

A Smart Green EPR400 Final Report LaTeX digital twin

Final Report

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Submitted as partial fulfilment of the requirements of Project EPR402
in the Department of Electrical, Electronic and Computer Engineering
University of Pretoria

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Study leader: Mr. X. Why

Part 1. Preamble

This report describes work that I did <to be completed>.

Project proposal and technical documentation

This main report contains an unaltered copy of the approved Project Proposal (as Part 2 of the report).

Technical documentation appears in Part 4 (Appendix).

All the code that I developed appears as a separate submission on the AMS.

Project history

This project makes extensive use of existing algorithms on ... Some of the algorithms I used were adapted from ... Where other authors' work has been used, it has been cited appropriately, and the rest of the work reported on here, is entirely my own.

Language editing

This document has been language edited by a knowledgeable person. By submitting this document in its present form, I declare that this is the written material that I wish to be examined on.

My language editor was _____.

Language editor signature

Date

Declaration

I, P. Pompies understand what plagiarism is and have carefully studied the plagiarism policy of the University. I hereby declare that all the work described in this report is my own, except where explicitly indicated otherwise. Although I may have discussed the design and investigation with my study leader, fellow students or consulted various books, articles or the internet, the design/investigative work is my own. I have mastered the design and I have made all the required calculations in my lab book (and/or they are reflected in this report) to authenticate this. I am not presenting a complete solution of someone else.

Wherever I have used information from other sources, I have given credit by proper and complete referencing of the source material so that it can be clearly discerned what is my own work and what was quoted from other sources. I acknowledge that failure to comply with the instructions regarding referencing will be regarded as plagiarism. If there is any doubt about the authenticity of my work, I am willing to attend an oral ancillary examination/evaluation about the work.

I certify that the Project Proposal appearing as the Introduction section of the report is a verbatim copy of the approved Project Proposal.

P. Pompies

Date

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LIST OF ABBREVIATIONS

AWGN	Additive white Gaussian noise
BER	Bit error rate
BPSK	Bipolar phase shift keying
DSP	Digital signal processor
GSM	Global System for Mobile communications
SNR	Signal-to-noise-ratio

Part 2. Project definition: approved Project Proposal

This section contains the problem identification in the form of the complete approved Project Proposal, unaltered from the final approved version that appears on the AMS.

For use by the Project lecturer		Approved	Revision required
<div>Feedback</div> <div>✓<div>Approved</div></div>			

To be completed by the student				
PROJECT PROPOSAL 2023				
Title	Surname	Initials	Student no	Project no
Mr	Pompies	P	12345678	Study leader (title, initials, surname)
		Mr X. Why		
Project title				
A Smart Green EPR400 Final Report LaTeX digital twin				

Language editor details	Language editor signature
Student declaration I understand what plagiarism is and that I have to complete my project on my own.	Study leader declaration This is a clear and unambiguous description of what is required in this project. Approved for submission (Yes/No)
Student signature	Study leader signature and date

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Part 3. Main Report

1. Literature study

Shannon *et al.*[1]

2. Approach

3. Design and implementation

3.1 Design summary

3.2 Theoretical analysis and modelling

3.3 Simulation study and optimisation

3.4 Hardware design

3.5 Hardware implementation

3.6 Software design

3.7 Software implementation

3.8 Final system integration and testing

4. Results

4.1 Summary of results achieved

4.2 Qualification tests

5. Discussion

5.1 Critical evaluation of the design

5.1.1 Interpretation of results

5.1.2 Critical evaluation

5.1.3 Unsolved problems

5.1.4 Strong points of the design

5.1.5 Expected failure conditions

5.2 Considerations in the design

5.2.1 Ergonomics

5.2.2 Health and safety

5.2.3 Environmental impact

5.2.4 Social and legal impact

5.2.5 Ethics clearance

6. Conclusion

6.1 Summary of the work completed

6.2 Summary of the observations and findings

6.3 Contribution

6.4 Future work

7. References

- [1] C. Shannon, “A Mathematical Theory of Communications,” *Bell Systems Technical Journal*, vol. 27, October 1948.

Part 4. Appendix: technical documentation

HARDWARE part of the project

Record 1. System block diagram

Record 2. Systems level description of the design

Record 3. Complete circuit diagrams and description

Record 4. Hardware acceptance test procedure

Record 5. User guide

SOFTWARE part of the project

Record 6. Software process flow diagrams

Record 7. Explanation of software modules

Record 8. Complete source code

Complete code has been submitted separately on the AMS.

Record 9. Software acceptance test procedure

Record 10. Software user guide

EXPERIMENTAL DATA

Record 11. Experimental data