

Unplagged Developers Manual

Building the Plagiarism Detection Cockpit

Term paper for the master project I

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Introduction

After Minister Guttenberg had to resign, because of the plagiarisms found in his doctoral thesis, the big media coverage and interest in plagiarism in Germany has very much subsided (?). However, the initial idea for the creation of the “Unplagged” project, whose development approach will be described here, can be found in this very case of plagiarism. Related to it were the formation of the [GuttenPlag](#) and its descendant [VroniPlag](#). Both are Wiki-based communities that are collaboratively discovering and collecting plagiarism in their respective cases and are kind of the role models for the way the Unplagged system is developed.

The project idea and context were provided by our professor Dr. Debora Weber-Wulff and the two-term master project, every media informatics student at the [HTW-Berlin](#) has to take. Professor Weber-Wulff is a well known expert in Germany on the topic of plagiarism. As she has also done research in this field for over ten years and is actively involved in the VroniPlag community under her synonym “WiseWoman”(?), she came up with the idea to build a dedicated system — a “Plagiarism Detection Cockpit”(?) — that is modeled after the experiences that were made with the workflow used in VroniPlag and GuttenPlag.

So, to put it in a catchy marketing phrase, here is what Unplagged aims to become:

**Unplagged is a simple, web-based, collaborative system to help
discover, collect and document plagiarism in scientific papers.**

To make things a bit more conceivable, we also often refer to it as a mixture of a very specialised text editor, with a focus on comparing texts and marking passages and a modern project management tool like [Redmine](#) or [JIRA](#), to manage the collaborative

aspects of the system. The big distinction we make to other plagiarism software on the market is, that the approach is not to autodetect plagiarism, but focused on aiding the workflow of the users while searching for plagiarized fragments inside a scientific paper, a homework assignment or any other kind of probable textual plagiarism.

This present document will be the handbook that gets you started if you are interested in helping us with the development of this open source project, which is licensed under the [GNU GPLv3](#).

Chapter Overview

One of the biggest problems we faced at the start was, that none of the team members had written a longer scientific text than a bachelors thesis and therefore the experience we got with actual scientific writing was very limited and very specific to the field of computer science. We understand the ethical problems, that come with the betrayal of good scientific practice of plagiarists, but we simply can not relate easily to the amount of work that has to be put into a PhD., or be as passionate about plagiarism as Prof. Weber-Wulff always is, because we never experienced it ourselves.

That is why we had a lot of catching up to do on the most important history behind VroniPlag, the different types of plagiarism, different citation styles and the research Prof. Weber-Wulff and others had already done on systems that try to help finding plagiarism. Chapter 1, [A Plagiarism Primer](#), will give a brief overview of the most important topics to get you up to speed with the domain of the software, if you are not already familiar with it.

Chapter 2, [Project Workflow and Requirements](#), will be the place, where the development process is described and a collection and description of the parts of the system, that already exist or that we identified as necessary parts of Unplagged will be given. As the system is developed with an agile project management style, this will be done primarily based on the product backlog.

If you know all those things already and simply want to get started working and coding,

you should probably jump to [3, Developing Unplugged](#). This chapter will give the technical insights into the system, the basic installation steps and all necessary tools for you as a developer.

Conventions

To markup important words in the text, the following typographical conventions are used:

Italic

First used technical terms

Constant Width

Programm code, file names, paths

Bold Constant Width

Variables that have to be changed by the user

1. A Plagiarism Primer

In this chapter we will give a brief overview of the most important topics to get you up to speed with the domain of the software, if you are not already familiar with it.

1.1. Plagiarism definition

1.2. Basic Classification of Plagiarisms

In this part, we will try to cover common classifications of plagiarism. First, we want to figure out the purpose of the classification.

There are many reasons explaining why people plagiarize. Generally those include, that they didn't have the time, energy or the ability to do the work by themselves or that they try to steal other's work on purpose with the hope that others will not recognize it. This kind of plagiarism is done intentionally and named *deliberate plagiarism(?)*.

Another kind is *accidental plagiarism*. This occurs when texts from some sources are copied or rephrased, but no reference is given. The reason is that the writer didn't know that it is a plagiarism because of "carelessness or lack of skill"(?) while writing.

Anyway, it is important to know, that working with the source carelessly may cause plagiarism. Classification of plagiarism is also a good way to help distinguish typical types of plagiarism, so that people are aware and able to reference the sources carefully and to avoid plagiarizing.

Classification of plagiarism is also good for professors or the plagiarism detection community such as VroniPlag, because it gives them a common terminology, which enables them to communicate faster and more efficiently. It also helps them to realize what category and how many percent the text is plagiarized if there is any suspicion, so that statistical data can be created.

So the classification is about the way to detect plagiarism while conducting a citation. But what is a citation, and what kinds of citation are there? Understanding of citations and the way to cite is an important thing in order to avoid and detect plagiarism.

1.2.1. Definition of Citation

"A citation is a credit or reference to another document or source"
(?)

According to this definition, citation is your reference to a source of information, which was generated by someone and should be indicated properly when this source is used in your work.

Based on ?, there are 3 forms of citation:

Direct quotation:

That is an exact word-to-word copy from one source. In this case, in order to cite you have to mark the text with quotation marks and indicate a parenthetical referencing, which includes the book's name and the page number where you found the source.

Paraphrase:

That is your own explanation of someones idea. Many people think it is not a plagiarism because the text is written with your own words. But it is still a plagiarism because basically that is not your idea or your opinion, but the author's himself. In this case of citation, some keywords are still kept in the work. Therefore the parenthetical reference must be given.

Summary:

That is the same as paraphrase, but this kind of citation is likely a summary of the text. In this case you have to give the parenthetical referencing as well.

Now we can see that citation has a lot of forms. You are free to use the source but make sure to cite sources properly or you are applying a plagiarism.

After understanding what citation is and its form, now we can try to classify the plagiarism. The criteria which we choose for classification are based on the VroniPlag's plagiarism categories, because this project is implemented based on the workflow of the VroniPlag community.

By VroniPlag, it does not matter what citation standard system is used in the work, but it is important to know how the citation is documented and if the reference is given properly.

VroniPlag's classification of plagiarism

According to VroniPlag there are the following plagiarism categories. The categories are originally written in German, and the translation or the similar category in English is written right after the german expression.

Komplettplagiat/Copy & Paste:

The name of this category already indicates how the text is plagiarized. The plagiariser just copies from the source exactly word-by-word and does not leave any proper reference to the source intentionally. Some is too lazy so that they just copy existing mistakes, formats etc... without checking, which later can become a proof of plagiarism.

The category is differentiated by the way of conducting a citation. Source is not cited: the original text is completely copied but the source reference is not given intentionally. Source is cited but not completely: reference is given but not correctly.

Verschleierung/Paraphrasing:

The texts from different sources are rephrased and mixed together. The plagiariser try to hide his stealing by changing some word orders, replacing words with synonyms ... The source is not given with the hope, that the text is considerably generated by the plagiariser himself and therefore the plagiarism will not be detected.

Übersetzungsplagiat/translations:

This kind of plagiarism occurs when the sources in foreign languages are translated. The plagiariser pretend that this translated text is his own work. Sources are oft not given properly. This is a well-liked way in researching because there are many translation tools which can be found easily in Internet such as Babelfish, Google Translate ... and it is not easy to detect the plagiarism with existing plagiarism detection tools.

Alibi-Fußnote/The forgotten Footnote:

in this category, the source is cited but the real location of the source is hidden.

Bauernopfer und. Verschärftes Bauernopfer:

The source reference is embedded in footnote part but it redirects to another text part of the source which has no relation with the plagiarized text.

Other categories**Halbsatzflickerei/The Labor of Laziness:**

The plagiariser takes sentences, or just parts of sentence from different sources, tries to reword them and mixes all so that they look fit together. Source reference is not or not correctly given.

Shake & Paste:

The sentence or paragraph from one source is mixed with one from another source. This plagiarism can be detected by changes of writing styles. Source reference is also not given properly.

1.3. How to detect plagiarism

Plagiarism detection means a lot of effort and hard work, because a lot of documents, books and papers must be found, scanned and compared line for line. Often it is really complicated to find available sources in libraries or scientific database systems and plenty of pages must be copied by hand. During the last ten years a lot of software companies came into market to automatize this process and developed algorithms to find plagiarisms automatically. These systems are called "Plagiarism detection systems (PDS) ". There are two different approaches for plagiarism detection systems to identify plagiarism in text documents:

1. Corpus based analysis

means to "compare suspicious documents against a set of potential original documents" PAN'07 to find similar text passages.

2. Intrinsic analysis

"identifies potentially plagiarized passages by analyzing the suspicious document with respect to changes in writing style". PAN'07

These computer assisted detection systems alone are not appropriate to find all plagiarisms without human judgement.

We found out that the most practical way is to combine both approaches - the first step is to use the computer-based detection to find similarities between the suspicious documents and the original papers. The second step is to examine the results, validate them and continue the search in a deeper level. (see figure 4 stage)

(Culwin, Fintan; Lancaster, Thomas (2001), "Plagiarism issues for higher education", Vine 31 (2): 36-41, doi:10.1108/03055720010804005)

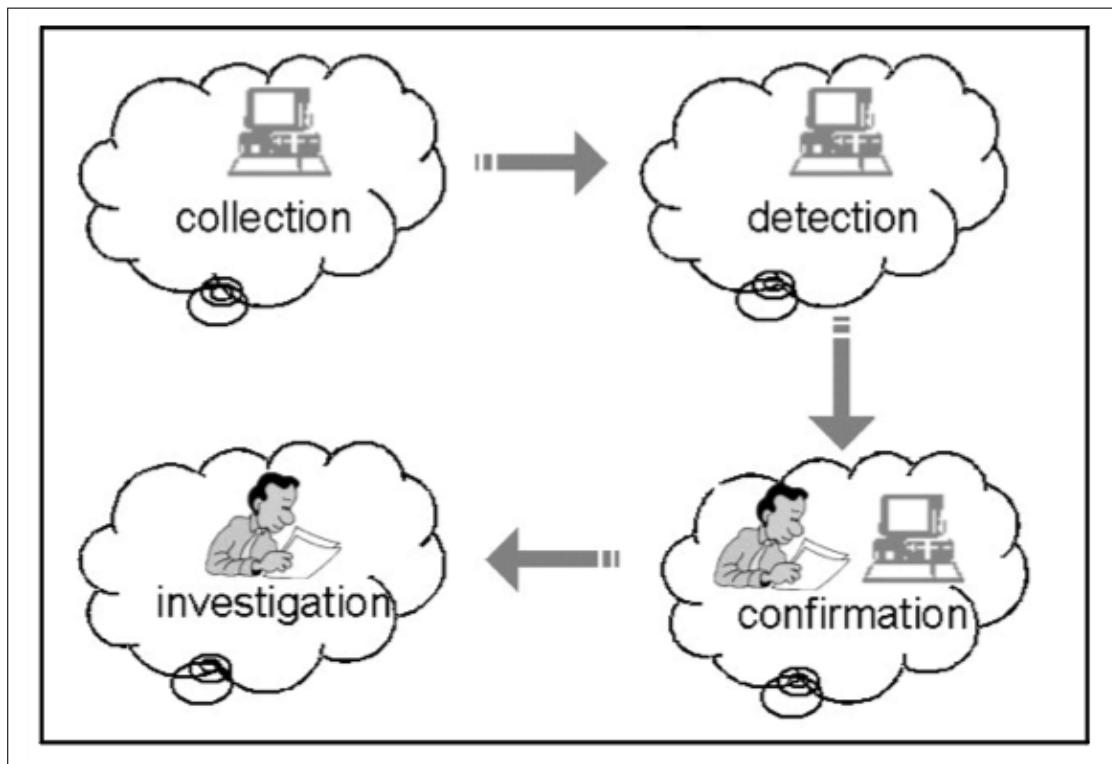


Figure 1.1.: 4-stage plagiarism detection process

1.3.1. Commercial software systems

Name	No free access	Free version available	Free demo available	Website
Plagaware		X		www.plagaware.de
Turnitin			X	www.turnitin.com
Ephorus			X	www.ephorus.com
Plagscan	X			www.plagscan.com
Urkund			X	www.urkund.com

Figure 1.2.: Overview of Commercial Detection Systems

Several computer companies developed commercial software systems to facilitate the detection of plagiarism. They offer different terms of pricing and online as a service or offline programs. The software system compare digital content from the internet or different types of databases. They seek for similarities, report suspicious parts and try to answer the question if the present text is a plagiarism or not.

This chapter covers parts of the results of the big "Plagiarism Detection System Test 2010". The following benchmarking was done by Prof. Debora Weber-Wulff at the University of Applied Sciences HTW Berlin and her plagiarism team in 2010. The entire benchmarking includes 26 of the 47 available systems on the market and gives an overview of the strengths and weaknesses of these systems in finding plagiarism.

We used the top 5 "partially useful" software systems in this benchmarking to overview the market and find the best usable features for our own system to simplify the daily work of plagiarism finders.

PlagAware

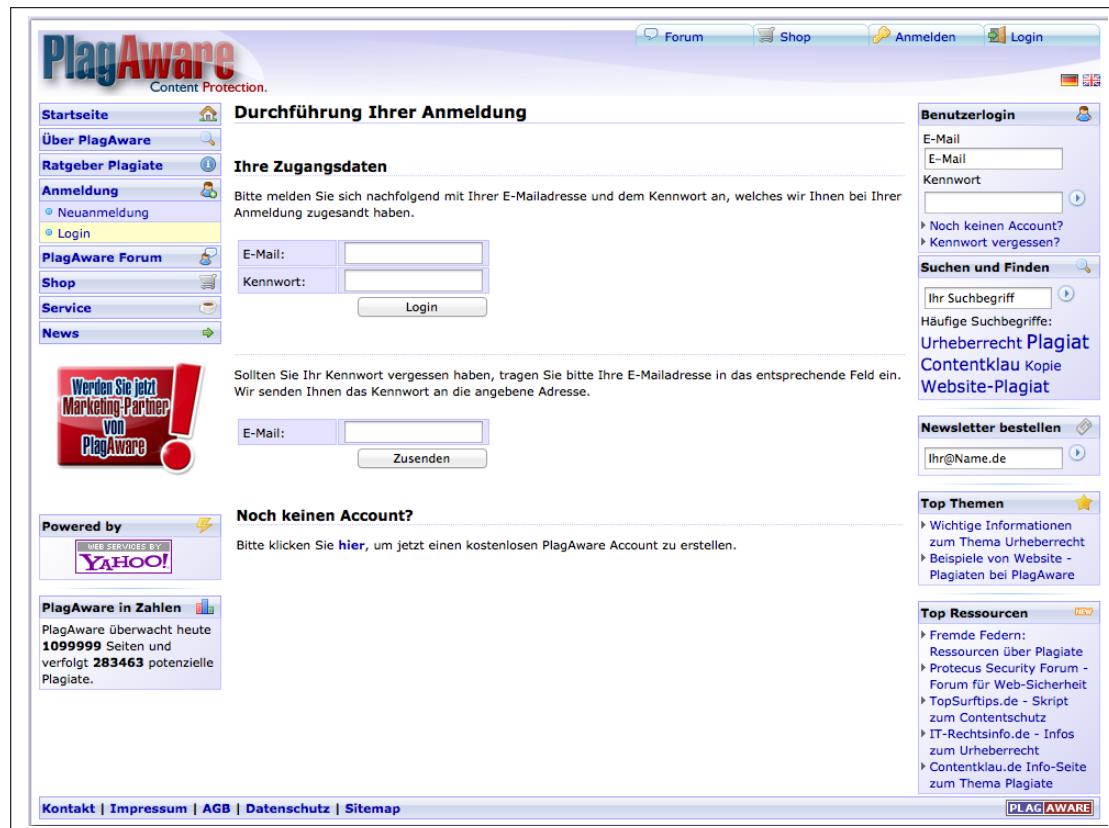


Figure 1.3.: Plagaware Website

Plagaware Business Promotion

"PlagAware is an online-service, which offers services around the topics Searching, finding, analysing and tracing of plagiarisms. The central element of PlagAware is a search engine, which is specialised in detecting identical contents of given texts. Contrary to the plagiarism scanning with classical search engines, the places of finding are not directly transferred to the user, but analysed on the rate and the type of analogy, before a message to the user is written. By this the differing result reports of PlagAware allow to recognise very fast the percentage and the distribution of the copied text contents, thus permitting an efficient and secure rating of a possible plagiarism."

“PlagAware Business Promotion”(?) [PlagAware](#)

PlagAware is software company from Ulm in Germany. The website is online for nearly 5 years and is the top-ranked system in the HTW ”Plagiarism Detection System Test” 2010, but in fact it still detect only 61,11% of the plagiarism cases. Although PlagAware ”produces excellent documentation of the plagiarism found, highlighting the commonalities in a side-by-side presentation. However, its usefulness at university is limited, as each file must be uploaded individually - no ZIP file or student-submission is possible. The system was not designed to be used in a university setting, but rather to find plagiarisms of online texts, which is important for sites trying to optimize their search machine ranking, as plagiarism will contribute to downranking.” [Plagiat Website](#)

Figure Overview shows an overview of all fragments and the results of the plagiarism detection. In figure Side-by-side shows a nice side-by-side fragment view, where all found plagiarisms are shown with different colors. Anomalies in the text are highlighted and the barcode-view is available.

