# Machine Learning Approaches to the Blockchain

#### Jean-Paul Ebejer

Supervisor: Dr Zhivago

Co-supervisor: Dr Who

May, 2022

Submitted in partial fulfilment of the requirements for the degree of Some Degree.



#### Acknowledgements

#### **Abstract**

## **Contents**

Lis	st of F	igures	VÌ
Lis	st of T	Tables	vii
Lis	st of A	Abbreviations	viii
1	Intro	oduction	1
	1.1	Motivation	1
	1.2	Aims and Objectives	1
	1.3	Our Approach	2
	1.4	Document Structure	2
2	Bacl	kground & Literature Overview	3
	2.1	An Example of an Equation	3
	2.2	An Example of a Numbered List	4
	2.3	An Example of a Bulleted List	4
	2.4	An Example of a Figure	5
	2.5	An Example of a Side-by-Side Figure	5
	2.6	An Example of Using of Acronyms	6
	2.7	An Example of a Table	7
	2.8	An Example of a Long Table	7
	2.9	A Landscape Table Example	10
	2.10	A Theorem Example	12
	2.11	. A Lemma Example	12
	2.12	A Proof Example	13
	2.13	B A Listing Example	14
	2.14	An Algorithm Example	15
	2.15	Some Technique One	15
		2.15.1 Some Sub-technique One	16

#### CONTENTS

	2.16 Some Technique Two	17
	2.17 Evaluation Criteria	18
	2.18 Related Work	18
	2.19 An Example of Suppressing Page Numbers on A Float Page	18
	2.20 Summary	
3	Materials & Methods	21
	3.1 Summary	21
4	Results & Discussion	22
	4.1 Summary	23
5	Evaluation	24
	5.1 Summary	25
6	Conclusions	26
	6.1 Revisiting the Aims and Objectives	26
	6.2 Critique and Limitations	26
	6.3 Future Work	27
	6.4 Final Remarks	27
Re	eferences	28
Αŗ	ppendix A Media Content	29
Αŗ	opendix B Installation Instructions	31
Δr	onendix C User Manual	34

## **List of Figures**

2.1	This is the short caption for List of Figures	5
2.2	Short Caption	6
2.3	Short Random Caption	20

## **List of Tables**

2.1	A Beautiful and Complex Table (for tables captions above)	7
2.2	Performance of Ligity in HTS mode against the Ligity-compatible DUD-E targets	8
2.3	A landscape table	11

### **List of Abbreviations**

CDMA Code Division Multiple Access	. 6
GSM Global System for Mobile communication	. 6
TDMA Time Division Multiple Access	. 6
UA Used Acronym	.6

#### 1 Introduction

Note that you may have multiple \include statements here, e.g. one for each subsection.

General structure of this chapter should read as follows. This chapter should be used to motivate your study and answer the question "Why is this important?". Also, it should define what you set out to achieve (these will be revisited in the conclusions chapter). You should describe your approach to the Aims and Objectives, including an evaluation part.

#### 1.1 Motivation

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### 1.2 Aims and Objectives

#### 1.3 Our Approach

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### 1.4 Document Structure

### 2 Background & Literature Overview

In this section you need to explain all the theory required to understand your dissertation (i.e. the following chapters). But really in this chapter I am going to show you some examples.

#### 2.1 An Example of an Equation

The following is the most beautiful equation in maths, Euler's Identity (Equation 2.1).

$$e^{i\pi} + 1 = 0 (2.1)$$

where:

e =the constant

i = of complex fame

 $\pi = \text{not of the apple variety}$ 

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### 2.2 An Example of a Numbered List

This is an example of a numbered list:

- 1. This is my first point
- 2. My second
- 3. My third!
- 4. And my fourth?

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### 2.3 An Example of a Bulleted List

This is an example of a bulleted list:

- This is my first point
- · My second
- My third!
- And my fourth?

#### 2.4 An Example of a Figure

A test figure is shown in Figure 2.1.



Figure 2.1: A test figure. This caption is huge, but in the list of figures only the smaller version in the square brackets will appear.

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### 2.5 An Example of a Side-by-Side Figure

Two figures shown side-by-side are shown in Figure 2.2.

