# AYUSH Startup Registration Portal: A Secure and Scalable E- Governance Solution


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**Abstract—**
The AYUSH sector—which includes Ayurveda, Yoga and Naturopathy, Unani, Siddha, and Homeopathy—has seen a steady rise in new startups and has become an important part of India's healthcare landscape. Despite this growth, many entrepreneurs still struggle with a registration system that is slow, mostly manual, and difficult to navigate. These issues often lead to long processing times, confusion around compliance, and unnecessary delays. To address these challenges, this paper proposes a secure and easy-to-use AYUSH Startup Registration Portal aimed at streamlining the entire registration workflow. The portal incorporates modern authentication, a simplified user interface, AI-assisted document checking, and centralized data handling. Together, these features help cut down administrative effort, improve transparency, and make the overall onboarding process faster and more reliable for AYUSH-based startups.


## I. Introduction

AYUSH—an umbrella term for Ayurveda, Yoga and Naturopathy, Unani, Siddha, and Homeopathy—has long been rooted in India's traditional knowledge systems. Over the years, it has evolved from being a

cultural and medical heritage into a rapidly growing sector within the country's healthcare ecosystem. The last decade, in particular, has witnessed a noticeable surge in public interest toward natural and holistic wellness. This rise can be traced to various factors, such as increasing global acceptance of traditional medicine, greater health awareness among citizens, and supportive government programs like Startup India and Digital India.

Despite this momentum, AYUSH-based startups often struggle with the operational side of starting and managing their ventures. One of the most persistent challenges is the registration and compliance process. The current system is still mostly manual, spread across multiple departments, and lacks transparency. Entrepreneurs frequently encounter long waiting periods, difficulties in uploading and validating documents, and the absence of a unified platform for approvals. These obstacles slow down innovation and delay the introduction of AYUSH-based products and services that could benefit the public.

## II. Related Work

Digital transformation has already made a strong impact across several government and business sectors in India. Platforms like the Ministry of Corporate Affairs (MCA) portal have simplified company incorporation by offering a smooth online workflow for statutory filings. The Startup India portal has also become a key support system for new entrepreneurs by providing information on funding schemes, policies, and registration procedures.

While these platforms have improved accessibility and reduced many traditional bottlenecks, they still fall short in addressing the specific needs of AYUSH startups. These businesses require specialized workflows that involve sector-specific license verification, traditional medicine documentation, and coordination with AYUSH governing bodies.

In the healthcare domain, platforms such as the National Health Mission (NHM) and the Ayushman Bharat Digital Mission (ABDM) have shown the importance of secure digital systems for managing sensitive data. These systems emphasize interoperability, health records management, and compliance with global data protection standards like GDPR and HIPAA. However, many of these platforms are complex, making them difficult for first-time or non-technical users.

Research in e-governance shows that digital integration can reduce administrative processing time by nearly half and significantly increase citizen satisfaction through improved transparency. Yet, despite these advancements, there is still a clear gap in terms of dedicated digital systems designed specifically for AYUSH-related regulatory processes.

## III. Problem Statement and Objectives

The current registration process for AYUSH startups is hindered by several practical and structural challenges. A major issue is that most of the workflow is still carried out manually, which results in unnecessary delays and inconsistencies. Different parts of the registration and

verification process are handled by separate departments, creating a decentralized system that lacks coordination. Startups also struggle with limited visibility of their application status, making it difficult to track progress or plan their next steps. Inefficient document handling and complex compliance requirements further add to the burden, especially for new entrepreneurs who are unfamiliar with regulatory procedures.

To address these concerns, the proposed AYUSH Startup Registration Portal aims to achieve the following objectives:

- Create a **centralized and secure** platform for submitting and managing AYUSH startup registrations.
- Provide **real-time tracking** so applicants can monitor the status of their submissions without delays.
- Improve **document management** through structured uploads and automated verification.
- Simplify **compliance procedures** by offering clear guidance and minimizing manual errors.