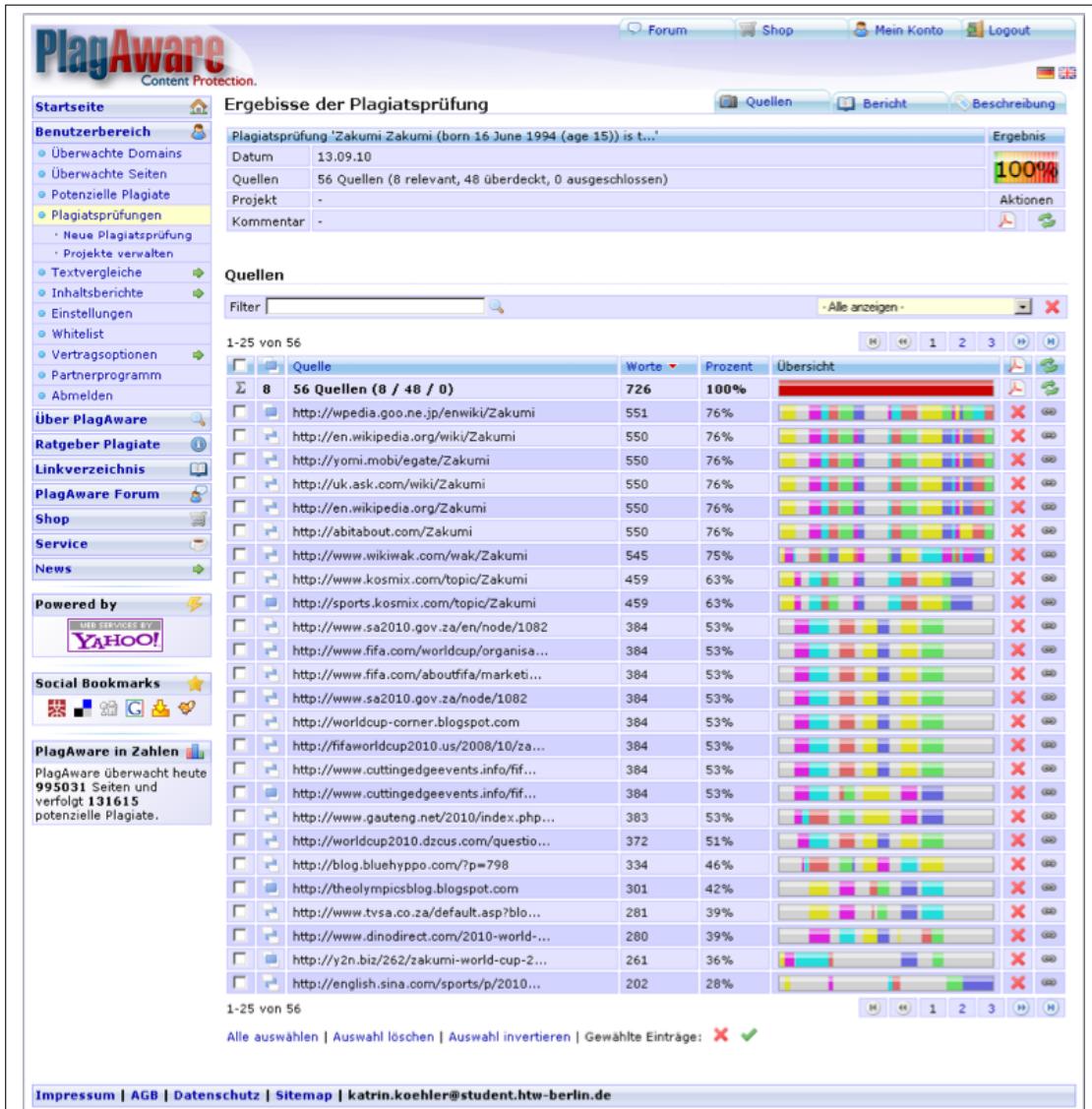


Figure 1.4.: Plagaware overview

PlagAware Costs

PlagAware has four different payment-models:

1. Free

30 scans/month for free. Every additional scan costs 3,0 ct.

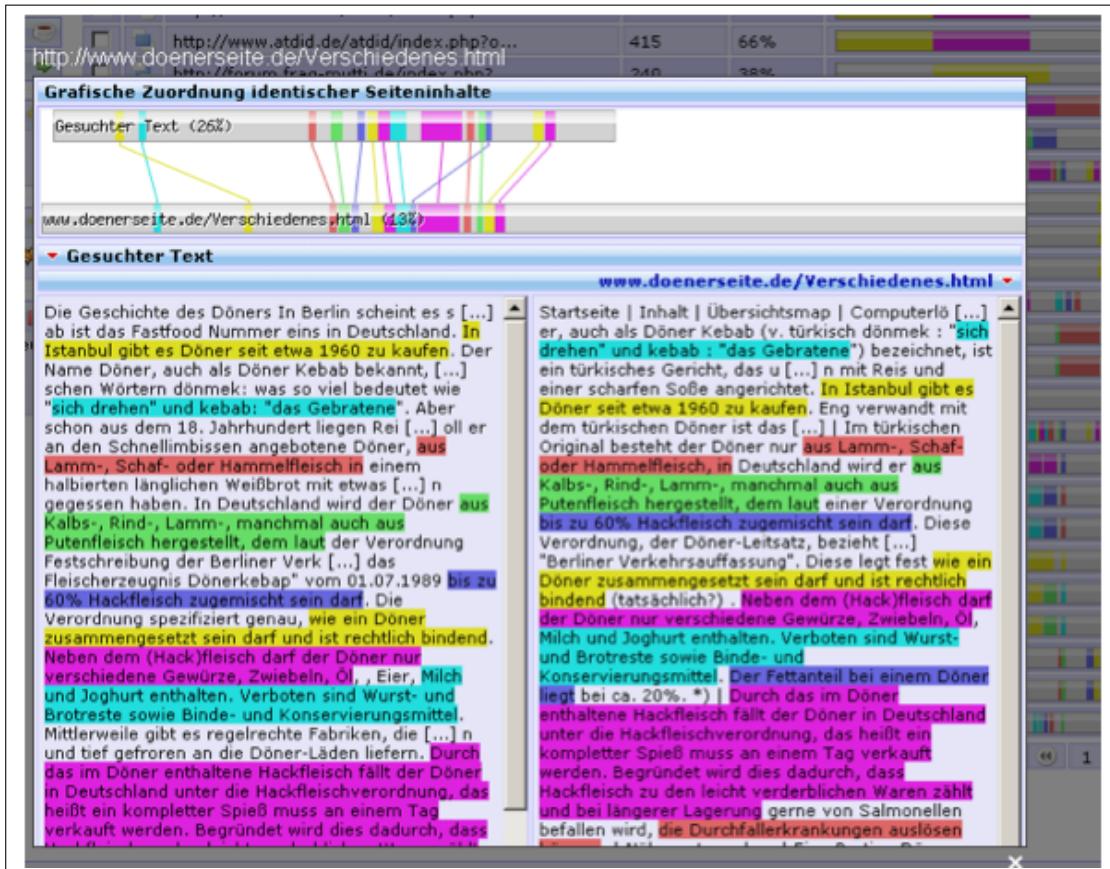


Figure 1.5.: Plagaware side-by-side view

2. Light

EUR 2,99/month. 150 scans/month included. Every additional scan costs 2,0 ct.

Mininum term of 6 month.

3. Standard

EUR 7,49/month. 500 scans/month included. Every additional scan costs 1,5 ct.

Mininum term of 6 month.

4. Premium

EUR 14,99/month. 1500 scans/month included. Every additional scan costs 1ct.

Mininum term of 6 month.

Turnitin

The screenshot shows the Turnitin homepage. At the top, there is a navigation bar with links for 'Startseite', 'Produkte', 'Kunden', 'Partner', 'Support und Schulung', 'Über uns', and a search bar. On the right side of the header are fields for 'E-mail' and 'Passwort' with buttons for 'ANMELDEN', 'Account erstellen', and 'Passwort zurücksetzen'. Below the header, there is a language selector set to 'Deutsch' and a 'suchen...' search input field.

The main content area features a large banner with the text 'Die umfassende Lösung zur Evaluierung von Texten' (The comprehensive solution for evaluating texts). It lists three benefits: '✓ Originalität sicherstellen', '✓ Arbeiten benoten', and '✓ Peer-Reviews erleichtern'. Below this, there are two red buttons: 'ERFAHREN SIE MEHR' and 'FORDERN SIE EIN ANGEBOT AN'. To the right of the banner, there is another section titled 'Plagiatsprävention mit Turnitin' (Plagiarism prevention with Turnitin) for 'Pädagogische Hochschule Zürich' on March 28, 2015, from 12.15 - 17.00 Uhr, with a red 'ANMELDEN' button.

Below the banner, there is a testimonial in German: "Ich habe Stunden damit zugebracht, mithilfe von Google nach ungewöhnlichen Formulierungen zu suchen, wenn ich vermutete habe, dass ein Student eine Arbeit nicht selbst verfasst hat. Jetzt suche ich einfach schnell mit Turnitin!" followed by a red double quote mark. Below the testimonial is a small note: "- LEHRKRÄFT".

On the right side of the main content area, there is a section titled 'Turnitin – Resultate auf einen Blick' (Turnitin – Results at a glance) with a list of statistics:

- über 200 Millionen archivierte Arbeiten
- über 90.000 Magazine und Bücher
- über 1 Million aktive Lehrkräfte
- über 17 Milliarden gecrawlte Webseiten
- 10.000 Bildungseinrichtungen
- über 20 Millionen lizenzierte Studenten
- 126 Länder

Below this list is a note: 'ENTDECKEN SIE, WAS EINE HALBE MILLION LEHRKRÄFTÉ SCHON WISSEN' and a link to a PDF download: 'PDF herunterladen'.

At the bottom of the page, there is a footer with links for 'Startseite', 'Datenschutz', 'Nutzungsrichtlinien', 'Kontakt', and copyright information: 'Copyright © 1998 - 2012 iParadigms, LLC. Alle Rechte vorbehalten.' and a small logo.

Figure 1.6.: Turnitin Website

Business Promotion

"Our award-winning solution discourages plagiarism and facilitates rich, meaningful feedback that improves writing skills, promotes critical thinking, and streamlines grading."

"Turnitin"(?)[Turnitin](#)

Turnitin is a product by a company called iParadigms. It is a well-known US plagiarism software system and one of the most used plagiarism detection systems in the education sector. The website is online for nearly 13 years and the system is at the second position in the HTW "Plagiarism Detection System Test" 2010.

The best results can be achieved with material which is already in the database.

In the past they had a lot of problems to deal with umlauts, and having a complex setup. They improved a lot of parts especially the german translation. Still a big problem for european countries is the copyright policy of Turnitin. They still storing copies of user material in their database without a permission. [Plagiat Website](#)

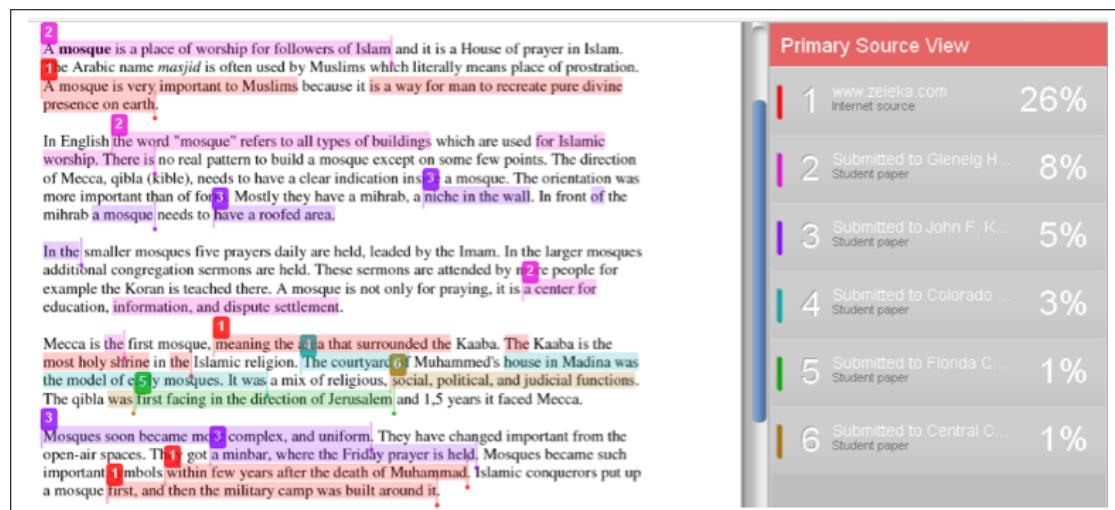


Figure 1.7.: Turnitin - A lot of little matches can't be found, if the sensibility has not been raised.

In 2008 the system was placed at the 13th position. The reason of this change is that the other systems have gotten worse. Turnitin has still problems of flagging spam sites especially when these sites are not safe for work (e.g. site with pornography content). (figure porn) On the other hand the search algorithm of Turnitin is storing sites in their database although they are still not exist. [Plagiat Website](#)

Costs

There are different license models for the education sector and the cost depends on the amount of users .

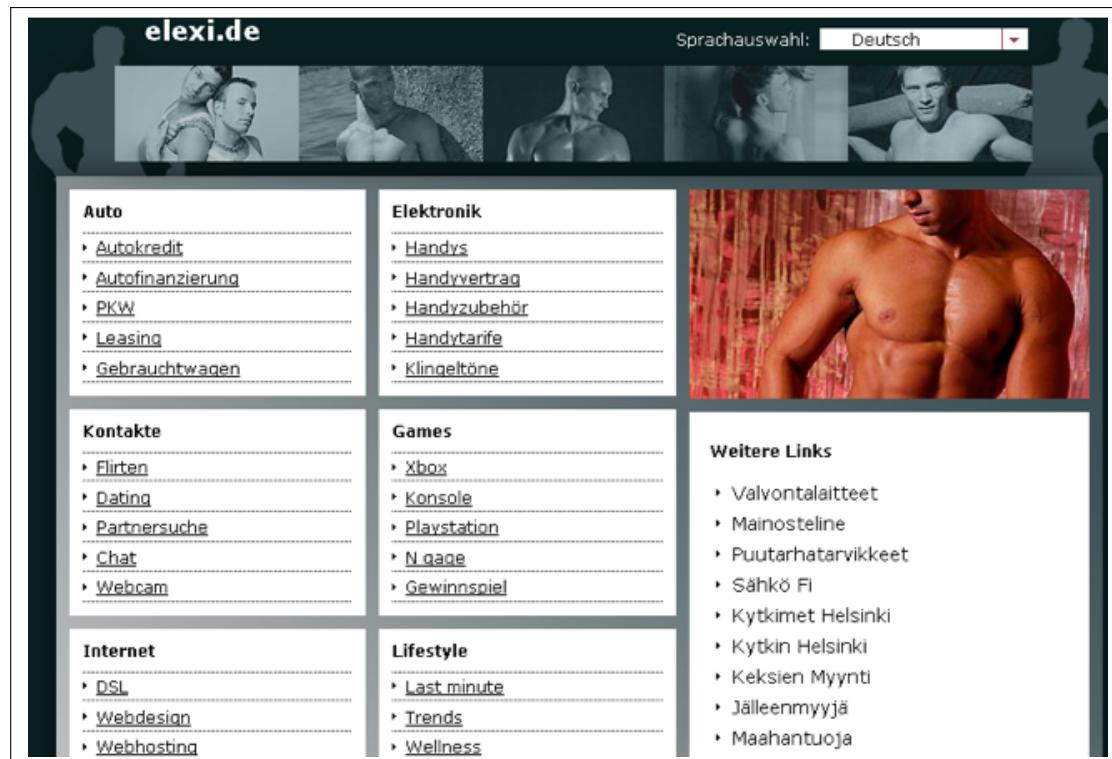


Figure 1.8.: Turnitin - A lot of spam-sites are reported. Not all sufficient to use at work.
This is one of the harmless examples.

Ephorus



The screenshot shows the homepage of the Ephorus website. At the top, there is a navigation bar with links for "Start", "Demo", "Produkte", "Referenzen", "Support", and "Kontakt". A language selector dropdown is set to "Deutsch". The main content area features a large orange header "ephorus" composed of many small, scattered words. Below this is a photograph of a spiral-bound notebook and a pen. The main text on the page reads: "Nie mehr selbst nach Plagiaten suchen? Dem Ärger ein Ende bereiten und dafür qualitativ bessere Arbeiten erhalten? Kein Problem! Mit Ephorus beugen Sie Plagiaten ohne zusätzlichen Aufwand vor! Mehr noch, mit diesem Marktführer im Bereich des Anti-Plagiatismus sind Ihnen beste Ergebnisse zu niedrigen Kosten garantiert. Mit Ephorus unterscheiden Sie die Spreu vom Weizen!" It also mentions a free demonstration available by clicking a link. A "Login" button is located at the bottom left of the main content area. At the very bottom of the page, there is a footer with the text "© Ephorus 2012 | Privacy statement | Disclaimer".

Figure 1.9.: Ephorus Website

Business Promotion

"Never search for plagiarism yourself again? An end to all irritations and qualitatively better papers? No problem. With Ephorus, you can prevent plagiarism with no extra effort. Moreover, with this anti-plagiarism market leader, you will be assured of the best service and the lowest prices. With Ephorus, teaching will be fun again! Would you like to try out Ephorus?"

"Ephorus Business Promotion"(?) Ephorus

The third position in the HTW "Plagiarism Detection System Test" 2010 is Euphorus. It's a plagiarism detection system from the netherlands and the website is online for nearly 8 years. 2007 it took the first place in the test, 2008 it was only position 8. Now they redesigned and reorganized the system and old problems were solved. The usability of reports and the whole handling of the system very good. (figure: report) But their still problems with umlauts and the european copyright problematic like in Turnitin. (figure: umlauts)

Eingereichtes Dokument - Download

68% 32-zakumi.pdf - Umbenennen 02-09-2010 | 15:08

Quellenliste

68% Gesamte Übereinstimmungen

51%	<input checked="" type="radio"/> http://worldcup-corner.blogspot.com/
51%	<input type="radio"/> http://www.cbn.co.za/pressoffice/2010/fullstory/1028.htm
51%	<input type="radio"/> http://www.sa2010.gov.za/node/1082
37%	<input type="radio"/> http://www.tvsouthafrica.net/default.asp?blogname=shugesblogiwood&articleid=9369
22%	<input type="radio"/> http://www.southafrica.info/2010/zakumi.htm
16%	<input type="radio"/> http://en.wikipedia.org/wiki/Zakumi

Bericht

Zakumi
Zakumi (born 16 June 1994 (age 15)) is the Official Mascot for the 2010 FIFA World Cup. He is a cheerful and sporty leopard with green hair, presented on 22 September 2008. His name comes from "ZA", the ISO 3166-1 alpha-2 code for South Africa, and "kumi", a word that means ten in several African languages.

