**Software Requirement  
Specification for**

**VendorInsight**

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# Introduction

## 1.1. Purpose

The purpose of this Software Requirements Specification (SRS) document is to provide a detailed overview of our product, VendorInsight. This web application is designed to revolutionize the e-commerce experience in Nepal by leveraging advanced analytics and AI-driven technologies to enhance both vendor performance and customer satisfaction. The SRS will outline the functionalities, system features, user interactions, and constraints of VendorInsight.

## 1.2. Project Scope

VendorInsight is an ambitious project aimed at transforming the e-commerce sector in Nepal. This multi-vendor platform will not only provide a marketplace for vendors to sell their products but also offer advanced features such as predictive analytics for sales forecasting, inventory optimization, and AI-driven personalized recommendations for customers. This system will address the market's need for a sophisticated e-commerce solution that enhances user experience and optimizes vendor performance. The project scope includes the development of the web platform, integration of AI and machine learning algorithms for analytics and recommendations and ensuring a seamless user experience for both vendors and customers.

## 1.3. References

IEEE. IEEE Std 830-1998 IEEE Recommended Practice for Software Requirements Specifications. IEEE Computer Society, 1998.

# 2. Overall Description

## 2.1. Product Perspective

VendorInsight is envisioned as a cutting-edge, multi-vendor e-commerce platform that integrates advanced artificial intelligence (AI) technologies to elevate both vendor and customer experiences. This platform distinguishes itself from traditional e-commerce systems by focusing on vendor-centric analytics and AI-driven recommendations. As a standalone product, it proposes a novel approach in the realm of digital commerce, specifically tailored to the burgeoning e-commerce market of Nepal. VendorInsight is not merely an addition to existing platforms but a comprehensive solution that addresses current market gaps with innovative features like predictive analytics for sales, sentiment analysis of customer reviews, and personalized recommendation systems.

## 2.2. Product Functions

The primary functions of VendorInsight include:

* **Predictive Analytics for Vendor Sales:** Leveraging machine learning algorithms to offer sales forecasting and inventory optimization.
* **Personalized Recommendation System:** Utilizing AI to analyse customer behaviour and provide personalized product suggestions.
* **Sentiment Analysis:** Employing natural language processing to interpret customer feedback for improved product recommendations and vendor insights.
* **Real-Time Sales Analytics Dashboard:** Providing vendors with dynamic data visualization tools for performance tracking and decision-making.
* **Multi-Vendor Platform Management:** Featuring an intuitive dashboard for vendors to manage their inventory, view analytics, and adjust pricing.
* **Integration of AI Models:** Ensuring the backend, developed with the Django framework, seamlessly integrates various AI models for analytics and recommendation systems.

## 2.3. User Classes and Characteristics

VendorInsight targets multiple user classes, including:

* **Vendors:** Businesses and individuals seeking advanced tools for sales optimization and market analytics.
* **Customers:** Users seeking a personalized shopping experience with recommendations tailored to their preferences and purchase history.
* **Administrators:** Platform managers responsible for overseeing platform operations and vendor coordination.

## 2.4. Operating Environment

VendorInsight is designed to operate in a web-based environment, compatible with major browsers and adaptable to various devices (desktops, tablets, smartphones). The backend will be powered by Python and the Django framework, with the frontend utilizing technologies like JavaScript, HTML5, CSS3, and Bootstrap. The system will leverage PostgreSQL for database management and employ Git for version control.

# 3. External Interface Requirements

## 3.1. User Interface

* **Web Interface:** A web interface that ensures a consistent user experience. This includes clear navigation menus, intuitive dashboard layouts for vendors, and an easy-to-use interface for customers.
* **Vendor Dashboard:** An interactive dashboard for vendors to manage products, view sales analytics, and receive inventory alerts. This dashboard should be intuitive and provide comprehensive tools for managing e-commerce operations.
* **Customer Interface:** A customer-focused interface featuring personalized recommendations and easy access to product categories. It should also include a review and rating system for products.
* **Admin Panel:** A backend interface for system administrators to manage the platform, including user account management and content moderation.

## 3.2. Hardware Interfaces

As a web-based application, VendorInsight does not directly interface specific hardware.

## 3.3. Software Interfaces

VendorInsight will interact with several software components:

* **Web Browsers:** Compatibility with major web browsers like Chrome, Firefox, Safari, and Edge.
* **Database Systems:** Interface with PostgreSQL for structured data and MongoDB for unstructured or semi-structured data.
* **AI and ML Libraries:** Integration with AI and machine learning libraries (like PyTorch) for the recommendation engine and predictive analytics.