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected





(a) Goku (b) More Goku

Figure 2.2: The same super saiyan. Two times.

font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### 2.6 An Example of Using of Acronyms

In the early nineties, GSM was deployed in many European countries. Global System for Mobile communication (GSM) offered for the first time international roaming for mobile subscribers. The GSM's use of Time Division Multiple Access (TDMA) as its communication standard was debated at length. And every now and then there are big discussion whether Code Division Multiple Access (CDMA) should have been chosen over TDMA.

If you want to know more about Global System for Mobile communication (GSM), Time Division Multiple Access (TDMA), Code Division Multiple Access (CDMA) and other acronyms, just read a book about mobile communication. Just to mention it: There is another Used Acronym (UA), for testing.

		w = 8			w = 16					
_	t = 0	t = 1	t = 2	_	t = 0	t = 1	t=2			
dir = 1										
С	0.0790	0.1692	0.2945		0.3670	0.7187	3.1815			
С	-0.8651	50.0476	5.9384		-9.0714	297.0923	46.2143			
С	124.2756	-50.9612	-14.2721		128.2265	-630.5455	-381.0930			
dir = 0										
С	0.0357	1.2473	0.2119		0.3593	-0.2755	2.1764			
С	-17.9048	-37.1111	8.8591		-30.7381	-9.5952	-3.0000			
С	105.5518	232.1160	-94.7351		100.2497	141.2778	-259.7326			

Table 2.1: A Beautiful and Complex Table (for tables captions above)

#### 2.7 An Example of a Table

A beautiful table is shown in Table 2.1, data from Ebejer et al. (2012) (when citing as part of text, otherwise use parentheses (Ebejer et al., 2012) version).

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### 2.8 An Example of a Long Table

The following is an example of a table (Table 2.2) spanning multiple pages.

Table 2.2: Performance of Ligity in HTS mode against the Ligity-compatible DUD-E targets. The mean (and standard deviation in parentheses) values of ROC AUC using Tanimoto is 0.622 ( $\pm 0.132$ ), while for Tversky it is 0.671 ( $\pm 0.142$ ); the mean EF $_{1\%}$  using Tanimoto is 5.648 ( $\pm 8.668$ ), while for EF $_{1\%}$  using Tversky it is 9.047 ( $\pm 12.713$ ).

Target	No.	No.	ROC	ROC	BEDROC	BEDROC	EF <sub>1%</sub>	EF <sub>1%</sub>
	of	of	AUC	AUC	Tani-	Tver-	Tani-	Tversky
	Ac-	De-	Tani-	Tver-	moto	sky	moto	
	tives	coys	moto	sky				
ABL1 ACE	182 281	10,750 16,877	0.563 0.787	0.473 0.787	0.077 0.336	0.077 0.401	1.653 12.425	2.204 19.525
ACES	453	26,242	0.634	0.645	0.077	0.455	1.766	5.518
ADA	93	5,450	0.724	0.660	0.149	0.147	3.251	3.251
ADA17	532	35,898	0.638	0.728	0.103	0.283	1.317	9.030
ADRB1	247 231	15,850	0.523	0.647	0.065	0.129	1.619	5.262
ADRB2 AKT1	293	14,999 16,450	0.523 0.386	0.589 0.548	0.052 0.039	0.040 0.107	1.735 2.737	0.000 3.080
AKT2	117	6,900	0.511	0.685	0.140	0.194	8.568	8.568
ALDR	159	8,988	0.574	0.610	0.202	0.172	10.747	6.322
AMPC	48	2,845	0.521	0.541	0.049	0.023	0.000	0.000
ANDR	269	14,349	0.722	0.742	0.194	0.354	4.839	24.938
AOFB	121	6,875	0.422	0.464	0.045	0.027	1.652	0.000
BACE1 BRAF	283 152	18,100 9,950	0.441 0.612	0.775 0.639	0.017 0.208	0.310 0.165	0.000 12.502	13.062 5.264
CASP3	199	10,694	0.600	0.037	0.208	0.103	0.502	7.031
CDK2	474	27,838	0.467	0.507	0.021	0.048	0.000	1.055
COMT	41	3,846	0.789	0.889	0.338	0.665	19.447	58.341
CP2C9	120	7,449	0.518	0.634	0.058	0.186	1.660	8.299
CP3A4	170	11,787	0.450	0.493	0.022	0.057	0.000	2.345
CSF1R CXCR4	166 40	12,149 3,405	0.526 0.575	0.542 0.722	0.136 0.217	0.152 0.134	6.031 12.665	7.238 0.000
DEF	102	5,699	0.732	0.722	0.217	0.134	10.786	15.689
DHI1	330	19,348	0.481	0.595	0.089	0.062	2.422	1.211
DPP4	533	40,941	0.586	0.591	0.154	0.157	4.312	3.937
DRD3	480	34,048	0.484	0.441	0.043	0.046	1.251	0.626
DYR	231	17,196	0.694	0.758	0.210	0.230	6.504	7.371
EGFR ESR1	542 383	35,047 20,683	0.593 0.838	0.491 0.861	0.054 0.527	0.037 0.594	0.922 31.281	0.000 39.101
ESR1 ESR2	367	20,003	0.836	0.870	0.563	0.574	20.130	32.644
FA10	537	28,324	0.564	0.674	0.058	0.118	0.930	2.232
FA7	114	6,249	0.762	0.859	0.210	0.332	6.105	8.721
FABP4	47	2,749	0.786	0.744	0.191	0.276	0.000	10.623
FAK1	100	5,350	0.642	0.531	0.111	0.065	2.019	0.000
FGFR1	139	8,698 5,700	0.511	0.522	0.036	0.088	0.722	1.445
FKB1A FNTA	111 592	5,799 51,493	0.605 0.411	0.751 0.625	0.162 0.012	0.164 0.132	8.122 0.000	3.610 4.053
FPPS	85	8,842	0.411	0.823	0.012	0.132	2.360	36.581
			U., I,	0.703		4: N		

