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Degree2Startup: Personalized Startup Idea, Government Scheme & Document Guide System

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Abstract: ***Entrepreneurship is a key driver of economic growth, innovation, and employment generation in India. Despite numerous government initiatives such as Startup India, Atal Innovation Mission, and Ministry of Micro, Small and Medium Enterprises (MSME), a significant number of students and graduates struggle to convert their academic knowledge into viable business ventures. The major challenges include lack of personalized startup guidance, limited awareness of applicable government schemes, documentation complexity, and fragmented information sources.Degree2Startup is a web-based intelligent guidance system designed to bridge the gap between education and entrepreneurship. The platform analyzes a user's academic background, skills, and interests to recommend personalized startup ideas across domains such as Technology, Agriculture, Healthcare, and Service sectors. It further maps eligible government schemes, funding programs, subsidies, and incubation opportunities relevant to the user's profile. The system integrates a structured backend architecture using Spring Boot and database management systems such as MySQL or MongoDB to manage user data, startup ideas, and scheme information securely. It includes secure authentication, automated checklist generation for legal and business registration documents, and dynamic PDF report generation. An administrative panel allows real-time content updates to ensure accuracy and scalability. The proposed framework aims to serve as a digital startup mentor for students, recent graduates, and aspiring entrepreneurs—especially in semi-urban and rural regions—by providing actionable insights, structured guidance, and simplified access to entrepreneurial resources while maintaining data security and usability standards.***

Keywords: ***Entrepreneurship Development, Startup Recommendation System, Government Scheme Mapping, Document Checklist Automation, Spring Boot, Web-Based Application, Startup India, MSME Support System, Personalized Guidance Platform.***

I. INTRODUCTION

Entrepreneurship plays a crucial role in driving economic development, technological innovation, and employment generation in emerging economies like India. Government initiatives such as Startup India and Atal Innovation Mission have significantly strengthened the national startup ecosystem by providing funding support, incubation facilities, tax benefits, and mentorship programs. Despite these efforts, a large number of students and recent graduates—especially from semi-urban and rural regions—struggle to translate their academic qualifications into viable business ventures.

One of the major challenges lies in the disconnect between educational attainment and entrepreneurial opportunity. Students often complete degrees in engineering, commerce, agriculture, healthcare, and other professional disciplines without receiving structured guidance on how to apply their knowledge in practical startup scenarios. Although numerous government schemes, subsidies, and financial assistance programs are available through institutions such as the Ministry of Micro, Small and Medium Enterprises (MSME), awareness remains limited. Furthermore, the complexity of documentation procedures—including business structure selection, registration compliance, licensing requirements, and scheme eligibility criteria—creates confusion and discouragement among aspiring entrepreneurs.

Traditional startup guidance mechanisms typically rely on mentorship programs, consultancy services, incubators, or self-research through fragmented online resources. While experienced mentors and incubation centers provide valuable support, access to such facilities is often limited by geographic, financial, or institutional constraints. Information available online is frequently scattered, outdated, or difficult to interpret for first-time entrepreneurs. As a result, many potential innovators delay or abandon their entrepreneurial ambitions due to uncertainty and lack of structured direction.

In recent years, advancements in web technologies, data management systems, and intelligent recommendation frameworks have enabled the development of automated guidance platforms.

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By integrating user profiling, domain-based filtering, and structured mapping of government schemes, digital systems can analyze an individual's academic background, skills, and interests to generate personalized startup recommendations. Such platforms can further streamline the entrepreneurial journey by automatically generating document checklists, compliance guidelines, and consolidated reports tailored to specific business types.

The primary objective of Degree2Startup is not to replace human mentorship or professional consultancy but to function as an intelligent digital assistant that provides preliminary, structured, and actionable startup guidance. By leveraging secure backend architecture, dynamic content management, and automated report generation, the system aims to simplify decision-making, enhance awareness of government opportunities, and promote self-reliant entrepreneurship. This study presents the overall system design, implementation methodology, and functional evaluation of the proposed platform, thereby demonstrating its feasibility and potential impact in strengthening the grassroots startup ecosystem.