# 4. System Features

## 4.1. Predictive Analytics for Vendor Sales (PAVS)

* **Description and Priority:** High Priority. This feature enables vendors to access predictive insights about sales trends, inventory needs, and pricing strategies, using advanced machine learning algorithms.
* **Stimulus/Response Sequences:**
  + Stimulus: Vendors input historical sales data.
  + Response: The system analyses the data and provides sales forecasts and inventory recommendations.
* **Functional Requirements:**

REQ-PAVS-1: The system must analyse historical sales data to provide future sales trend forecasts specifically for the vendor.

REQ-PAVS-2: The system should offer inventory optimization suggestions based on predictive analytics, tailored to the vendor's needs.

REQ-PAVS-3: The system must allow vendors to input and customize data inputs and parameters for their specific analytics requirements.

## 4.2. Personalized Recommendation System (PRS)

* **Description and Priority:** High Priority. This system leverages customer data to offer personalized product recommendations, enhancing the shopping experience and potentially increasing sales.
* **Stimulus/Response Sequences:**
  + Stimulus: Customers browse, search for products, or make purchases.
  + Response: The system dynamically updates and displays personalized product recommendations.
* **Functional Requirements:**

REQ-PRS-1: The system must implement AI algorithms to generate personalized product recommendations for each customer, based on their individual behaviour and purchase history.

REQ-PRS-2: The system should update recommendation lists in real-time, reflecting the current interactions of each individual customer.

## 4.3. Sentiment Analysis of Customer Reviews (SACR)

* **Description and Priority:** High priority. This feature analyses customer reviews to understand sentiment, aiding in product recommendation and vendor insights.
* **Stimulus/Response Sequences:**
  + Stimulus: Customer submits a product review.
  + Response: The system processes the review for sentiment analysis and updates product insights.
* **Functional Requirements:**

REQ-SACR-1: The system must analyse text from customer reviews to determine sentiment, providing insights that are specific to each product (positive, neutral, negative).

REQ-SACR-2: The system should integrate sentiment analysis results into the recommendation engine and vendor dashboards, enhancing both customer experience and vendor insights.

REQ-SACR-3: The system must provide vendors with specific insights on customer sentiment for each of their products.

## 4.4. Multi-Vendor Platform Management (MVPM)

* **Description and Priority:** Medium priority. This feature offers a comprehensive dashboard for vendors to manage their products, view analytics, and adjust pricing and inventory.
* **Stimulus/Response Sequences:**
  + Stimulus: Vendor logs into the dashboard to manage their store.
  + Response: The system presents a comprehensive view of sales, analytics, and management tools.
* **Functional Requirements:**

REQ-MVPM-1: The system should enable vendors to view and manage their product listings, including adding, updating, or removing products, specifically on their individual dashboards.

REQ-MVPM-2: The system must provide a real-time analytics dashboard to the vendor, showcasing sales data, customer demographics, and market trends.

REQ-MVPM-3: The system should allow vendors to adjust pricing and inventory based on analytics insights, tailored to their individual store metrics and performance.

# 5. Other Non-Functional Requirements

## 5.1. Performance Requirements

* **System Speed and Responsiveness:** The application should load within 3 seconds under normal conditions, with real-time updates in user dashboards.
* **Data Processing:** Predictive analytics and recommendation algorithms should process data and update results within acceptable time frames, not exceeding 5 seconds.
* **Scalability:** The system should be designed to sustain at least a 50% increase in concurrent user load and data volume per year, without any degradation in response time or processing efficiency.

## 5.2. Safety Requirements

* **Data Integrity:** Implement checksums and transactional integrity checks to ensure that data remains accurate and uncorrupted during all stages of processing and storage.
* **Operational Safety:** The system must have redundancy mechanisms and failover protocols in place to prevent operational failures, aiming to reduce system downtime to less than 0.1% annually.

## 5.3. Software Quality Attributes

* **Usability:** The user interface must ensure that navigation is intuitive, and the design is accessible, with an average user learning curve not exceeding 30 minutes.
* **Reliability:** The system should have a high level of uptime (aiming for 99.9%) and include with built-in error-handling capabilities to ensure continuous operation under normal conditions.
* **Maintainability:** Code should be well-documented and modular to ensure ease of updates and maintenance, with documentation coverage exceeding 95%.