Fiber Optic

Stock Management System

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From 06 Jul. To 07 Aou. 2019

Everything not saved will be lost.

–Nintendo 'Quit Screen' message

Acknowledgements

I'd like to take the time to acknowledge My Supervisor **Moez BOOTERAA** for all the help he gave and the work inducive environment he provided. I'd also like to acknowledge my co-Supervisor **Alaa LAABIDI** for always guiding me and checking my progress, for his help and all the encouragement. I'd also like to thank **My Sister** for her constant encouragement and help, but most importantly I'd like to thank **My Parents** for all their efforts raising me up and guaranteeing such an environment that allowed me to flourish into who I am Now. For all the Times they spent thinking and worrying about me, Thank you.

Thank you all, I appreciate it, I'd also like to thank **ENIT** and all the **Teachers** and **Staff** for their efforts and insights: True Learning comes from you, it's YOU who must spend time in trial and error to truly learn.

Abstract

There are a few reasons why we use **Stock Management Apps** that are based on **Databases**, lowering the **time** it takes to find what we're looking for and minimizing the risk for **data inconsistencies** and **redundancy** that are found among many alternatives like .xml files, also it can guarantee a **separation of concerns** through different **levels of permissions**, and that in turn lowers the risk of users tinkering with things they are not allowed to - or even limiting their access.

In this report we talk about the **conception**, **design** and **realisation** of a Stock Management Application for Tunisie Telecom's Stock of fiber optics, with a separation of Permissions between what different User types can do.

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Introduction

In this section I will explain and summarize what was my internship all about and give a brief outline for the chapters to come.

1.1 | Motivation

As part of my Computer Science Curriculum in the National Engineering School of Tunis, I wanted to complete my internship in a company that is in line with my professional orientation. I did not choose a Telecommunications Company because I wanted to switch to the field of Telecommunications afterwards, but because the mission that was proposed to me was consistent with my professional goals.

Indeed, my primary mission was to observe the environment and interaction of Tunisie Telecom's employees and their discipline and hard work, I also discovered several new tools and techniques that proved very helpful, I also learned the roles of several devices and also many techniques employed by Tunisie Telecom to guarantee their Networks are top notch, it was a great opportunity for me to actually be in such an environment, which gave me more courage as a student to see myself becoming a Software Engineer.

In a second time, I had to design a Web Platform, which is accessible locally. Its role is to enable Tunisie Telecom staff of Creating, Storing, Updating and Deleting different entries of a Fiber Optics stock management program according to their permissions, putting as a priority the simplicity and efficiency of the Web Platform.

Finally, I'm very satisfied of this internship because it introduced me to a lot of new concepts like HTML, CSS, BootStrap, PHP, MySQL, LAMP stack, Linux and even Git Version Control Systems in a domain that I love. And also allowed me to highlight my skills aquired during my Software Engineering year of studies.

The place where I did the Internship is shown in Figure 2.1.

Figure 1.1: Tunisie Telecom

This is an Image taken from Google Maps of the Digital Transmission Center (Centre de Transmission Numérique - CTN) of Tunisie Telecom based in Place Pasteur, Belvedere, hereafter noted DTC. Where I did my Internship.

1.2 | Aims and Objectives - Outline

Besides this Chapter chapter 1 and the Conclusion chapter 4. There are two main chapters:

- In Chapter chapter 2,I will Introduce Tunisie Telecom DTC Belvedere, the company's history and its field of Telecommunications and the things I saw there, as well as the Data Unit (Unité Data) branch, that is responsible for dealing with big companies and clients in which I worked.

- In Chapter chapter 3, I will Introduce the Problem that we faced in Tunisie Telecom alongside the Solution I came up with, It's analysis, conception and realisation alongside the tools I learned throughout the way.

Organization Overview

In this section we'll review Tunisie Telecom's History, Notable Leaders, Its' business sector and the wide range of clients it offers its services to, as well as its' organizational hierarchy and it's work environment.

2.1 | Introduction to Tunisie Telecom & History

2.1.1 | Introduction to TT

Tunisie Telecom is the brand name of the historical provider of telecommunication services in Tunisia. Its capital is 875 million euros and its transaction number, in 2004, amounted to 750 million euros.

Tunisie Telecom is the fully integrated telecom services operator in Tunisia, with leading market positions across all segments with over 7 million customers and an employee base of c.7,500. Tunisie Telecom offers the largest mobile coverage in the country, owns and operates a nationwide fixed and fiber network infrastructure. This is complemented by an extensive submarine cable network allowing for direct and fully redundant connectivity with Europe, Africa and Asia. Tunisie Telecom's service offering ranges from 4G mobile broadband to Fiber-To-The-Home and Fiber-To-The-Building as well as cloud and IP-MPLS solutions for entreprises.

