://hypothesis.org/doc/api/]. However, developers need to take advantage of the current approach, making it easier to integrate with other tools and services.

Relevance

- increase the relevance of annotations
- manage the relevance of annotations
- reduce the relevance of annotations

To understand the relevance of annotations, we must consider the context in which they are used. Annotations are typically used to highlight specific parts of a document or article. By understanding the context, we can better determine the relevance of each annotation. This can be done by analyzing the text around the annotated word or phrase, as well as the overall purpose of the document. For example, if a word is highlighted in a scientific paper, it may be more relevant than if it were highlighted in a news article. Similarly, if a word is highlighted in a technical document, it may be more relevant than if it were highlighted in a general text. By considering the context, we can better determine the relevance of each annotation.



Building Comments

calls for assistance in reconciling efficiency and effectiveness in peer review.

Peer review limitations have been addressed with a revolutionary or evolutionary perspective. The former include: incentivize good peer reviewing by rewarding their best reviewers [4] or revealing reviewers' identities [26]. Alternatively, evolutionary solutions do not change current practices but provide some kind of support: online reviewing for reducing the workload and speeding the communications between authors, editors and reviewers [25]; training programmers for young scientists to devel-

Gradation of themes

Place comments

Lookup and suggest literature

Depth of analysis



Major weakness



Minor weakness



Strength

The problem should be analyzed in more detail

hevner theory

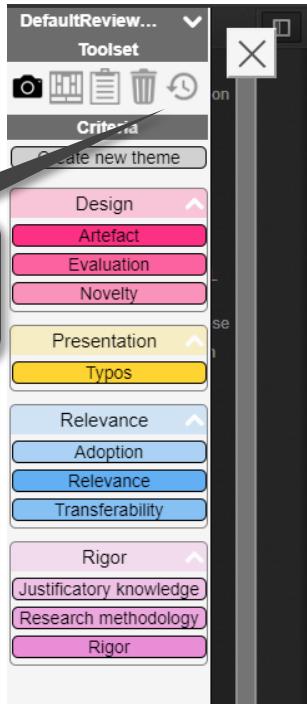
Design Science Research Contributions - Finding a Balance between Artifact and Theory. (2018)

Will Artificial Intelligence Automate Theory Building? Are there Lessons for Academia from Practice? (2018)



Building Resumption button

Resumption button



- The goldilocks issue. A great variety of good tools exist, but makes more difficult to choose the appropriate annotation system for a certain scenario [Kalboussi16].

2.3. The solution: an SPL approach

To improve quality, productivity and reducing costs in software development the software reuse is a must [Krueger92].

An approach in the software reuse area is Software Product Line (SPL), which is defined by Clements et al. [Clements02] as "a set of software-intensive systems that share a common, managed set of features satisfying the specific needs developed from a common set of core assets in a prescribed way". A SPL based on a set of core assets can instantiate new applications in a specific domain, in our case in Web Annotations.

Our hypothesis is that the use of SPLs can help to take advantage of the reuse of assets.

- increase the quality of annotations
- manage the reuse of assets
- reduce the cost of reuse

To understand this we will analyze the Relevance

Relevance

dd

exist some approaches to solve this problem. Components or common features are used to reuse assets.

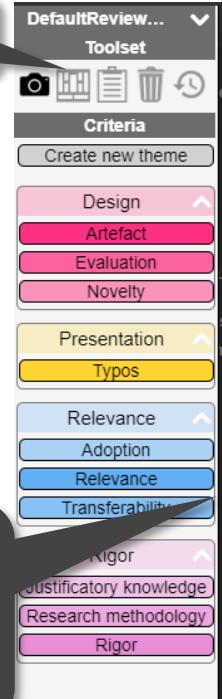
Hypothes.is forks. Hypothes.is is a web-based annotation tool which is developed by the University of Michigan. It allows users to develop new annotation features without changing the configuration aspects of the client side browser or the server connection. However, in some cases, so developers need to implement their own features. The implementation is well documented and extendable. Hypothes.is has a guide for developers at <http://hypothesis.org/doc/api/>. However, developers need to implement their own approach, making it difficult to reuse assets.

The current version of Hypothes.is is not open source. The code is available for download at <https://github.com/hypothesis/hypothesis>. Some parts of the code are available under the MIT license, while others are under the Apache 2.0 license. The code is written in Python and uses the Django framework.

Building Canvas review summarization



Canvas button



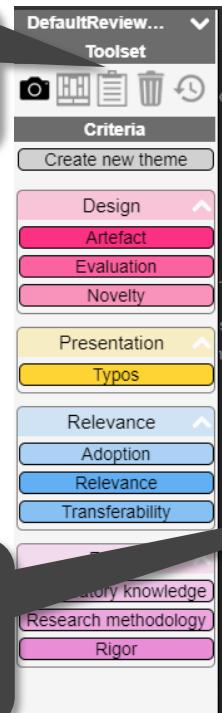
	Design	Evaluation	Novelty
Design	Artefact	Solution comparison	
Relevance	Depth of analysis	Significance	Meta-requirements
"Peer review limitations have been addressed with a revolutionary or evolutionary perspective. The former include: incentivize good peer reviewing by rewarding their best reviewers[4]or revealing reviewers' identities [26]."			Transferability
Rigor	Generative potential		
	Justificatory knowledge	Nascent Theory	Testable hypotheses
	Meta-design	Research methods	

Displays annotated content colored by given gradations



Building Head-start template for review writing

Template creation button



<Summarize the work>

STRENGTHS:

- the proposed solution is clear and convincing.
 - * (Page 6): "It is available for download at the Chrome's Web Store".
The availability of the artefact is a plus.
 - the artefact has been compared with extant solutions.
 - * (Page 12): "Is Review&Go perceived to be better than conducting the review through Acrobat Reader". The comparison with Acrobat Reader is pertinent.

MINOR WEAKNESSES:

There is a minor point that should be clarified. The paper seems to overlook the 'why' and focus too much on the 'what'.

* (Page 1): "Different causes can be blamed for this situation: (1) lack of transparency in the process [18,5], (2) lack of agreement about what constitutes good reviewing [18,16,24,8], (3) lack of skills and reviewing experience [11,8], or (4) lack of time".
The problem should be analysed in more detail.

