

Subject Code and Title: SEP401 (N06748) Software Engineering Principles

Clinic Trends AI

Assessment 1, Part A: Software Project Proposal

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1. Introduction

In the fast-paced world of aesthetic clinics, customer satisfaction is vital but often measured retroactively. Clinics use survey tools like NPS but lack the analytical systems to proactively act on the data. ClinicTrendsAI addresses this gap by offering a predictive dashboard powered by machine learning that visualizes satisfaction trends and forecasts potential dips.



This project aims to bridge professional experience managing large-scale clinic operations with transition into software engineering. We have access to a rich dataset of over 1 million customer records, offering real-world relevance. It's an opportunity to apply regression and classification models, along with intuitive data visualization tools, to help managers and owners make proactive decisions in business.

The importance of rigorous requirement analysis and proactive issue detection is also highlighted in the literature. As noted by Ewusi-Mensah (2003), poor planning and evolving requirements are a frequent cause of failure in software projects. Stephens (2015) also emphasizes the value of structured engineering steps while developing high-quality systems.

This project is significant because it introduces automation, forecasting and explainability into service quality management, which is often manual and reactive.

2. Similar Work

Several companies use customer satisfaction analytics, such as Medallia (<https://www.medallia.com>) and Qualtrics (<https://www.qualtrics.com>), but they often require expensive subscriptions and are not tailored for small to medium-sized clinics. Tools like SurveyMonkey (<https://www.surveymonkey.com>) offer dashboards and emails, but lack predictive analytics. Academic work such as Ahmad et al. (2013) discusses maintainability and satisfaction indicators, which will guide model feature selection.

This project differs by offering:

- A lightweight, open-source MVP
- Tailored prediction for NPS evolution
- Feature importance for actionable insights

Cobb (2015) also outlines how agile project management techniques can improve responsiveness to customer feedback, a concept central to this dashboard's iterative development.

References:

- Stephens, R. (2015). *Beginning Software Engineering*. Wrox.
- Ahmad, M. O., Markkula, J., Oivo, M. (2013). Factors affecting software maintainability from customer perspective. *J. Syst. Softw.*
- Ewusi-Mensah, K. (2003). *Software Development Failures*. MIT Press.
- Cobb, C. G. (2015). *The Project Manager's Guide to Mastering Agile*. Wiley.

3. Proposal

ClinicTrendsAI is a Streamlit-based Python application that loads CSV survey data and outputs:

- Historical visualizations of NPS over time and per clinic
- Machine learning predictions for future NPS
- Alerts for negative trend thresholds
- Feature impact analysis to understand drivers of satisfaction

3.0 Methodology

This project will adopt a lightweight Agile-inspired methodology, enabling development in short, iterative cycles. This approach will allow for continuous feedback and refinements based on model performance and visual outputs. The flexibility of Agile is ideal for managing evolving insights from real-world data while maintaining a clear trajectory toward project deliverables.

3.1 Deliverables

- A functioning MVP dashboard (Streamlit + Python)
- Machine Learning module for satisfaction forecast
- Alert system based on NPS thresholds
- Documentation and demo video

3.2 Tasks

- Data preprocessing and wrangling
- Exploratory data analysis
- Model selection and training (regression or classification)
- UI/UX design in Streamlit
- Integration of model with dashboard
- Testing and validation

3.3 Timeline

Phase	Weeks												Activities
	1	2	3	4	5	6	7	8	9	10	11	12	
Requirements gathering	x	x	x										Define metrics, user stories, risk mapping
Design and dataset setup				x	x	x							Prepare sample data, create mockups, select ML model

Development							x	x	x	x			Backend/Frontend build, ML model integration
Testing and Evaluation												x	Model accuracy checks, usability testing
Presentation and delivery												x	Final polish, prepare demo and results summary

3.4 Evaluation

The project's success will be evaluated through:

- Accuracy and performance of prediction model
- User testing for clarity and utility of dashboard
- Ability to identify and act on customer churn risks

3.5 Contributions

ClinicTrendsAI contributes an affordable, scalable solution for small clinics to leverage AI for operational insight. It also demonstrates the use of applied ML in software engineering practice.

4. References

- Stephens, R. (2015). *Beginning Software Engineering*. Wrox Press.
- Ewusi-Mensah, K. (2003). *Software Development Failures*. MIT Press.
- Cobb, C. G. (2015). *The Project Manager's Guide to Mastering Agile*. Wiley.
- Ahmad, M. O., Markkula, J., Oivo, M. (2013). *Factors affecting software maintainability from customer perspective*. *Journal of Systems and Software*.