

# SMART INDIA HACKATHON 2024



**Problem Statement ID -** SIH1682

**Problem Statement Title -**  
Centralized Automated Solution for Price  
Estimation & Reasonability.

**Theme -** Smart Automation

**PS Category -** Software

**Team ID -** 19290

**Team Name -** Code\_9to5



## Proposed Solution

We propose a “**Centralized Automated Web Platform**” designed to streamline and enhance the **price estimation and benchmarking** process in government procurement. This platform utilizes real-time data from public sources to enable procurement teams to make faster, transparent, and informed decisions. With a user-friendly interface, it adheres to **General Financial Rules (GFRs)**, minimizing manual effort while maximizing efficiency.

## Implementation/Features

- **AI-Powered Web Crawling**: Integrates **NLP**, **machine learning**, and **Puppeteer** to automatically fetch price data from various public sources, ensuring accurate market prices for both common items (like laptops) and specialized products (like VHF equipment)..
- **Intelligent Price Estimation**: Uses AI-driven models and integrates **GeM (Government e-Marketplace) API** and **Alpha Vantage API** to predict price reasonability and trends, supporting informed decision-making for upcoming procurement needs.
- **Real-Time Dashboard**: Provides an interactive dashboard where users can input specifications and receive immediate insights into price benchmarks.

## Solution Resolution

- **Efficiency & Accessibility**: Built on **Next.js** for rapid navigation and improved load times across all devices.
- **Cloud-Powered Scalability**: Utilizing **AWS Cloud services** for optimal performance, allowing the system to handle large datasets seamlessly.
- **Automated Market Surveys**: AI-based web crawlers replace traditional market surveys, gathering data efficiently to save time and effort for procurement teams.

## Unique Value Proposition

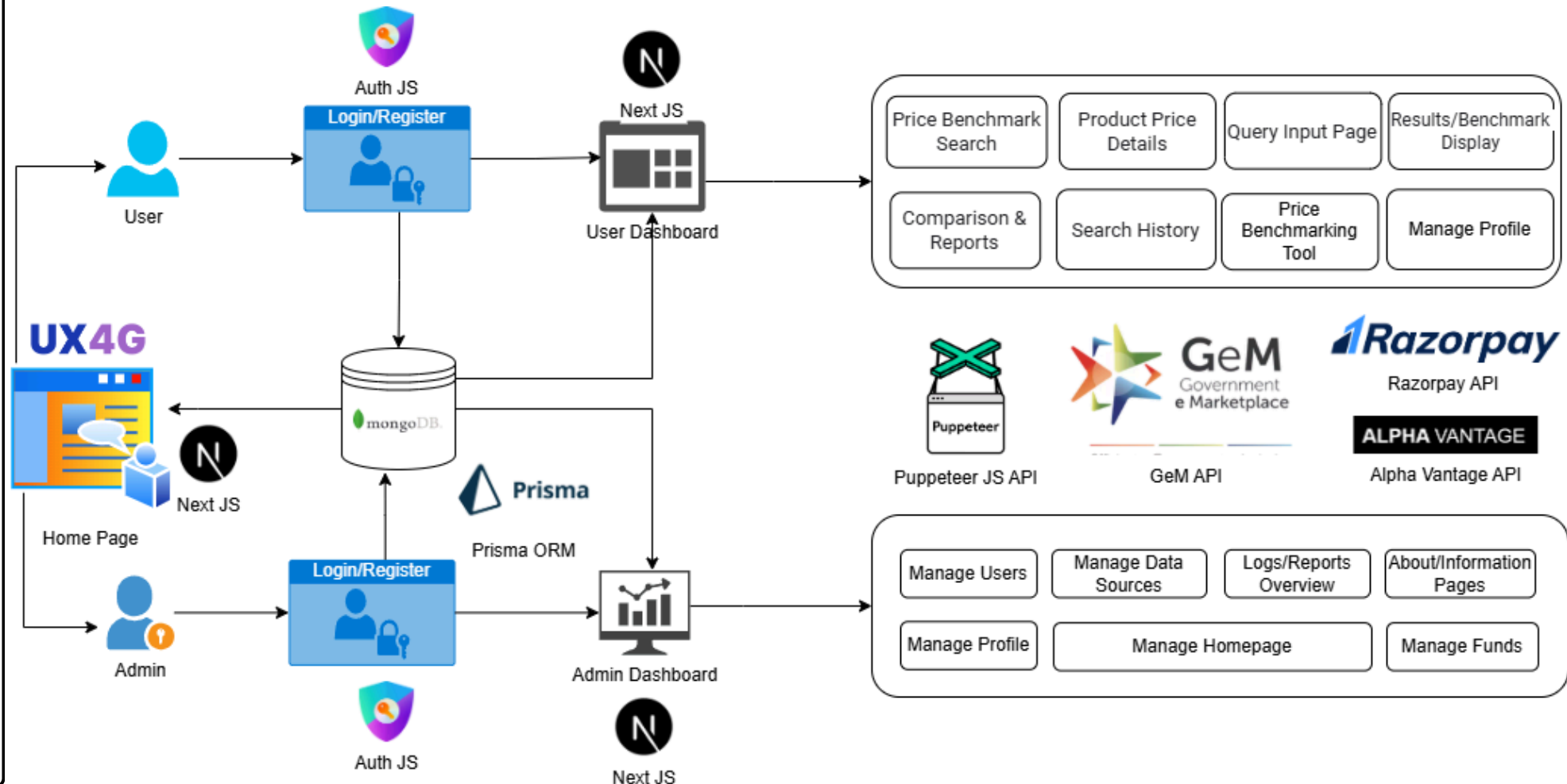
- **Comprehensive Price Benchmarking**: Aggregates data from various sources, including market surveys, last purchase prices, and government-defined rates, to provide reliable price estimates.
- **AI-Driven Forecasting**: Predicts future pricing trends, enabling departments to plan and budget effectively using **Price API**.
- **Dynamic and Responsive**: The platform’s AI integration allows for continuous improvement in data accuracy and user experience, making procurement smarter and more efficient.