I would encourage the authors to look at the following papers: [1]

TYPOS:

- (Page 1): "raison d'etre"

REFERENCES:

- [1] Richard Baskerville, Abayomi Baiyere, Shirley Gregor, Alan R. Hevner, Matti Rossi: Design Science Research Contributions - Finding a Balance between Artifact and Theory. (2018)

<Comments to editors>

Evaluation Technology acceptance model



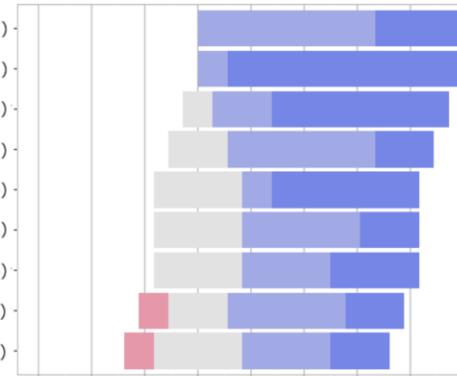
- Goal: predict the **adoption of Review&Go tool** to improve peer-review
- Participants: 6 researchers + 3 PhD students
- Questionnaire: Technology Acceptance Model (TAM)
 - 5 LIKERT scale



Evaluation Technology acceptance model results

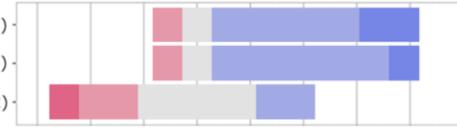
Relative advantage

- 1.- The color-coding highlighter helps me keep focus throughout (1)
- 2.- The typo criterion is useful for spotting mistakes (1)
- 3.- Review&Go helps me be more efficient reviewer w.r.t using Acrobat Reader (0.88)
- 4.- Qualifying comments through poles and paragraphs clarifies comment understanding (0.77)
- 5.- The generated draft provides a useful head-start (0.66)
- 6.-The canvas helps me resume review activities (0.66)
- 7.- Review&Go helps me be more effective reviewer w.r.t using Acrobat Reader (0.66)
- 8.- The canvas provides a useful outline of the review so far (0.66)
- 9.-The resume button helps me resume review activities (0.55)



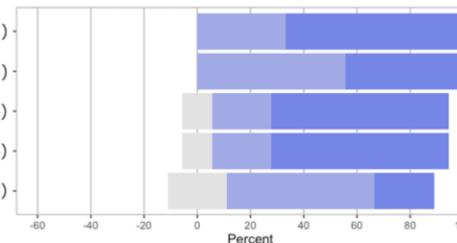
Compatibility

- 10.- Review&Go highlighting is similar to Acrobat Reader's (0.77)
- 11.- Review&Go commenting is similar to Acrobat Reader's (0.77)
- 12.- Review&Go overviewing is similar to Acrobat Reader's (0.22)



Complexity

- 13.- I found Review&Go easy to install (1)
- 14.- In general, I found Review&Go easy to use (1)
- 15.- I found Review&Go highlighting sidebar easy to operate with (0.88)
- 16.- I found Review&Go buttons easy to operate with (0.88)
- 17.- I found Review&Go canvas easy to interact with (0.77)



■ Strongly Disagree ■ Disagree ■ No Opinion ■ Agree ■ Strongly Agree

Generalization of the problem and solution



- Review&Go follows an **evolutionary approach**, keeping reviewing practices
- Initial evaluations shows that dedicated web annotation tool could be **adopted** as a solution to facilitate and provide higher quality reviews in conference papers
- Review&Go accounts for **+20 users** in the last two years

Outline

1. Context
2. Research methodology
3. Web Annotation for data extraction in SLRs
4. Web Annotation for assignment marking
5. Web Annotation for peer review
6. **SPLs to harness heterogeneity in web annotation**
7. Conclusions

6. SPLs to harness heterogeneity in web annotations

WACline



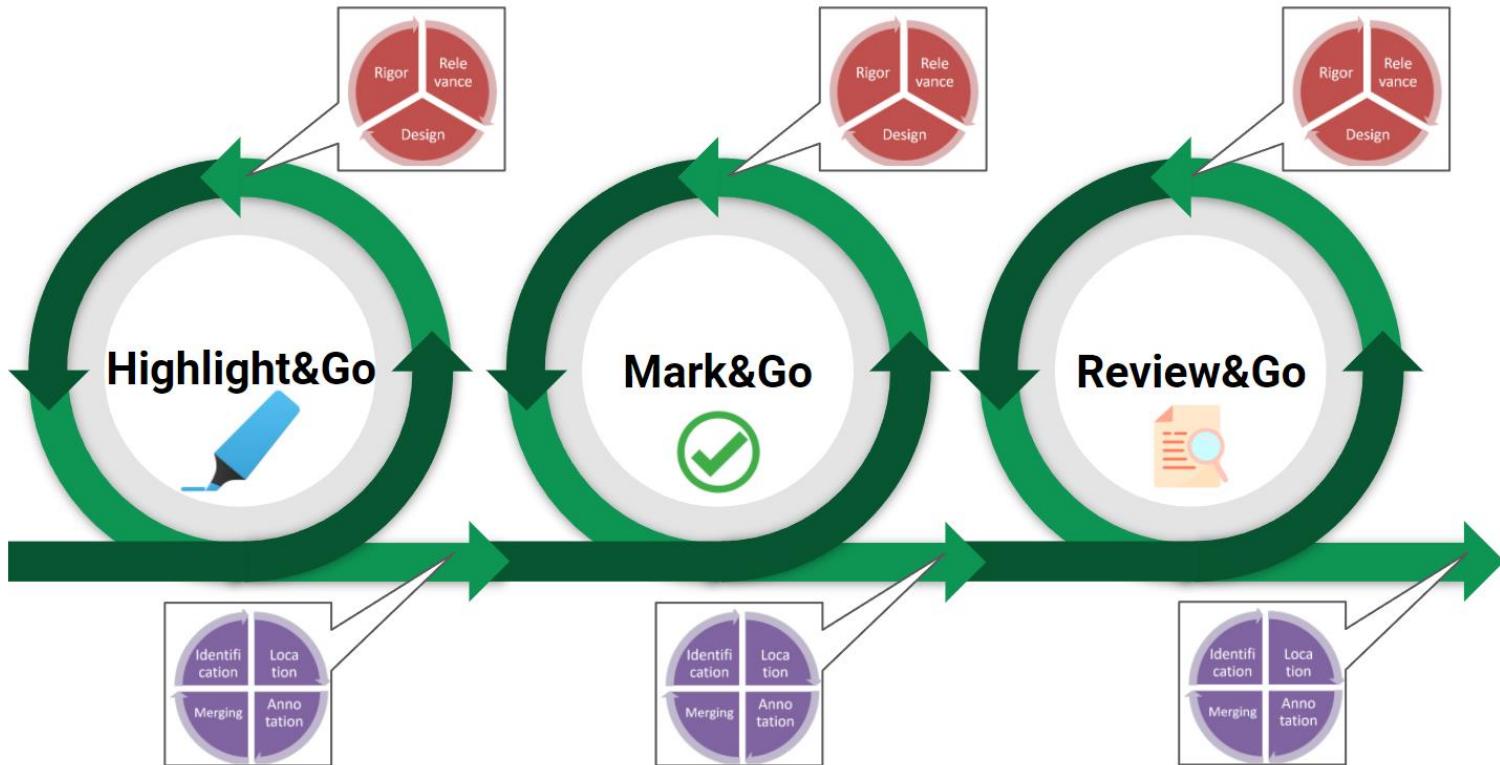
How to design a platform to systematically reuse features

