

My Bachelor/Master/Diploma Thesis Title – (MBMDTT)

— Proposal for a Master's/Bachelor's Thesis —

Firstname Lastname

Advised by:

- ...

Topic Description

This is my topic description. In this section I will provide a short introduction on what is the problem at hand, why it is a problem, and what I propose to do. Shaw [Sha03] wrote a paper with hints on how to write good software engineering research papers. By the way, this was an example for using the *natbib* command `\citet{}`. *AspectJ* is tool to weave cross-cutting concerns into Java programs [Asp]. This was just an example for using the *natbib* command `\citep{}`. Some grouped references from the SE@HU Group: [? ? ? ?], as well as an article example: [?].

General advice: You should make good use of *diagrams*, *graphics*, *tables* and/or other visual elements to explain your topics.

1 State of the art and preliminary work

In the following, I will review the state of the art with respect to the topic goals and specifically focus on the currently available code-based and model-based performance problem detection approaches and their applications to locate and remove performance problems. Current work in the field can be divided into n groups of general approaches: *the first group*, *the second group*

1.1 The first group of approaches

Here I say something smart about the first group of approaches to show the reader that I have a general understanding of the field and of what has been done by other groups of researchers so far.

Open challenges addressed by the thesis project. In this proposal, we will develop something that nobody else does, related to the first set of approaches. My approach has the advantage that it is *much better than other approaches*. As an example, reconsider subsection 1.1, but now including *something I think is important*. By quantifying this we can do *that*. By capturing and quantifying *this*, we open a wide range of new applications, pushing forward the state of the art in this field. We strive to address the following challenges that we identified by studying the literature in the field:

- How can we utilize *this* in order to obtain *that*?
- Based on that, how can we develop an even faster way to do *this* while meeting the crucial requirements?
- In what way will performing *that* influence the realm of time and space?

1.2 The second group of approaches

...

Open challenges addressed by the thesis project. Challenges related to the second group of approaches:

- ...
- ...
- ...

2 Objectives and work program

2.1 Anticipated total duration of the project

I anticipate a total duration of *4 or 6 months*.

2.2 Objectives

This thesis aims to improve and investigate the following:

- In *one field*, the focus is on *something*, while *problems are these*, where yet undiscovered defects may loom.
- In *other field*, the goal is to *do this*, unveiling new horizons.
- In *the third*, the idea is to achieve excellent achievement in the field of excellence.

The key concept for these aims is *this*, a technique which does *that*. These techniques are *normal* in contrast to *abnormal* behavior, and thus fuel the innovations above.

In order to reach the overall goal of the project, MBMDTT is structured into four work packages, outlined below, whose interplay could be visualized in a similar way as in Figure 1. If I would use this exact figure in my proposal, it would probably not get accepted. Additionally, I may of course have more or less than four work packages, depending on what suits my project.

WP1: Something, something and doing something. The first work package (WP1) will provide something.

Problems from WP1 will then form a base for the next three work packages (WP2, WP3 and WP4).