2.1.2 | History

The law establishing the National Telecommunications Office, whose commercial name is Tunisie Télécom, was promulgated on 17 April 1995 and came into force on 1 January 1996.

Tunisie Télécom sets up, operates and markets the first GSM network in Mauritania (Mattel) from May 2000. It also enters into a technical cooperation agreement with Djibouti Telecom for the development of its telecommunications networks.

It became a public limited company at the end of 2002, it changes its legal status, by a decree of April 5, 2004, to become a limited company called "Tunisie Telecom". It is experiencing partial privatization in July 2006 with the entry into its capital, up to 35%, of the Emirati consortium EIT (Emirates International Telecommunications).

From 2008, Tunisie Telecom offers the possibility to national bank card holders to feed the balance of their prepaid lines via ATMs of the Arab Tunisian Bank (Mobilink service).

On March 21, 2009, Tunisie Telecom launched a new brand, Elissa, with offers specifically designed for young people under 25; it becomes accessible to all without age limit as of March 10, 2012.

In the spring of 2011, following the Tunisian revolution, the company is shaken by a major social conflict between the representatives of the Tunisian General Labor Union (UGTT) and those of its UAE shareholder over the fate of some 60 contracts representing 3.5% of the payroll; it is marked by strikes and sit-ins affecting the proper functioning of the operator. It ends with the end of these employment contracts, with the exception of ten contract holders retaining their positions.

In September 2012, Chief Executive Officer (CEO) Ali Ghodhbani retires and is replaced by Mokhtar Mnakri, former CEO of Alcatel's subsidiary.

In 2014, Salah Jarraya was appointed CEO to replace Mnakri, whose term was coming to an end.

In June of the same year, the employees started a social movement to obtain a salary increase and to claim the application of the agreements signed in February 2011. They gather around the UGTT and carry out many work stoppages until May they succeed in May 2015. Following these social movements and strikes, Jarraya resigns on July 2nd.

On August 12, Nizar Bouguila is appointed CEO.

On March 15, 2016, Tunisie Telecom launched its new visual identity called "Life is Emotions", with a new logo. In August, Tunisie Telecom finalizes the purchase of 65.4% of the entire capital of GO.

Bouguila is replaced on September 19, 2017 by Mohamed Fadhel Kraiem. On November 7, Tunisie Telecom signed a five-year contract with the Ministry of Information Technologies and the Digital Economy to cover white areas with broadband telecommunications services.

On December 13, 2017, UAE investment fund Abraaj announced that it had signed an agreement the day before for the definitive purchase of EIT's 35% stake. However,

the bankruptcy of the fund cancels the operation.

2.2 | Activities of Tunisie Telecom & Customers

Tunisie Telecom offers services in the field of fixed and mobile telecommunications. In June 2006, it has 1,259,000 fixed-line subscribers (PSTN), of which it has a monopoly, and 3,265,000 subscribers to the GSM network, the first line having been inaugurated on March 20, 1998.

With a share of market of 35.4% in December 2014) in the mobile phone market, Tunisie Telecom is the second largest mobile operator in the country, behind Ooredoo, leader with a 45.7% market share. In 2014, the incumbent operator posted an average monthly growth rate of 4.2%, which enabled it to surpass five million subscriptions.

Tunisie Telecom is also an Internet access provider (Frame Relay, ADSL, X.25, LS, ISDN and WLL for rural telephony).

In 2010, Tunisie Telecom launched, in collaboration with the Tunisian Post, the MobiDinar mobile remote payment service.

In November 2014, Tunisie Telecom signs a partnership with the Khechine group, which consists in offering the telecom company advantages over the services of the tourism group, in exchange for an advantageous telecommunication offer for hotels and tourism establishments in the country.

In 2016, Tunisie Telecom signs a partnership agreement with the Tunisian Order of Engineers, which allows its members to benefit from a wide range of telecommunication services.

On April 17, 2017, the CEO Nizar Bouguila and the CEO of the CARTE group (Tunisian-European Insurance and Reinsurance Company), Hassine Doghri, announced that they are signing a partnership to optimize the fixed communications of the insurer.

At the end of August 2017, Bouguila and Néji Baghouri, president of the National Union of Tunisian Journalists (SNJT), signed a new partnership agreement stipulating the provision of telecommunications services by Tunisie Telecom to SNJT. The convention also plans to equip the training room at the union's headquarters with new technologies and, thanks to the awarding of a special annual prize, to reward "journalism of excellence".

On November 16, 2017, Tunisie Telecom and the Almadanya Foundation renew their partnership and sponsorship agreement, already three years old, and announce their willingness to launch a new challenge to transport students from remote areas.