that satisfies heterogeneity and extensibility

so that developers reduce the development and maintenance costs

in the creation of web annotation extensions for reviewing?

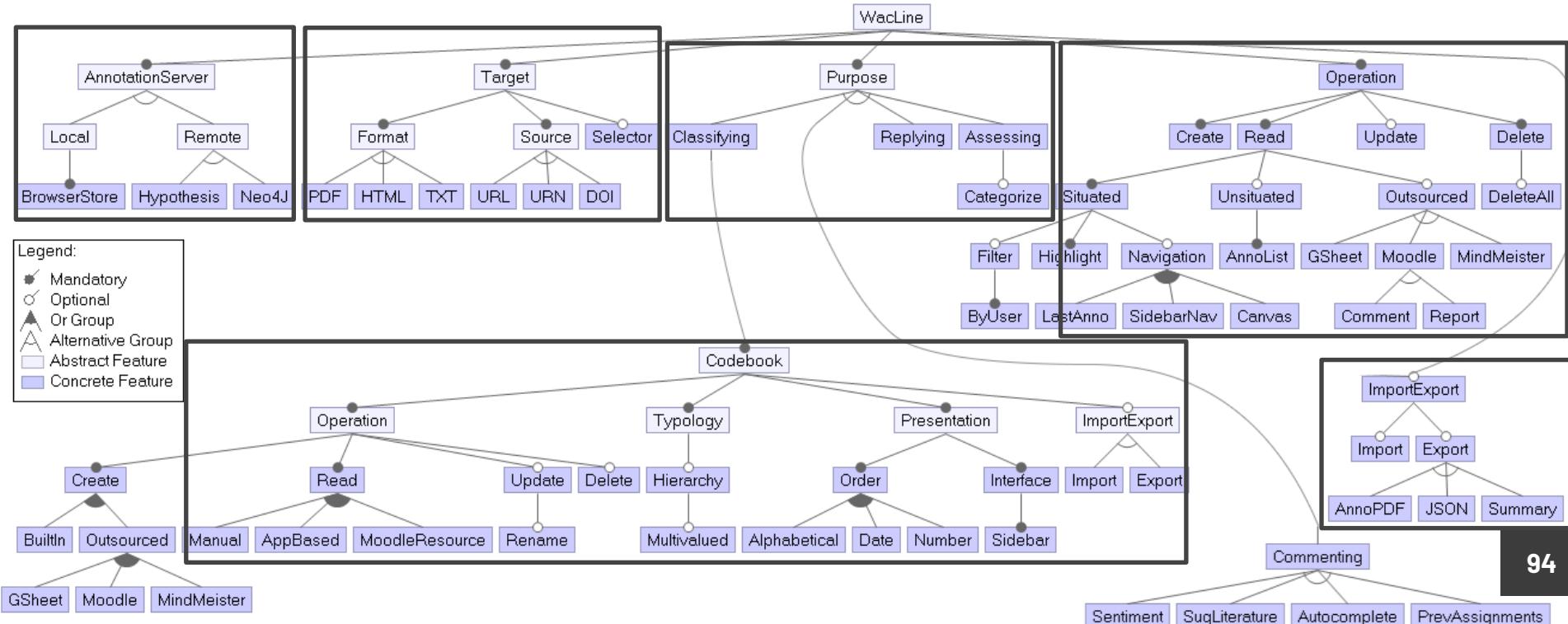
Development of SPL: reactive approach



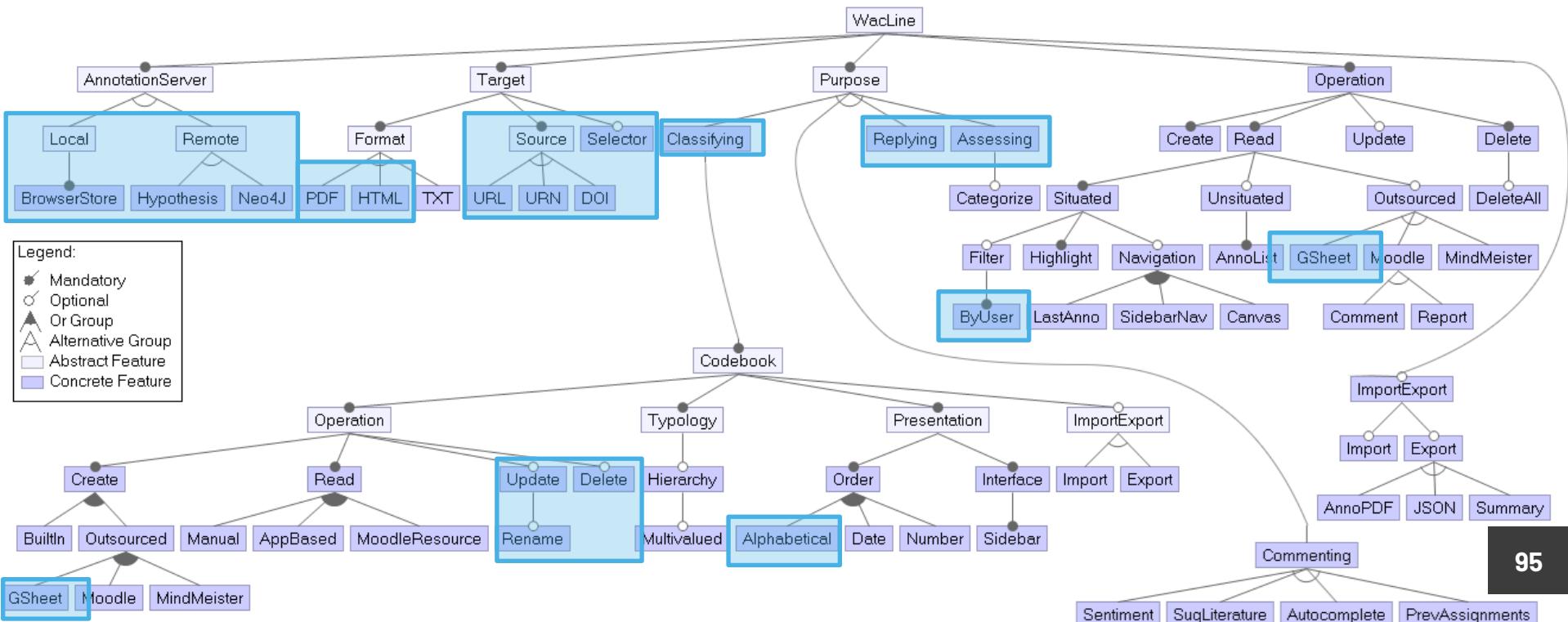
WACline



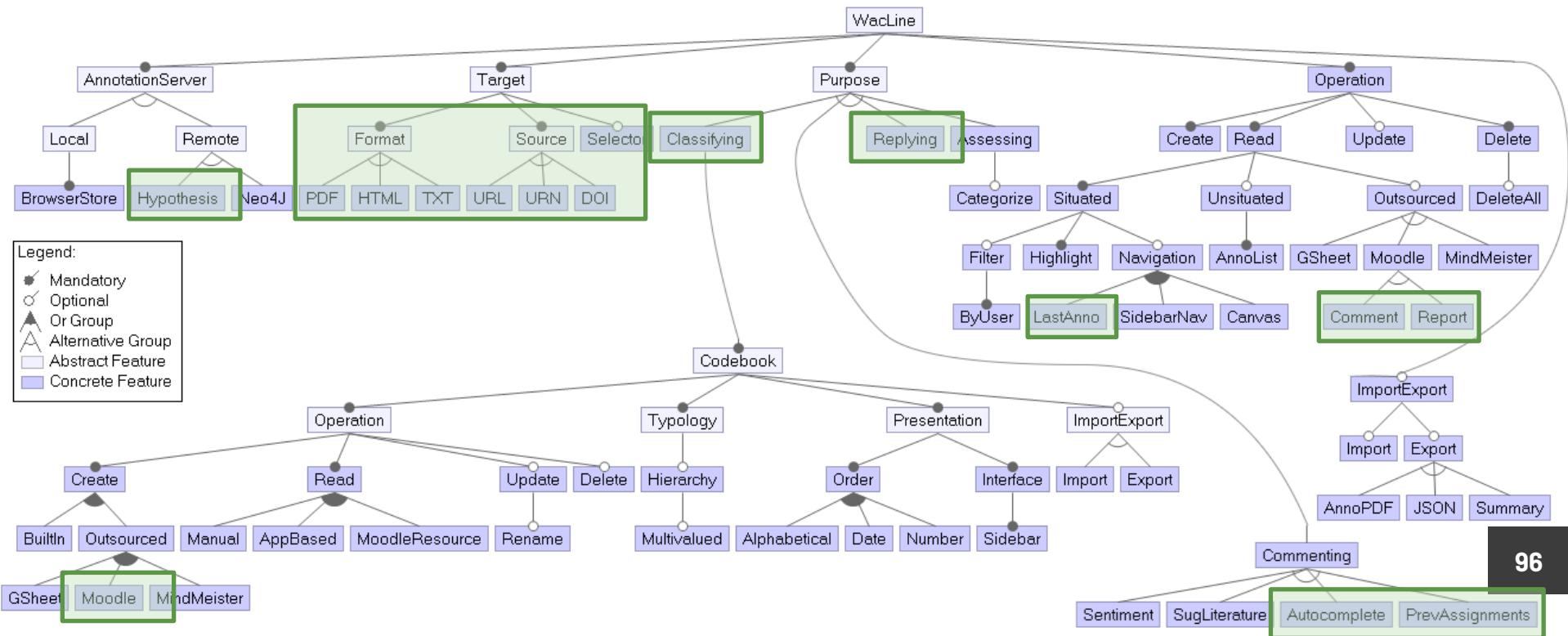