## Technology Used

## Implementation/Features

- **Frontend:**  
Next.js, Tailwind CSS
- **Component Library:**  
UX4G(A Govt. Component Library)
- **Backend:**  
Express.js, Prisma ORM, Node.js
- **Database:** MongoDB
- **Cloud Service:** AWS
- **Authentication:** Auth.js
- **Payment Integration:**  
Razor Pay
- **APIs:**  
Price API,  
GeM (Government e-Marketplace)  
API, Alpha Vantage API

## Process Flow Diagram



## Feasibility of the Idea

### 1. Technical Feasibility

- **Advanced Web Technologies:** Utilizing Next.js for a responsive user interface and Node.js for backend operations ensures smooth interactions and data handling.
- **Cloud Infrastructure:** Robust cloud solutions such as AWS will support data storage, AI computations, and scalability.
- **AI and ML Integration:** Incorporating machine learning algorithms and natural language processing (NLP) to enhance data accuracy and user interactions.
- **Admin Panel Functionality:** An admin panel will facilitate user management, data oversight, and performance monitoring, ensuring smooth operation and quick response to issues.

### 2. Financial Feasibility

- **Funding Sources:** Potential funding through government grants, partnerships with tech firms, and collaborations with procurement agencies to support initial development and maintenance costs.

### 3. Market Feasibility

- **Target Audience:** The primary users include procurement teams in government sectors, healthcare professionals, and researchers needing reliable price benchmarks.
- **Unique Value Proposition:** The lack of comprehensive platforms focused on price benchmarking and procurement makes this solution highly attractive.

## Potential Challenges and Risks

### 1. Technical Challenges

- **Performance Optimization:** Ensuring smooth functionality across various devices while handling large datasets.
- **AI Computation Demands:** AI models may require significant computing resources, potentially slowing down the application.
- **Complex Technology Integration:** Managing the interplay between multiple technologies can introduce complexity.
- **Data Accuracy:** Ensuring the integrity of data and accuracy in NLP for meaningful user interactions.
- **Admin Panel Management:** Developing and maintaining the admin panel adds another layer of complexity, requiring dedicated resources.