On February 6, 2018, Tunisie Telecom and PROLOGIC Holding, the leader in the IT equipment and services market in Tunisia, announce the signing of a new three-year partnership agreement. Also in February, Tunisie Telecom launches its "Wi-Fi on board" offer, a pilot action conducted in partnership with the National Intercity Transport Company (SNTRI) to offer free Internet access via Wi-Fi in the bus network.

On July 10, in Tunis, the management of Tunisie Telecom and that of Vodafone announce that they have signed a new partnership agreement.

On 28 August, Hermess Group CEO Ali Hermassi and Tunisie Telecom signed a partnership agreement further placing the operator as a leader in business services on the Tunisian telecommunications market.

Note that this section may be based on some articles I read on wikipedia and TT's official website. Here are the references (**??**).

2.3 | Organizational Hierarchy

Since September 2010, the functional organization chart of T.T is as follows: 2.1.
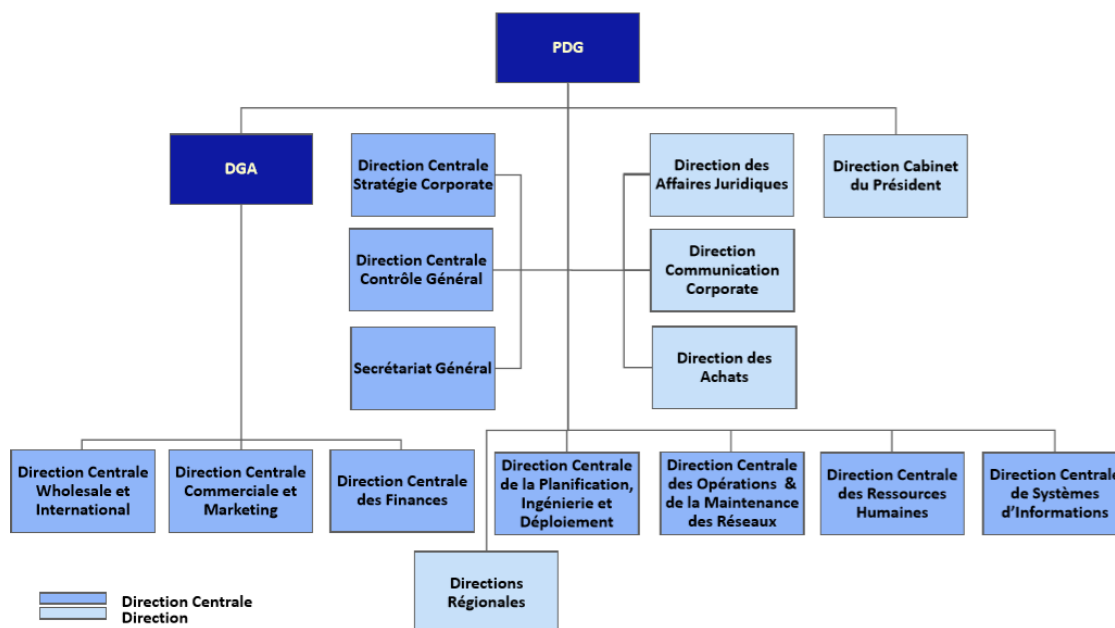
Figure 2.1: Tunisie Telecom

During my internship, I worked for the Data Unit - Business Networks Management Unit that gas the role of ADSL Management, Fiber Optic Management, and manage-

ment of DATA equipment.

2.4 | Work Environment

The work environment is exceptionally excellent, Transparent and Open Communication are at the epicenter of what I think is really good about this work environment: We were feeling heard - as interns, we had value and we certainly felt that we belong in the organization. They also gave us the opportunity to Give and Take, that is, we never felt stuck through bureaucracy or even felt that we're doing worthless work, No, our work was at the very center of what Tunisie Telecom employees needed, and we're also allowed to voice our own opinions back, that's a sign of mutual trust in which we're not afraid to suggest ideas to improve the work process! And the thing that I truly appreciated about the whole process was the Recognition of Hard Work: I feel valued by them for the work I had put in.

The Stock Management Web Application

In this section I will represent what you did in the internship. The project as well as its Conception and design, the Tools Used and its Realisation.

3.1 | Introduction

During the last two weeks of the internship, I was given the task to design and implement A stock management Web application for Tunisie Telecom's Stock of Fiber Optics, all for the benefits of a DBMS: Efficiency, Reliability, Convenience, Safety, Multi-User storage of and access to massive amounts of persistent data.