Feature model



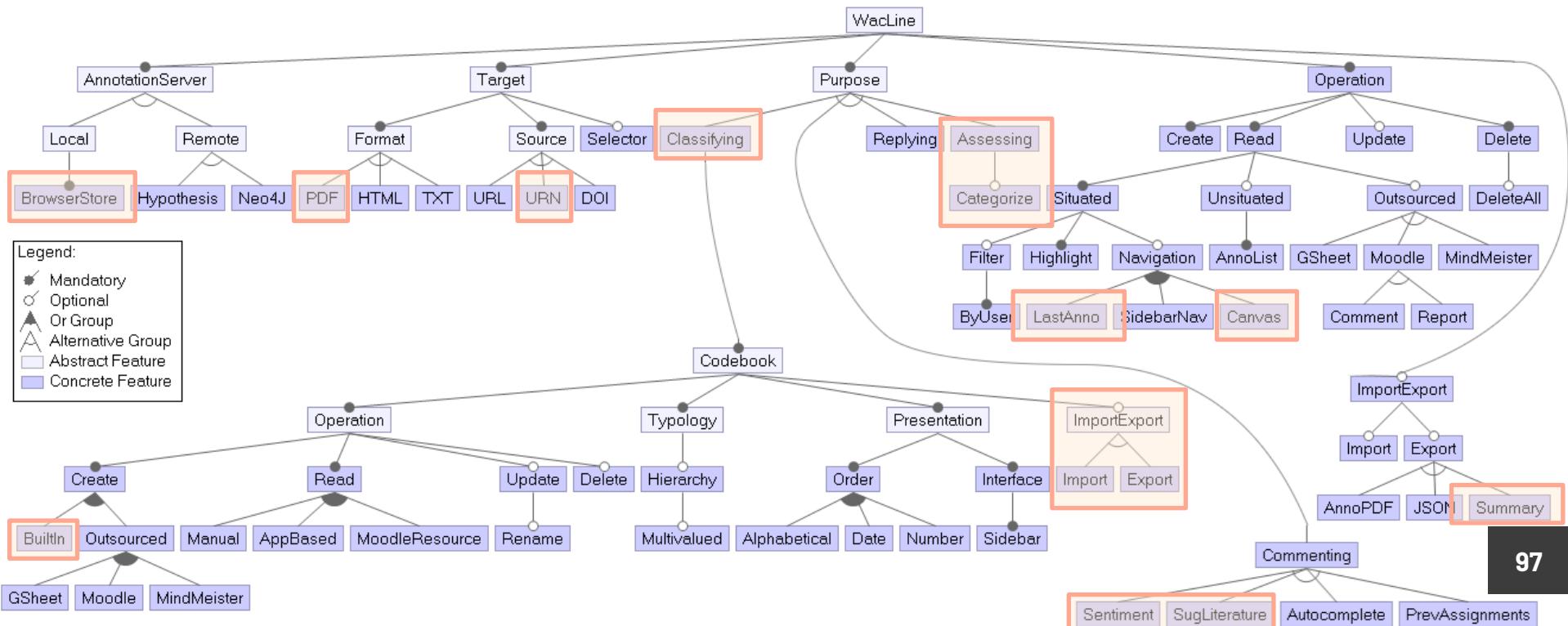
Highlight&Go



Mark&Go



Review&Go



Evaluation



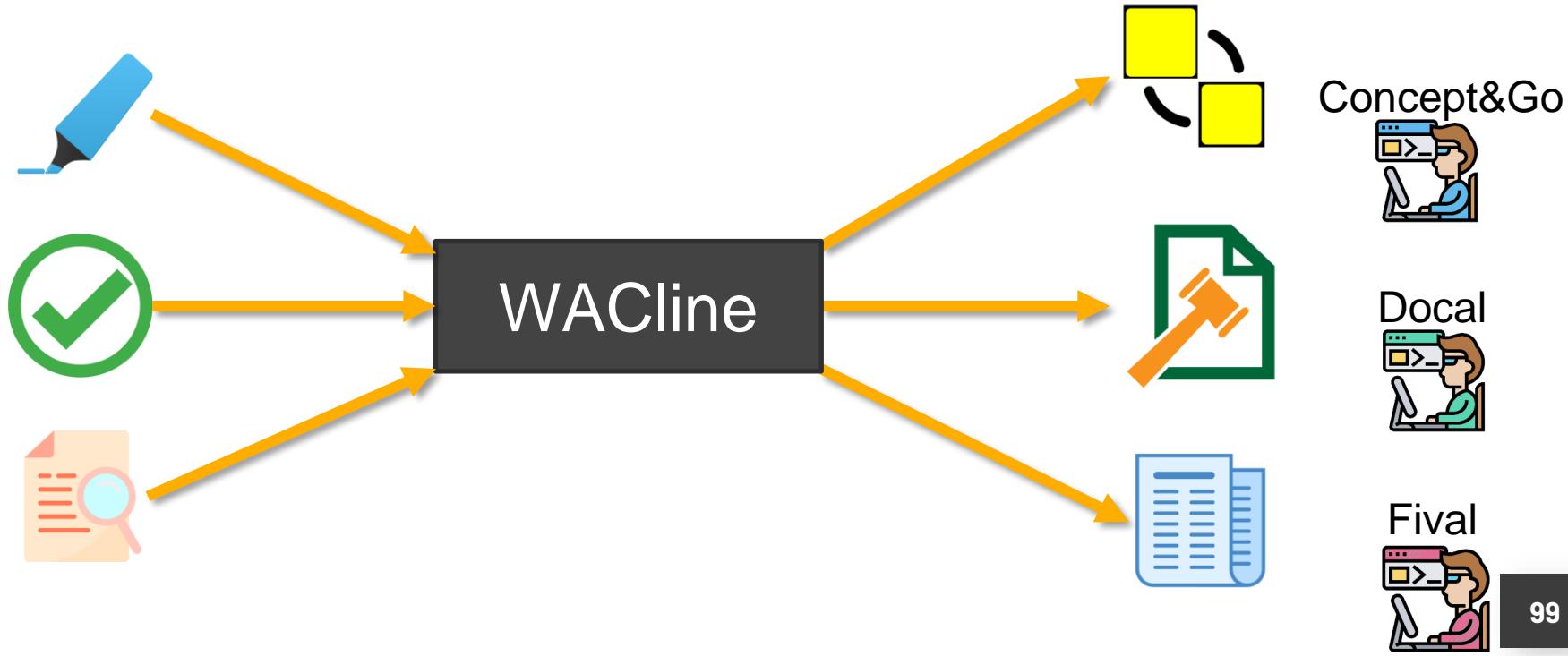
Technical feasibility

whether the SPL has enough variability to develop other annotation tools for review

Gains in quantification

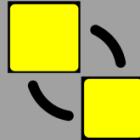
measure costs in development and maintenance, and reusability of the source code

Annotation tools created from WACline



Evaluation: technical feasibility

Concept&Go



Framed as an MSc, Concept&Go supports creation of concepts maps in CmapCloud by creating and linking annotations from learning materials