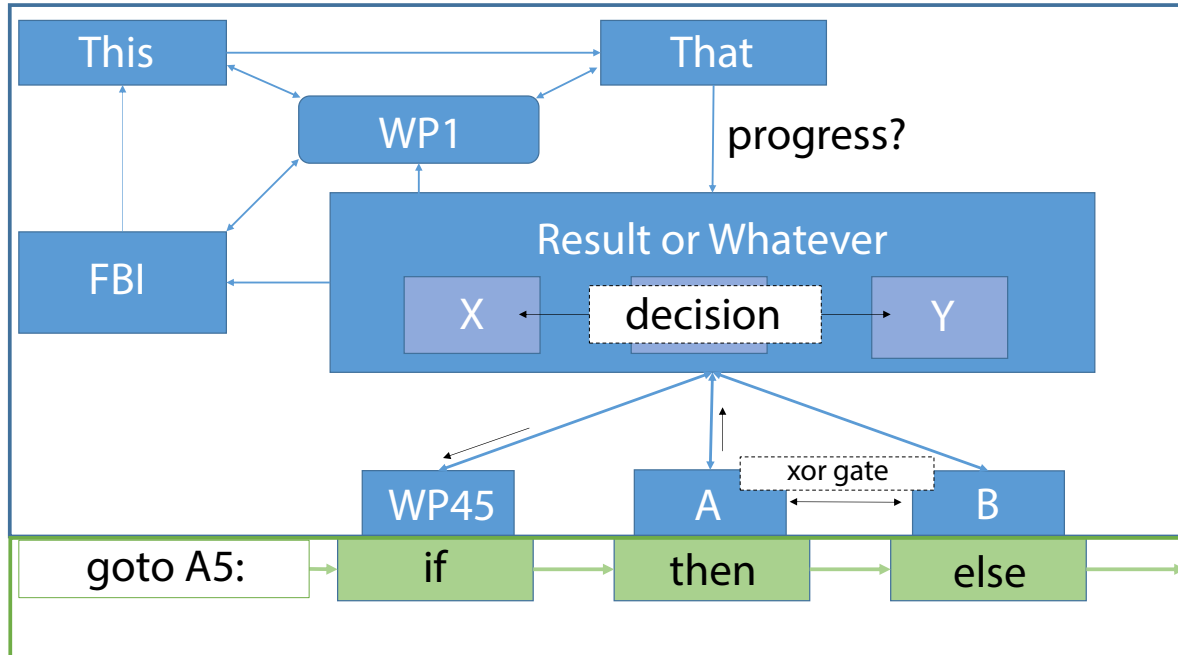


Figure 1: Example overview of a project

WP2: Working in a coal mine. The second work package will use *something* to do the work on doing *the things*.

WP3: Sixteen tons. Using a white-box approach, dirt will be dug.

WP4: Celebration preparation. In the fourth work package, using data provided by WP2, we prepare the celebration party if this proposal gets accepted.

In all work packages, the research shall be driven by *some procedure* on real-life systems or dead-life systems. Furthermore, the results from WP2–WP4 will continuously provide feedback for WP1. This is basically a lot of nonsensical text.

2.3 Work programme incl. proposed research methods

In the following, we present the details of each of the work packages, discussing the motivation, the research plan together with the individual tasks, as well as the intended research methodology and validation strategy to be used. An anonymized example work plan is shown in Figure 2.

WP1 Something, something and doing something.

Challenges and motivation. Here, you should summarize challenges and motivation for the work package at hand. For example, you could write things like:

For this work package, the main challenge will be to find the right balance between something and something else. This search will be driven by *other things* and experiments in WP2, WP3, WP4.