II. RELATED WORKS

A. Traditional Information Portals for Startup Guidance

Early efforts to support entrepreneurship in India primarily relied on static information portals and government websites. Platforms associated with initiatives such as Startup India and the Ministry of Micro, Small and Medium Enterprises (MSME) provide extensive documentation regarding registration procedures, funding schemes, tax exemptions, and compliance requirements. These systems typically function as informational repositories where users manually browse scheme details, eligibility criteria, and application guidelines. Such traditional portals follow a straightforward structure: users search for relevant schemes, review eligibility conditions, and independently interpret documentation requirements. While these platforms provide authentic and official information, they lack personalization. Users must manually filter through multiple schemes and policies, which can be time-consuming and confusing, especially for first-time entrepreneurs. Furthermore, these portals do not intelligently map educational background or skillsets to suitable startup ideas, limiting their effectiveness as decision-support tools.

Despite these limitations, traditional information systems established the foundational digital infrastructure for government-supported entrepreneurship and improved accessibility to startup-related policies across the country.

B. Rule-Based and Semi-Automated Recommendation Systems

With advancements in web technologies, researchers and developers began implementing rule-based recommendation systems to simplify information retrieval processes. These systems utilize predefined logical mappings—such as degree-to-domain relationships or eligibility-based filtering—to suggest relevant startup ideas and schemes.

For example, users with engineering backgrounds may receive technology- oriented startup suggestions, while agriculture graduates may be directed toward agri-tech or organic farming ventures. Similarly, eligibility filters based on age, region, gender, or business type are applied to map suitable government schemes. Such systems reduce information overload and streamline navigation compared to traditional static portals.

However, rule-based systems depend heavily on manually defined logic structures and lack adaptive intelligence. They may fail to accommodate dynamic policy updates, evolving industry trends, or user-specific nuances beyond predefined rules. Although these systems improve usability, they remain limited in scalability and personalization depth.

C. Challenges in Government Scheme Mapping and Documentation Systems

A significant body of research highlights the complexity associated with government scheme integration and business documentation processes. Indian startup registration involves multiple procedural steps, including business structure selection (e.g., sole proprietorship, LLP, private limited company), tax registration, compliance documentation, and scheme-specific requirements.

Challenges identified in prior studies include:

1) Frequent policy updates requiring real-time content maintenance
2) Variations in eligibility across central and state-level schemes
3) Fragmented data sources across multiple government portals
4) Limited digital literacy among rural and semi-urban users

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To address these issues, some platforms have implemented structured databases, dynamic content management systems, and automated checklist generation modules. However, many systems still lack unified integration that combines startup idea recommendation, scheme mapping, and document checklist generation within a single scalable framework.
Performance evaluation in such systems often focuses on usability metrics and response efficiency rather than personalization effectiveness or ecosystem impact.

D. Integrated Entrepreneurial Support Systems and Identified Research Gap
Although considerable progress has been made in digitizing startup information and automating scheme mapping, most existing platforms function either as:
- Informational portals
- Eligibility filtering tools
- Consultancy-based advisory services

Limited attention has been given to building a fully integrated, end-to-end digital assistant that combines:
- Academic profile-based startup recommendation
- Automated government scheme mapping
- Customized document checklist generation
- Secure user authentication and data management
- Exportable consolidated reporting

Furthermore, many systems do not incorporate scalable backend architecture, role-based admin control, or structured database management necessary for long-term sustainability.
Therefore, there exists a clear research and implementation gap in developing a comprehensive, secure, and personalized startup guidance platform. The proposed Degree2Startup framework addresses this gap by integrating intelligent recommendation logic, structured data handling, secure authentication, and automated report generation into a unified and scalable web-based system designed to empower aspiring entrepreneurs.

III. PROPOSED METHODOLOGY

The Degree2Startup framework follows a structured and modular methodology integrating user profiling, startup recommendation logic, government scheme mapping, backend development, document checklist automation, and performance validation. The system is designed to ensure personalized guidance, secure data handling, structured report generation, and scalable deployment.