w3.org/TR/annotation-model/#introduction

CXLEExport

Linking

Creating new relation

From: Body Linking word: To: Target

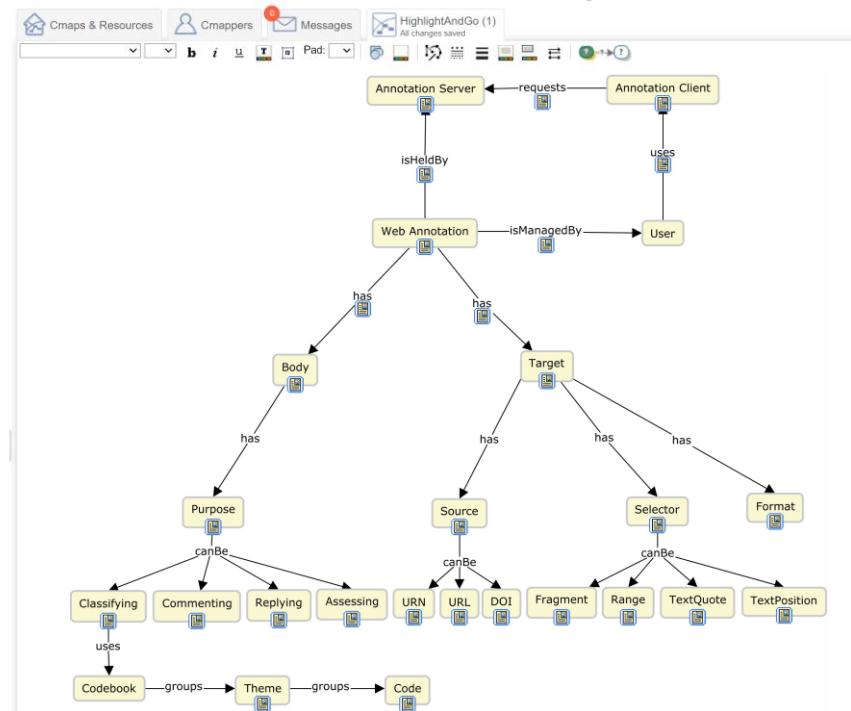
is related to

Save relationship Save & Create another

Cancel

Annotation Data Model does not prescribe a transport protocol for creating, managing and re

The screenshot shows a web browser window displaying the W3C Annotation Model specification. A red box highlights the 'CXLEExport' section. Below it, a green box highlights the 'Linking' section. A modal dialog box titled 'Creating new relation' is open, showing fields for 'From' (Body), 'Linking word' (is related to), and 'To' (Target). At the bottom are 'Save relationship' and 'Save & Create another' buttons, along with a 'Cancel' button.



Evaluation: technical feasibility

Docal



Framed as a BSc,
Docal supports
the review of law
case documents

The screenshot shows the Docal application interface. On the left, there is a sidebar titled "DOCAL" with a "DocExport" button and several error detection buttons: "Create new theme", "Presentation", "Grammar error", "Orthography error", and "Typo". Below these are "Create New Session" and "Aitor" buttons. A list of session names is displayed: "Pandemia de enfermedad por coronavirus de 2019-2020 - Wikipedia, la enciclopedia libre", "Organización Mundial de la Salud - Wikipedia, la enciclopedia libre", and "Hipertensión arterial - Wikipedia, la enciclopedia libre". A red box highlights the "Session" button at the bottom of the sidebar.

The main window displays a document from the "JURISPRUDENCIA" section. The header includes the seal of the "CONSEJO GENERAL DEL PODER JUDICIAL". The document title is "Roj: STSJ PV 31/2020 - ECLI: ES:TSJPV:2020:31". A modal dialog box titled "Linking" is open, asking "Select one annotation to link:" with a dropdown menu containing "Pandemia de enfermed...-Orthography error- mayor núm". At the bottom of the dialog are "OK" and "Cancel" buttons.

At the bottom of the main document view, the text reads:

DEMANDA N.º: Procedimiento de SENTENCIA N.º: 072/2020 Instancia 23/2020
NIG PV: 00.01.4-20/000040
NIG CGPJ: 48020.34.4-2020/0000040
SALA DE LO SOCIAL DEL TRIBUNAL SUPERIOR DE JUSTICIA DE LA COMUNIDAD AUTÓNOMA DEL PAÍS VASCO
En la Villa de Bilbao, a 26 de mayo de 2020.
La Sala de lo Social del Tribunal Superior de Justicia de la Comunidad Autónoma del País Vasco, formada por los/as Ilmos./llmas. Sres./as. D. FLORENTINO EGUARAS MENDIRI, Presidente en funciones, D. JOSE LUIS ASEÑO PINILLA y D. JOSE FÉLIX LAJO GONZÁLEZ, Magistrados/as, ha pronunciado
la siguiente
EN NOMBRE DEL REY

Evaluation: technical feasibility

Fival



Framed as a BSc,
Fival supports
assessment of
BSc theses based
on standard
rubrics to write a
final report

The screenshot shows the Fival software interface. On the left, a sidebar titled "Word export" displays a "TOTAL GRADE: 1.60". A context menu is open over the sidebar, with the "Grade" option highlighted. In the center, a section titled "2. Planteamiento del proyecto" contains a "Grading" dialog box. The dialog box displays the message "The note is over 10 with a weight of 2" and a text input field containing the number "8". Below the dialog are "OK" and "Cancel" buttons, with "Grading" also labeled near the bottom right. The main content area below the dialog includes sections like "2.1 Objetivos" and a bulleted list of objectives.

