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AYUSH STARTUP REGISTRATION PORTAL: A SECURE AND SCALABLE E-GOVERNANCE SOLUTION

A Digital Approach to Streamline Compliance for AYUSH Startups

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Abstract: The AYUSH sector, which includes Ayurveda, Yoga and Naturopathy, Unani, Siddha, and Homeopathy, has become an important contributor to India's healthcare ecosystem. Although the sector is expanding rapidly, startups continue to struggle with slow, manual, and fragmented registration processes. These challenges often cause delays in compliance and reduce the efficiency of onboarding new enterprises. This paper presents a secure and scalable AYUSH Startup Registration Portal developed to address these issues through modern web technologies and structured workflows. The proposed system integrates a React/Next.js frontend, a Node.js and Express-based backend, PostgreSQL and MongoDB databases, AI-enabled document verification, and a real-time notification service. The portal improves transparency, minimizes human error, and reduces administrative workloads, thereby supporting faster integration of AYUSH startups into the regulatory ecosystem.

IndexTerms **- AYUSH, e-governance, startup registration portal, document verification, web application, Digital India.**

I. INTRODUCTION

AYUSH, which refers to Ayurveda, Yoga and Naturopathy, Unani, Siddha, and Homeopathy, forms a major component of India's traditional medical heritage. Over the last decade, the sector has expanded significantly due to rising public interest in holistic wellness, growing acceptance of natural medicine, and government initiatives such as Startup India and Digital India. As a result, many new startups have emerged in the AYUSH domain, contributing to innovation, healthcare accessibility, and economic growth.

Despite this progress, AYUSH entrepreneurs face several barriers during registration and compliance. The current system remains largely manual, involves multiple agencies, and lacks a unified platform, leading to long processing times and communication gaps. Issues such as difficulty in uploading documents, lack of real-time tracking, and unclear compliance steps further add to the burden. These limitations delay the introduction of useful AYUSH products and services into the market.

II. RELATED WORK

Digital governance platforms have been developed across various government sectors in India to simplify administrative procedures and improve service delivery. Systems such as the Ministry of Corporate Affairs (MCA) portal and the Startup India portal provide online workflows for company registration, statutory compliance, and accessing government incentives. While these platforms have successfully reduced delays and increased accessibility for general startups, they do not fully address the unique compliance requirements of AYUSH-based enterprises. These requirements include specialized documentation, traditional medicine licensing procedures, and integration with AYUSH regulatory bodies.

Several healthcare-related digital portals, such as the National Health Mission (NHM) dashboard and the Ayushman Bharat Digital Mission (ABDM), highlight the potential of secure data handling and interoperable health records. These systems demonstrate strong data-protection models that follow global standards such as GDPR and HIPAA. However, many of these platforms are complex, and non-technical users often find them difficult to navigate, limiting their usability.

Research in e-governance indicates that digital transformation can reduce administrative processing time by up to 50% while increasing transparency and citizen satisfaction. Consolidated platforms allow integration of multiple services, reducing duplication of work and enhancing efficiency. Despite this progress, a significant gap remains—there is no specialized digital portal designed specifically for AYUSH startups. Existing systems lack tailored workflows for AYUSH documentation, licensing checks, and compliance verification.

Therefore, the proposed AYUSH Startup Registration Portal aims to bridge this gap by offering a domain-specific solution that incorporates streamlined workflows, document verification, and real-time communication features suited to the needs of AYUSH entrepreneurs.

III. PROBLEM STATEMENT AND OBJECTIVES

Despite the growth of the AYUSH sector, the current registration process for AYUSH startups remains slow, highly manual, and fragmented across multiple government departments. Entrepreneurs often face long delays, repeated document submissions, unclear compliance steps, and the absence of real-time updates. These issues create uncertainty, reduce transparency, and ultimately delay the entry of AYUSH-based products and services into the market. The lack of a unified digital platform results in duplicated workload for officials and poor communication between stakeholders.