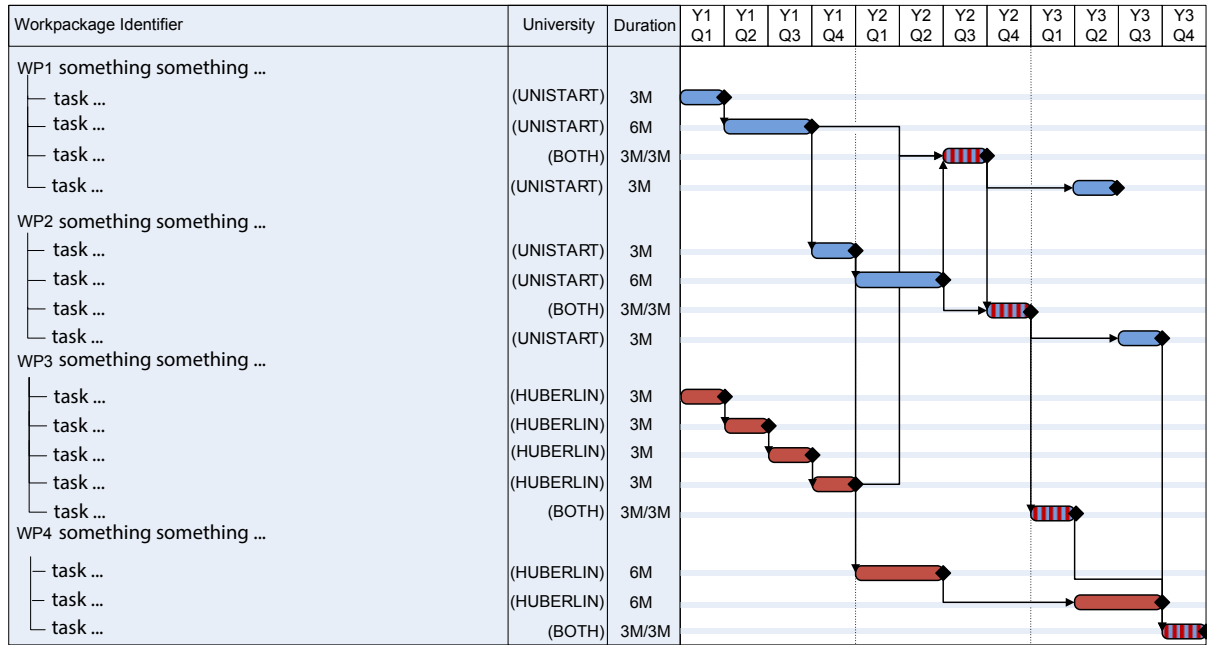


Figure 2: An example work plan of another project

Research plan and individual research tasks. In this work package, we create the theoretical foundation for the required *somethings* that satisfy the requirements of the *something* *elses*.

WP1.1 Refining something

The first task aims to provide effective algorithms for probabilistic model construction. Existing approaches [vHWH12] will be used as a baseline to derive algorithms that do *something*. I am now just citing [Asp] for the fun of it. It is widely accepted that Novel *probabilistic something* approaches are expected to

- do *something* that will be explained here in a sentence or two, and
- do *something else*, using *aReallyNiceFramework* [FH11].

To this end, we will have to deal with two challenges:

Noise. Look at this wonderful paragraph with mathematical formulae. Rather than learning a complete model that covers the entire state space, axioms that capture *conditional probabilities* between two or more events may already be sufficient for producing test suites with comparable quality. For instance, if we know that two events A and B normally follow each other (formally: $\mathcal{P}_{\geq 1}[\Box(A \Rightarrow \mathcal{P}_{\geq 0.99}(\Diamond B))]$), we can focus on precisely such sequences (to test common behavior), or its complement (to test uncommon behavior).

Granularity. We would be naïve to expect a single “one size fits all” specification. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Alea iacta est.

It is thus expected that this WP is driven by the impact of algorithmic choices on the effectiveness of the mined specifications in tasks WP3, WP4, and WP2. After an experimental evaluation on a large set of sample instances, each iteration of the WP will thus produce individual software assessment tasks.

Research methodology and validation strategy. In this work package, we use different fundamental methods to greatly decrease performance, and we avoid any technique that provides even the slightest increase of accuracy. Hah, got you! No, we don't do that, of course. We use some profound methods and mechanisms that provide assistance to our research. You should state here, how you intend to achieve your stated goals and how you intend to validate your results in the end.

WP1.2 The second important task

Do something similar to what was done in WP1.1.

WP2 Working in a coal mine.

Again, describe what you will do in this package, refine it in subtasks.

WP3 Sixteen tons.

Again, describe what you will do in this package, refine it in subtasks. Gets repetitive, doesn't it?

WP4 Celebration preparation.

Again, describe what you will do in this package, refine it in subtasks. It's enough, stop it already!

2.4 Data handling

All results from the thesis experiments will be publicly available, including all data and all code. In addition, the thesis source code will be made available through a public repository (e.g. github.com), such that additional researchers can use it and contribute to the project. Each published experiment will be made replicable through included automated scripts.

2.5 Other information

If any.

3 Bibliography

References

- [Asp] AspectJ language extension.
- [FH11] Sören Frey and Wilhelm Hasselbring. The CloudMIG approach: Model-based migration of software systems to cloud-optimized applications. *International Journal on Advances in Software*, 4(3):342–353, April 2011.
- [Sha03] Mary Shaw. Writing good software engineering research papers: minitutorial. In *Proceedings of the 25th International Conference on Software Engineering (ICSE 2003)*, pages 726–736. IEEE Computer Society, May 2003.
- [vHWH12] André van Hoorn, Jan Waller, and Wilhelm Hasselbring. Kieker: A framework for application performance monitoring and dynamic software analysis. In *Proceedings of the 3rd ACM/SPEC International Conference on Performance Engineering (ICPE 2012)*, pages 247–248. ACM, April 2012.

4 Project requirements

Description of what is required for project.

4.1 Cooperation with other researchers

List of researchers you plan to collaborate with, if any. If so, to what extent and in what manner do you plan to collaborate?

4.2 Scientific equipment

If you need some equipment, describe it here. Cars and planes will not be made available, though, no matter how badly you need it.

4.3 Project-relevant interests in commercial enterprises

Describe them here.