Eingereicht:
One thing is for sure, Zakumi will be first on the dancefloor and last off it at the biggest party in the world - the 2010 FIFA World Cup South Africa™. He wants to dance and entertain as many people as he can. He is an animator for fans, players and officials, for schoolchildren, teenagers and big kids alike!

Gefunden:
One thing is for sure, Zakumi will be first on the dancefloor and last off it at the biggest party in the world - the 2010 FIFA World Cup South Africa™. He wants to dance and entertain as many people as he can. He is an animator for fans, players and officials, for schoolchildren, teenagers and big kids alike!

Eingereicht:
Zakumi is a jolly, self-confident, adventurous, spontaneous, and actually quite shrewd little fellow. He loves to perform and always follows his instinct and intuition, yet sometimes has the tendency to exasperate a bit. You will often find him fooling about and teasing

Gefunden:
Zakumi is a jolly, self-confident, adventurous, spontaneous, and actually quite shrewd little fellow. He loves to perform and always follows his instinct and intuition, yet sometimes has the tendency to exasperate a bit. You will often find him fooling about and teasing

Figure 1.10.: Ephorus report - gives a great overview of the results

Ephorus costs

Not stated.

Buchbesprechung (Originaltitel: „The Handmaid's Tale“) In einem fiktiven Staat im Jahr 2195 in Nordamerika haben religiöse Fundamentalisten die totalitäre Republik Gilead errichtet. Nach einer atomaren Verseuchung ist ein großer Teil der weiblichen Bevölkerung unfruchtbar. Frauen werden entmündigt und in drei Gruppen eingeteilt: Ehefrauen von Führungskräften, Dienerinnen und Mägde. Letztere werden zur Fortpflanzung rekrutiert und sollen nach biblischem Vorbild für unfruchtbare Ehefrauen Kinder empfangen. Können sie ihre Aufgabe als Gebärmaschine nicht erfüllen, werden sie in entfernte Kolonien zu gefährlichen Arbeiten wie Giftmüllentsorgung abgeschoben. Desfred, Hauptfigur und Erzählerin, lebt in einer Welt, in der sie nur geduldet wird, weil sie gesund ist und gebären kann. Sonst wäre sie für ihren Widerstand gegen die herrschende Diktatur schon lange erhangt worden. Ihr Glück ist, das gebärfähige Frauen Mangelware sind: die Umwelt ist so verseucht, daß die meisten Menschen unfruchtbar sind. Darum wird sie „Magd“ bei einem altilchen Offiziersehepaar, und ihre einzige Aufgabe ist, bei den rituellen Befruchtungsakten stillzuhalten. Und bald schwanger zu werden, aber das ist nicht so einfach. Desfred wird dem Kommandanten Fred als Zweitfrau in dessen Haushalt zugewiesen, wo regelmäßig die entwürdigende Prozedur des Geschlechtsakts in Gegenwart der Ehefrau durchgeführt wird. Ihr Zimmer darf Desfred nur zu seltenen Einkäufen und zu öffentlichen Hinrichtungen verlassen. Sie hat sich dem totalitären Regime unterworfen, dem sie nur durch Zufall entfliehen kann. Desfreds Tonbandaufzeichnungen schildern in einfachen Worten den Alltag in einer entmenschlichten Gesellschaft mit vollständiger Überwachung und grausamer Unterdrückung. Unterbrochen werden die Beschreibungen von Desfreds Erinnerungen an die alte Zeit: an Mann und Kind, aber auch an die Errichtung des Überwachungsstaats. Wie es dazu kam, ist eigentlich noch interessanter: nach und nach wurden die Rechte der Frauen beschnitten. Erst funktionierten ihre Kreditkarten nicht mehr, dann durften sie nicht mehr arbeiten, usw. Die Parallelen zu Nazideutschland ist subtil, aber vorhanden: auch den Juden beschritt man nach und nach ihre Freiheiten, so langsam, daß jeder Schritt als gerade noch erträglich schien. Eindringlich entsteht das Bild der totalen Repression, das umso bedrückender auf die Leser wirkt, als es eine geringe Distanz zur Gegenwart aufweist: mit alltäglichen Requisiten wie Computer und Kreditkarte, die hier in den Dienst der Republik Gilead gestellt werden. Trotz offenkundiger Parallelen zu 1984 von George R. Orwell ist „Der Report der Magd“ aber weniger als Utopie denn als Stellungnahme zu aktuellen politischen Strukturen und Diktaturen zu verstehen.

Figure 1.11.: Ephorus Problem with umlauts

PlagScan

Business Promotion

PlagScan stands for professionalism

- All documents are treated 100% confidential
- You control whether your document is checked against others, or not
- Integration via API in your existing CMS or learning management system possible

Plagiarism check as easy as pie: PlagScan

- Annotations directly in the document, check without additional work
- No installation - complete functionality in every browser
- All popular formats can be processed

Save time with PlagScan

Figure 1.12.: Plagscan Website

- Check several documents in parallel.
- Fully automated document analysis.
- No use of your resources, all computation is carried out on our servers.

“Plagscan Business Promotion”(?) Plagscan

Plagscan is a software company from Mainz, Germany. It placed at position number 4 in the HTW "Plagiarism Detection System Test" 2010. The website is online for 3 years and in the preview check 2008 it came to the 10th position. As a user you have to buy "Plag Points" (PP). One test costs 1 PP per 100 words. The administrator sets up users and assigns them points for use. There are three different kinds of reports - a list of possible sources with links to click on, the submitted document with the suspicious areas linked to a possible source, and a docx file with the sources in comments. There's no side-by-side presentation, so it's not possible to compare the fragments. Although there are still problems, PlagScan was first place in usability, but only 8th place in overall effectiveness with only 60% of the points awarded for finding plagiarisms.

The screenshot shows the Plagscan dashboard. On the left, a sidebar includes a greeting ('Hallo Bernhard Blütentraum!'), navigation links ('Institution', 'Ihr Guthaben', 'Texteingabe', 'Hilfe anzeigen', 'Admin fragen', 'Einstellungen'), and a 'Plagiat Level' section with a color-coded legend (0-1%, 1-5%, 5-100%). The main area displays a table of 10 analyzed documents. Each row shows the document name, word count, plagiarism percentage (in green), and a link to the report ('Bericht'). The table also includes columns for selecting all documents, deselecting all, and deleting selected ones. At the bottom of the page, there are links for 'Copyright © PlagScan.com 2010', 'Kontakt & Impressum', and 'AGB & Datenschutz'.

		Ausgewählte Dokumente	Analysieren	Löschen	
<input type="checkbox"/>	18_vikinger.pdf - Die Vinland-Karte, die isla*ndische	879 Worte	Inhalt	0% Bericht>>	2010-08-03 10:36:58
<input type="checkbox"/>	17_squaredance.pdf - Square Dance Ein Square D:	531 Worte	Inhalt	7.2% Bericht>>	2010-08-03 10:36:56
<input type="checkbox"/>	16_jelenik.pdf - Elfriede Jelinkel ist am 20.10.1946 in	468 Worte	Inhalt	50.2% Bericht>>	2010-08-03 10:36:55
<input type="checkbox"/>	15_beduerfnisanstalt.pdf - Bedu*fnisanstalten, im w	721 Worte	Inhalt	30.9% Bericht>>	2010-08-03 10:36:53
<input type="checkbox"/>	14_schmeling.pdf - Max Schmeling war ein deutsche	706 Worte	Inhalt	0% Bericht>>	2010-08-03 10:36:50
<input type="checkbox"/>	13_piment.pdf - Viele von den uns heute bekannten	494 Worte	Inhalt	0% Bericht>>	2010-08-03 10:36:48
<input type="checkbox"/>	12_mikrobrauereien.pdf - Eine Mikrobrauerei, oder i	720 Worte	Inhalt	0% Bericht>>	2010-08-03 10:36:46
<input type="checkbox"/>	11_mankell.pdf - Vor dem Einsetzen des Frostes ist	670 Worte	Inhalt	57.2% Bericht>>	2010-08-03 10:36:44
<input type="checkbox"/>	10_fraktur.pdf - Die Fraktur wird oft als "alte Schrift"	1131 Worte	Inhalt	5.1% Bericht>>	2010-08-03 10:36:42
<input type="checkbox"/>	19_blogs.pdf - Der Begriff Blog geht zurück auf der	1062 Worte	Inhalt	1.2% Bericht>>	2010-08-03 10:36:40

Figure 1.13.: Plagscan report is clear and tidy.

Plagscan costs

PlagScan has four different payment-models without a contract:

1. 9 Euro

500 Plagpoint - 50.000 words - 200 Sites.

Dateiname: 21.doc Datum: 2010-08-03 12:14 Ergebnisse der Plagiarismus Analyse vom 2010-08-03 12:16:42	
127 Treffer von 43 Quellen, von denen 42 Onlinequellen sind. Plagiat Level: 	
Im Dokument anzeigen Docx-Dokument herunterladen	
Zeige besten Treffer pro Quelle - klicken Sie ihn an um alle Treffer anzuzeigen oder auf die URL für die Quelle selbst.	
29 Treffer von ein PlagScan Dokument datiert vom 2010-08-03 10:40	
<p><input type="checkbox"/> Wenige Tage nach den ersten Protesten begannen gewaltsame Ausschreitungen vorwiegend ... Tibeter in Lhasa dann auch in anderen Teilen des Landes die sich sowohl gegen chinesische Zivilisten als auch gegen die staatlichen ... und deren Einrichtungen richteten</p>	
16 Treffer von http://de.wikipedia.org/wiki/Tibetische_Uhrufen_2008	
<p><input type="checkbox"/> Wenige Tage nach den ersten Protesten begannen gewaltsame Ausschreitungen vorwiegend ... Tibeter in Lhasa dann auch in anderen Teilen des Landes die sich sowohl gegen chinesische Zivilisten als auch gegen die staatlichen ... und deren Einrichtungen richteten</p>	
14 Treffer von http://forum.gaming-universe.de/index.php?showtopic=14315&mode=threaded	
<p><input type="checkbox"/> März meldete zu diesem Vorfall die amtliche Nachrichtenagentur Xinhua unter Berufung auf Polizeiquellen beim Einsatz seien vier Demonstranten durch Schüsse verletzt worden</p>	
7 Treffer von http://www.mogelpower.de/forum/thread.php?thread_id=233840	
<p><input type="checkbox"/> Ausländische Webseiten werden in China in der Regel umgehend geblockt wenn sie regierungskritische Inhalte verbreiten</p>	
6 Treffer von http://www.computerwoche.de/nachrichtenarchiv/1858744	
<p><input type="checkbox"/> Wie der heimische Anbieter Baidu unterwerfen sich auch ausländische Unternehmen wie Google einer umstrittenen Selbstzensur in dem sie eigenhändig systemkritische Inhalte aus den Suchergebnissen herausfiltern um in China weiterhin Geschäft machen zu können</p>	
5 Treffer von http://www.adhs-anderswelt.de/index.php?topic=21220.20	

Figure 1.14.: Plagscan reports are not self-explanatory.

2. 19 Euro

1.250 Plagpoints - 125.000 words - 500 Sites.

3. 29 Euro

2.000 Plagpoints - 200.000 words - 800 Sites. .

4. 69 Euro

5.000 Plagpoints - 500.000 words - 2.000 Sites.

Urkund

The screenshot shows the Urkund website's demo page. On the left, there's a sidebar with contact information for various regions:

- Continental Europe:** URKUND France (Tel: +33 970 447 884, Fax: +33 1 73 72 91 75, email: savoirplus@urkund.fr)
- URKUND España:** Tel: +34 902 001 288, Fax: +34 902 001 289, email: conocer@urkund.es
- URKUND Nederland:** Tel: +31 (0)10 3 400 666, info@urkund.eu, www.urkund.eu
- URKUND Belgium:** Tel: +32 (0)2 6118715, info@urkund.be, www.urkund.be
- URKUND Deutschland:** Tel: +49 69 59 603 605, wissen@urkund.de
- URKUND Türkiye:** Etkin Proje Yönetim Dan., Tic. Ltd. Şti., info@urkund.com.tr, Tel: +90 (0)216 325 83 89, Fax: +90 (0)216 340 19 57
- URKUND Polska:** Tel: +48 510 099 134, support@urkund.pl, www.urkund.pl

Central and South America: Grupo Difusión Científica, Av. Emiliano Zapata No. 285 (Eje 7A Sur), Tel: +55 5090 2800, +55 5090 5300

Scandinavia / Others: PrioInfo (HQ), Tel: +46 8 7385200, info@urkund.se, Box 3217, 10364 Stockholm, Sweden

In the center, there's a diagram titled "Transport" showing the flow of data between a "Browser" (Client Objects) and a "Server (.Net Objects)". The "Transport" box contains "XML" and "JSON". Arrows indicate "Serialize" from Client Objects to Transport, "Deserialize" from Transport to Client Objects, and "Serialize" from Transport to Server, with "Deserialize" from Server to Transport.

Text on the right side of the diagram area:

URKUND is the leading system for plagiarism control in the Nordic region. It is designed with user friendliness in mind and is designed to help teachers and examiners. The system helps improve the quality of education by providing pedagogical support in the writing process and to save time otherwise spent on verifying the contents of written assignments.

URKUND can be integrated into external systems, allowing users of a Learning Management System to use URKUND as part of an already familiar environment. The new web service (2011) has all the nuts and bolts to make the interaction between our partners and us both more modern and flexible. The new web service uses completely different technology and we have therefore in connection with the revamp also improved major parts of both the flow and the logic. Among other things, we move away from e-mail as a method of transmitting documents in favour of a REST-based protocol. The new integration service is not an SOAP web service. It uses a REST inspired protocol using XML or JSON over HTTP.

URKUND is already integrated with a number of common Learning Management Systems, such as Moodle, Blackboard, Fronter, SharePoint, PingPong, Vklass and others.

Integration with It's Learning is coming up during 2011.

Figure 1.15.: Urkund Website

Business Promotion

"URKUND was born from the academic world. A team of teachers developed the idea of a web based service that would help them detect and deter plagiarism and URKUND was born in the fall of 2000. The problem of plagiarism received much attention in the media and more and more began realise the scope of the problem and the need of a tool to support the pedagogical work. URKUND continued to grow and develop over the years and came to be recognised as Sweden's foremost anti plagiarism service.

Today, URKUND is present in our neighbouring countries and continental Europe as well as the USA, Asia and the Middle East.

URKUND is a natural part of the educational work of the academic world today. Both faculty and students are aware of the immediate and long term benefits of our system."

["Urkund Business Promotion"\(?\) Urkund](#)

Urkund is the last system in our comparison of partially useful systems. It ranked at the 5th position in the HTW "Plagiarism Detection System Test" 2010. The company is from sweden and started their business in 2000. In this test it ranked high in effectiveness but on the other side it's not easy to use. It has problems in the translation and after the redesign 2008 the usability was going worse. Overall "the navigation is confusing, the layout at times catastrophic with texts overlapping fields, the printed reports could be better, the error messages are cryptic, and the link descriptions are unclear." "Plagiat Team HTW"(?)

Urkund costs

Not stated.

Figure 1.16.: Urkund List view

Resume commercial software systems

Although over the years there are more software detection systems that claim to check text reliable if it's plagiarism or not, but the quality of the systems decreases. A big problem that some of the tested systems offer "ghostwriting".

"In 2008 the systems fared slightly better on the test, but in 2010 many have lost the ability to detect plagiarisms that have been slightly edited - word orders switched, words dropped or added, or synonyms used. The best systems only reached a grade of C-, not quite reaching 70% of the possible points.

The 2010 test included not only short essays in German, but also ones in English and Japanese. Additionally, a usability metric was calculated that took into account aspects

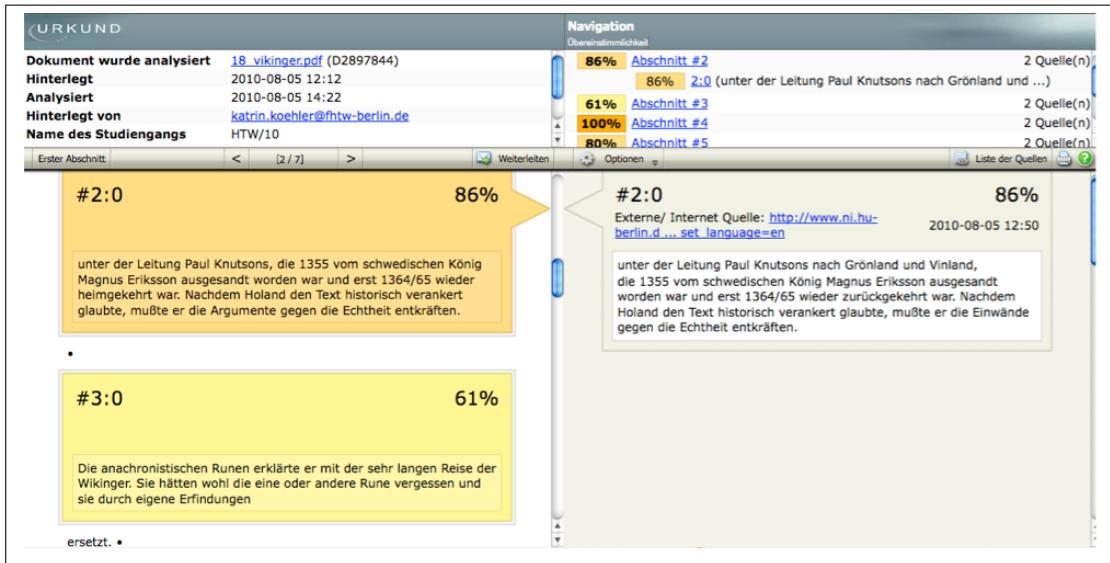


Figure 1.17.: Urkund Report

such as design, language consistency, navigation, print quality of the reports, and how well the system fits into the workflow of a university. A new professionalism metric includes giving a real street address and the name of a contact person; not advertising for paper mills or ghostwriting services; answering the phone during normal business hours and not installing malware on the computer under the guise of installing the detection software.