2. Planteamiento del proyecto

Grading

The note is over 10 with a weight of 2

8

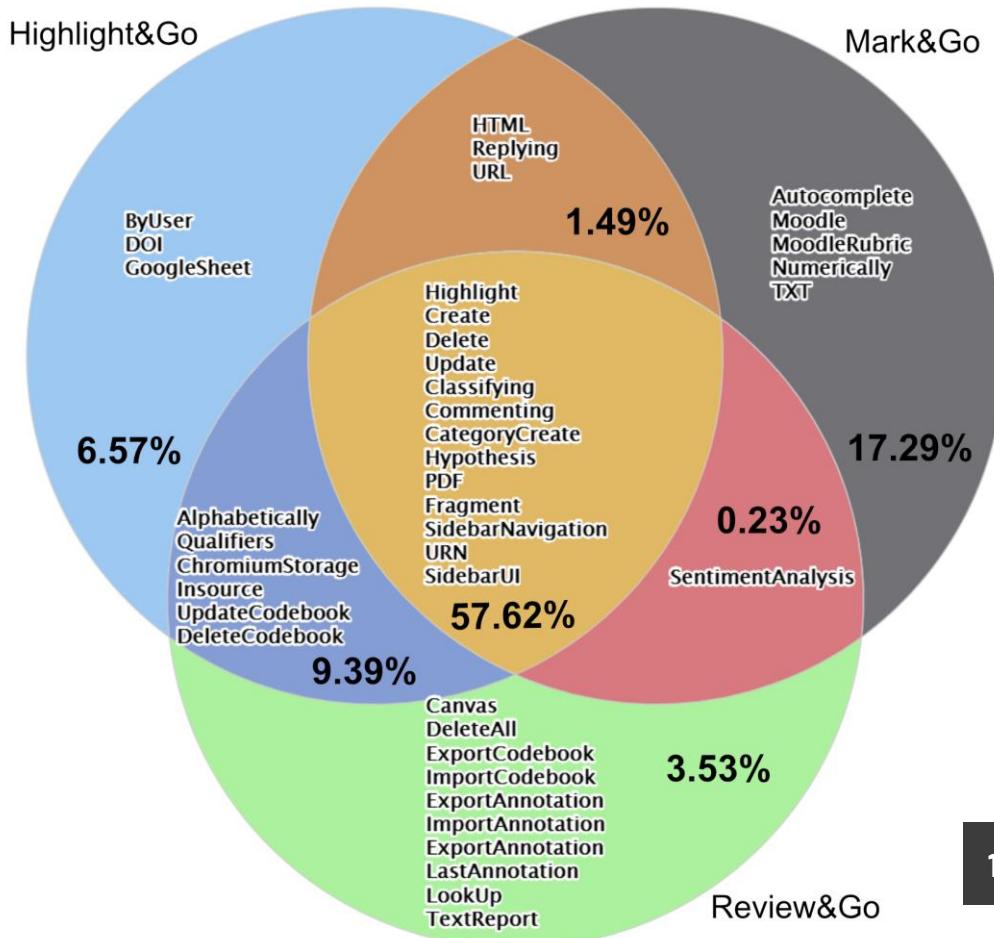
OK Cancel Grading

2.1 Objetivos

La gestión y desarrollo el proyecto se llevarán a cabo con los siguientes objetivos:

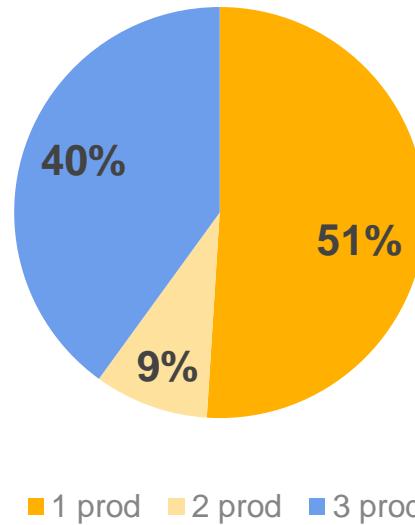
- Definir un modelo de datos para el sistema de evaluación de los TFGs, diferenciando dos tipos claros, el modelo para uso privado del profesor evaluador y el modelo que compartirá el tribunal.
- Estudiar y adaptar el *módulo de anotación* para que este permita las anotaciones públicas y privadas.

**WACline
accounts for
16.179 source
lines of code
(SLOC)**

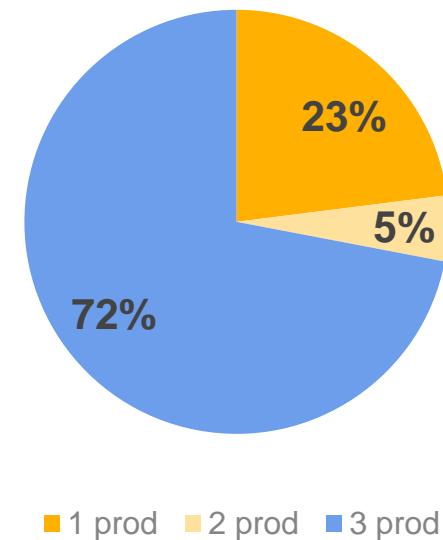


In last 4 years
we solved 57
bugs affecting
4011 SLOCs

issues



SLOCs



Outline

1. Context
2. Research methodology
3. Web Annotation for data extraction in SLRs
4. Web Annotation for assignment marking
5. Web Annotation for peer review
6. SPLs to harness heterogeneity in web annotation
- 7. Conclusions**

7. Conclusions

Research questions solved



How to design a platform to systematically reuse features

that satisfies heterogeneity and extensibility

so that developers reduce the development and maintenance costs

in the creation of web annotation extensions for reviewing?

WAcline

How to design a dedicated annotation tool

that satisfies portability

so that researchers conduct data extraction effectively and efficiently

in literature reviews?



How to design a dedicated annotation tool

that satisfies seamless integration with LMSs

so that lecturers can increase the feedback quality

in higher education institutions

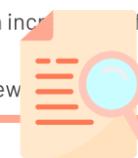


How to design a dedicated annotation tool

that provides guidance

so that reviewers can increase the feedback quality

in scholarly peer review



Main Publications



- Diaz, O., Medina, H., & Anfurrutia, F. I. (2019). Coding-Data Portability in Systematic Literature Reviews: a W3C's Open Annotation Approach.
 - EASE'19. Core **A**, Class **3**.
- Diaz, O., Contell, J. P., & Medina, H. (2019). Performant Peer Review for Design Science Manuscripts: A Pilot Study on Dedicated Highlighters.
 - DESRIST'19. Core **A**, Class **3**.
- Diaz, O., Medina, H., & Perez Contell, J. (2021). Promoting Design Knowledge Accumulation Through Systematic Reuse: The Case for Product Line Engineering.
 - HICSS'21. Core **A**, Class **2**. **Nominated to best paper award**
- Medina H., Diaz O. & Garmendia X. (2022) WAcline: A Software Product Line to harness heterogeneity in Web Annotation.
 - SoftwareX Vol. 18C. JCR **Q2**.

Publications and presentations in international Conferences & Workshops



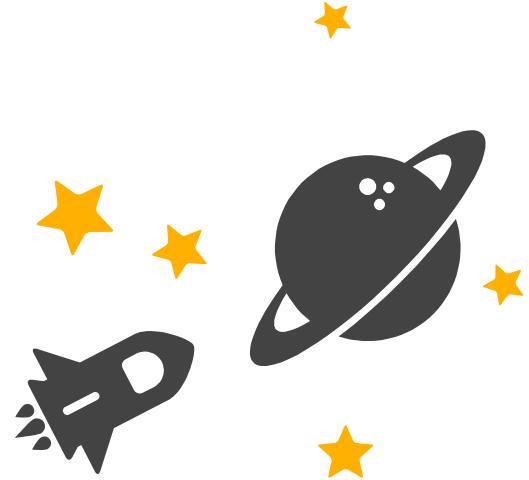
- Medina, H., Díaz, O., & Anfurrutia, F. I. (2018). Highlight&Go: una extensión para automatizar la extracción de datos en revisiones sistemáticas de la literatura utilizando Google Sheets.
 - JISBD'18
- Medina, H., Diaz, O., Contell, J. P. (2018). The Cold-star Challenge: Introducing annotation at the University of the Basque Country.
 - IAnnotate'18
- Medina, H., Diaz, O. (2019). Web Annotations for Assignment Marking: Challenges and opportunities.
 - IAnnotate'19
- Diaz, O., Contell, J. P., & Medina, H. (2020). Software scaffolds for quality feedback in peer review.
 - PEERE'20
- Garmendia, X., Diaz, O., Medina, H. (2022). Deconstructing Concept Maps: Uncovering the readings behind the concepts through text annotation.
 - Cmap Conference'22