(continued...)

Target	No.	No.	ROC	ROC	BEDROC	BEDRO	EF <sub>1%</sub>	EF <sub>1%</sub>
	of	of	AUC	AUC	Tani-	Tver-	Tani-	Tver-
	Ac-	De-	Tani-	Tver-	moto	sky	moto	sky
	tives	coys	moto	sky				
GCR	258	14,998	0.805	0.834	0.244	0.324	3.092	8.116
GLCM	54	3,790	0.667	0.685	0.182	0.279	1.873	11.240
GRIA2	158	11,842	0.662	0.684	0.248	0.154	11.392	5.696
GRIK1 HDAC2	101 185	6,547 10,300	0.656 0.676	0.668 0.734	0.203 0.187	0.102 0.201	7.978 4.318	1.995 4.318
HDAC2	170	10,300	0.640	0.734	0.107	0.201	2.946	8.250
HIVINT	100	6,640	0.390	0.554	0.120	0.116	0.000	3.018
HIVPR	535	35,724	0.663	0.872	0.072	0.490	0.187	23.898
HIVRT	338	18,884	0.495	0.475	0.124	0.085	4.443	1.777
HMDH	170	8,750	0.480	0.906	0.068	0.652	2.358	35.963
HS90A	88	4,850	0.635	0.506	0.096	0.083	0.000	3.436
HXK4	92	4,700	0.662	0.803	0.206	0.307	15.192	9.766
IGF1R	148	9,300	0.502	0.575	0.057	0.189	2.037	14.941
INHA	43	2,300	0.493	0.575	0.031	0.045	0.000	0.000
ITAL	138	8,500	0.619	0.465	0.037	0.065	0.000	0.728
JAK2	107	6,500	0.472	0.475	0.073	0.118	2.807	6.549
KIF11	116	6,850	0.755	0.781	0.149	0.219	4.289	2.574
KIT	166	10,449	0.463	0.437	0.045	0.030	0.000	0.000
KITH KPCB	57 135	2,850 8,699	0.649 0.753	0.838 0.813	0.228 0.220	0.709 0.338	14.069 8.923	47.483 12.641
LCK	419	27,391	0.733	0.813	0.220	0.043	0.000	1.910
LKHA4	171	9,448	0.718	0.694	0.238	0.150	8.203	1.758
MAPK2	101	6,148	0.660	0.670	0.174	0.199	5.988	3.992
MCR	94	5,149	0.816	0.888	0.215	0.454	6.436	19.307
MET	166	11,249	0.566	0.531	0.130	0.065	6.032	0.603
MK01	79	4,550	0.518	0.602	0.121	0.206	5.095	3.821
MK10	104	6,600	0.488	0.489	0.020	0.031	0.962	0.962
MK14	578	35,847	0.511	0.589	0.040	0.064	0.173	0.519
MMP13	572	37,199	0.648	0.753	0.134	0.268	2.446	9.957
MP2K1	121	8,146	0.669	0.569	0.187	0.058	3.293	0.823
NOS1 NRAM	98 98	8,028	0.483	0.451	0.109 0.342	0.041 0.290	3.071 11.221	0.000 3.060
PA2GA	96 99	6,200 5,150	0.853 0.793	0.859 0.756	0.342	0.250	1.020	3.059
PARP1	508	30,029	0.635	0.730	0.225	0.133	11.234	7.884
PGH1	195	10,798	0.645	0.637	0.213	0.100	0.000	2.050
PGH2	435	23,139	0.716	0.780	0.166	0.291	3.444	9.874
PLK1	107	6,800	0.658	0.531	0.123	0.048	1.871	0.000
PNPH	103	6,946	0.575	0.578	0.161	0.181	4.888	8.799
PPARA	373	19,399	0.783	0.778	0.262	0.280	6.693	7.764
PPARD	240	12,250	0.547	0.544	0.078	0.098	1.665	2.498
PPARG	484	25,299	0.515	0.605	0.055	0.118	0.619	4.955
PRGR	293	15,648	0.740	0.793	0.142	0.318	2.053	14.714
PTN1	130	7,249	0.398	0.538	0.055	0.090	0.000	3.068
PUR2	50 77	2,700	0.851	0.837	0.281	0.255	7.857	1.964
PYGM PYRD	77 111	3,944 6,449	0.403 0.682	0.492 0.710	0.016 0.462	0.137 0.413	0.000 34.027	3.917 16.118
FIND	111	0,447	0.002	0.710	0.462	0.413	34.02/	10.110