The systems were categorized as partially useful, barely useful, and useless for university purposes. The best systems with between 60 and 70% effectiveness are PlagAware, Turnitin, Ephorus, PlagScan and Urkund.

Our recommendation: Only use these systems when suspicions of plagiarism arise that cannot be found with 3-5 words in a search machine. The focus should be on teaching students about plagiarism and how to avoid it instead of investing time in using software. Most of the work involved later is in preparing a plagiarism case and dealing with the plagiarist, and for this good documentation is needed. Very few systems provide good documentation.” (plagiats)

1.3.2. Free tools and techniques

simtext Google-Search



Figure 1.18.: Google Search

1.4. Vroni Plag

VroniPlag is a wiki platform which many volunteers, who are ready to give their free time, their money or their books/resources etc. work on. They collaborate with each other in order to detect plagiarism in dissertations or habilitations.

Das VroniPlag Wiki ist ein am 28. Maerz 2011[2] auf Wikia gegrundetes Wiki, das verschiedene Hochschulschriften - hauptsaechlich Dissertationen - untersucht, die unter Plagiatsverdacht geraten sind. Die Untersuchungen fuehrten in mehreren Faellen zur Aberkennung des Doktorgrades. Der Gruender von VroniPlag ist Martin Heidingsfelder. Das ist nicht genau bekannt, da man sich fuer eine Mitarbeit nicht anmelden muss. Es gab am 18.3.2012 6335 Seiten im Wiki, 189 verschiedene Accounts haben schon mal editiert, 21 Leute sind als Admins eingetragen, und es gibt 3 Buerokraten, die Rechte vergeben koennen.

VroniPlag is named after the first case which they published. The case was the one of Veronica Saß.

Because it is a wiki page, which means open to all, every one could join in. If somebody is interested in a public case, he can feel free to edit the page without asking for an allowance. In the chat portal of this community, one could ask for more help or to take a look at the list of waiting fragments.

Before starting detection, there are some information that a collaborator might know.

1.4.1. Plagiarism detection steps

A suspicious case is called *candidate case*. This case is still not public for all. If a user has detected some suspicious part of a dissertation, he/she may first go to Chat portal to indicate his/her suspicion. He/she has also to give at least one original text source as proof for it. If it is well reasoned that there is an existing plagiarism, he/she must see if there are enough collaborators, who are ready to spend their time to work with.

The candidate case has been given an anonymous name and not public until there is proof, that there is at least 10% of the pages, in which plagiarized texts are found. After that the case will be published with the name of the author.

During the detection process, the candidate case will be divided into smaller fragments. The fragments will be checked carefully if there is a plagiarism found. If there is, a report is created which shows in which fragment the plagiarism is found. The original source is also correspondingly given.

After checking, fragment's state is changed to "to be proofed." That means, this fragment must be checked again by a second inspector. The result will be classified in corresponding category (see [VroniPlag's classification of plagiarism](#)).

After all fragments are checked, an overview of detected plagiarism will be generated. The overview includes the following parts:

Part 1:

The whole page numbers with two different colors. The page number includes also a link redirecting to corresponding fragment.

- Grey: page in which there is no plagiarism found or not checked yet.
- Blue: page with plagiarised texts found. The link goes to the plagiarized text in comparison with the source as well.

Part 2:

The second part is a generated barcode label which performs the percent of plagiarism found in one page with different colors.

Haupttext
001 002 003 004 005 006 007 008 009 010 011 012 013 014 015 016 017 018 019 020
021 022 023 024 025 026 027 028 029 030 031 032 033 034 035 036 037 038 039 040
041 042 043 044 045 046 047 048 049 050 051 052 053 054 055 056 057 058 059 060
061 062 063 064 065 066 067 068 069 070 071 072 073 074 075 076 077 078 079 080
081 082 083 084 085 086 087 088 089 090 091 092 093 094 095 096 097 098 099 100
101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120
121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140
141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160
161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180
181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220
221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240
241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260

Figure 1.19.: Source: <http://de.vroniplag.wikia.com/wiki/Lm>, 19/03/2012, 08:53

- Blue: pages which are not calculated in the dissertation such as Index, Appendix, literature list
- Grey: suspiciously plagiarized
- Black: verified that 100% of the page is plagiarized
- Brown: verified that more than 50% of the page is plagiarized
- Red: verified that more than 75% of the page is plagiarized

If there is more than 10% of the whole pages plagiarized, the case will be public on wiki. Then a report will be sent to the university, where the dissertation is finished.

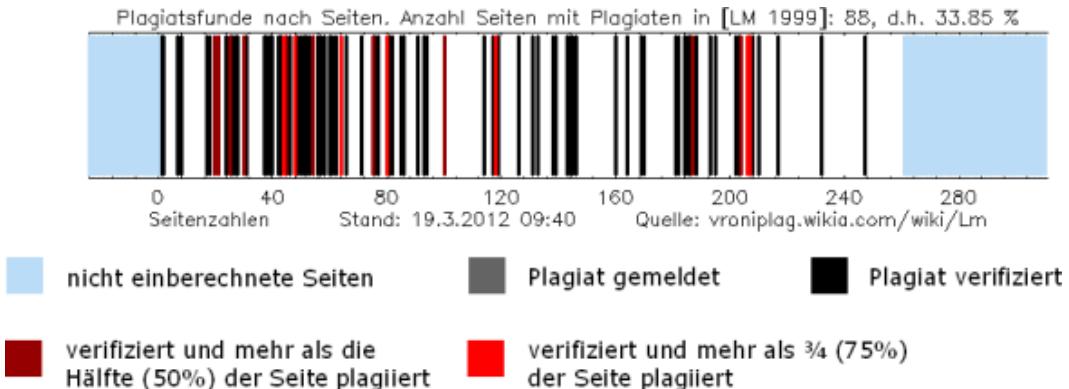


Figure 1.20.: Source: <http://de.vroniplag.wikia.com/wiki/Lm>, 19/03/2012, 08:54

1.4.2. Technical support

Most of the work by VroniPlag is done by hand. For example collaborators could use Google to search for sources, or they borrow books from the library and scan the texts. Generally there is no special software to help detect plagiarism, but collaborator could feel free to choose some of the existing software to help work faster.

1.4.3. Pros & Contras



Figure 1.21.: colors

2. Project Workflow and Requirements

First of all, we've got some kind of confession to make: Unplagged is like a big playground of new workflows and technologies for us, as we are aiming to incorporate “best-practices” wherever possible, or at least what we currently consider to be best-practices.

We believe this approach is necessary, because of the fact, that we are essentially trying to incubate Unplagged as a real open source project and this will only work if it is well crafted and if cutting-edge workflows and technologies are used. Nearly all of the team members are also working in some kind of web related side job, so we all got enough experiences with the problems that can occur during the maintenance of badly designed software.

Most of the times this works pretty well, but sometimes we are still trying to figure out how to get everyone up to speed with every technology and part of the system or how to divide the responsibilities carefully.

To start this project, we opted to use *Scrum*¹ as our agile development approach. If you are familiar with this methodology, you may notice, that there could be a few problems when considering, that the team is working mostly distributed without a common office and with very different time tables for each of the members.

We struggled a bit to tweak the workflow that is required by Scrum to fit the situation we faced, but you will see in the following what we came up with.

¹A nice introduction into Scrum is “The Scrum Primer” of the Scrum Alliance: <http://www.scrumalliance.org/resources/339>

2.1. The Workflow

To make it possible to work efficiently together in this kind of environment, we chose to use [Redmine](#) as our project management tool, which you can access under:

- <http://tickets.unplagged.com>

If you register there, an administrator should grant you access to the tickets and the wiki, so that you can participate in solving the problems at hand.

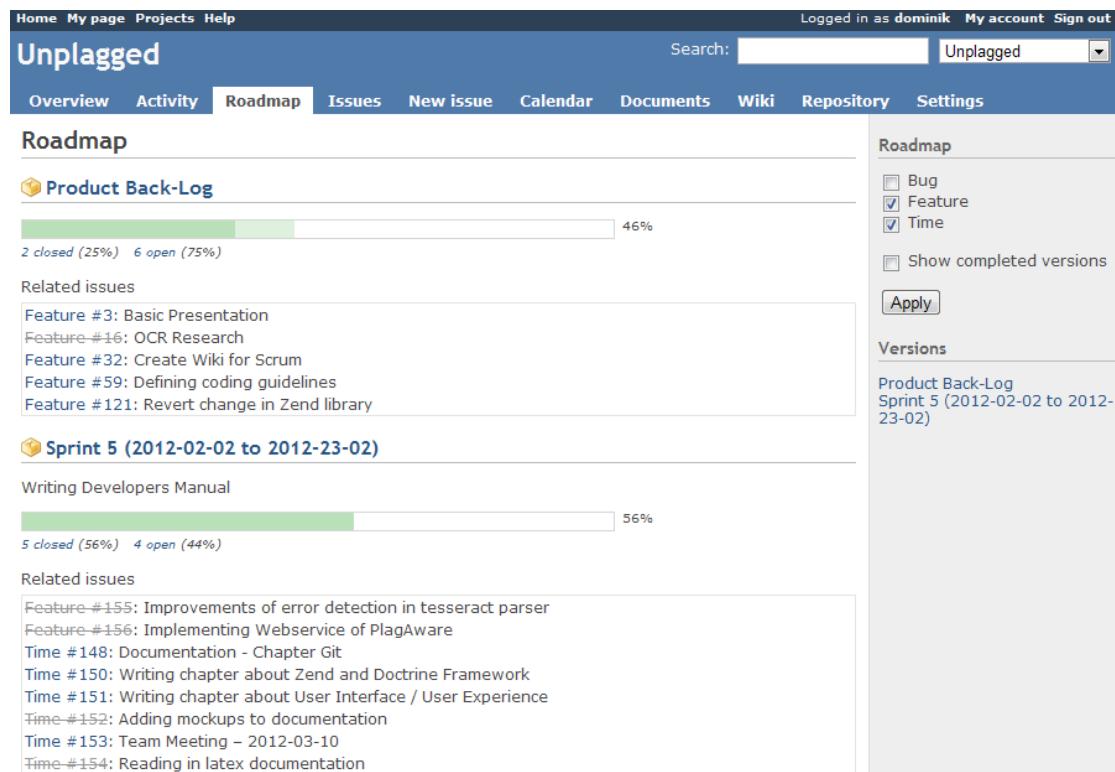


Figure 2.1.: Redmine Roadmap

What we are doing there is to map every *Sprint* and the *Product Backlog* to Redmine's notion of "Version" and every identified *User Story* to an "Issue".

You can see in figure 2.1 the view of the roadmap, with the current sprint 5 designated to create this very document at the bottom and a not very well filled product backlog at

the top.

Normally every identified user story that is not part of the current sprint should be in the product backlog (and we got plenty), but as we were still working in our small group at this point, the hassle of filling in all the tickets seemed unnecessary. This is something that will be fixed in the near future, so that you are able to see where the development is going.

Currently we are working mostly with four week long sprints, to overcome the problem that we are not working fulltime on the tickets, which is something that scrum normally assumes.

To have a nice statistical overview and more planning security for the “scrums”, it is required to log the time that was spent on an issue within redmine.

2.1.1. Product Owner — “The Debbie Meetings”



Figure 2.2.: Scrum Meeting

To figure out the user stories we mostly rely on what we internally call “Debbie Meetings”. Normally at the end of every sprint, the members of the team meet with Prof. Weber-Wulff, who we state to be our *Product Owner*. We simply sit down there and talk about

what should be implemented in the next sprint and collect it on cards as you can see in figure 2.3.

We consider this to be just a temporary way of handling this, because we hope that when we eventually have a prototype that we consider to have enough “business value” to be shown to more people, the focus will shift away from Prof. Weber-Wulff to a more broader understanding of the product owner.

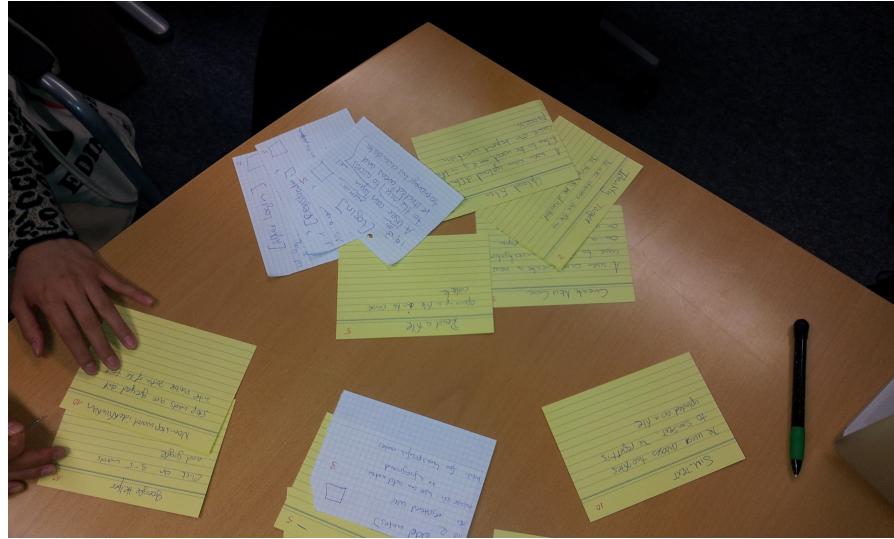


Figure 2.3.: User Stories

This means, that we want to open up our ticket system to directly collect new user stories and gather feedback for example from the VroniPlag group, which can be reached through their IRC channel #VroniPlag on:

- <http://webchat.freenode.net/>

2.1.2. Team Meetings

The Unplugged version of the *Daily Scrum* is currently a weekly meeting.

2.2. Target Group

2.3. User roles

As the Unplagged system will provide a permission based user system, our goal is to make it possible, to create custom user roles from an administration area and make it possible for users to have multiple user roles in one case and also different roles for different cases. The standard roles which will be provided by the system are:

Guest A user without a valid login can only see the parts of cases that are set to be public.

Registered Registered users can get “promoted” to higher roles and contribute to publicly editable cases.

Collaborator Collaborators are registered users who were granted access to a specific case. Collaborators can access and edit these projects.

Case-Manager Case-Managers can set up new cases and manage collaborators for their cases and project versions. They may have the permission to add or remove project members.

Admin An admin owns all permissions, such as user administration or project administration. They also have the ability to block/unblock an existing case.

2.4. Basic functionalities

2.5. Document Parser

2.6. Detection Modes

2.7. Plugin Architecture

2.8. Use Cases

3. Developing Unplagged

Coming from the [Project Workflow and Requirements](#) here we have yet another set of requirements, before we can start with the actual description of the way you can help us develop the system. This time it's about what we believe will be helpful or sometimes even necessary prerequisites.

First of all, the programming languages mostly used in Unplagged are PHP and JavaScript, both of which in conjunction with a framework. Teaching programming languages is, as you probably can imagine, well beyond the scope of this document, but we will at least try to cover the most important concepts of the frameworks as they occur.

The used frameworks are [jQuery](#) for Javascript and [ZEND](#) for PHP respectively. jQuery is kind of the industry standard for unobtrusive scripting with about 50% of the Top 10.000 websites using it according to [?](#) and the Zend framework is also well established and brings a lot of features, that are useful to this project.

For most of the other topics, we will give you some (hopefully) helpful resources on the way, if it isn't covered thoroughly by us. But just to let you know, here is a list of the buzzwords, err technologies that will be mentioned:

- HTML5 and CSS3
- Continuous Integration
- Responsive Webdesign
- Progressive Enhancement

- Git, Netbeans, Redmine
- Tesseract, Imagemagick, Simtext

As said before, the system is developed, so that it should work on multiple platforms. This makes it sometimes difficult to describe certain installation processes in a way that would work for everybody. As it's often most problematic, to get some Linux software running on Windows, we will mostly concentrate on the way those things are done on this platform and give the instructions for other operating systems as an aside if necessary.

3.1. Development Environment

The following section will mostly focus on the way you can get a development version of Unplagged up and running on your system.

3.1.1. Git

The source code and files of all parts of the Unplagged project are managed through Git, with the repository hosted at [Github](#). Git is a distributed version control system, that exists since 2005 and gained more and more track in recent years. Many developers prefer it over other version control systems, because it is much easier to create different branches and merge them again or simply initialize local repositories. This made it also interesting for us to use it for Unplagged.

However, none of the team members had ever used Git before in a bigger context so it was a challenge to get it running on all the systems. But we took it, to explore all the features Git offers.

Installing Git Bash

First of all let's find out, how to install the Git console application, called Git Bash. Unfortunately all the GUIs we were evaluating didn't work consistently, so we decided to use it from the command line only. A very good instruction on how to install the Git Bash can be found on the website of the github project:

Windows: <http://help.github.com/win-set-up-git/>

Linux: <http://help.github.com/linux-set-up-git/>

Mac OS X: <http://help.github.com/mac-set-up-git/>

Getting the source code of the unplagged project

Now it is time to get the project source code on your machine. As said before, the whole unplagged project is hosted on github, so if you want to be able to contribute source code later on, you first need to create an account there:

- <https://github.com>

This isn't necessary, if you simply want to look into the source code, which can be accessed via the repository URL:

- <https://github.com/benoertel/unplagged>

If you haven't been granted write access to the above mentioned repository by a project member (which is very likely when you are reading this document for the first time), you will need to do a fork of the Unplagged project right at github, like described in:

- <http://help.github.com/fork-a-repo/>

After this, the following steps are mostly the same for everybody, with the distinction of the project URIs, which should be the one of your newly created fork.

Open up the Git Bash and switch to the directory where you want the project to be located and clone the repository as you can see in listing 3.1.

Listing 3.1: Cloning a repository

```
1 cd Sites/unplagged.local  
2 git clone  
    https://<username>@github.com/benoertel/unplagged.git
```

After this you should have a local copy of all the repository data in the specified directory.

