

## MDM2 – Case Study: Intelligent Systems in Production. One-Page Proposal

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<b>Project Title</b>	Towards Better Product Quality: Identifying Legitimate Quality Issues using NLP & Machine Learning																																																																																																						
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<b>Industrial Application</b>	Manufacturing and Product Quality Management: Automating the classification of service repair reports to identify genuine product quality issues using Natural Language Processing (NLP) and Machine Learning (ML).																																																																																																						
<b>Keywords</b>	NLP, Machine Learning, Product Quality, Service Reports, Automation, Text Classification																																																																																																						
<b>Submission Date</b>	2025-10-19																																																																																																						
<b>Gant Chart</b>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>PHASE</th><th>WEEK 1 (10-02)</th><th>WEEK 2 (10-09)</th><th>WEEK 3 (10-16)</th><th>WEEK 4 (10-23)</th><th>WEEK 5 (10-30)</th><th>WEEK 6 (11-06)</th><th>WEEK 7 (11-10)</th><th>WEEK 8 (11-13)</th><th>WEEK 9 (11-13)</th><th>WEEK 10 (11-20)</th><th>WEEK 11 (11-27)</th><th>WEEK 12 (12-04)</th><th>WEEK 13 (12-11)</th><th>WEEK 14 (12-18)</th><th>WEEK 15 (01-08)</th><th>WEEK 16 (01-15)</th></tr> </thead> <tbody> <tr> <td>1</td><td style="background-color: black;"></td><td style="background-color: black;"></td><td style="background-color: black;"></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>2</td><td></td><td></td><td style="background-color: black;"></td><td style="background-color: black;"></td><td style="background-color: black;"></td><td style="background-color: black;"></td><td style="background-color: black;"></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>3</td><td></td><td></td><td></td><td></td><td></td><td></td><td style="background-color: black;"></td><td style="background-color: black;"></td><td style="background-color: black;"></td><td style="background-color: black;"></td><td style="background-color: black;"></td><td style="background-color: black;"></td><td style="background-color: black;"></td><td></td><td></td><td></td></tr> <tr> <td>4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td style="background-color: black;"></td><td style="background-color: black;"></td><td style="background-color: black;"></td><td></td><td></td></tr> <tr> <td>5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td style="background-color: black;"></td><td style="background-color: black;"></td></tr> </tbody> </table>	PHASE	WEEK 1 (10-02)	WEEK 2 (10-09)	WEEK 3 (10-16)	WEEK 4 (10-23)	WEEK 5 (10-30)	WEEK 6 (11-06)	WEEK 7 (11-10)	WEEK 8 (11-13)	WEEK 9 (11-13)	WEEK 10 (11-20)	WEEK 11 (11-27)	WEEK 12 (12-04)	WEEK 13 (12-11)	WEEK 14 (12-18)	WEEK 15 (01-08)	WEEK 16 (01-15)	1																	2																	3																	4																	5																
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<b>1) Problem Statement &amp; Measurable Outcomes</b>	Manual classification of technical service reports is time-consuming and inconsistent, especially with large multilingual datasets. The project aims to automate fault identification from service logs using NLP and ML techniques. Success will be measured through metrics such as classification accuracy, macro F1-score, and reduction in manual review time.																																																																																																						
<b>2) Motivation &amp; Industrial Relevance</b>	Manufacturers face delays in detecting product faults due to manual review. This system enables early fault detection, faster design feedback, and improved customer satisfaction by automating report analysis. Industries like appliances, automotive, and electronics can integrate this framework to strengthen quality assurance and reliability processes.																																																																																																						
<b>3) Related Work Snapshot</b>	Recent industrial studies show the potential of NLP for analyzing customer feedback and maintenance logs. Text-based fault detection models using TF-IDF, Word2Vec, and BERT have proven effective in detecting technical anomalies. This project builds upon such methods to create a domain-specific quality monitoring model tailored for Electrolux Professional service data.																																																																																																						
<b>4) Method &amp; Feasibility</b>	Service reports are preprocessed through a multilingual NLP pipeline for text normalization and translation. Feature extraction methods (TF-IDF, Word2Vec, GloVe, Doc2Vec) are benchmarked, and the best-performing model is selected for final deployment. Data is anonymized to ensure privacy and GDPR compliance. Expected outputs include a classification model, evaluation dashboard, and validation report.																																																																																																						
<b>5) Milestones &amp; Timeline</b>	<ul style="list-style-type: none"> <li>Phase 1 (Oct 16): Define project scope, collect dataset, set up NLP pipeline.</li> <li>Phase 2 (Nov 6): Implement preprocessing and feature extraction methods.</li> <li>Phase 3 (Nov 27): Train and evaluate ML models, select best classifier.</li> <li>Phase 4 (Dec 18 ): Integrate feedback mechanism and finalize MVP.</li> <li>Phase 5 (Jan 15): Prepare final report, create demo presentation, upload all files to GitHub.</li> </ul>																																																																																																						
<b>6) Risks &amp; Ethics</b>	Potential risks include data imbalance and language inconsistencies. To mitigate these, data augmentation and translation normalization are applied. All reports are anonymized, ensuring no PII exposure. Ethical AI practices are followed, maintaining transparency, fairness, and data security throughout development.																																																																																																						

Phase 1 rubric (15%): Team & GitHub (2%), On-time (2%), Topic & Proposal (5%) — Industrial Application, Problem+Outcomes, Feasibility+Timeline; Presentation (6%).