Publications under review



- Diaz O., Medina H., Azanza M. Balancing Quality and Timeliness in Student Feedback at Scale: A Case of Action Design Research.
 - Submitted for review in 2022 to Elsevier Computers&Education
- Medina, H., Azpeitia, I., Anfurrutia, F. I., Díaz, O. Supporting efficient and effective data extraction through annotation tooling.
 - Submitted for review in 2022 to Elsevier Information and Software Technologies

Impact

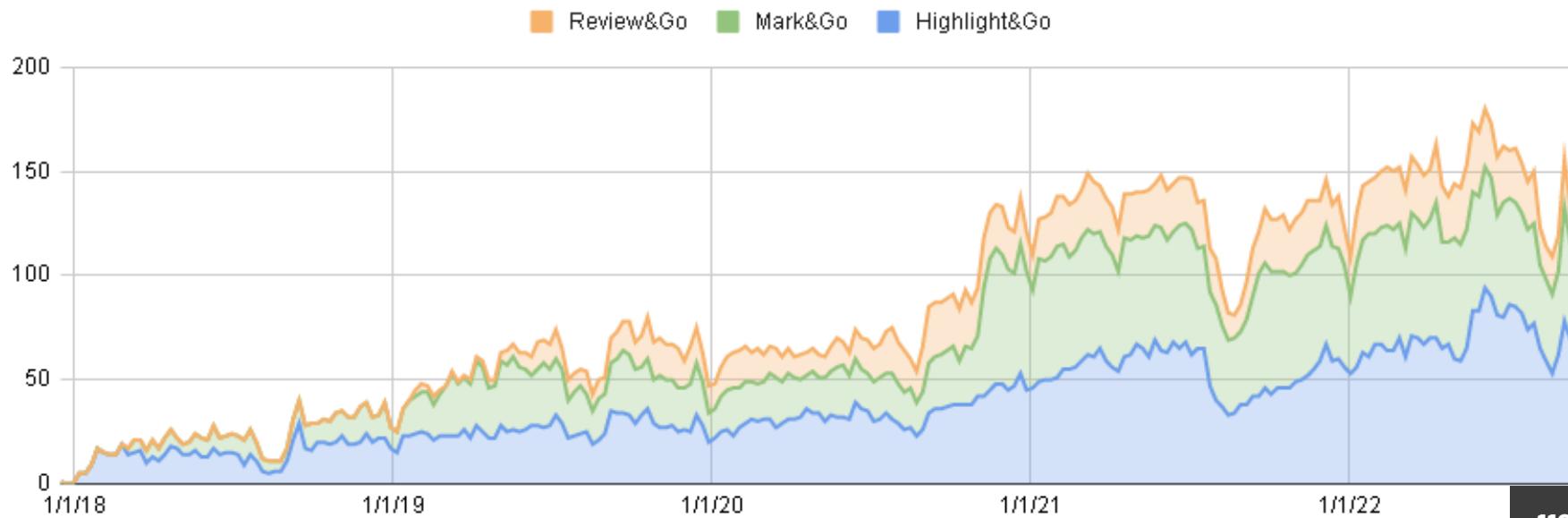


This research not only influenced the knowledge base, also the application context communicating results in an effective way to practitioners [GH13b]

Practical impact



- 3 annotation tools used available in the Chrome Web Store

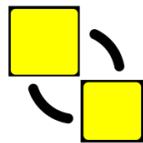


* Number of users accumulated by the three tools based on Chrome Web Store

Practical impact

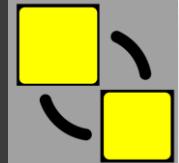


- A platform for annotation clients reuse (WACline):
 - Source code available and documented
 - 3 additional annotation tools:



- WACline and its products have been involved in 5 BSc and 1 MSc Thesis

Practical impact



Posta ▾ Egutegia ▾ Helbide-liburua ▾ Zereginak ▾ Oharrak ▾ Laster-markak Fitxategi-kudeatzailea ⚙️ 🔍

2022/10/03 7% / 10 GB Sarrerako onzia (5117 mezu) Bilatu (Mezu osoa) 🔍

Freskatu Erantzun Birbidali Ezabatu Beste batzuk Iragazkia

Nork Gaia Ezabatu Data Tamaina

Connect&Go and Sero! 2022/09/29 12 KB

▷ Connect&Go and Sero! 2022/09/29 (09:11:37 CEST) +

Testua (6 KB) 🔍

Oscar, Xabier, Haritz

Thank you again for the demonstration of Concept&Go. I have already tested it with Sero! — it performed perfectly with .cxl import. Sero's auto layout made quick work of the initial organization.

I would like to set up a Zoom call with you next week to continue the discussion and include our development team.

I'm excited by the opportunity to integrate further!

...



Future work: Highlight&Go, Mark&Go, Review&Go



Highlight&Go to **support other SLR activities** (piloting, studies selection) or auditability of results by third-party researchers



Evaluation of **quality of feedback** by students and generalize results with no-computer-science lecturers



Review&Go's annotations to **support other stakeholders**: editors, authors, readers

Future work: WACline



- Validate heterogeneity **recreating** other annotation tools
- Address **what** users can annotate: W3C not only supports text annotation
- WACline as a SPL for **learning** and **researching about SPLs** (e.g. [AIMD21, MD22])
- Evaluate **Concept&Go, Docal & Fival** with real users

This concludes the presentation

Thank you very much for your attention



Harnessing customization in Web Annotation: A Software Product Line approach

PhD Candidate: Haritz Medina

Supervisors: Prof. Dr. Oscar Díaz & Dr. Maider Azanza

