

CHAPTER 1. INTRODUCTION

1.1 Project Background

A Product Requirement Document (PRD) is a construct that focuses on product requirements, spanning the entire product lifecycle. This document helps designers and product developers understand customer needs by detailing the product overview, goals, and target audience. PRDs also list and define both functional and non-functional requirements, assumptions and constraints, and criteria for success and failure. Well-articulated PRDs assist the various teams involved in product development understand the purpose and vision for each product.

The creation of PRDs is a manual and iterative process, in part, due to the absence of automation in the PRD writing process. Since PRDs are natural-language documents, the quality of a PRD is heavily dependent on the author's clarity of thought. Natural language requirements are known to create ambiguity, incompleteness, and inconsistency. This is especially true when different collaborators and stakeholders interpret the PRD. Requirements engineering has documented the adverse effects of misalignment on product planning and development (Norheim et al., 2024).

In contemporary software development, where requirements may evolve and necessitate constant revision of documentation, the challenge of maintaining aligned documentation is compounded by the nature of agile development. In the absence of up-to-date documentation, developers lose the utility of the reference, which is one of the primary motivators for the need to document. This can be a significant hindrance to the formation of a flexible and agile development team (Birru et al., 2025). Documenting software development builds the need for an integrated system that accommodates rapid draft generation, ease of revision, and provision of flexible document structure while still incorporating manual oversight.

The most recent advancements in Artificial Intelligence (AI) and Natural Language Processing (NLP) together with the advent of Large Language Models (LLMs) have generated unprecedented opportunities for the automation of software

development. A systematic literature review conducted by (Hou et al., 2024) indicates that the use of LLMs has proliferated the automation of the majority of the software development tasks, the most significant of which is documentation. Although the use of LLMs for the automation of documentation related to requirements engineering is still in its infancy, it is well understood that the use of LLMs in this area still needs tight supervision due to LLMs failure to provide quality outputs that are reliable and can be validated (Norheim et al., 2024).

Existing research (Almonte et al., 2025) indicates that the use of LLMs to automate the generation of requirements (especially the delineation of non-functional requirements from the statement of functional requirements) is feasible. However, most of the existing research still focuses on the automation of the generation of the fragmented requirements of the system. This provides an opportunity for the automation of the generation of an integrated and flexible system that allows the automation of the generation of requirements, coupled with an editable and flexible draft output that allows iterative refinement and history traceability of the outputs.

This project therefore proposes the creation of an AI-Based Product Requirement Document Generator utilizing Large Language Models. This system will take initial product inputs, run the inputs through the LLM generation workflow, and produce a draft of the Product Requirement Document (PRD). Users will then have the ability to review, edit, refine, and save or export the PRD. This project aims to create a more standardized and pragmatic approach to the creation of PRDs while maintaining the human review step in the documentation workflow.

1.2 Problem Statement

Based on the background provided, this project focuses on the challenge of addressing the reliance on the manual method for creating Product Requirement Documents (PRDs). PRDs play a crucial role in the documentation of the goal, need, constraints, and criteria for the success of the product. However, preparation of PRDs is primarily reliant on natural language statements and several iterations of revision by the writer. This creates a slow and inconsistent method for preparing

PRDs as different authors perceive and interpret the ideas, needs, and constraints of the product in different ways. In the field of requirements engineering, inconsistency and ambiguity are critical as they define the requirements that are prone to be misinterpreted during the process of implementation (Marques et al., 2024; Norheim et al., 2024).

The second challenge is that in the modern software development context, documentation must keep pace with changes to requirements. Agile development methodology favors rapid and frequent changes to development and the associated requirements. PRDs that are manually maintained may not be consistently updated. This results in PRDs becoming stale and no longer serving as a reliable reference. This introduces a gap in documentation that misaligns the current product and the requirements, which adversely affects the planning and the efficiency of the development process of the product (Birru et al., 2025).

The third issue relates to the limitations present within current approaches to AI-supported requirements documentation. Although there has been an increasing interest in the use of LLMs in the fields of Software Engineering and Requirements Engineering, these studies are mostly concerned with isolated tasks such as the elicitation of requirements, the documentation of Software Requirements Specifications (SRSs), the formulation of user stories, and/or the articulation of non-functional requirements, among others. Although these studies present the use of LLMs for tasks related to requirements, they do not fulfill the demand for an integrated PRD-centered workflow that generates a PRD draft, allows users to review and edit the draft, supports the draft refinement, controls the history of the draft, and allows the final document to be exported (Almonte et al., 2025; Hou et al., 2024; Krishna et al., 2024).

Therefore, it is imperative to develop and assess an AI-based PRD Generator for more systematic PRD preparation. The envisioned solution is to be capable of producing, from preliminary product inputs such as product briefs and/or requirement notes, a draft of a PRD that is structured and can be reviewed, edited, refined, and exported by its users. The objective of this project is not to eliminate the use of human judgment in the product planning process; instead, the objective

is to provide a tool that is workflow-oriented in such a way that it allows faster drafting and greater structural consistency to the PRD preparation process that incorporates the human review of the draft.

1.3 Project Objectives

- a. To create a PRD generation capability that uses LLMs to convert preliminary product inputs, such as product briefs, requirement notes, and product ideas, into drafts of structured PRDs.
- b. To develop features that allow users to review, edit, and refine the generated PRD drafts through rich-text editing, AI-assisted content refinement, document quality assessment, version history, and management of the document lifecycle.
- c. To create features that allow users to export and share their finalized PRD drafts in multiple usable formats, including PDF, DOCX, Markdown, HTML, and text formats compatible with other tools.