The most important git commands

You are now ready to use Git! Here are some more instructions on the most important commands and how to properly use it. However, if the given instructions in this manual are not enough, feel free to checkout the whole Git manual on:

- <http://schacon.github.com/git/user-manual.html>

The Unplagged project consists of several branches, which are used to develop and store code independently of the other developers. Once a new feature is done, it is merged into the master branch. The master branch usually includes only fully tested and deployable source code.

As a new developer, it is important to create an own branch before doing anything else and switch to it.

Listing 3.2: Creating branches

```
1 git branch mynewfeature  
2 git checkout mynewfeature
```

Now anything in the repository can be changed. At any point changes can be versioned in the repository by using the `git commit` command. If new files were created, `git add` has to be executed as well.

Listing 3.3: Adding all new files and committing

```
1 git add .
2 git commit -m "A message that describes the changes."
```

When the feature is fully working and approved, it has to be merged back to the master branch, in order to get deployed to the staging environment. To do this, the master branch has to be checked out, updated with `git pull` and then all changes have to be merged from the new feature into the master branch. The feature branch can then be removed.

Listing 3.4: Merging branch into master

```
1 git checkout master
2 git pull
3 git merge mynewfeature
4 git branch -d mynewfeature
```

In comparison to Subversion for example, Git has one more step to really write back to the remote source repository. After a `git commit`, a `git push` has to be executed, each push can include multiple commits.

Listing 3.5: Pushing to the server

```
1 git push origin master
```

This is nearly it, the changes to the repository have been pushed to the master branch. The only thing, that probably has to be done now, is to open up a pull request on github, if you developed on your own fork of the project. This means, that you are asking the project members who have access to the “real” Unplugged github account, to integrate your changes into the actual project sources. A nice description of how this process is done can be found at github again:

- <http://help.github.com/send-pull-requests/>

Handling conflicts in merging process

It is possible, if two developers were working on the same part of a file, that a conflict is found during the merge. Such a conflict could look like this:

Listing 3.6: Merge conflict

```

1 CONFLICT (content): Merge conflict in readme.txt
2
3 To https://github.com/benoertel/unplagged.git
4 ! [rejected]          master -> master (non-fast-forward)
5 error: failed to push some refs to 'https://github.com/
       benoertel/unplagged.git'
6 To prevent you from losing history, non-fast-forward updates
   were rejected
7 Merge the remote changes (e.g. 'git pull') before pushing
   again. See the
8 'Note about fast-forwards' section of 'git push --help' for
   details.
9
10 # Unmerged paths:
11 #   (use "git add/rm <file>..." as appropriate to mark
12 #     resolution)
13 #   both modified:      readme.txt
14 #

```

To resolve the issues, open the files listed in the error message, in this case *readme.txt* and decide how the correct version should look like, by removing or changing all the “< < < < < < HEAD” and “> > > > > > b478801d68267ef479acc5ca54544634c52c545c” parts accordingly or using a dedicated merge tool, that is able to show you the changes that were made

Here is an example of how this process would work:

Listing 3.7: Conflicted file

```
1 <<<<< HEAD
2 The goal of this project is the creation of an easy-to-use,
   web-based
3 system to document and detect plagiarism in scientific papers.
4
5 hello world
6 =====
7
8 The goal of this project is the creation of an easy-to-use,
   web-based
9 system to document and detect plagiarism in scientific papers.
10
11 >>>>> b478801d68267ef479acc5ca54544634c52c545c
12 Just a change for educational purposes.
```

It could look like this after merging:

Listing 3.8: Fixed conflict after merging

```
1 The goal of this project is the creation of an easy-to-use,
   web-based
2 system to document and detect plagiarism in scientific papers.
3
4 hello world
5
6 Just a change for educational purposes.
```

3.1.2. Local Deployment

This subsection will describe how to configure a virtual host properly. A virtual host is a domain that is mapped to the local web server. It is assumed that Apache, MySQL and PHP are already running on the machine. If not, here are some tutorial to get them all running:

Windows:

<http://www.apachefriends.org/de/xampp-windows.html#1098>

Mac OS:

<http://www.djangoproject.com/blog/2011/07/24/installation-of-mysql-server-on-mac-os-x-lion/>

<http://www.quarkstar.at/index.php/2009/05/18/webserver-aktivieren-und-konfigurieren-in-mac-os-x/>

Most Linux distributions should already have this kind of server stack installed.

The main goal to make the system run, is to create a local domain and add the virtual host from listing 3.12 to the vhost config.

In Max OS X this can be done via the command line:

Listing 3.9: Mac OS X: Creating virtual host

```
1 sudo vi /private/etc/hosts
2 #add the following line:
3 "127.0.0.1 unplagged.local"
4
5 sudo vi /private/etc/apache2/extr/httpd-vhosts.conf
```

On Windows you need to open up your *hosts* file, which is mostly located in *C:\WINDOWS\system32\drivers\etc\hosts*, and add the following line on the bottom:

Listing 3.10: New host declaration

```
1 127.0.0.1 unplagged.local
```

Now you need to open your apache configuration file *C:\xampp\apache\conf\httpd.conf* and remove the hash symbol(uncomment) from the following line

Listing 3.11: httpd.conf

```
1 #Include conf/extr/httpd-vhosts.conf
```

Add the following configuration to the httpd-vhosts.conf file you just included:

Listing 3.12: Apache configuration

```
1 <VirtualHost *:80>
2   ServerName unplagged.local
3   DocumentRoot "/Users/me/Sites/unplagged.local/public"
4   SetEnv APPLICATION_ENV "development"
5
6   <Directory "/Users/benjamin/Sites/unplagged.local/public">
7     Options +Indexes +FollowSymLinks +ExecCGI
8     DirectoryIndex index.php
9     AllowOverride All
10    Order allow,deny
11    Allow from all
12  </Directory>
13 </VirtualHost>
```

You can tryout your new configuration by entering *unplagged.local* in your browser.

3.1.3. Netbeans

Configuring Tests

Documentation

Unplagged uses [?](#) for the generation of a HTML page of all the source code documentation comments, because of it's superior and much more beautiful user interface in comparison to the older [?](#).

Sadly the automatic generation is not yet supported by Netbeans, but as it will be soon(?), we are currently only generating this server-side as described in section [3.1.5](#).

This section will be enhanced, when the Netbeans user interface becomes available. If you are interested, you could install the software for yourself and use it over the command line.

3.1.4. Additional Software

As we currently have no installer or script that checks for installed software, you still have to install some additional dependencies to make some parts of the system work. Those are mainly command line tools that we use for the optical character recognition or text comparison.

Most of the times the software wouldn't break completely if those dependencies were not installed, but some parts would silently fail, which is of course one of the more annoying problems to debug.

Tesseract

Tesseract is an open source OCR¹ software, that is currently used to "figure out" texts from scanned images a user can upload.

The big idea is to build the system in a way that enables users to plugin their favourite OCR system, but to have one default system that produces satisfying results.

You can download the latest installation files under:

- <http://code.google.com/p/tesseract-ocr/downloads/list>

After installing Tesseract, the easiest way to make it work with Unplagged, is to put it on your systems execution path, so that it could be called from the command line in any directory.

If for some reason you don't want to do this, you can also change the following line in /application/configs/application.ini to the path where you installed Tesseract to:

Listing 3.13: Tesseract executable path

¹Optical character recognition

```
1 parser.tesseractPath = 'tesseract'
```

You should be able to click the “parse” icon on files now:

Dateiname	Hochgeladen	Aktionen
crockford_gray.png	2012-01-18	
haunschild_black_and_white.png	2012-01-18	
bachelor_gray.jpeg	2012-01-18	
typography_color.png	2012-02-01	
bachelor_color.tiff	2012-02-01	
typography.tiff	2012-02-01	
crockford_gray.png	2012-02-01	
bachelor_color.tiff	2012-02-01	
crockford_gray.png	2012-02-01	
typography_color.png	2012-02-01	
haunschild_gray.png	2012-02-01	

Figure 3.1.: Parsing Files with Tesseract

Imagemagick

Simtext

Simtext is a text comparison tool, that is able to output nice data of the differences between texts. In figure 3.2 for example, you can see the default side-by-side comparison and in figure 3.3, the output in *diff* format is shown.

```
ca. Command Prompt

F:\projects\unplagged\unplagged\library\SIM\bin>sim_c ../READ.ME ../READ_ME
File ./READ.ME: 268 tokens
File ./READ_ME: 397 tokens
Total: 665 tokens

./READ.ME: line 3-8 [72]
# $Id: READ.ME,v 2.9 2008/09/23 09:07:
These programs test for similar (or eq
files and can be used to detect common
Checkers are available for C, Java, Pa
natural text.

./READ.ME: line 27-34
Dick Grune
Vrije Universiteit
de Boelelaan 1081
1081 HV Amsterdam
the Netherlands
email: dick@cs.vu.nl
ftp://ftp.cs.vu.nl/pub/dick
http://www.cs.vu.nl/~dick

./READ_ME: line 44-51 [49]
Dick Grune
Vrije Universiteit
de Boelelaan 1081
1081 HV Amsterdam
the Netherlands
email: dick@cs.vu.nl
ftp://ftp.cs.vu.nl/pub/dick
http://www.cs.vu.nl/~dick

./READ.ME: line 1-3 [25]
# This file is part of the software si
# Written by Dick Grune, Vrije Univers
# $Id: READ.ME,v 2.9 2008/09/23 09:07:
# $Id: READ_ME,v 2.7 2008/09/23 09:07:

F:\projects\unplagged\unplagged\library\SIM\bin>
```

Figure 3.2.: Default Simtext output

Figure 3.3.: Simtext output in diff format

Installing Simtext can sadly be a bit tricky, because only the sources and no executables(at least none that worked for us) are distributed. We already provided a Windows 64bit EXE and an executable that runs on our Ubuntu staging environment in `/library/SIM/bin`, but if you use any other environment, you will have to compile the C sources of the system for yourself. The sources can be found here:

- http://dickgrune.com/Programs/similarity_tester/

We assume, that Linux users will be familiar with the installation steps that are described in the readme file. The only thing that can be easily overlooked there is the necessity to install *Flex* first. Windows however needs some special treatment to make the compilation work:

1. Download and install “Make for Windows” from <http://gnuwin32.sourceforge.net/packages/make.htm> and “Flex for Windows” from <http://gnuwin32.sourceforge.net/packages/flex.htm>

2. Add the folder of the binaries to the path (should be something like C :)

```
Program Files (x86)  
GnuWin32  
bin)
```

3. Rename “flex.exe” to “lex.exe”

4. Unzip and open Simtext directory on the command line and type:

Listing 3.14: Installing and checking simtext

```
1 >make  
2 >sim_c --help  
3 >sim_c READ.ME READ_ME
```

3.1.5. Continuous Integration

To always have a running version of the latest code, we use an automated workflow, that always deploys everything that has been pushed to the Github repository on the Unplagged staging server. The machine this is done with, is a simple Ubuntu web server, that is also used for hosting our collaboration tools and the webpage.

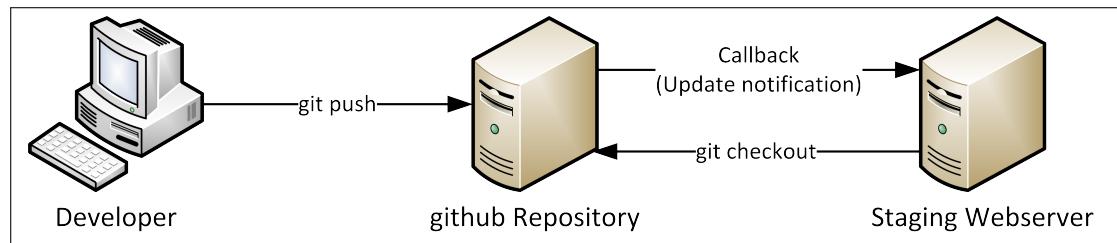


Figure 3.4.: Deployment workflow

As you can see in figure 3.4 the mechanism used for this is a callback, the *post-receive hook* of git, which github employs to let it's users enter a *post-receive URL* to call a URL after someone has pushed to the repository. The URL that gets called is located on our staging server and gets answered by a Redmine plugin called “redmine_github_hook”,

that would normally only call a checkout on the server-side repository, so that the newest sources can be seen via the Redmine web frontend.

Listing 3.15: Changes to redmine.github_hook.rb

```
1 # Fetches updates from the remote repository
2 def update_repository(repository)
3   command = git_command('fetch origin', repository)
4   if exec(command)
5     command = git_command("fetch origin '+refs/heads/*:refs/
6       heads/*'", repository)
7     exec(command)
8   end
9   #custom checkout to preview area
10  system('sh /usr/local/etc/scripts/buildUnplaggedPreview.sh
11    ')
12 end
13 end
```

However, we tweaked the source code of this plugin slightly, as you can see on line 9 in listing 3.15 so that it also calls the below bash script(listing 3.16) to initiate the deployment process.

Listing 3.16: Deployment script

```
1#!/bin/bash
2
3 cd /var/git/unplagged.git/
4 GIT_WORK_TREE=/var/www/preview.unplagged.com git checkout -f
5
6 cd /var/www/preview.unplagged.com
7 #generate phpdoc
8 apigen -s application/ -s library/Unplagged/ -d docs/phpdoc --
9   title "Unplagged Documentation" --todo yes
10
11 #run database build scripts
12 cd scripts/build
13 php initdirectories.php
14 php doctrine_staging.php
```

```
15 cd /var/www  
16 chown www-data:www-data preview.unplagged.com
```

The bash script is then used to do a “clean checkout”(without hidden .git folders) of the repository and to run “Apigen”, an engine to process the PHPDoc comments inside the project. Those two things can be accessed by the already prepared vHosts on the server:

- <http://preview.unplagged.com/>
- <http://phpdoc.unplagged.com/>

If you would like to get access to the preview areas, you need to obtain the password and username from a team member.

Possible Improvements

The above described workflow is, as we believe, already on a good way, but it still has a lot of room for improvement. First of all, it would be nice to only let the deployment go through, if the unit tests ran successfully on the server and to have some sort of email notification mechanism if this wasn’t the case.

Another improvement would also be to have a separation into a staging environment with the newest commits and an actual preview environment, that can be deployed to a known stable state/commit of the system in a simple manner.

3.2. User Interface / User Experience

This chapter will explain the progress and development of the user interface of our project. As we tried to follow the typical project workflow, we first drew a lot of mockups in the beginning, which represented the main features of Unplagged. At first the wireframes, or

also called mockups were drawn by hand, before we digitalized them. As an example the mockups of the 'new case' page are shown below. All the other mockups can be found in the appendix.

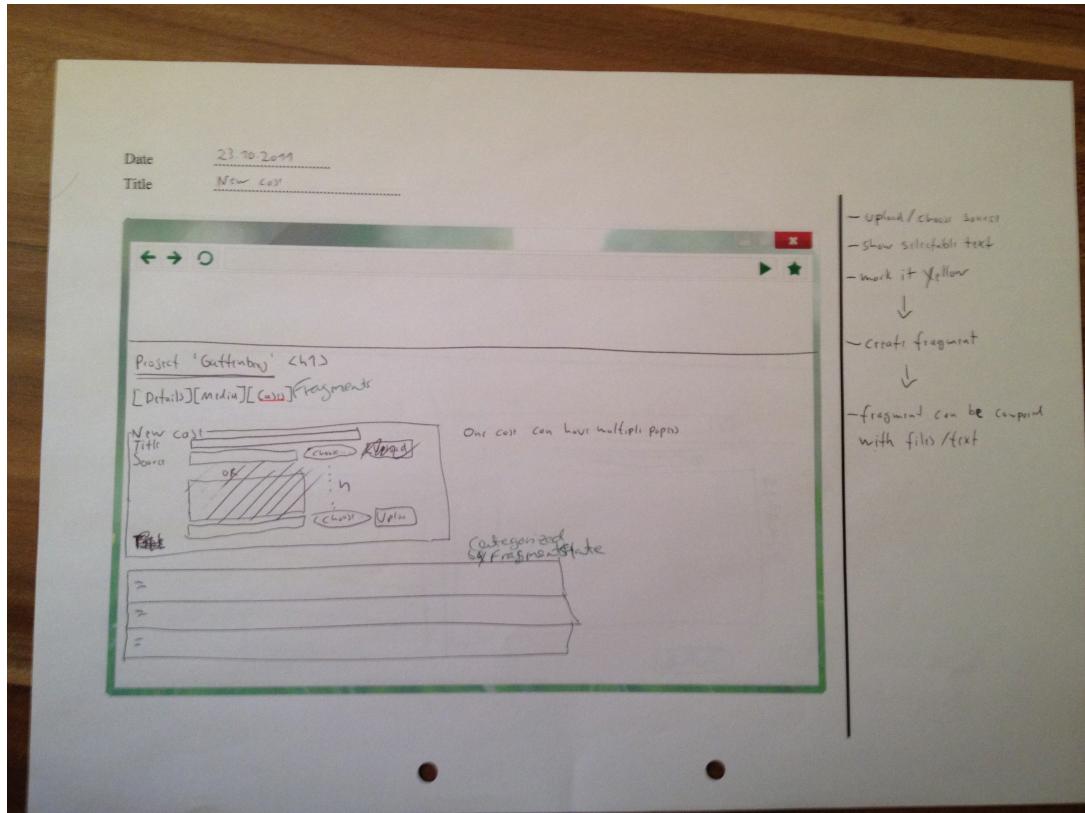


Figure 3.5.: Mockup – New case – hand-drawn

After we had a basic idea how the main interface should be structured, we created a first screen in Photoshop. Therefore we got several helpful suggestions from the website PremiumPixels: <http://www.premiumpixels.com/>.