The major challenges identified in the existing system include:
- Manual and decentralized workflows
- Absence of real-time status tracking
- Inefficient and error-prone document management
- Complex compliance requirements with limited guidance
- No single-window access for AYUSH-specific procedures

To address these issues, the proposed system has the following objectives:
- To develop a centralized and secure digital portal for AYUSH startup registration
- To provide real-time tracking of application status for improved transparency
- To incorporate AI-assisted document verification to reduce manual errors
- To support efficient communication through automated notifications
- To ensure role-based access control for secure and accountable processing
- To offer guided forms and compliance assistance tailored to AYUSH regulations

By meeting these objectives, the proposed solution aims to create a smooth, transparent, and scalable e-governance platform that supports the growth and formal operation of AYUSH startups in India.

IV. SYSTEM DESIGN

The proposed AYUSH Startup Registration Portal is designed as a modular and scalable system that integrates modern web technologies with secure backend services. The architecture follows a layered approach to ensure maintainability, performance, and ease of deployment. The system primarily consists of a React/Next.js frontend, a Node.js and Express backend, and PostgreSQL/MongoDB databases for managing structured and unstructured data. Cloud services and third-party APIs are integrated to support storage, verification, and communication features.

The frontend layer provides an intuitive user interface built using React and Tailwind CSS. It offers guided forms, multilingual support, accessibility features, and responsive layouts to make the portal accessible to both urban and rural users. The interface allows startups to submit applications, track status updates, upload documents, and receive automated notifications.

The backend layer is built on Node.js and Express, following a RESTful API structure. The backend handles authentication, authorization, application processing, document verification, and communication workflows. Each function is organized as a microservice module, allowing the system to scale independently as demand increases. Secure authentication mechanisms such as OAuth 2.0 and JSON Web Tokens (JWT) ensure protection of user sessions and sensitive data.

The data storage layer uses PostgreSQL for structured records, such as startup profiles and compliance details, and MongoDB for semi-structured data such as document metadata. All uploaded documents are stored securely using AWS S3 buckets, with encryption to maintain confidentiality and integrity.

The system also integrates external APIs such as Twilio, SendGrid, and WhatsApp Business API for real-time notifications. These services allow users to receive updates regarding approval stages, missing documents, or verification alerts, enhancing transparency throughout the registration cycle.

Overall, the design provides a secure, transparent, and efficient digital workflow that aligns with Digital India and modern e-governance standards.The overall workflow of the proposed AYUSH Startup Registration Portal is illustrated in Fig. 1. The diagram presents the step-by-step swimlane process involving user registration, AI-based verification, official review, real-time application tracking, and certificate generation.

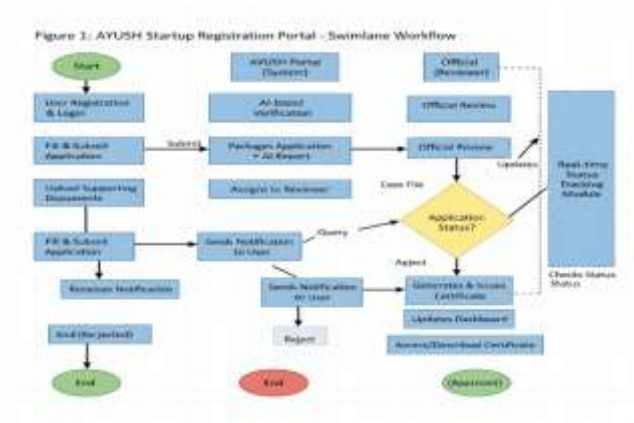

Fig. 1. workflow process of the proposed ayush startup registration portal

V. IMPLEMENTATION

This section discusses the implementation of the key modules in the AYUSH Startup Registration Portal, including user authentication, startup registration, and AI-driven document evaluation. The frontend is built using React/Next.js, and the backend is implemented using Node.js and Express with MongoDB/PostgreSQL for data management.

A. User Authentication Module

The system implements a secure login mechanism using JWT-based authentication. The login page allows startups and officials to access the portal with validated credentials. The interface is clean, responsive, and designed for ease of use. **Fig. 2** shows the login interface of the implemented AYUSH Startup Registration Portal.