1.4 Project Scope

This project seeks to develop and evaluate DraftMind, a web-based AI tool, to automate the generation of Product Requirement Documents (PRDs) from scratch via the use of Large Language Models (LLMs). This project aims to streamline the PRD drafting process by allowing users to convert preliminary product concepts, product briefs, or notes on requirements into completed PRD drafts. This project will also address AI-based PRD generation, document review and refinement, document management and export functionality, and prototype assessment in the field of software product planning.

1.4.1 User Scope

This project is designed for product development and software delivery stakeholders. Therefore, this project is designed with product managers, business analysts, project managers, software developers, technical leads, and team members who need to prepare or review PRD documents. They will be able to

enter product details, choose a PRD template, create a structured PRD draft, edit the draft, use AI to improve the draft, manage the document versions, score PRD draft quality, and export the PRD in desired formats. The PRD generated is considered a reviewable draft and not a final document to be accepted as is.

1.4.2 System Scope

This project will create a web-based PRD generation platform powered by LLM services to create PRD draft text based on user input and the PRD template. Structured PRD generation, rich text, and AI draft text improvement, version control, status tracking, template driven document PRD, quality assessment, and multi-format export are some of the services the platform will provide. The platform will support the export of PRD documents in formats used by tools such as Slack and Jira, and in PDF, DOCX, and Markdown and HTML text. These will be provided as document export services and not API based integrations. The major evaluation criteria for this project will be its ease of use, the quality and efficiency of the PRD draft generation, and the functional completeness of the developed prototype.

1.5 Project Significance

This project has important practical implications for the stakeholders involved in the development of products and the delivery of software by helping them to create product requirement documents (PRDs) through a semi-automated and more obvious workflow. DraftMind allows product development stakeholders to convert initial product ideas, product briefs, and product requirement notes into draft PRDs that are better structured and can be reviewed, edited, improved, managed, and exported. The system offers multiple tools to assist users in breaking the drafting cycle while ensuring the continuous presence of an author. These tools include generation support via AI, drafting via templates, editing supported by rich text, AI-based refinement, version control, quality assessment, and document exports in multiple formats. All of these provide assistance to the users in a PRD preparation system.

From an academic point of view, this project extends the discussions on requirements-related documentation and software engineering within the context of large language models (LLMs). Recent research indicates that LLMs have been the focus of increasing research in the field of software engineering and more specifically in the domain of requirements engineering and documentation (Hou et al., 2024; Marques et al., 2024). This domain still requires careful attention to the correctness, completeness, consistency, and the validation of the requirements, in addition to human oversight (Norheim et al., 2024). This project thus holds value by showing how LLMs can be used in the context of PRD generation, combining AI, and user evaluation, review, and editing.

This project focuses on the use of AI in a web-embedded environment for PRD generation. The prototype combines a rich-text document with a workflow for LLM content generation, template-based document structure, intelligent text suggestion, document lifecycle management, quality assessment, and export in multiple formats. This demonstrates a practical document preparation system, supported by generative AI, that offers a structured drafting and a human-in-the-loop editing system. The additional components of the system extend the definition of generative AI from merely a text generation system. From a technical viewpoint, this project focuses on a web-embedded environment for AI-supported PRD generation.

This project also advances the Ninth Sustainable Development Goal, “Industry, Innovation and Infrastructure” (*Goal 9 | Department of Economic and Social Affairs*, n.d.) SDG 9 is concerned with the advent of a resilient context, inclusive and sustainable industrialization, and innovation. In this regard, DraftMind introduces innovations in software documentation by employing LLMs in the development of Product Requirement Document (PRD) drafts. With the capability of supporting product teams in the generation of drafts that are structured, reusable, and easy to export, this project promotes the digital innovations that are characteristic of contemporary software development.

1.6 Chapter Summary

This chapter has provided the foundation for the AI-Based Product Requirement Document (PRD) Generator. It covered the background, problem statement, objectives, scope, and importance of the project. The chapter began with the importance of PRDs in software product development and the difficulties of preparing PRDs manually. Manual PRD preparation frequently leads to lack of consistency, lack of clarity, and incomplete PRDs, as well as challenges keeping PRD-related documents in sync with evolving product requirements. These difficulties emphasize the need for the PRD preparation system to be more structured and to provide more guidance.

This project was developed to address the stated challenges. Specifically, the aim was to develop and assess DraftMind, a web-based PRD Generator that leverages Large Language Models (LLMs) for structure-based PRD draft generation, AI-driven document iteration, as well as intelligent document management and export capabilities in multiple formats. The project scope includes the entire PRD workflow from product input and template generation to document review, editing, iteration, versioning, assessment, and export. It is designed to assist users in PRD draft preparation while retaining the critical need for user oversight.

This chapter has considered the value of the project in a range of contexts. Practically, the system offers stakeholders a more systematic approach in the preparation of a PRD. From an academic perspective, the system assists in furthering the debate on the role of LLMs in the field of software engineering and the accompanying documentation of requirements. From a technical viewpoint, the system offers a web-based preparation of a document with an example of the AI-aided generation of an accompanying text. The project also addresses Sustainable Development Goal 9, as it fosters creativity in the field of software-related documentation. The literature pertaining to PRDs, requirements engineering, LLMs, and the existing methodologies and solutions are reviewed in the next chapter, as well as the research gaps that underpin the development of this project.