(continued...)

Target	No.	No.	ROC	ROC	BEDROC	BEDROC	EF <sub>1%</sub>	EF <sub>1%</sub>
	of	of	AUC	AUC	Tani-	Tver-	Tani-	Tver-
	Ac-	De-	Tani-	Tver-	moto	sky	moto	sky
	tives	coys	moto	sky				
RENI	104	6,956	0.720	0.789	0.043	0.138	0.000	0.000
ROCK1	100	6,300	0.347	0.449	0.020	0.084	1.000	4.000
RXRA	131	6,950	0.788	0.900	0.219	0.596	6.091	27.407
SAHH	63	3,450	0.874	0.852	0.598	0.542	35.050	27.084
SRC	524	34,500	0.565	0.477	0.065	0.050	0.382	0.573
TGFR1	133	8,499	0.609	0.639	0.147	0.154	10.565	4.528
THB	103	7,450	0.794	0.762	0.238	0.150	10.614	0.965
THRB	461	27,000	0.605	0.706	0.063	0.166	2.166	5.632
TRY1	449	25,975	0.711	0.815	0.147	0.280	2.898	6.688
TRYB1	148	7,650	0.670	0.670	0.153	0.132	3.378	3.378
TYSY	109	6,745	0.594	0.725	0.071	0.226	0.911	5.468
UROK	162	9,850	0.525	0.650	0.036	0.120	0.000	1.854
VGFR2	409	24,948	0.632	0.578	0.083	0.093	1.465	1.465
WEE1	102	6,150	0.934	0.929	0.789	0.797	59.348	61.294
XIAP	100	5,150	0.752	0.974	0.190	0.897	8.077	51.490

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### 2.9 A Landscape Table Example

Next is an example of a wide table on a landscape oriented paper (Table 2.3).