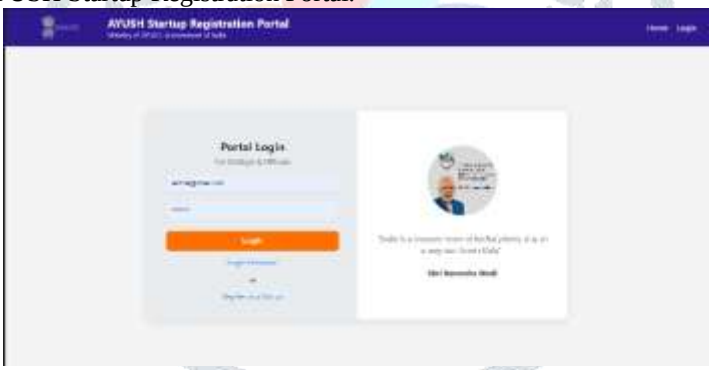

Fig. 2. login page interface of the Ayush startup registration portal

B. Startup Registration Module

This module allows startups to submit their details along with all required documents. The form includes startup information, founder details, contact information, password creation, and document upload fields. Validation is performed at the frontend to reduce user errors. **Fig. 3** illustrates the registration form created as part of the implementation.

Fig. 3. startup registration form interface of the Ayush portal

C. AI-Based Document Verification Module

An AI-based evaluation system analyses uploaded documents to assess completeness and relevance based on AYUSH compliance requirements. The system generates a match percentage and assigns a classification such as "Excellent," "Average," or "Low Alignment". **Fig. 4** shows the output of the AI-based evaluation module with the match score and decision.

Fig. 4. ai-based document evaluation output of the Ayush startup registration portal

VI. RESULTS AND DISCUSSION

The implementation of the AYUSH Startup Registration Portal demonstrates significant improvements over the traditional manual registration process. The shift from paper-based workflows to a fully digital system reduces processing delays, improves transparency, and increases efficiency for both startups and AYUSH officials.

The portal's automated workflow enables applicants to track their application status in real time, reducing uncertainty and eliminating the need for repeated follow-ups. The AI-based document verification module also plays a key role by providing an automated preliminary assessment of uploaded documents, helping reviewers identify missing or non-compliant submissions early in the process. This reduces human error and shortens the decision-making cycle.

The user authentication system performed reliably, ensuring secure login for both applicants and administrators. The registration form interface was evaluated for usability, and feedback indicated that the form layout, field arrangement, and validation messages were easy to understand. The system's ability to send automated notifications through email, SMS, or WhatsApp ensures that applicants stay updated throughout the review cycle.

In addition, cloud-based storage (AWS S3) and database integration (PostgreSQL and MongoDB) ensured reliable data handling and scalable performance. Initial load testing suggested that the system could handle multiple simultaneous submissions with minimal latency, indicating potential for statewide or national-level deployment.

Overall, the results validate that the proposed portal provides a practical, scalable, and transparent solution to streamline AYUSH startup registration and compliance workflows.

VII. CONCLUSION AND FUTURE WORK

This paper presented the design, development, and implementation of a secure and scalable AYUSH Startup Registration Portal aimed at addressing the limitations of the existing manual registration system. By integrating modern web technologies, a microservice-based backend, AI-assisted document verification, and automated communication services, the portal significantly enhances efficiency, reduces delays, and improves transparency.

The system's modular design allows it to be easily extended with additional features, while the use of cloud services ensures high availability and scalability. The introduction of AI-assisted verification reduces human workload and minimizes errors, making the review and approval process more reliable.

Although the current version of the portal successfully streamlines registration and compliance tracking, several extensions can further enhance its functionality. Future work may include:

a) Integration of funding or grant recommendation modules for startups
- Post-registration compliance tracking with automated reminders
- Advanced data analytics dashboards for policymakers
- Multilingual support and offline-first capabilities for rural accessibility
- Blockchain-based audit trails for enhanced security and transparency

b) With these enhancements, the portal has the potential to become a comprehensive e-governance ecosystem for supporting AYUSH startups across India.

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