Eberhard Karls Universität Tübingen
Mathematisch-Naturwissenschaftliche Fakultät
Wilhelm-Schickard-Institut für Informatik

Master Thesis Medical Informatics/Bioinformatics

Title

Your Name

end date

Reviewers

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Your Name:

Thesis title

Master Thesis Medical informatics/Bioinformatics

Eberhard Karls Universität Tübingen

Thesis period: start date – end date

Abstract

One page summary of the thesis.

Zusammenfassung

Einseitige Zusammenfassung der Thesis auf Deutsch.

Acknowledgements

This section is dedicated to all the people who helped, supported and supervised you during the time of your thesis. Since the majority of scientific works would not be possible without the help and guidance of others, you can use this page to say thank you to the people who supported you.

Contents

List of Figures

List of Tables

List of Abbreviations

AB	Antibody
bNAb	Broadly neutralizing antibody
CTL	Cytotoxic T-cell lymphocyte
HIV	Human immunodeficiency virus
HLA	Human leucocyte antigen
Pol	Polymerase

Chapter 1

Introduction

Recent developments in science have shown that the problem of this thesis is becoming more relevant. New methods have been published by many authors and therefore it is important to do this specific analysis.

The focus of this thesis is on implementing a new method that can outperform current state-of-the-art approaches.

1.1 Previous work

For many years, students have been using their own Master thesis templates which has lead to a large variety of layouts. In 1989, Mittelbach and Schöpf published the first paper about the LaTeX project that revolutionized typography for the following decades. Nowadays, students will no longer have to rely on tedious office apps and can thus write beautiful theses using this template. We could have included the previous statement about LaTeX without referencing to its first publication but since every part of this work is written as a scientific thesis, we will make sure that **every fact and every citation is properly referenced** unless they are *statements made by the author*. To emphasize statements we generally use *italic* but **bold face** is also possible.

1.2 Aim of this thesis

Writing a thesis without an aim is like boiling pasta without water, so we have to state the goals that we want to achieve.

Chapter 2

Materials and Methods

2.1 Dataset

This thesis is based on a clinical dataset of 1270 patients.

Table 2.1: Overview of the clinical data availability and distribution of the dataset to different locations.

available data	Location A	Location B	location C	sum
gene expression	750	230	290	1270
methylation	400	180	100	680

2.2 Methods

2.2.1 Preprocessing

...

2.2.2 Analysis methods

Kernel functions

For two samples x_i and x_j in the preprocessed data, the Gaussian radial basis function (RBF) kernel is calculated applying the general rule of thumb for the γ parameter based on the number p of features (Gärtner et al., 2002):

$$k_{RBF}(x_i, x_j) = \exp(\gamma||x_i - x_j||^2) \ \text{ with } \ \gamma_{default} = \frac{1}{2p^2} \qquad (2.1)$$

Chapter 3

Results

Here we describe our results and show interesting figures to visualize our findings (see figure 3.1).
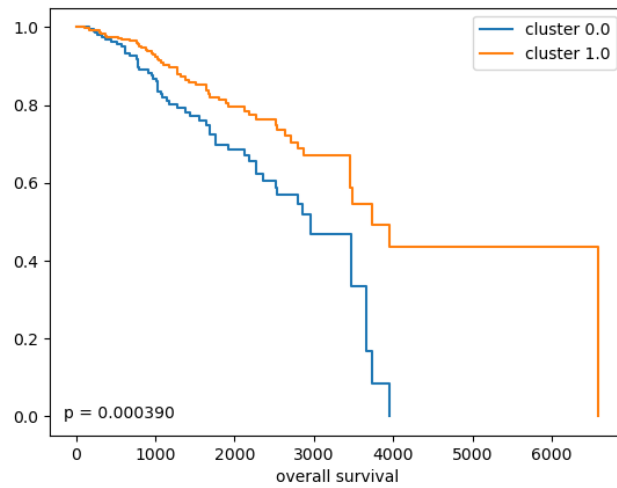

Figure 3.1: Kaplan-Meier diagram of the survival estimates for the clusters generated by the XYZ method. Applying the log rank test shows significant difference between the cluster-specific survival times (p = 0.00039).

Chapter 4

Discussion and Outlook

In this section, we want to make sure that our results are nicely discussed. This also means that we compare our findings to the state-of-the-art results or methods and cite relevant literature. This part also combines the computer science aspects of this work and the biological or medical meaning of the achieved results.

4.1 Newly developed method

...

4.2 Conclusion

Brief summary of the findings of this thesis

4.3 Outlook

What would be the next steps based on the contribution of this thesis?

Appendix A

Further Tables and Figures

Table A.1: Comparison of the analysis value of random clusters.

	mean analysis value	
cluster	dataset 1	dataset 2
random 1	0.287483	0.416021
random 2	0.343780	0.352417
random 3	0.222721	0.414979

Bibliography

Gärtner, T., Flach, P. A., Kowalczyk, A., and Smola, A. J. (2002). Multi-instance kernels. In *Proceedings of the Nineteenth International Conference on Machine Learning*, ICML '02, pages 179–186, San Francisco, CA, USA. Morgan Kaufmann Publishers Inc.

Mittelbach, F. and Schöpf, R. (1989). With latex into the nineties. *TUGboat*, 10:681–690.

Selbständigkeitserklärung

Hiermit versichere ich, dass ich die vorliegende Masterarbeit selbständig und nur mit den angegebenen Hilfsmitteln angefertigt habe und dass alle Stellen, die dem Wortlaut oder dem Sinne nach anderen Werken entnommen sind, durch Angaben von Quellen als Entlehnung kenntlich gemacht worden sind. Diese Masterarbeit wurde in gleicher oder ähnlicher Form in keinem anderen Studiengang als Prüfungsleistung vorgelegt.

Ort, Datum   Unterschrift