Table of Contents

Title of the Report 3
Abstract 3
List of Acronyms 3
Introduction 3
Project Context 3
Challenge and Objectives 3
Methodological Overview 3
Report Structure 4
Problem Understanding 4
Introduction 4
Challenge Description 4
Stakeholder Analysis 4
User Analysis 4
Requirements 4
Objectives and Success Criteria 4
Summary 4
State of the Art 4
Introduction 5
Domain Overview 5
Existing Solutions 5
Relevant Technologies and Approaches 5
Gap Analysis 5
Design Implications 5
Summary 6
Critical Thinking and Ethical Considerations 6
Introduction 6
Stakeholders and Impact 6
Risks and Concerns 6
Design Implications 6
Summary 7
Data Understanding 7
Introduction 7
Data Sources 7
Data Quality Assessment 7
Exploratory Analysis 7
Data Limitations 7
Summary 7
Solution Design 7
Introduction 7
Solution Vision 7
Design Requirements 7
User Stories 7
Conceptual Data Model 8
Information Architecture 8
UX/UI Design 8
Summary 8
Development 8

Introduction 8
System Architecture 8
Data Pipeline 8
Backend Development 8
Analytics Components 8
Front-End Development 8
Integration 8
Summary 8
Evaluation 9
Introduction 9
Functional Testing 9
Usability Testing 9
Validation Against Requirements 9
Discussion 9
Deployment 9
Introduction 9
User Manual 9
Installation and Deployment 9
Sustainability and Maintenance 9
Summary 9
Conclusions 9
Achievements 9
Limitations 10
Future Work 10
Acknowledgements 10
Bibliography 10

Title of the Report

- Author1
- Author2
- Author3

2026/02/16 22:34 · epsatisep · 0 Comments

Abstract

2026/02/16 22:31 · epsatisep · 0 Comments

List of Acronyms

Acronym	Description
CRISP-DM	Cross-Industry Standard Process for Data Mining
ISEP	Instituto Superior de Engenharia do Porto
MADS4Engineering	Minor in Applied Data Science to Engineering

2026/02/16 22:32 · epsatisep · 0 Comments

Introduction

Project Context

MADS4Engineering provides a project-based learning and intercultural multidisciplinary teamwork experience; the real-world challenge; the composition of the team; the relevance of multidisciplinary and intercultural collaboration.

Challenge and Objectives

Describe very briefly the challenge addressed; main project objective; key expected outcome.

Methodological Overview

Just a paragraph explaining that: Design Thinking supported problem framing and user-centred design; CRISP-DM structured the data science activities; Scrum supported project execution. No methodological details.

Report Structure

Chapter	Description
1	…
2	…
3	…
4	…
5	…
6	…
7	…
8	…

2026/02/16 21:05 · epsatisep · 0 Comments
0 Comments

Problem Understanding

Introduction

Provide here an overview of the contents (structure) of this chapter.

Challenge Description

Stakeholder Analysis

User Analysis

Requirements

Objectives and Success Criteria

Summary

2026/09/08 17:34 · mads4engineering · 0 Comments

State of the Art

This chapter provides the reader with the relevant technical-scientific background as well as existing related products and research, also known as the state of the art, in the field(s) of the project.

Introduction

Provide here an overview of the contents (structure) of this chapter.

These are examples of citations to books **[1]** and **[2]**, a chapter on a smart companion **[3]**, articles on IoT **[4]**, blimps **[5]**, cloud computing **[6]**, gas emissions **[7]**, pedestrian crossing behaviour **[8]**, smart bicycles **[9]** and diaper moisture **[10]**, and to Web resources **[11]**, **[12]** and **[13]**.

Domain Overview

Existing Solutions

Commercial solutions

Open-source solutions

Research prototypes

Compare selected solutions considering the requirements of your own solution

Relevant Technologies and Approaches

Data sources and acquisition

Data analysis and modelling techniques

Data visualisation techniques

UI/UX approaches

Development technologies

Gap Analysis

Summary of limitations of existing solutions

Identified opportunity

Positioning of the proposed solution

Design Implications

Summary

Provide here the conclusions of this chapter and make the bridge to the next chapter.

What did the you learn from the state of the art and how did it influence the proposed solution?

2026/02/16 21:06 · epsatisep · 0 Comments

Critical Thinking and Ethical Considerations

Introduction

Provide here an overview of the contents (structure) of this chapter.

Stakeholders and Impact

Identification of affected stakeholders

Expected benefits

Potential risks

Risks and Concerns

Ethical issues

Privacy and security issues

Bias and fairness issues

Sustainability issues and SDG alignment

Applicable regulations

Design Implications

How the identified concerns influenced the design

Requirements derived from ethical and critical thinking considerations

Summary

Provide here the conclusions of this chapter and make the bridge to the next chapter.

2026/02/16 21:10 · epsatisep · 0 Comments

Data Understanding

Introduction

Data Sources

Data Quality Assessment

Exploratory Analysis

Data Limitations

Summary

2026/09/08 17:42 · mads4engineering · 0 Comments

Solution Design

Introduction

Solution Vision

Design Requirements

User Stories

Conceptual Data Model

Information Architecture

UX/UI Design

Summary

2026/09/08 17:43 · mads4engineering · 0 Comments

Development

Introduction

Provide here an overview of the contents (structure) of this chapter.