The next step, before the HTML template got created, we defined the key features, our user interface should take care of:

- Responsive Layout – optimized layouts for different devices
- Cross-Browser-Compatibility

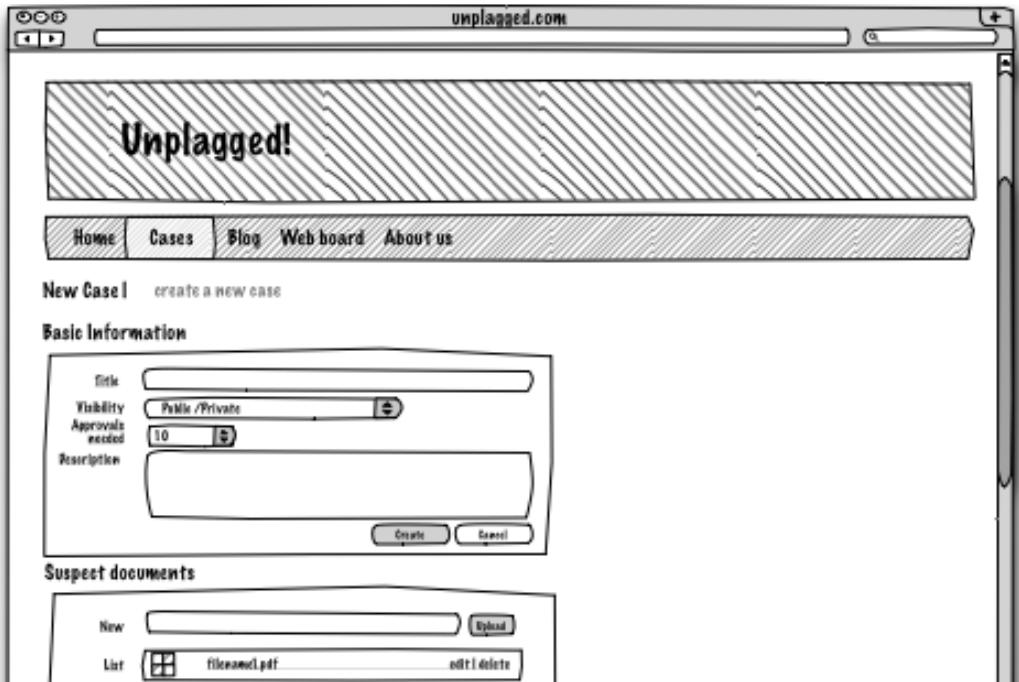


Figure 3.6.: Mockup – New case – digitalized

- Light-weight and w3c-conform XML Markup
- Progressive enhancement with CSS3 – CSS instead of images where possible

3.2.1. Responsive Layout using CSS3 Media Queries

Since the worldwide amount of smartphones and tablets is growing very fast, website developers should optimize for these devices as well. And so do we. Some functionality as uploading a file, doesn't work on iOS at all, but at least all functions that are working on mobile devices, should work. So the goal is creating a user interface that uses the same markup, but displays differently on different devices. Therefore CSS media queries can be used, these are basically conditions that execute a part of CSS only if the condition is true. The most prominent conditions are the following:

Listing 3.17: CSS Media Queries

```
1 max-width: 600px # max browser width 600px
```

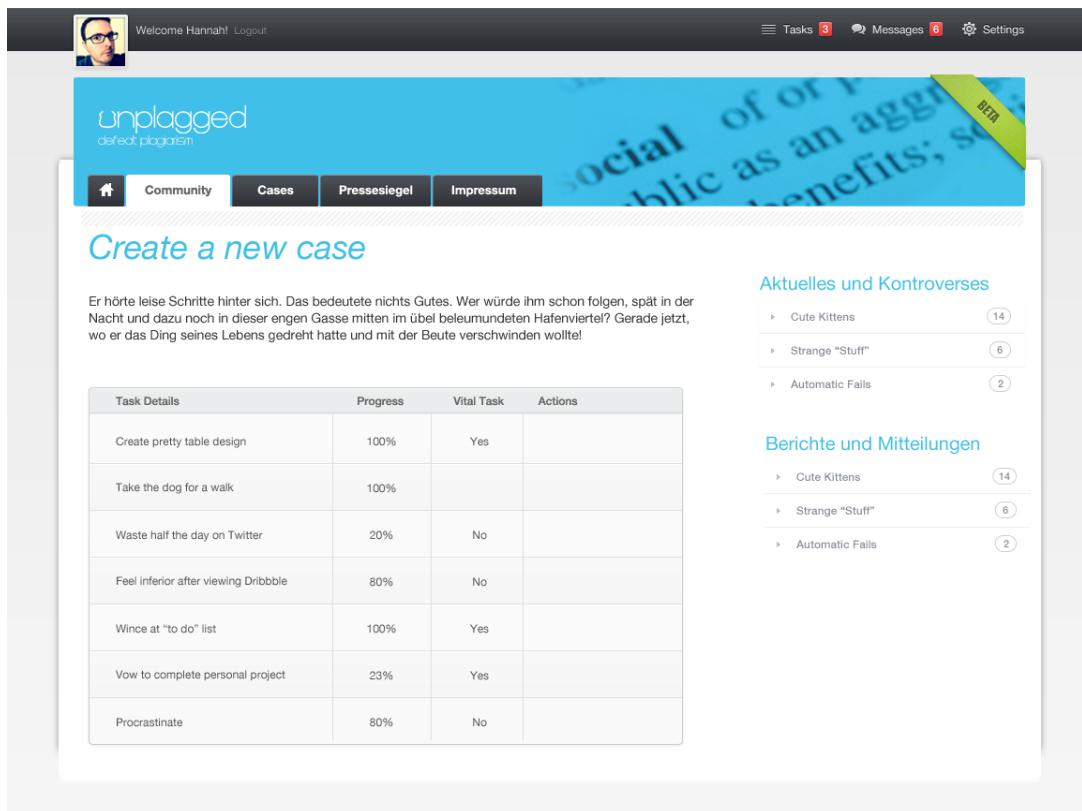


Figure 3.7.: Initial Screen PSD

```
2 min-width: 300px # min browser width 300px
3 orientation:landscape # current orientation landscape mode
4 orientation:portrait # current orientation portrait mode
5 -webkit-min-device-pixel-ratio: 2 # min pixel ration (iPhone
   4, Retina)
```

These media queries can be combined in any order to display an optimized page for each device. Since only the CSS changes, the HTML does not have to be touched. An example query looks like this:

Das entsprechende CSS Media Query sieht wie folgt aus:

Listing 3.18: CSS Media Query

```
1 @media only screen and (max-width: 600px) { }
```

Media queries are a new feature of modern browsers, except IE9. Though, this isn't a problem, because browsers that don't support them, just display the default css for desktop browsers.

3.2.2. Javascript and fallbacks

Even though many websites require Javascript as mandatory for using the whole functionality range of the page, it is important to provide as much functionality as possible, when Javascript is turned off. A short example will show how to implement a pagination with and without Javascript.

Usually when Javascript is disabled, the whole page will be reloaded, when the user changes to another page of the paginated content. The URL in this case will look something like this: <http://unplugged.local/document/list/page/2>. When Javascript is enabled, it is much faster to only refresh the area of the page, that really needs to reload, in this case the table with the content of the next page. It is only possible to change the hash of an URL, the part after the hash key (#), using Javascript, the changed URL will be: <http://unplugged.local/document/list/#page/2>. An event called 'hashchange' can

trigger a change of this part of the url and then reload the content through an AJAX request.

The pagination has the same HTML markup with and without Javascript, but with Javascript enabled it is much more convenient.

Listing 3.19: Javascript Pagination

```
1 $(".pagination a").live("click", function() {
2     var href = $(this).attr("href");
3     if(href) {
4         var substr = href.split('/');
5         var hash = substr.substr.length-2] + "/" + substr[
6             substr.length-1];
7         window.location.hash = hash;
8     }
9     return false;
10 });
11
12 $(window).bind('hashchange', function(){
13     var newHash = window.location.hash.substring(1);
14
15     if (newHash) {
16         var substr = newHash.split('/');
17         var hash = substr.substr.length-2] + "/" + substr[
18             substr.length-1];
19
20         var url = window.location.pathname;
21         if(url.charAt(url.length-1) != '/') {
22             url += '/';
23         }
24         url += hash;
25         $("#main-wrapper").load(url + " #main");
26     };
27 });
```

3.3. Frameworks

When we first discussed which programming language and frameworks, the Unplagged project should be built on, we figured out, that everyone was familiar with PHP. Since programming in a group requires a much better structure, than programming on your own, we needed a framework that requires a comfortable Model-View-Controller structure, we decided to use the Zend Framework. And to get rid of all the database issues as well as getting a flexibility in the used database system, we decided to use an Object-Relational-Mapping framework, called Doctrine. What an ORM is, will be discussed later on.

3.3.1. Zend Framework

The Zend Framework is a typical PHP Framework using the Model-View-Controller pattern. Due to it's pre-defined directory structure, it is easy to get well seperated code.

The directories and their meaning:

- application — includes controller, models and view
- data — currently only includes i18n stuff (language stuff)
- docs — PHP Documentation and Developers Manual
- library — extrnal and internal frameworks and extension to the Zend framework
- public — files that are accessible directly through the browser
- scripts — build scripts, deploying scripts
- temp — data that is overridden at any deployment

- tests — PHP Unit tests

The Zend framework offers REST-ful URLs that follow a fixed pattern: unplugged.local/controller/action/key/value/key2/value2. Each controller is defined as ControllerName-Controller.php in the application/controllers directory and includes all possible actions. For example a file controller will look like this:

Listing 3.20: Persisting an object to the database in Doctrine

```

1 class FileController extends Zend_Controller_Action{
2     public function init() {
3     }
4
5     public function indexAction() {
6     }
7
8     public function uploadAction() {
9     }
10
11    public function listAction() {
12    }
13
14    public function downloadAction() {
15    }
16 }
```

By default, if no action is defined, the indexAction is called. For each action the appropriate view is by default rendered in the application/views/scripts/controllerName/actionName.phtml file.

The models directory includes all the objects, this will be discussed in more detail in the following chapter about Doctrine.

3.3.2. Doctrine

The whole database connection management of Unplagged is implemented using the Doctrine Framework in version 2. It consists of two layers, a database abstraction layer (DBAL) and an object relational mapping framework (ORM). The DBAL uses PDO, a PHP framework for encapsulating database statements. The DBAL manages the communication with any kind of SQL database and offers an own query syntax. This has the advantage, that the database behind the framework can be changed from MySQL, to OracleSQL, PostgreSQL or SQLite at any time. The DBAL is the agent between PDO and the ORM. The ORM is the connection between PHP objects and the DBAL.

Before the use of Doctrine is described, it will be explained, how the database on a new machine can be created and how the database structure can be updated, whenever something changed in the structure. Actually this is very easy, it is required to have a local my sql database at this point having 'root' as a username, no password and a database called 'unplagged'. It is also possible to create a new configuration in the application/configs/application.ini file, although this step will not be described in this chapter. If the database is created, the build script can be executed:

Listing 3.21: Updating database structure

```
1 php unplagged.local/scripts/build/doctrine.php
```

Now, the database is created or updated. If the database already existed, the data in it will not be removed! As described below, the big advantage of ORM is, that the programmer can stay in the PHP object context at any time. The only thing that has to be done additionally, is adding comments to the member variables of a class, that define the fields in the database:

Listing 3.22: Defining a class in Doctrine

```
1 /** @Entity */
2 class UserClass
3 {
4 /** @Column(type="integer") */
5 private $id;
6 /** @Column(length=30) */
```

```
7 private $username;  
8 }
```

The whole syntax documentation of doctrine can be found here: <http://docs.doctrine-project.org/projects/doctrine-orm/en/latest/index.html>

To persist a new object to the database, the persist method on this object has to be called, this writes the object into the doctrine cache. It stays in the cache, until the flush method is called, which actually executes all the previous operation since the last flush. These can be deleting, updating, or editing an object.

Listing 3.23: Persisting an object to the database in Doctrine

```
1 $user = new User();  
2 $user->setUsername('Max');  
3 $em->persist($user);  
4 $em->flush();
```

As the previous examples show, no database programming is necessary to create or persist a new object to the database, everything can be done in the PHP object context.

3.4. Architectural Goals

3.4.1. Progressive Enhancement

3.4.2. Test Driven Development

4. Summary and Outlook

During our first project semester, we already immersed into the field of plagiarism detection very deeply. After we read about existing websites and talked to Prof. Dr. Weber-Wulff about her experience and missing features at VroniPlag, we defined our list of requirements. In the next step we developed first user interface mockups and a basic layout, before we started the development of some requirements.

The application of a modified version of Scrum as our agile software development method was a very interesting and new experience to all of us. With the use of Redmine for keeping track of all issues, repository changes and time logs, everyone in the team was at anytime able to take a look on the current project state.

All in all the conditions for a successful development were allocated properly and we already have implemented many features of the requirements list, that can be improved in the next semester.

Though the employed development processes in this semester were not as consistent as they should have been. The in theory defined rules, how to program and how to test source code properly, were not always applied. So one of the main goals for the second semester is to improve this process. We need to focus on test driven development and to increase our velocity during the sprints, in order to get stable code more easily.

Another issue we need to work on is the staging environment we are using. Some features behave differently on Mac OS and Windows machines. Since we have only one staging environment, which updates on every commit to our git repository, it sometimes happens that a feature working on Windows crashes the staging environment. As a solution we should setup a second pre-staging environment which updates at every commit to the

repository automatically and another more stable server, which gets updated manually as soon as the pre-staing environment is testet properly.

The documentation of our work, which is represented in this developers manual was done in the end of the semester. In the next semester we are planning to extend and keep the manual up to date at every sprint, which means less time for documentation in the end and preferably more time for development.

A. Minutes

B. Logged Time As Of March 11, 2012

The following tables are some example reports generated from the logged time in Redmine. To find the most recent version of these reports or to generate custom data analysis you can use the “Report” tool found in Redmine on the “Overview” page.

Table B.1.: Overview By Member and Month

Member	2011-10	2011-11	2011-12	2012-1	2012-2	2012-3	Total
Dominik Horb	27.30	10.00	55.75	51.00	28.00	16.80	188.85
Benjamin Oertel	34.00	29.00	19.00	57.50	4.50	29.00	173.00
Elsa Mahari	9.50	10.00	23.50	14.50	7.00		64.50
Tien Nguyen	1.00	24.00	13.00	12.00			50.00
Heiko Stammel	16.00	28.00	13.50	11.00			68.50
Total	91.30	101.00	124.75	146.00	39.50	45.80	548.35

Table B.2.: Overview By Member and Issue

Issue	Member	Total
none		18.30
Feature #1: Trac aufsetzen	Dominik Horb	2.00
Feature #5: Create Wiki List of Interesting Plagiarism Papers	Dominik Horb	1.00
Feature #6: Logo	Dominik Horb	1.00
Feature #8: Configure Email Notification in Trac	Benjamin Oertel Elsa Mähari	8.00
Feature #9: Github in Trac integrieren	Dominik Horb	1.50
Bug #11: Umstellung von Trac auf Redmine	Dominik Horb	1.00
Bug #12: Zeitmanagement in Trac integrieren	Dominik Horb	3.50
Bug #13: Initialize basics in wiki and issues	Dominik Horb	4.80
Bug #14: Setup Github in Redmine	Dominik Horb	1.00
	Dominik Horb	2.50
	Dominik Horb	2.50

Table B.2.: Overview By Member and Issue

Issue	Member	Total
Bug #15: Fremde Federn finden	Dominik Horb	3.00
Feature #16: OCR Research	Dominik Horb	3.50
Feature #20: Create Wiki Page for UserRoles	Dominik Horb	3.50
Time #21: Meeting 24.10.11	Tien Nguyen	1.00
	Dominik Horb	12.50
	Benjamin Oertel	2.50
	Elsa Mahari	2.50
	Tien Nguyen	2.50
	Heiko Stammel	2.50
Time #22: Meeting 17.10.11		10.00
	Dominik Horb	2.00
	Benjamin Oertel	2.00
	Elsa Mahari	2.00
	Tien Nguyen	2.00
	Heiko Stammel	2.00
Time #23: Meeting 10.10.11		10.00
	Dominik Horb	2.00
	Benjamin Oertel	2.00
	Elsa Mahari	2.00

Table B.2.: Overview By Member and Issue

Issue	Member	Total
Time #24: Debbie-Meeting 18.10.11	Tien Nguyen Heiko Stammel	2.00 2.00
	Dominik Horb	7.00
	Benjamin Oertel	1.00
	Elsa Mahari	2.00
	Tien Nguyen	1.00
	Heiko Stammel	2.00
Feature #28: Resume: Projectmeeting with HTW-Plag-Team		4.00
Feature #29: Projectmanagement Research	Heiko Stammel	4.00
Feature #30: Scrum Research	Heiko Stammel	7.00
Feature #31: Create Wiki for Project Management Steps	Heiko Stammel	7.00
Feature #32: Create Wiki for Scrum	Heiko Stammel	6.00
Bug #33: Mockup hand-drawing	Heiko Stammel	2.00
Bug #34: Mockup digital version	Benjamin Oertel	1.00
	Benjamin Oertel	6.00
	Benjamin Oertel	11.00
	Benjamin Oertel	11.00

Table B.2.: Overview By Member and Issue

Issue	Member	Total
Bug #35: Textvergleich-Algorithmen rechechieren	Tien Nguyen	1.00
Time #39: Meeting 31.10.11		12.50
	Dominik Horb	2.50
	Benjamin Oertel	2.50
	Elsa Mahari	2.50
	Tien Nguyen	2.50
	Heiko Stammel	2.50
Time #43: Meeting 2011-11-04 (Martin Heidingsfelder)		8.00
	Benjamin Oertel	2.00
	Elsa Mahari	2.00
	Tien Nguyen	2.00
	Heiko Stammel	2.00
Feature #44: Setting up initial Zend Framework + Doctrine environment		2.00
Feature #45: User Stories	Benjamin Oertel	2.00
Time #47: Meeting 07.11.11	Tien Nguyen	1.00
		10.00
	Dominik Horb	2.00
	Benjamin Oertel	2.00
	Elsa Mahari	2.00
	Tien Nguyen	2.00