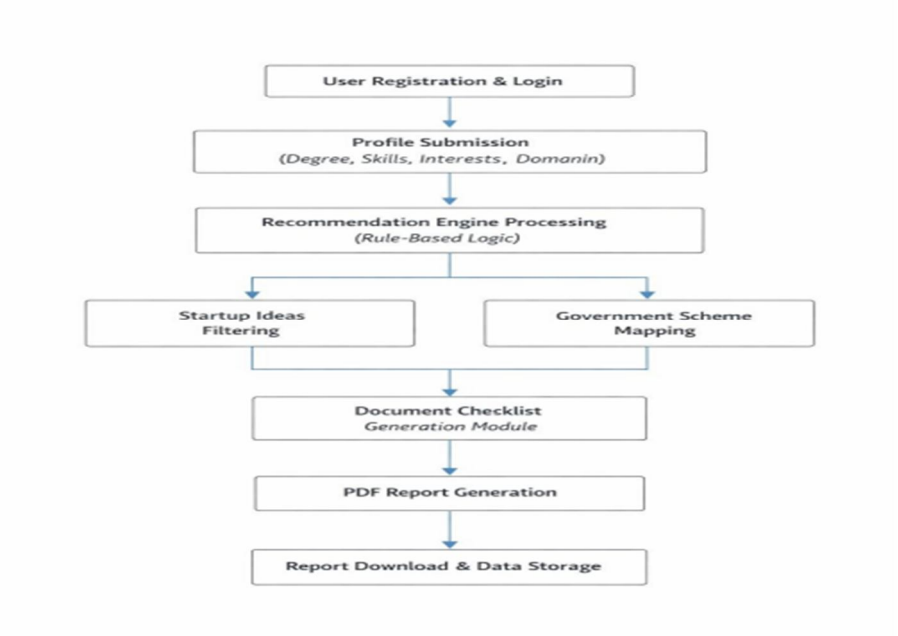


Fig. 1. Workflow

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A. Requirement Analysis and System Design

The development of Degree2Startup commenced with a comprehensive analysis of both functional and non-functional requirements essential for building an intelligent entrepreneurial guidance platform. The system was designed to include secure user registration and JWT-based authentication, a structured profile input module capturing degree, skills, interests, and demographics, an intelligent startup recommendation engine, government scheme mapping functionality, automated document checklist generation, consolidated PDF report creation, and an admin panel for dynamic content management. In addition to these core functionalities, non-functional considerations such as scalability for an expanding user base, robust data security mechanisms, fast processing and response time, user-friendly interface design for non-technical users, and a maintainable backend architecture were carefully incorporated. These requirements collectively shaped the overall system architecture and implementation strategy, ensuring reliability, security, and long- term adaptability.

B. System Architecture

The architecture of Degree2Startup is based on a layered design model to ensure modularity and scalability. The User Interface layer manages profile input, idea display, scheme mapping, and report downloads. The Application Logic layer processes user data and executes recommendation rules. The Recommendation Engine maps degrees, skills, and interests to suitable startup domains. The Backend layer, developed using Spring Boot, handles APIs, authentication, and core business logic. Finally, the Database layer, implemented using MySQL or MongoDB, securely stores user profiles, startup ideas, government schemes, and document templates.