### 2. Financial Challenges

- **Ongoing Maintenance Costs:** Sustaining cloud storage and server management may become challenging without a solid user base or funding.

### 3. Market Challenges

- **Increasing Competition:** As interest in procurement tech grows, scalability may become a challenge.
- **User Adaptation:** Encouraging users to transition to this new technology may require additional training and resources.
- **Internet Accessibility:** Limited connectivity in certain demographics could hinder platform accessibility.

## Strategies to Overcome Challenges

### 1. Technical Strategies

- **Optimization Techniques:** Implement strategies like data caching and efficient algorithm design to improve performance.
- **Cloud Offloading:** Moving heavy computational tasks to cloud servers to mitigate resource demands on local devices.
- **Modular Architecture:** Designing a modular application to simplify integration of different technologies, including the admin panel.
- **Enhanced Data Accuracy:** Utilizing feedback loops and diverse training datasets to improve NLP and data accuracy.
- **Admin Panel Tools:** Develop user-friendly admin tools to streamline data management and monitoring tasks.

### 2. Financial Strategies

- **Flexible Cloud Infrastructure:** Adopting a pay-as-you-go model through platforms like AWS to manage costs efficiently as the user base grows.

### 3. Market Strategies

- **Scalable Architecture:** Using a microservices approach for scalability and adaptability as user needs evolve.
- **User-Centric Design:** Creating a simplified user interface with intuitive navigation to enhance user experience.
- **Edge Computing:** Implementing edge computing solutions to reduce latency for users in low-connectivity areas.
- **Localized Outreach:** Tailoring marketing and support efforts to engage different demographics effectively.

## Impact on the Target Audience

### Enhanced Understanding of Procurement

- Users gain insights into price estimation methodologies, fostering appreciation for transparent practices.

### Awareness of Cost Efficiency

- Empowers procurement teams to adopt cost-effective practices, emphasizing the significance of price reasonability.

### Personalized Benchmarking

- Delivers tailored insights for specific procurement needs, enhancing decision-making efficiency.

### Ethical Procurement Promotion

- Raises awareness about ethical sourcing, contributing to responsible public fund usage.

### Community Knowledge Sharing

- Facilitates collaboration among procurement professionals, enriching collective intelligence and best practices.

### Tech Integration

- Introduces advanced technologies, boosting digital literacy in traditional procurement sectors.

## Benefits of the Solution

### Social Benefits

- Preserves vital procurement knowledge and encourages transparency among vendors.

### Economic Benefits

- Offers a cost-effective solution compared to traditional methods, improving efficiency in price evaluations.

### Environmental Benefits

- Advocates for sustainable procurement practices and promotes responsible vendor selection.

### Technological Benefits

- A cloud-based platform ensures seamless access and performance for users, leveraging AI for accurate price estimation.

### Personalized User Experience

- Tailored dashboards enhance navigation and efficiency, while an admin panel supports user management and feedback integration.

## Important References taken for the Research Work ([Hyperlinks included](#))

1. **General Financial Rules (GFR):** [Guidelines from the Ministry of Finance, Government of India.](#)
2. **Amendments to GFR 2017:** [Amendment in General Financial Rules, 2017.](#)
3. **Procurement Guidelines and Forms:** [GENERAL FINANCIAL RULES 2017 - Kolkata Port Trust](#)
4. **"General Financial Rules 2017" on the Ministry of Finance website.**
5. **Web-Crawling Techniques:** [Data aggregation methods discussed in the Journal of Information Technology.](#)
6. **"Amendments to GFR 2017" on government news or official ministry websites.**
7. **Competitive Landscape Evaluation :** [GeM \(Government e-Marketplace\)](#), [Coupa](#), [SAP Ariba](#), [Zycus](#), [Procurify](#).