3.2 | Tools Used

During my internship I used a number of tools including:
- Kali Linux 2019.3 & Elementary OS 5.0 Juno
- LAMP 7.3.9
- Git 2.23.0 & GitHub
- Sublime Text 3.0
- MikTex 2.9.7100 & TexWorks 0.6.3

3.3 | Analysis & Conception

In this Section I will Present a detailed analysis of the problem at hand and its proposed Conception.

3.3.1 | Analysis

We need to track each Fiber Optic Strand, to which Client it is reserved and on which optical fiber loop between Data Transmission Centers it is located. And give different roles to different Users.
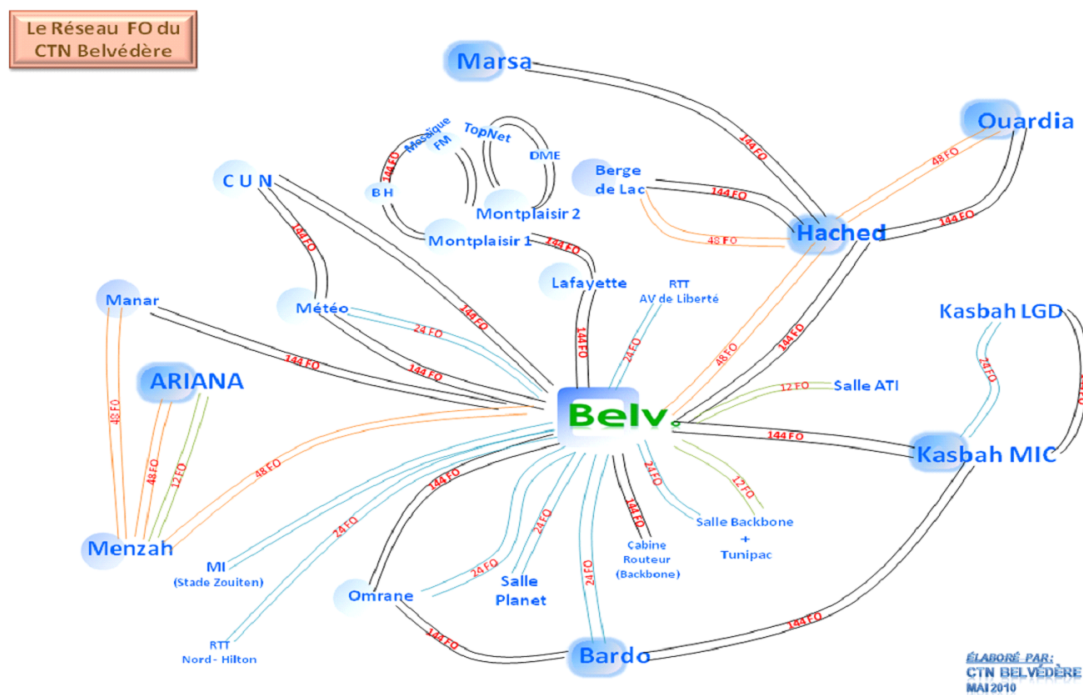
Figure 3.1: Optic Fibers Map

We definitely need this tool implemented as a DBMS because traditional .xls files doesn't provide redundancy control, nor does it give different users different profiles and roles, and we know that DBMS's provide all of that and so much more. The class diagram is shown in 3.3.

Figure 3.2: Optic Fibers Map

Figure 3.3: Conception

3.3.2 | Conception

In the Class Diagram and in our project, all revolves around the FiberOptic Ligne, which belongs to a certain Client (company or individual and further details are out of the

scope of this work), and is situated on a certain Circuit or 'Boucle' between DTC's, and also which Brin - Boucle pair are attributed to that Ligne along with the status. And then separately, there's an Employee with a status of Admin who has all the permissions on adding, modifying or even deleting Ligne, Client, Boucle, Brin and also other Employees. On the other hand a simple User can only create new Lignes for already existing Clients, on boucles that already exist. There are 144 Brins per Boucle, and they can have either the status used or unused or under maintenance.