Table 2.3: A table in landscape orientation.

m	x	у	z	а	$A_m$	В	С	x	у	z	а	$A_m$	В	С
1	16.128	+8.872	16.128	1.402	1.373	-146.6	-137.6	16.128	+8.872	16.128	1.402	1.373	-146.6	-137.6
2	3.442	-2.509	3.442	0.299	0.343	133.2	152.4	3.442	-2.509	3.442	0.299	0.343	133.2	152.4
3	1.826	-0.363	1.826	0.159	0.119	168.5	-161.1	1.826	-0.363	1.826	0.159	0.119	168.5	-161.1
4	0.993	-0.429	0.993	0.086	0.08	25.6	90	1.826	-0.363	1.826	0.159	0.119	168.5	-161.1
5	1.29	+0.099	1.29	0.112	0.097	-175.6	-114.7	1.826	-0.363	1.826	0.159	0.119	168.5	-161.1
6	0.483	-0.183	0.483	0.042	0.063	22.3	122.5	1.826	-0.363	1.826	0.159	0.119	168.5	-161.1
7	0.766	-0.475	0.766	0.067	0.039	141.6	-122	1.826	-0.363	1.826	0.159	0.119	168.5	-161.1
8	0.624	+0.365	0.624	0.054	0.04	-35.7	90	1.826	-0.363	1.826	0.159	0.119	168.5	-161.1
9	0.641	-0.466	0.641	0.056	0.045	133.3	-106.3	1.826	-0.363	1.826	0.159	0.119	168.5	-161.1
10	0.45	+0.421	0.45	0.039	0.034	-69.4	110.9	1.826	-0.363	1.826	0.159	0.119	168.5	-161.1
11	0.598	-0.597	0.598	0.052	0.025	92.3	-109.3	1.826	-0.363	1.826	0.159	0.119	168.5	-161.1

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### 2.10 A Theorem Example

**Theorem 1.** Let f be a function whose derivative exists in every point, then f is a continuous function.

**Theorem 2** (Pythagorean theorem). This is a theorem about right triangles and can be summarised in the next equation

$$x^2 + y^2 = z^2$$

And a consequence of Theorem 2 is the statement in the next corollary.

**Corollary 1.** There's no right rectangle whose sides measure 3 cm, 4 cm, and 6 cm.

You can reference theorems such as 2 when a label is assigned.

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### 2.11 A Lemma Example

**Lemma 1.** Given two line segments whose lengths are a and b respectively there is a real number r such that b = ra.

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest

gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### 2.12 A Proof Example

**Lemma 2.** Given two line segments whose lengths are a and b respectively there is a real number r such that b = ra.

<u>Proof:</u> To prove it by contradiction try and assume that the statement is false, proceed from there and at some point you will arrive to a contradiction.

#### 2.13 A Listing Example

```
1 import numpy as np
2
3 def incmatrix(genl1,genl2):
   m = len(genl1)
    n = len(gen12)
    M = None #to become the incidence matrix
    VT = np.zeros((n*m,1), int) #dummy variable
8
9
    #compute the bitwise xor matrix
10
    M1 = bitxormatrix(genl1)
11
    M2 = np.triu(bitxormatrix(genl2),1)
12
    for i in range (m-1):
13
     for j in range(i+1, m):
14
15
        [r,c] = np.where(M2 == M1[i,j])
16
        for k in range(len(r)):
         VT[(i)*n + r[k]] = 1;
17
18
          VT[(i)*n + c[k]] = 1;
19
          VT[(j)*n + r[k]] = 1;
          VT[(j)*n + c[k]] = 1;
20
21
22
          if M is None:
23
           M = np.copy(VT)
          else:
24
25
           M = np.concatenate((M, VT), 1)
27
          VT = np.zeros((n*m,1), int)
28
    return M
```

Listing 2.1: My Listing Caption

#### **Algorithm 1** An algorithm with caption

```
Require: n \ge 0
Ensure: y = x^n
y \leftarrow 1
X \leftarrow x
N \leftarrow n
while N \ne 0 do
if N is even then
X \leftarrow X \times X
N \leftarrow \frac{N}{2}
else if N is odd then
y \leftarrow y \times X
N \leftarrow N - 1
end if
end while
```

#### 2.14 An Algorithm Example

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### 2.15 Some Technique One

#### 2.15.1 Some Sub-technique One

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### 2.15.1.1 Some Sub-sub-technique One

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

## 2.16 Some Technique Two with Super Long Title Which Will Overrun In Header

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift - not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift - not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift - not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift - not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift - not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain

all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

Imagine some colourful description on Some Technique Three.

#### 2.17 Evaluation Criteria

This section should contain information on the metrics and background used to evaluate your work.