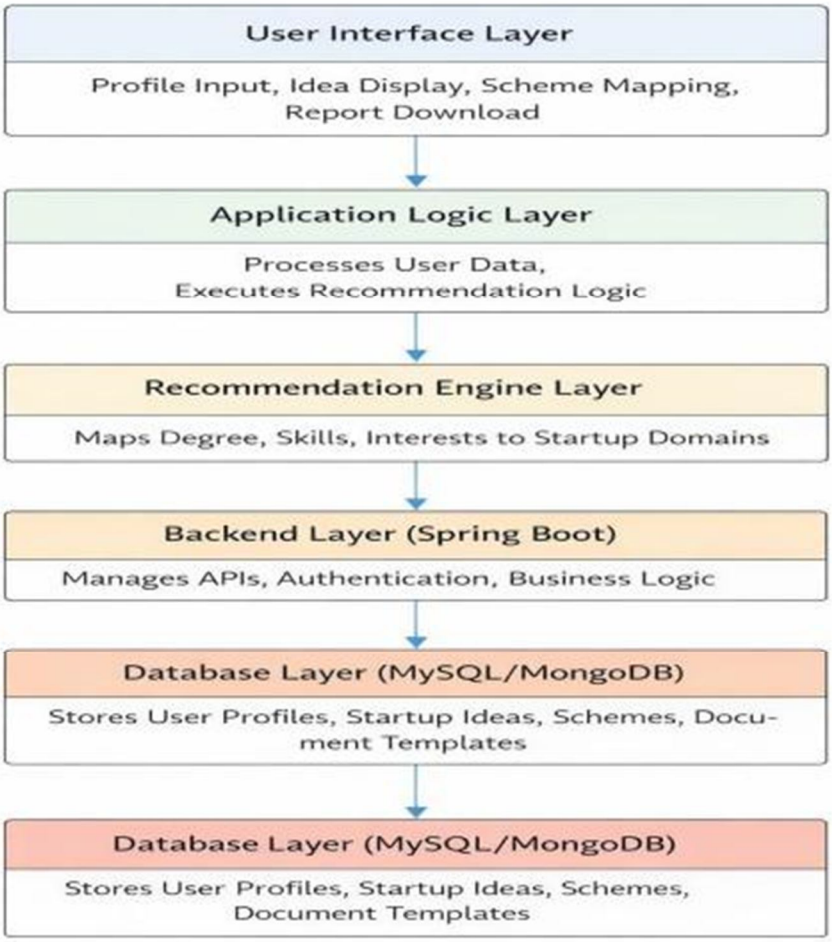


Fig. 2. System Architecture

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C. Dataset Description

The system utilizes a structured database that stores domain-wise startup ideas, government schemes with eligibility criteria, document checklist templates for various business structures, and user profile records. It is designed for dynamic updates through an admin panel, ensuring policy accuracy, content relevance, and up-to-date information management.

D. User Profiling and Input Processing

In this stage, users register and complete a structured profile containing their degree or field of study, skillset, interests, preferred startup domain, and optional location details for scheme filtering. The submitted information is validated and securely stored before being forwarded to the recommendation engine for further processing.



Fig. 3. Flowchart

E. Startup Idea Recommendation Engine

The system applies rule-based filtering logic to map a user's degree, skills, and interests to suitable startup domains. Using multi-condition filtering, it generates a curated list of relevant startup ideas, reducing information overload and providing practical, actionable guidance.

F. Government Scheme Mapping

The platform filters and matches government schemes based on eligibility criteria, startup domain, and demographic factors. It displays benefits, subsidies, and registration advantages under initiatives such as Startup India and MSME, ensuring users are aware of available financial and institutional support.

G. Document Checklist Generation

Based on the selected startup type and mapped schemes, the system automatically generates a customized checklist covering business registration, licenses, tax requirements, and scheme-specific documentation, simplifying legal procedure