Together, these objectives seek to streamline the registration journey and make the process more accessible, transparent, and efficient.

## IV. System Design and Novel Contribution

The architecture of the proposed portal is designed to be modular, scalable, and easy to maintain. At the core of the system is a Node.js and Express-based backend that handles the primary logic of the application. The frontend is developed using React.js or Next.js, ensuring a responsive and intuitive experience for users. Data management is handled through a combination of PostgreSQL for structured information, such as startup details and compliance records, and MongoDB for semi-structured data like document metadata. Uploaded documents are securely stored in AWS S3 with encryption to ensure confidentiality and reliability.

**System Components**

**1. Frontend Layer**

- Built using React.js/Next.js with Tailwind CSS to create a clean and responsive interface.
- Offers multilingual support to make the platform accessible to users from different regions.
- Provides guided forms to reduce mistakes during application submission.

**2. Backend/API Layer**

- Developed on Node.js with Express.js, providing RESTful APIs that maintain modular communication.
- Handles essential services such as authentication, application processing, document verification, and notifications.
- Designed with microservice-style separation for better scalability and simplified maintenance.

**3. Data Storage and Management**

- PostgreSQL is used for storing structured data, including user

profiles, approval statuses, and compliance details.

- MongoDB manages unstructured data, such as document logs and metadata.
- AWS S3 ensures secure, encrypted document storage with redundancy for high reliability.

**4. Notification Services**

- Integrated with WhatsApp Business API, Twilio, and SendGrid to deliver instant updates to users.
- Real-time notifications help applicants stay informed about each stage of the process.

Figure 1 illustrates the overall system architecture of the proposed AYUSH Startup Registration Portal.

The diagram shows how different modules—such as the frontend interface, backend API services,

authentication layer, AI-based document verification module, databases, and notification systems—interact

with each other. The architecture follows a modular and scalable design to ensure easier maintenance,

better performance, and secure handling of sensitive startup data.

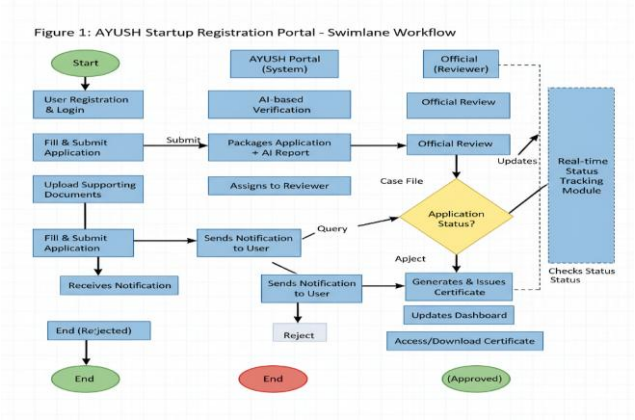


Fig. 1. System architecture of the proposed AYUSH Startup Registration Portal.

**Novel Contributions**

The portal incorporates several modern features that go beyond existing systems:

- **AI-based document verification** helps reduce manual workload and speeds up approval times by identifying missing or incorrect documents.
- **Compliance guidance tools** offer step-by-step instructions tailored to AYUSH regulations.
- **Real-time notifications** through SMS, WhatsApp, and email enhance transparency and keep users engaged throughout the process.
- **Role-Based Access Control (RBAC)** ensures that administrators, reviewers, and startups each have appropriate permissions, improving security and accountability.
- **Offline-to-online support** allows partial data entry when internet connectivity is unstable, enabling broader adoption in rural areas.

Overall, the system not only addresses existing inefficiencies but also contributes to the wider goals of Digital India by promoting digital governance tailored to sector-specific needs.