#### 2.18 Related Work

In this section you need to explain (and reference) similar work in literature. Make sure to:

- Give a systematic overview of papers with related/similar work
- Highlight similarities/differences to your work (perhaps in the form of a table)

For references use IEEE style (IEEE Ref. Guide) or Harvard style (Harvard Ref. Guide). Note that this section may be sectioned based on the different aspects of your dissertation. Some referenced text, as an example (Arrighi, 2003; Ebejer et al., 2016; Withers-Martinez et al., 2012).

## 2.19 An Example of Suppressing Page Numbers on A Float Page

Refer to Figure 2.3.

#### 2.20 Summary



Figure 2.3: Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### 3 Materials & Methods

This section should include a recipe of what you did (explain what you have done so if someone wants to reproduce the experiment, they can). A flow chart is typically helpful. Also, make sure to define all software that you used including version numbers and OS. Should also include a description of statistical methods used (if any).<sup>1</sup>

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### 3.1 Summary

<sup>&</sup>lt;sup>1</sup>For more information see: http://rc.rcjournal.com/content/49/10/1229.short

#### 4 Results & Discussion

Should include a reiteration of the experiments, and their outcome. Together with a description (discussion). Preamble should include a reminder of the aims and objectives together with a list of experiments to achieve these. Should include many charts and other visualization with appropriate descriptions.

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

This is the second paragraph. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

And after the second paragraph follows the third paragraph. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

After this fourth paragraph, we start a new paragraph sequence. Hello, here is some

text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### 4.1 Summary

#### 5 Evaluation

In an ideal world, you should have two kind of evaluations. The first is against some ground truth (perhaps a random model?). The second kind of evaluation is against other people's work (accuracy, speed, etc.). Any dimension which is of interest, should be evaluated. Evaluation should be statistically sound.

This is the second paragraph. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

And after the second paragraph follows the third paragraph. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

This is the second paragraph. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### 5.1 Summary

#### **6 Conclusions**

This section should have a summary of the whole project. The original aims and objective and whether these have been met should be discussed. It should include a section with a critique and a list of limitations of your proposed solutions. Future work should be described, and this should not be marginal or silly (e.g. add machine learning models). It is always good to end on a positive note (i.e. 'Final Remarks').

#### 6.1 Revisiting the Aims and Objectives

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### **6.2 Critique and Limitations**

#### **6.3 Future Work**

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### 6.4 Final Remarks

#### References

- Arrighi, P. Quantum computation explained to my mother. arXiv preprint quant-ph/0305045, 2003.
- Ebejer, J.-P., Morris, G. M., and Deane, C. M. Freely available conformer generation methods: How good are they? *J. Chem. Inf. Model.*, 52(5):1146–1158, 2012.
- Ebejer, J.-P., Charlton, M. H., and Finn, P. W. Are the physicochemical properties of antibacterial compounds really different from other drugs? *Journal of Cheminformatics*, 8(1), 2016.
- Harvard Ref. Guide. Harvard References Style. https://www.um.edu.mt/\_\_data/assets/pdf\_file/0007/353662/Harvard\_Guide.pdf. Last Accessed: March 18th, 2022.
- **IEEE Ref. Guide. IEEE References Style.** https://ieeeauthorcenter.ieee.org/wp-content/uploads/IEEE-Reference-Guide.pdf. Last Accessed: March 17th, 2022.
- Withers-Martinez, C., Suarez, C., Fulle, S., Kher, S., Penzo, M., Ebejer, J.-P., Koussis, K., Hackett, F., Jirgensons, A., Finn, P., and Blackman, M. J. Plasmodium subtilisin-like protease 1 (SUB1): Insights into the active-site structure, specificity and function of a pan-malaria drug target. *International Journal for Parasitology*, 42(6):597–612, 2012.

#### A Media Content

If the dissertation has a DVD or pendrive attached to it, you will need a section which explains what is on the media (structure, files, data, etc.). This could be a table with filename and description.

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift - not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift - not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift - not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift - not at all! A blind text like this gives you information about the selected

font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### **B Installation Instructions**

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift - not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift - not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift - not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift - not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello,

here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift - not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift - not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift - not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift - not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no

#### APPENDIX B. INSTALLATION INSTRUCTIONS

information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

#### C User Manual

And after the second paragraph follows the third paragraph. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

After this fourth paragraph, we start a new paragraph sequence. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

This is the second paragraph. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression

of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.