3.4 | Realisation

Here is a look at the Login screen, the DBMS will automatically recognize which role to grant the Employee. The password is a SHA-256 encrypted and saved in the DBMS. A
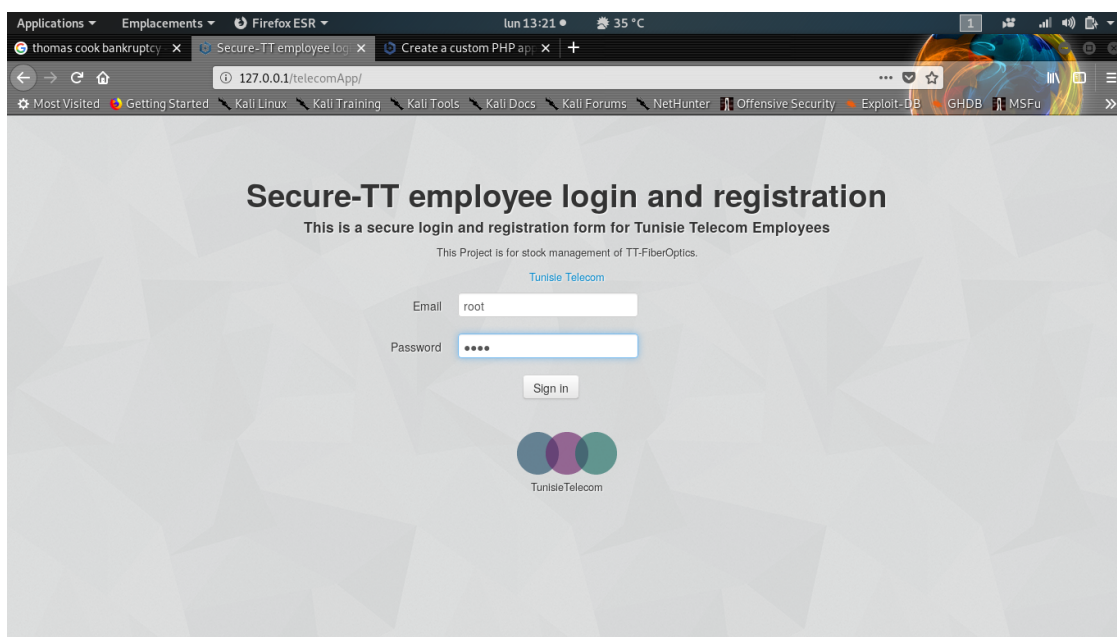
Figure 3.4: Login Screen

User - Employees Dashboard screen is shown below in Figure 3.5. As you can see, a User can only see things he's allowed to see, and can only modify these things exclusively. If the Login process recognizes the Employee as being the Admin, the Dashboard will be something like this, He have total control over everything, as is shown on the left, He can manage Clients, or what I presented in the Conception phase above as Ligne (I made the Implementation before the Conception, big mistake, I know), Employees, Boucles and Brins.

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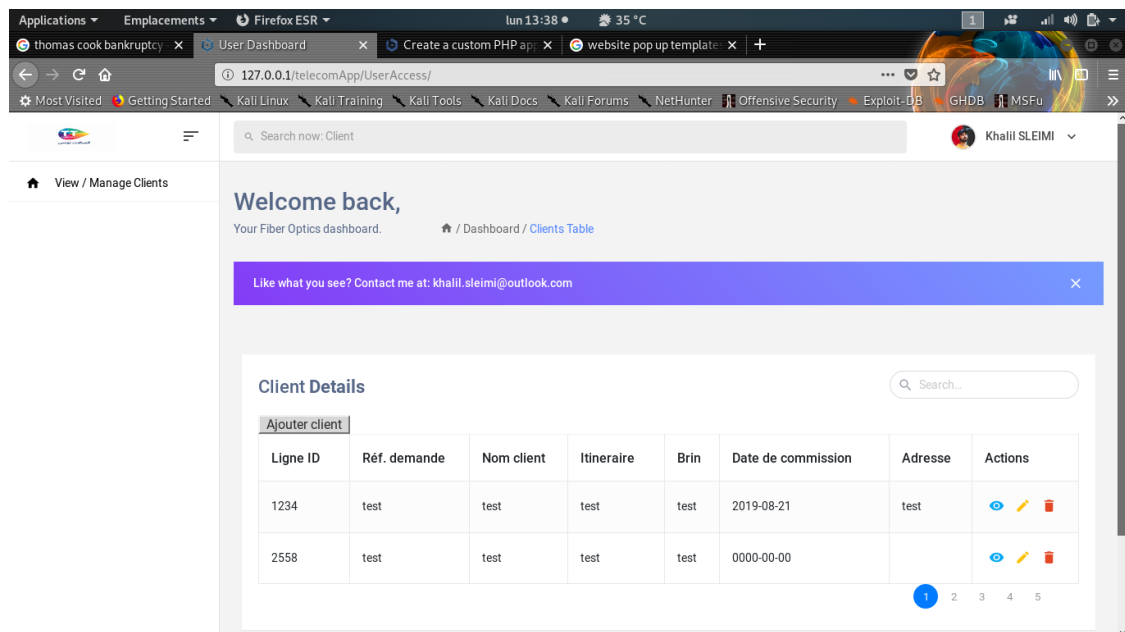
Figure 3.5: User Ligne
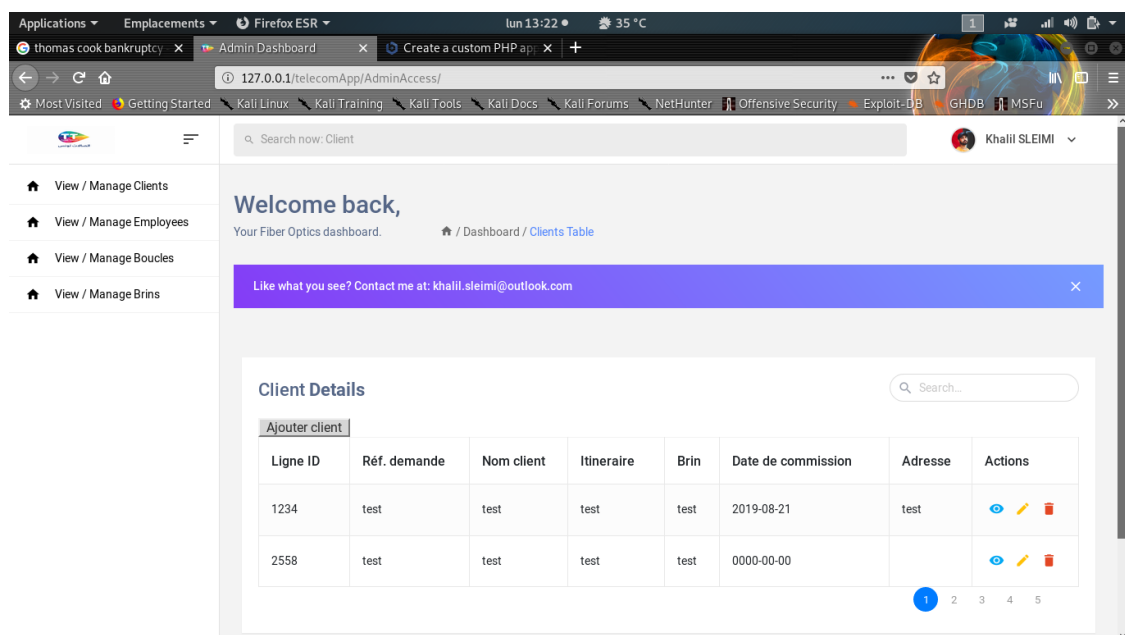
Figure 3.6: Admin Ligne