Table B.2.: Overview By Member and Issue

Issue	Member	Total
Time #48: Meeting 14.11.11	Heiko Stammel	2.00
	Dominik Horb	2.00
	Benjamin Oertel	2.00
	Elsa Mahari	2.00
	Tien Nguyen	2.00
	Heiko Stammel	2.00
Time #49: Wiki Editing	Dominik Horb	2.00
Bug #50: Meeting Plagiatssteam HTW 3.11.11	Dominik Horb	6.00
	Benjamin Oertel	1.50
	Heiko Stammel	1.50
Time #53: Debbie Meeting 15.11.11	Dominik Horb	3.00
	Benjamin Oertel	1.50
	Elsa Mahari	1.50
	Tien Nguyen	1.50
	Heiko Stammel	1.50
Feature #56: User registration	Benjamin Oertel	6.50
Feature #57: Profile information update		3.00

Table B.2.: Overview By Member and Issue

Issue	Member	Total
Time #58: Meeting 28.11.11	Benjamin Oertel Dominik Horb	3.00 2.50
	Benjamin Oertel Elsa Mahari	2.50 2.50
	Tien Nguyen Heiko Stammel	2.50 2.50
Feature #59: Defining coding guidelines	Benjamin Oertel	0.50
Feature #61: Meeting 24.11.11 - Setting up developing environment	Benjamin Oertel Dominik Horb	0.50 12.00
	Benjamin Oertel Elsa Mahari	3.00 3.00
	Tien Nguyen	3.00
Feature #62: Identify target	Benjamin Oertel	0.50
Feature #63: Read a file	Benjamin Oertel	1.00
Feature #64: Upload files	Elsa Mahari	8.00
Feature #65: User Login	Benjamin Oertel	6.50
		1.00

Table B.2.: Overview By Member and Issue

Issue	Member	Total
Feature #66: Create a new case	Tien Nguyen	5.50
	Dominik Horb	2.00
Feature #67: Setting up PHPUnit	Dominik Horb	7.50
	Benjamin Oertel	2.00
	Elsa Mahari	2.00
Time #68: Meeting 05.12.11		4.00
	Dominik Horb	2.00
	Elsa Mahari	2.00
Time #69: Reading DocBook-XML	Dominik Horb	4.00
	Benjamin Oertel	1.00
Feature #70: Writing git tutorial		1.00
Time #71: Meeting Online 07.12.11	Benjamin Oertel	1.00
	Dominik Horb	16.00
	Benjamin Oertel	4.00
	Elsa Mahari	4.00
	Tien Nguyen	4.00
Time #72: Meeting preparation PHPDoc		2.00
Feature #73: Layout design	Dominik Horb	2.00
		10.50

Table B.2.: Overview By Member and Issue

Issue	Member	Total
Bug #74: protocoll meeting minuts 05.12.2011	Benjamin Oertel	10.50
	Elsa Mahari	0.50
Time #75: Creation of Preview area on server		3.00
Time #76: Meeting 12.12.2011	Dominik Horb	3.00
	Dominik Horb	7.50
	Benjamin Oertel	1.50
	Elsa Mahari	1.50
	Tien Nguyen	1.50
	Heiko Stammel	1.50
Time #77: create Wiki page for MeetingMinutes 15.11.2011		0.50
	Tien Nguyen	0.50
Feature #78: Setting up the unplagged-blog		17.00
Feature #79: Google Helper	Heiko Stammel	17.00
Feature #80: SIM-Text	Elsa Mahari	10.00
		10.00
Feature #81: Correct/edit OCR-scanned Text	Dominik Horb	3.00
	Tien Nguyen	10.00
	Benjamin Oertel	4.00

Table B.2.: Overview By Member and Issue

Issue	Member	Total
Feature #82: De-hyphenator	Benjamin Oertel	8.00
Feature #83: Non-stop word identification	Dominik Horb	8.00
Feature #84: Display text	Heiko Stammel	2.00
Feature #85: Standard OCR	Dominik Horb	6.00
Feature #86: Change file list view columns	Benjamin Oertel	3.50
Feature #87: Decrease line-height in tables.	Dominik Horb	1.00
Time #89: create Wiki page for MeetingMinutes 13.12.2011	Benjamin Oertel	2.50
Time #90: Prepare automatic preview area	Tien Nguyen	18.00
Time #101: Preparation of Database Mocks	Dominik Horb	12.00
Feature #102: Basics for responsive layout	Benjamin Oertel	6.00
	Benjamin Oertel	0.50
	Benjamin Oertel	0.50
	Benjamin Oertel	0.50
	Tien Nguyen	0.50
	Dominik Horb	11.25
	Dominik Horb	3.50
	Dominik Horb	3.50
		9.00

Table B.2.: Overview By Member and Issue

Issue	Member	Total
Time #103: Meeting 10.01.12	Dominik Horb	9.00
		3.00
	Dominik Horb	1.50
	Elsa Mahari	1.50
Bug #104: Skype Meeting 4.01.12	Elsa Mahari	1.00
		3.00
Bug #105: Switching Menu to Zend_Navigation	Dominik Horb	3.00
		10.00
Feature #106: Add Imagick to convert to different formats	Dominik Horb	6.00
	Benjamin Oertel	4.00
Bug #107: Meeting 2012-01-09		1.50
	Tien Nguyen	4.00
Time #108: Skype Meeting 12.01.12	Dominik Horb	2.00
	Elsa Mahari	2.00
		2.50
Time #109: Cleaning up directory structure	Dominik Horb	2.50
		13.50
Feature #110: Implementing Zend_Acl for user access control	Dominik Horb	11.50
	Benjamin Oertel	2.00
Feature #111: Improving interface workflow		8.00

Table B.2.: Overview By Member and Issue

Issue	Member	Total
Time #115: Debbie Meeting 18.01.12	Benjamin Oertel	8.00
	Dominik Horb	6.00
	Elsa Mahari	3.00
Feature #116: Logger	Benjamin Oertel	3.00
	Dominik Horb	4.00
Feature #117: Create Paging mechanism	Benjamin Oertel	2.00
Bug #118: create Wiki page for MeetingMinutes 18.01.2012	Benjamin Oertel	2.00
Bug #119: Fixing several css issues	Tien Nguyen	6.00
Feature #120: Beautifying forms, tables and buttons	Benjamin Oertel	0.50
Time #122: 23.01.12 Meeting	Benjamin Oertel	0.50
	Dominik Horb	5.00
	Elsa Mahari	5.00
Time #123: 30.01.12 Meeting	Benjamin Oertel	5.00
	Dominik Horb	6.00
	Benjamin Oertel	2.00

Table B.2.: Overview By Member and Issue

Issue	Member	Total
Time #128: LaTeX preparation	Elsa Mahari	2.00
Time #142: License research and inclusion	Dominik Horb	2.00
Bug #143: Fixing tests after last refactorings	Dominik Horb	6.00
Time #144: Reading Zend Doku for Bootstrap Plugins	Dominik Horb	1.50
Time #145: Meeting 06.02.12	Dominik Horb	4.00
Time #146: Basic TOC and split up of LaTeX document	Dominik Horb	2.00
Feature #147: Preface Developers Manual	Dominik Horb	1.50
Time #148: Documentation - Chapter Git	Dominik Horb	7.00
Time #149: Meeting 04.03.12	Benjamin Oertel	4.50
Time #150: Writing chapter about Zend and Doctrine Framework	Benjamin Oertel	5.00
	Benjamin Oertel	5.00

Table B.2.: Overview By Member and Issue

Issue	Member	Total
Time #151: Writing chapter about User Interface / User Experience	Benjamin Oertel	6.00
Time #152: Adding mockups to documentation	Benjamin Oertel	2.00
Time #153: Team Meeting – 2012-03-10	Benjamin Oertel	2.00
Time #154: Reading in latex documentation	Benjamin Oertel	1.50
Feature #155: Improvements of error detection in tesseract parser	Benjamin Oertel	3.00
Feature #156: Implementing Webservice of PlagAware	Benjamin Oertel	2.00
Bug #157: Zend Acl – allowing/denying access to actions, not only controllers	Benjamin Oertel	1.00
Total		548.35

Table B.3.: Overview By Sprints

Version	2011-10	2011-11	2011-12	2012-1	2012-2	2012-3	Total
none	7.00		28.75	47.00	33.00	19.30	135.05
Sprint 1 (2011-10-01 - 2011-11-14)	81.80	67.50					149.30
Product Back-Log	2.50	0.50	3.00				6.00
Sprint 2 (2011-11-15 to 2011-12-13)		33.00	72.00				105.00
Sprint 3 (2011-12-14 to 2012-01-17)			21.00	63.00			84.00
Sprint 4 (2012-01-18 to 2012-02-01)				36.00	2.00		38.00
Sprint 5 (2012-02-02 to 2012-23-02)					4.50	26.50	31.00
Total	91.30	101.00	124.75	146.00	39.50	45.80	548.35