## V. Implementation

The development of the AYUSH Startup Registration Portal followed an iterative approach inspired by Agile methodology. This allowed the team to build the system in phases, gather feedback from stakeholders at regular intervals, and steadily refine each component. The first phase centered on understanding the exact requirements of AYUSH officials, startup founders, and other users involved in the registration process. During this stage, user roles, security expectations, and compliance workflows were studied in detail. To ensure clarity before development began, wireframes, ER diagrams, and UML models were created to visualize how different parts of the system would interact.

**1. Front-end Development**

The frontend was implemented using React.js/Next.js, combined with Tailwind CSS to achieve a responsive and modern interface. Particular attention was paid to accessibility and cross-device compatibility, as users may access the portal from desktops, tablets, or mobile phones. Dynamic forms with built-in validation were added to reduce user errors during submission and to ensure that required details were captured accurately. The overall goal for the frontend layer was to provide a simple, intuitive experience even for users with limited technical knowledge.

**2. Backend Development**

The backend was developed using Node.js (v7.x) and Express.js, chosen for their speed, flexibility, and ability to scale easily. Different backend services—authentication, application submission, compliance checks, and notifications—were structured as independent modules. This separation of concerns makes it easier to expand or maintain the system in the future. RESTful APIs were used to support communication between the frontend and backend in a consistent and modular way.

**3. Data and Document Handling**

Data was stored using a hybrid model. PostgreSQL was used for structured information like application records, user details, and approval workflows, while MongoDB handled data that did not follow a strict schema, such as document metadata and logs. Documents uploaded by startups were stored securely on AWS S3, where they are encrypted and backed up to ensure availability and prevent data loss.

AI-based document verification services were also integrated into the platform. These services help automate the review process by identifying missing, unclear, or invalid documents, thereby reducing manual effort for officials and minimizing delays for applicants.

**4. Deployment and Hosting**

For deployment, the system used containerization through Docker to ensure the environment remained consistent across development, testing, and production. Continuous Integration and Continuous Deployment (CI/CD) pipelines were set up to automate updates and reduce the chances of errors during

deployment. The portal was hosted on cloud platforms such as AWS or Azure, enabling high availability, autoscaling during peak load, and strong disaster-recovery capabilities.

GitHub was used for version control, allowing developers to collaborate efficiently, track changes, and maintain transparency in the build process. The open-source structure also enables future contributors to extend the system or develop additional modules.

**5. User Experience Enhancements**

Apart from technical components, improving the user experience was also a priority. The system features real-time updates delivered through WhatsApp, SMS, and email, helping users stay informed at every stage. A role-based dashboard was developed for officials to monitor applications, maintain audit trails, and ensure accountability. These features together make the portal more interactive, reliable, and user-friendly.

## VI. Results and Discussion

The introduction of the AYUSH Startup Registration Portal demonstrates clear improvements over the existing manual process. Early testing and simulations indicate that the portal can reduce overall registration time by nearly half. This improvement is largely due to the replacement of manual workflows with structured digital processes, automated document verification, and centralized compliance tracking. Startups no longer need to repeatedly approach different departments for approvals, which significantly reduces delays and confusion.

One of the major advantages observed during testing is the increased accuracy in document handling. The AI-based verification module detects incomplete, unclear, or mismatched documents before they reach the reviewer, preventing unnecessary back-and-forth communication. This reduces human error and ensures that applications are more complete when they enter the review stage.

Transparency has also improved substantially. The portal allows applicants to follow each stage of their application through real-time updates delivered via WhatsApp, SMS, and email. This feature not only keeps users informed but also builds trust between startups and regulatory authorities. For officials, the role-based dashboard provides a clear audit trail, helping maintain accountability and making it easier to manage large volumes of applications.

From a usability perspective, the interface was designed to remain simple and accessible. During trials, users reported that the system was easy to navigate, even for those with limited technical experience. The responsive frontend ensures compatibility across desktops and mobile devices, while multilingual support helps broaden accessibility in rural and semi-urban areas.