In this Figure 3.7, the Admin is allowed to Add, remove or even modify any other Employee, If we'd want it to be some more professional, the Department field will be

replaced by a Type field which is either "Admin" or "User". But this was done in less than a month from scratch, and also due to a HDD failure, I don't think I could've done any better - only if I had designed it from the get go and actively used github to back it up - and not forget "git add *" everytime I add some new file.
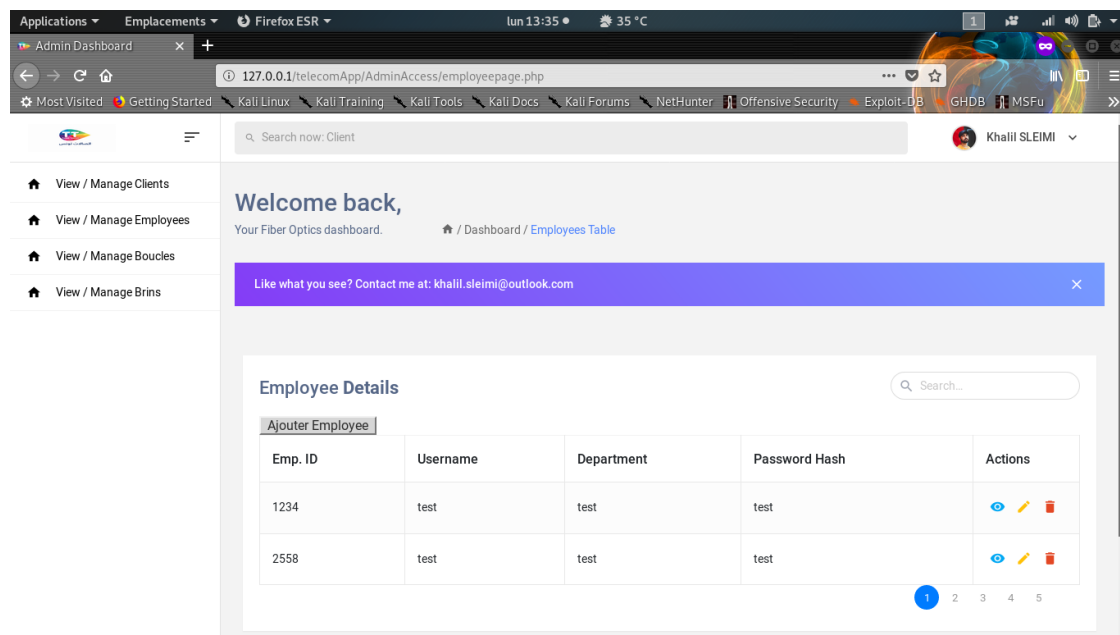
Figure 3.7: Admin Employee

Now, every Ligne is based on a certain Fiber Optic Boucle. This Menu allows the Admin to Manage these Boucles.