C. Mockups

C.1. Hand-Drawn

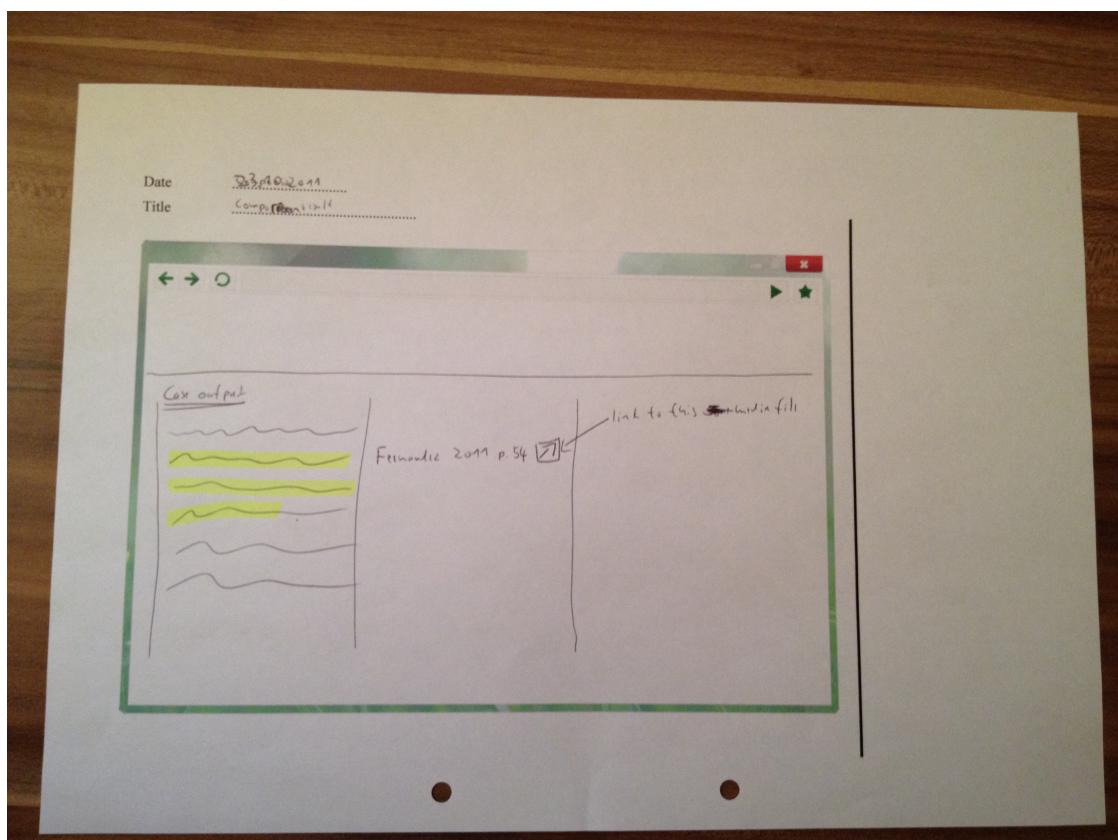


Figure C.1.: Mockup – Compare results – digitalized

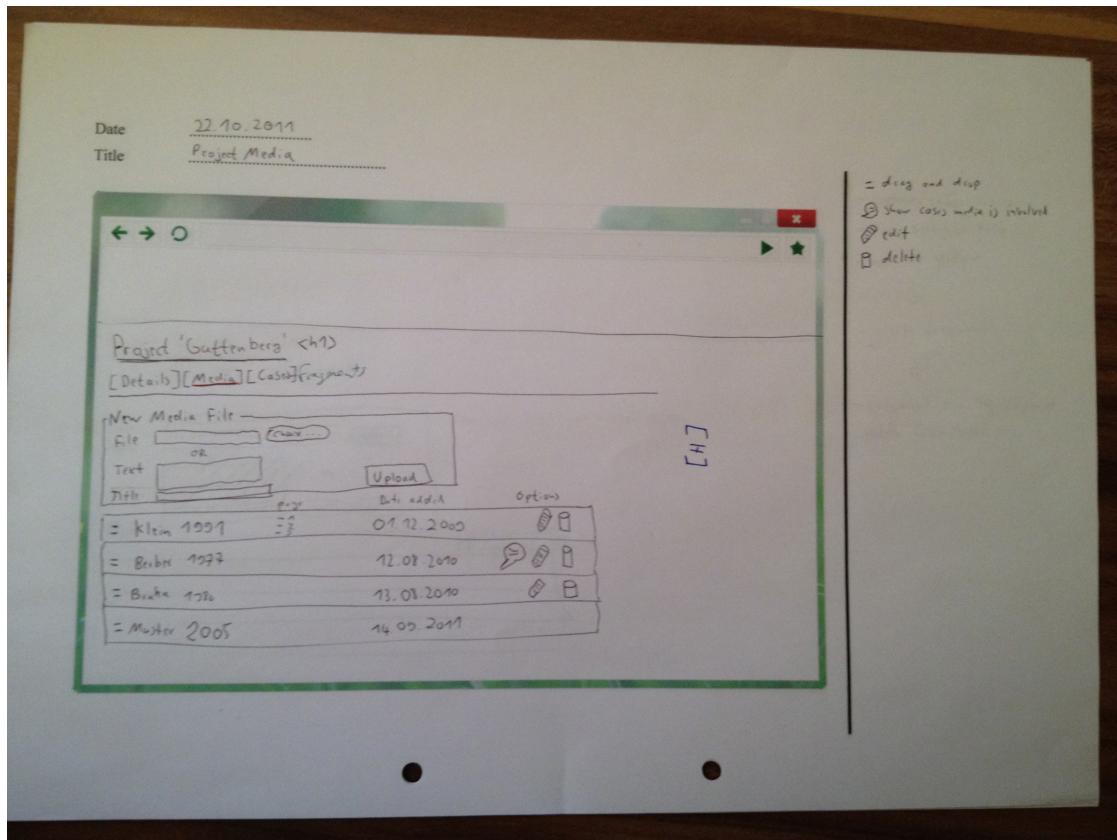


Figure C.2.: Mockup – Media list – digitalized

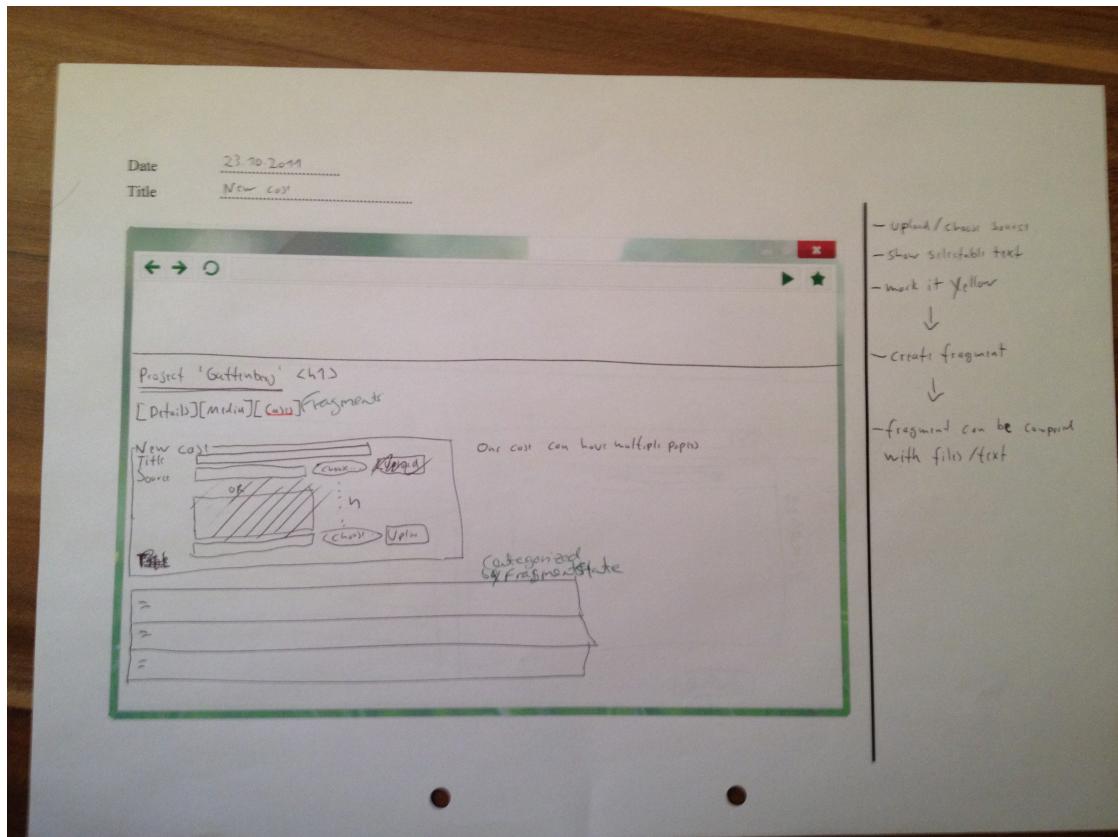


Figure C.3.: Mockup – New case – digitalized

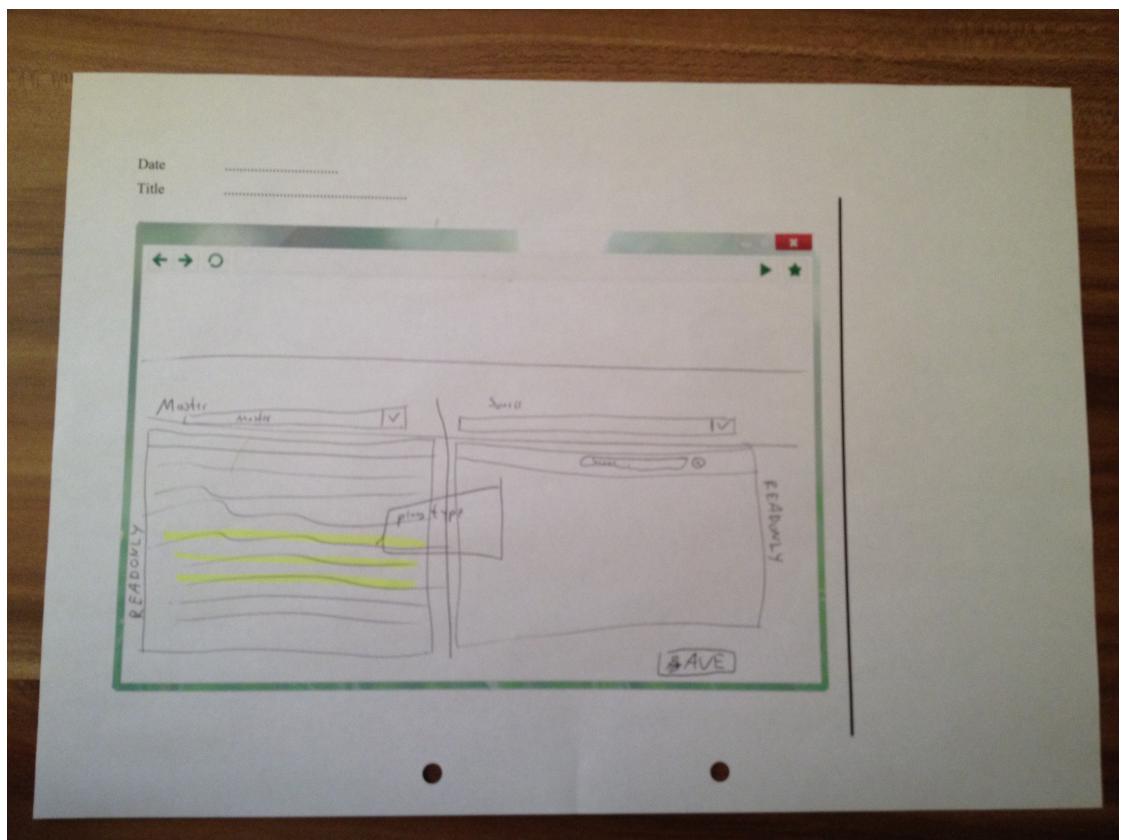


Figure C.4.: Mockup – New fragment – digitalized

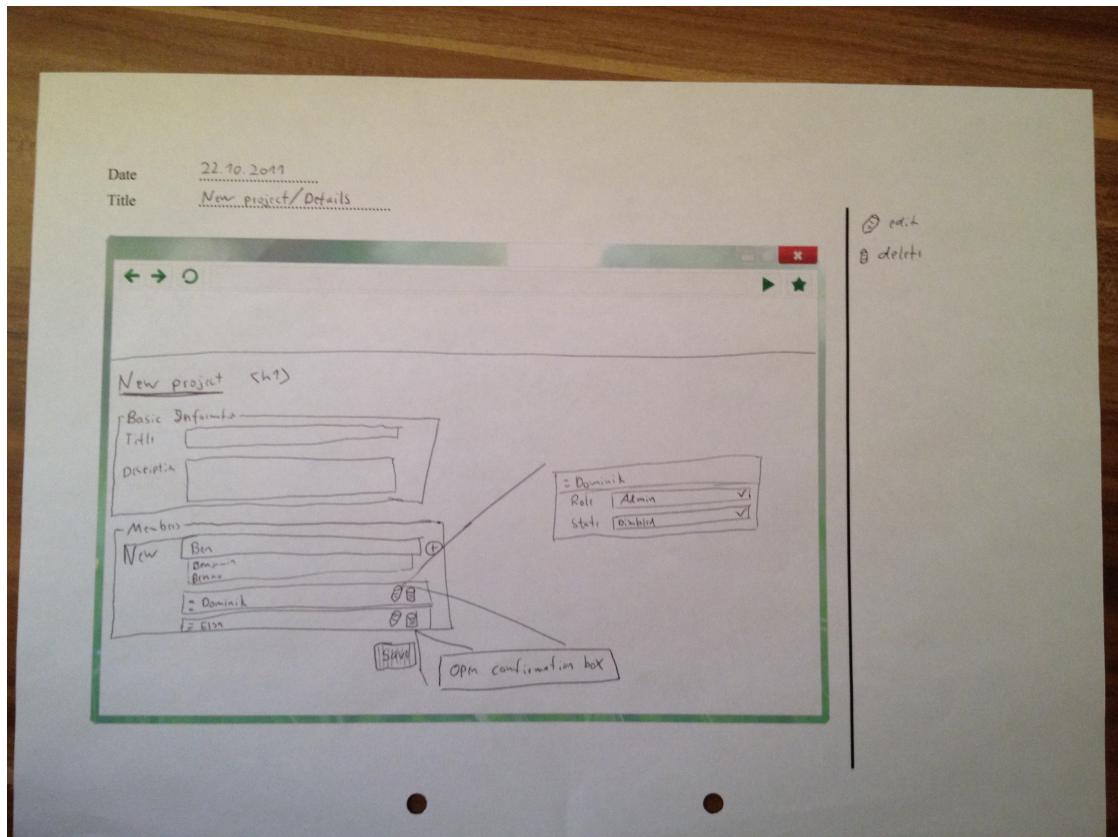


Figure C.5.: Mockup – New project – digitalized

C.2. Digitalized

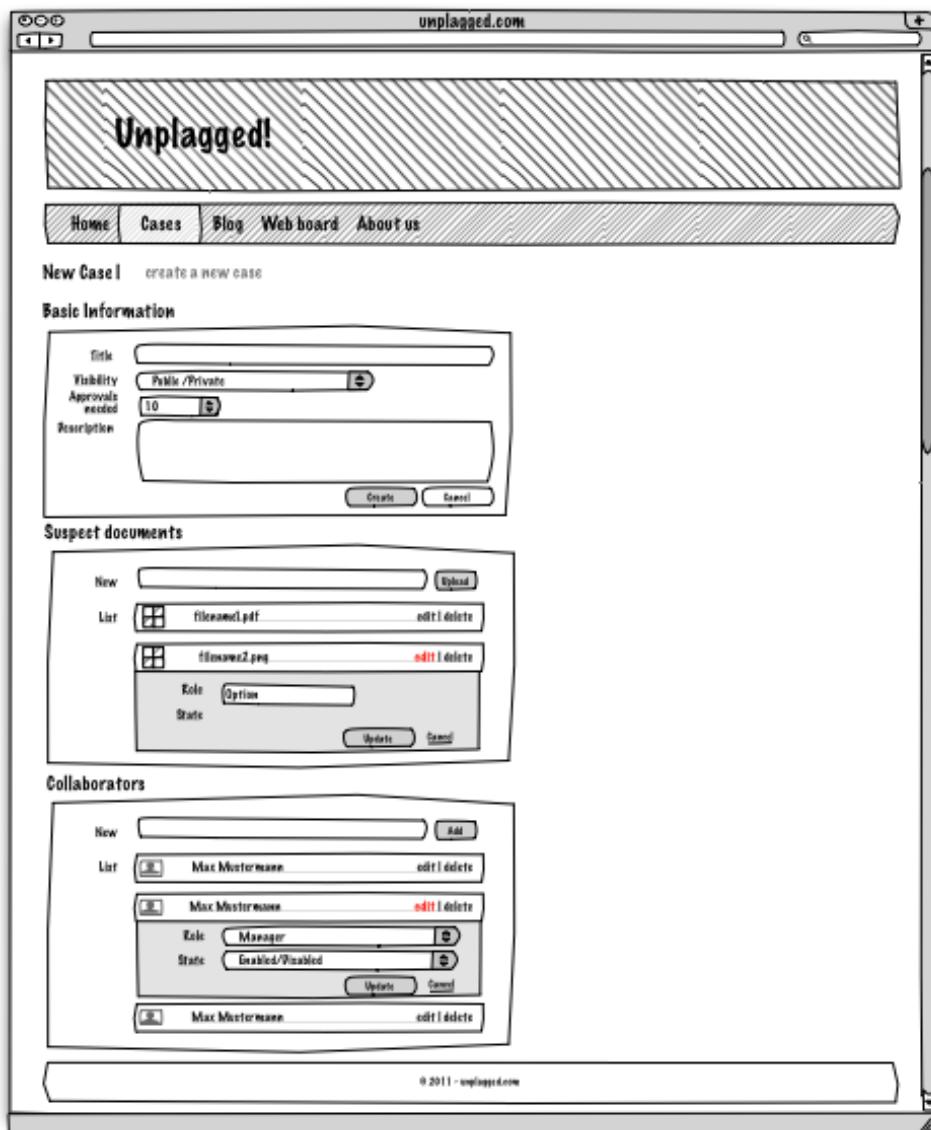


Figure C.6.: Mockup – New case – digitalized

Fragments | all fragments in case 'Gutenberg'

New Fragment

Suspect document: Gutenberg.pdf
Supposed source: Kafka

Clicking create opens a new page with suspect document and source pre-selected

Fragments by page

Page	Fragments	Latest activity	Options
(+) Page 1	021715	2011-08-25	
(+) Page 2	021715	2011-08-25	
(+) Page 3	011120	2011-08-25	
(+) Page 4	approved	2011-08-25	edit show approve
(+) Page 5	waiting approval	2011-08-25	edit show approve
(+) Page 6	waiting approval	2011-08-25	edit show approve
(+) Page 7	021715	2011-08-25	
(+) Page 8	021715	2011-08-25	

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Figure C.7.: Mockup – List fragments – digitalized

The mockup displays the Unplagged! website interface for creating a new fragment. The top navigation bar includes links for Home, Cases, Blog, Web-board, and About us. Below the navigation is a section titled "New Fragment | create a new fragment in case 'Utenberg'".

Suspect document: A text editor window showing a document page from "Utenberg.pdf" on page 1. The text discusses Josef K. being questioned about his dreams. A blue callout box highlights the phrase "mark as plagiarism" and notes "type: lorem ipsum".

Supposed source: A text editor window showing a document page from "Kafka" on page 8. The text discusses a dreamer named Josef K. being questioned about his dreams. A yellow callout box notes "- comments possible on each line, different colors per user" and "- text colors different per plagiarism type". A blue callout box highlights "commenter show comment".

Comment: A form for adding a comment. It includes fields for "Note" (with a large text area) and "Visibility" (set to "Private/Public/Group"). A yellow callout box lists comment status options: "status:
- new (created but not ready for verification)
- in-progress (can be edited)
- resolved
- feedback
- closed (9 approvals)
- rejected (9 declined)".

The footer of the application shows the copyright notice "© 2011 - unplagged.com".

Figure C.8.: Mockup – New fragment – digitalized

unplugged.com

Unplugged!

Home Cases Blog Web board About us

Show Fragment 1 fragment in case "Gutenberg"

Suspect document

File: document1.pdf
Page: 1
Line: 34-40

...Als Gregor Samza eines Morgens aus unruhigen Träumen erwachte, fand er sich in seinem Bett zu einem ungeheueren Ungeziefer verwandelt. Und es war ihnen wie eine Bestätigung ihrer neuen Träume und guten Absichten, ...
2 words below and 2 above ...

Supposed source

File: document1.pdf
Page: 1
Line: 34-40

emand musste Josef K. verleumdet haben, denn ohne dass er etwas Böses getan hätte, würde er eines Morgens verhaftet. »Wie ein Handl« sagte er, es war, als sollte die Scham ihn überleben. Als Gregor Samza eines Morgens aus unruhigen Träumen erwachte, fand er sich in seinem Bett zu einem ungeheueren Ungeziefer verwandelt. Und es war ihnen wie eine Bestätigung ihrer neuen Träume und guten Absichten, als am Ziele ihrer Fahrt die Tochter als erste sich erhob und ihren jungen Körper dehnte. »Es ist ein eigenmächtiger Apparat«, sagte der Offizier zu dem Fassungsverlustenden und überblieb mit einem gewissmaßen bewundernden Blick den ihm doch wohlbekannten Apparat.

(+) expand whole page (-) collapse whole page

commenter show facebook-like list with all selected users, comment and date

Ratings

appreciate : 1 rejects : 1

State: Approve

comment ratings that are not the most recent ones of a user are shown greyed out

Comment	User	Date	Rating
guten Absichten, als am Ziele ihrer Fahrt die Tochter als erste sich erhob und ihren jungen Körper dehnte. »Es ist ein eigenmächtiger Apparat«, sagte der Offizier zu dem Fassungsverlustenden und überblieb mit einem gewissmaßen bewundernden Blick den ihm doch wohlbekannten Apparat.	Max Mustermann	2011-11-05	no
Re: guten Absichten, als am Ziele ihrer Fahrt die Tochter als erste sich erhob und ihren jungen Körper dehnte. »Es ist ein eigenmächtiger Apparat«, sagte der Offizier zu dem Fassungsverlustenden und überblieb mit einem gewissmaßen bewundernden Blick den ihm doch wohlbekannten Apparat.	Emmy Watson	2011-11-06	no
Re: guten Absichten, als am Ziele ihrer Fahrt die Tochter als erste sich erhob und ihren jungen Körper dehnte. »Es ist ein eigenmächtiger Apparat«, sagte der Offizier zu dem Fassungsverlustenden und überblieb mit einem gewissmaßen bewundernden Blick den ihm doch wohlbekannten Apparat.	Max Mustermann	2011-11-07	no
guten Absichten, als am Ziele ihrer Fahrt die Tochter als erste sich erhob und ihren jungen Körper dehnte. »Es ist ein eigenmächtiger Apparat«, sagte der Offizier zu dem Fassungsverlustenden und überblieb mit einem gewissmaßen bewundernden Blick den ihm doch wohlbekannten Apparat.	Emmy Watson	2011-11-08	no
guten Absichten, als am Ziele ihrer Fahrt die Tochter als erste sich erhob und ihren jungen Körper dehnte. »Es ist ein eigenmächtiger Apparat«, sagte der Offizier zu dem Fassungsverlustenden und überblieb mit einem gewissmaßen bewundernden Blick den ihm doch wohlbekannten Apparat.	Max Mustermann	2011-10-27	yes

Figure C.9.: Mockup – Show fragment for approval – digitalized

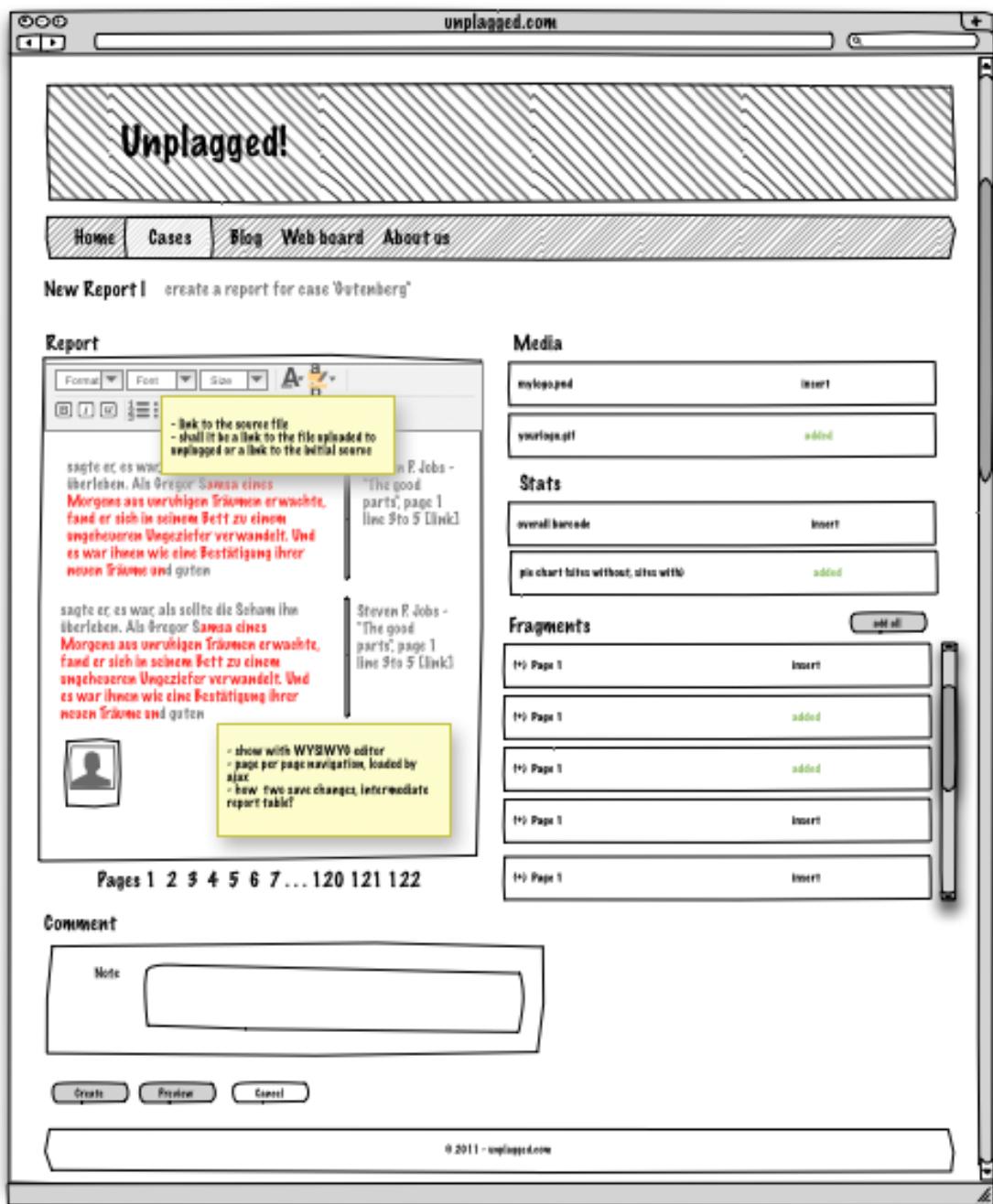


Figure C.10.: Mockup – New report – digitalized