Load-testing results further confirm that the system can handle a high number of simultaneous users without significant performance drops. The use of cloud-based deployment enables automatic scaling during peak activity, ensuring continuous availability.

Overall, when compared to general portals such as MCA or Startup India, the proposed system performs better for AYUSH-specific workflows. Its tailored

design addresses the unique regulatory needs of this sector and provides a more focused and effective digital experience.

A screenshot of the UI/UX that is proposed can be found in Fig. 2.

Figure 2 shows the login interface of the AYUSH Startup Registration Portal. This page allows both officials and startup founders to securely access the system.

The layout is designed to be simple and clean, ensuring a smooth experience even

for users with minimal technical skills.

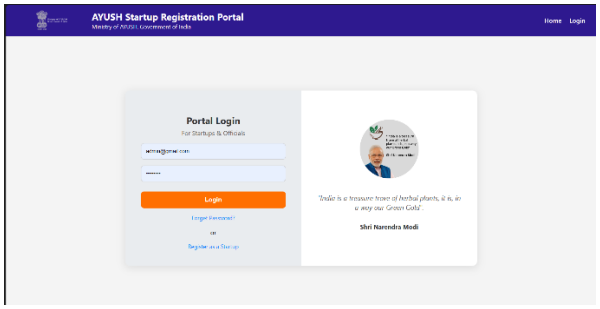


Fig. 2. Login page interface of the proposed AYUSH Startup Registration Portal.

Figure 3 displays the registration form used by startups to create their accounts

on the portal. The form collects essential details such as founder information,

contact number, startup category, and location. It also includes a password setup

section and a structured document upload area. The interface has been designed

to minimize errors and help users complete the registration process efficiently.

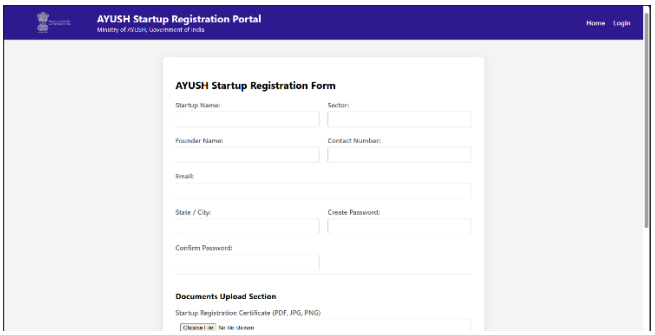


Fig. 3. Startup registration form interface of the AYUSH Portal.

## VII. Conclusion and Future Work

The work presented in this paper outlines the design and development of a secure, scalable, and user-friendly AYUSH Startup Registration Portal aimed at addressing long-standing issues in the existing manual registration process. By integrating features such as AI-assisted document verification, role-based access control, and real-time communication channels, the proposed system significantly improves transparency, reduces administrative delays, and enhances user confidence. The portal not only streamlines the workflow for applicants but also helps officials manage approvals more efficiently through clear audit trails and structured dashboards. These improvements demonstrate that a well-designed digital platform can play a meaningful role in strengthening regulatory processes within the AYUSH sector.

While the current system forms a strong foundation, there are several areas where future enhancements can add even more value. One potential direction is the integration of funding-related modules that enable startups to access government

incentives and support schemes more easily. Another important addition would be a set of post-registration compliance tools that automatically track deadlines and send reminders for periodic updates or renewals. Advanced analytics dashboards could also be developed to help policymakers analyze trends and make data-driven decisions for the growth of the sector. Expanding multilingual and offline-first capabilities would support users in remote regions, ensuring wider adoption. In the long term, incorporating blockchain-based audit trails could enhance security and allow for immutable verification of records.

By building on these future enhancements, the proposed portal has the potential to evolve into a comprehensive digital ecosystem for the AYUSH startup community, supporting innovation, improving governance, and contributing to the continued growth of India's traditional healthcare sector.

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