And in this figure is a view of how the pop up for adding and modifying Lignes - Clients is like

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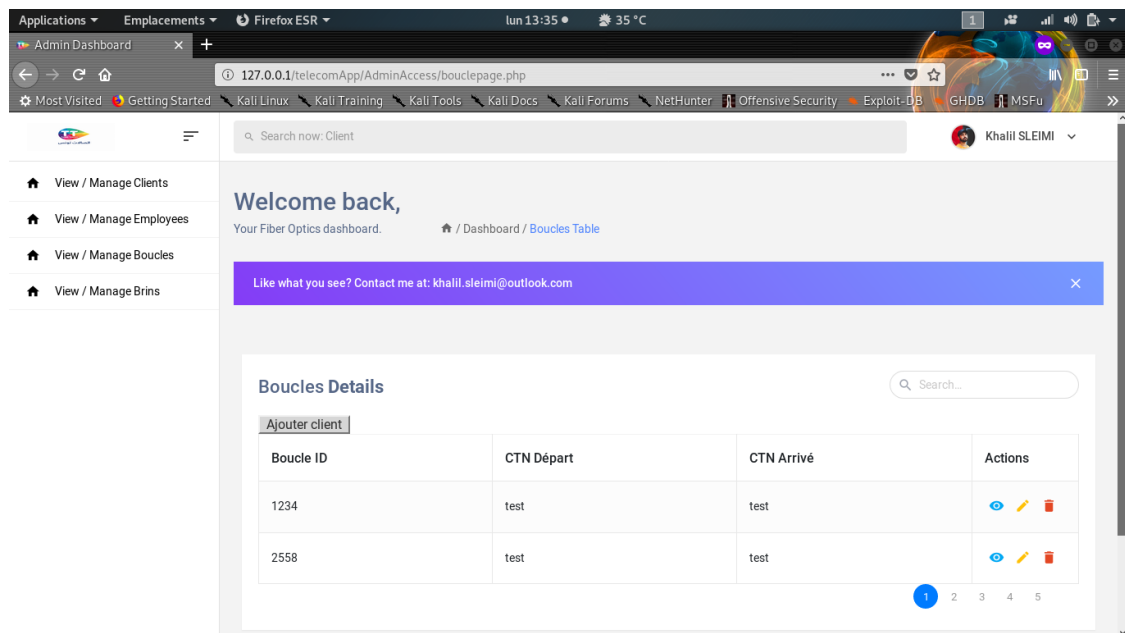
Figure 3.8: Admin Boucles

Figure 3.9: Pop Up

4
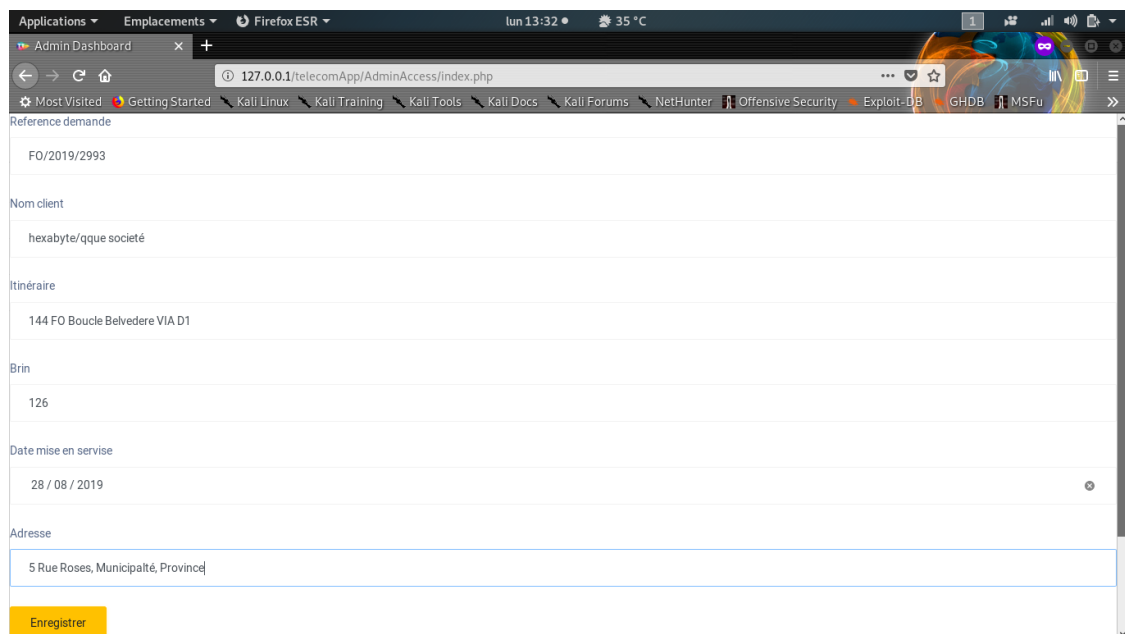
Conclusions

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.