System Architecture

Data Pipeline

Backend Development

Analytics Components

Front-End Development

Integration

Summary

Provide here the conclusions of this chapter and make the bridge to the next chapter.

2026/02/16 21:11 · epsatisep · 0 Comments

Evaluation

Introduction

Functional Testing

Usability Testing

Validation Against Requirements

Discussion

2026/09/08 17:47 · mads4engineering · 0 Comments

Deployment

Introduction

User Manual

Installation and Deployment

Sustainability and Maintenance

Summary

2026/09/08 17:48 · mads4engineering · 0 Comments

Conclusions

Achievements

Discuss here what was achieved (wrt the initial objectives) and what is missing (wrt the initial objectives) of the project.

Limitations

Identify here the limitations of the solution and prototype.

Future Work

Provide here your recommendations for future work.

2026/02/16 21:12 · epsatisep · 0 Comments

Acknowledgements

2026/02/16 22:33 · epsatisep · 0 Comments

Bibliography

Will be added automatically by citing, in the body of the report, entries specified in BibTeX format and stored in the https://www.mads4e.dee.isep.ipp.pt/doku.php?id=refnotes:bib file

PS - *If you have doubts on how to make citations, create captions, insert formulas, etc. visit this page with examples and select "Show pagesource" to see the source code.*

---

[1] Rita Thapa, Hom Bahadur Rijal, Masanori Shukuya, Hikaru Imagawa, 2019. Study on the wintry thermal improvement of makeshift shelters built after Nepal earthquake 2015. *Energy and Buildings*, 199, pp.62 - 71, ISSN 0378-7788.
[2] Kazuko Obayashi, Shigeru Masuyama, 2020. Pilot and Feasibility Study on Elderly Support Services Using Communicative Robots and Monitoring Sensors Integrated With Cloud Robotics. *Clinical Therapeutics*, ISSN 0149-2918.
[3] Alexandre Soares dos Reis, Elien Gielen, Ko Wopereis, Marcel Pasternak, Vaido Sooäär, Tobias Schneider, Abel J. Duarte, Benedita Malheiro, Jorge Justo, Cristina Ribeiro, Manuel F. Silva, Paulo Ferreira, Pedro Guedes, 2020. Smart Companion Pillow – An EPS@ISEP 2019 Project. *Robot 2019: Fourth Iberian Robotics Conference*, Cham: Springer International Publishing, pp.465–476, ISBN 978-3-030-36150-1.
[4] Abdelbaset S. Hamza, Rahman Tashakkori, Bejamen Underwood, William O'Brien, Chris Campell, 2023. BeeLive: The IoT platform of Beemon monitoring and alerting system for beehives. *Smart Agricultural Technology*, 6, pp.100331, ISSN 2772-3755.
[5] Manuel Mahn, Markus Kemper, 2006. A BEHAVIOUR-BASED NAVIGATION SYSTEM FOR AN AUTONOMOUS INDOOR BLIMP. *IFAC Proceedings Volumes*, 39, pp.837-842, ISSN 1474-6670.
[6] B. Sotomayor, Ruben S. Montero, I.M. Llorente, I. Foster, Sept 2009. Virtual Infrastructure Management in Private and Hybrid Clouds. *Internet Computing, IEEE*, 13, pp.14-22.
[7] Ranjith, V. Velmurugan, S. Thanikaikarasan, 2020. Prediction of Exhaust Gas Emission characteristics using Neem oil blended bio-diesel in diesel engine. *Materials Today: Proceedings*, 21, pp.870 - 875, ISSN 2214-7853.
[8] Anae Sobhani, Bilal Farooq, 2018. Impact of smartphone distraction on pedestrians crossing behaviour: An application of head-mounted immersive virtual reality. *Transportation Research Part F:*

Traffic Psychology and Behaviour, 58, pp.228 - 241, ISSN 1369-8478.
[9] YeongKyun Lee, Jongpil Jeong, 2018. Design and Implementation of Monitoring System Architecture for Smart Bicycle Platform. *Procedia Computer Science*, 134, pp.464–469, ISSN 1877-0509.
[10] Tareq Khan, May 2018. A Smart Wearable Gadget for Noninvasive Detection and Notification of Diaper Moister. *2018 IEEE International Conference on Electro/Information Technology (EIT)*, pp.0240-0244, ISSN 2154-0373.
[11] Android Open Source Project, 2014. *Android Developers: Android 4.1 APIs.* [Accessed in April 2017].
[12] Cloud Expo, 2008. *Twenty-One Experts Define Cloud Computing.* [Accessed in April 2021].
[13] Gartner, 2021. *Gartner Magic Quadrant for Data Science and Machine Learning Platforms.* [Accessed in April 2021].

From:
https://www.mads4e.dee.isep.ipp.pt/ - **MADS4Engineering**

Permanent link:
https://www.mads4e.dee.isep.ipp.pt/doku.php?id=report&rev=1788884745

Last update: **2026/09/08 17:25**