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4.1 | An Example of a Table Spanning Multiple Pages

The following is an example of a table (Table 4.1) spanning multiple pages.

Table 4.1: 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. of Actives	No. of Decoys	ROC AUC Tanimoto	ROC AUC Tversky	BEDROC Tanimoto	BEDROC Tversky	$EF_{1\%}$ Tanimoto	$EF_{1\%}$ Tversky
ABL1	182	10,750	0.563	0.473	0.077	0.077	1.653	2.204
ACE	281	16,877	0.787	0.787	0.336	0.401	12.425	19.525
ACES	453	26,242	0.634	0.645	0.077	0.155	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	15,850	0.523	0.647	0.065	0.129	1.619	5.262
ADRB2	231	14,999	0.523	0.589	0.052	0.040	1.735	0.000

(continued...)

Target	No. of Actives	No. of Decoys	ROC AUC Tanimoto	ROC AUC Tversky	BEDROC Tanimoto	BEDROC Tversky	EF$_{1\%}$ Tanimoto	EF$_{1\%}$ Tversky
AKT1	293	16,450	0.386	0.548	0.039	0.107	2.737	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	283	18,100	0.441	0.775	0.017	0.310	0.000	13.062
BRAF	152	9,950	0.612	0.639	0.208	0.165	12.502	5.264
CASP3	199	10,694	0.600	0.734	0.068	0.258	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	166	12,149	0.526	0.542	0.136	0.152	6.031	7.238
CXCR4	40	3,405	0.575	0.722	0.217	0.134	12.665	0.000
DEF	102	5,699	0.732	0.833	0.212	0.379	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	542	35,047	0.593	0.491	0.054	0.037	0.922	0.000
ESR1	383	20,683	0.838	0.861	0.527	0.594	31.281	39.101
ESR2	367	20,199	0.844	0.870	0.563	0.644	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	0.511	0.522	0.036	0.088	0.722	1.445
FKB1A	111	5,799	0.605	0.751	0.162	0.164	8.122	3.610
FNTA	592	51,493	0.411	0.625	0.012	0.132	0.000	4.053
FPPS	85	8,842	0.917	0.985	0.323	0.776	2.360	36.581
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	101	6,547	0.656	0.668	0.203	0.102	7.978	1.995
HDAC2	185	10,300	0.676	0.734	0.187	0.201	4.318	4.318
HDAC8	170	10,449	0.640	0.819	0.120	0.377	2.946	8.250
HIVINT	100	6,640	0.390	0.554	0.030	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	57	2,850	0.649	0.838	0.228	0.709	14.069	47.483
KPCB	135	8,699	0.753	0.813	0.220	0.338	8.923	12.641
LCK	419	27,391	0.471	0.437	0.031	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

(continued…)

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Target	No. of Actives	No. of Decoys	ROC AUC Tanimoto	ROC AUC Tversky	BEDROC Tanimoto	BEDROC Tversky	EF$_{1\%}$ Tanimoto	EF$_{1\%}$ Tversky
MP2K1	121	8,146	0.669	0.569	0.187	0.058	3.293	0.823
NOS1	98	8,028	0.483	0.451	0.109	0.041	3.071	0.000
NRAM	98	6,200	0.853	0.859	0.342	0.290	11.221	3.060
PA2GA	99	5,150	0.793	0.756	0.225	0.153	1.020	3.059
PARP1	508	30,029	0.635	0.692	0.215	0.231	11.234	7.884
PGH1	195	10,798	0.645	0.637	0.077	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	2,700	0.851	0.837	0.281	0.255	7.857	1.964
PYGM	77	3,944	0.403	0.492	0.016	0.137	0.000	3.917
PYRD	111	6,449	0.682	0.710	0.462	0.413	34.027	16.118
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

4.2 | Some Other Section

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.

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4.3 | A Landscape Table Example

Next is an example of a wide table on a landscape oriented paper.

m	x	y	z	a	A_m	B	C	x	y	z	a	A_m	B	C
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

4.4 | Summary

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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.

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.

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5.1 | Summary

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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 | Achieved 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

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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

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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.

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Installation Instructions

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User Manual

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