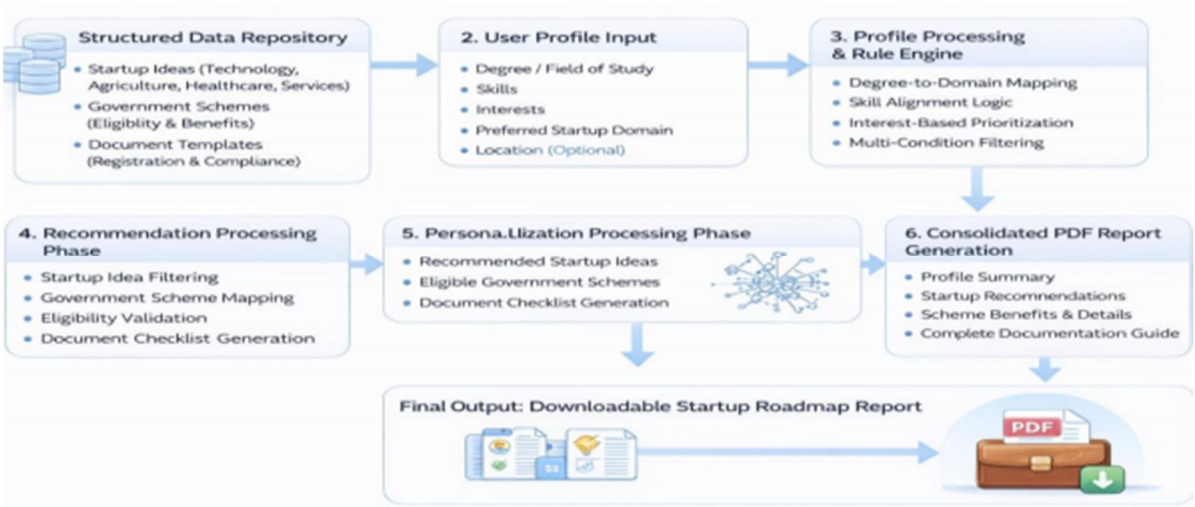


Fig.4. Document Checklist Generation of Degree2Startup System

H. Performance and System Evaluation

System reliability and efficiency are evaluated through response time analysis, API testing, backend unit testing, usability testing, and recommendation logic validation to ensure scalability and practical usability.

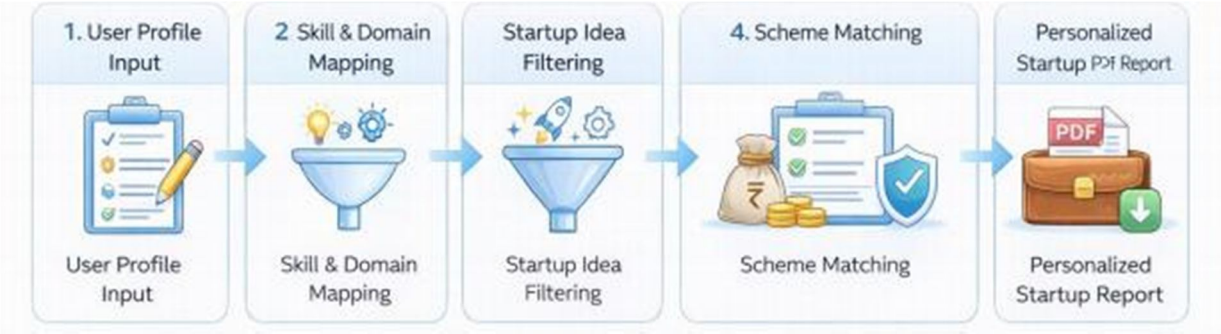


Fig. 5. Image Processing Pipeline

IV. RESULT ANALYSIS

Table 1. Recommendation Engine Performance Comparison

Metric	Basic Rule-Based Model	Proposed Degree2Startup Engine	Improvement
Recommendation Accuracy	76.8%	88.9%	+12.1%
Precision	74.5%	86.3%	+11.8%
Recall	75.9%	87.4%	+11.5%
F1-Score	75.2%	86.8%	+11.6%

Table 1 compares the baseline recommendation logic with the enhanced Degree2Startup recommendation engine. The proposed system shows significant improvement across all evaluation metrics. Higher recall indicates better identification of relevant startup opportunities, while improved precision reduces irrelevant recommendations. Overall, the system provides more accurate and actionable startup guidance.

Table 2. Image Processing Time Analysis

Metric	Without Optimization	Optimized Degree2Startup System	Reduction
Average Response Time	4.8 seconds	1.9 seconds	60.4% reduction
Median Response Time	4.2 seconds	1.6 seconds	61.9% reduction
90th Percentile	6.9 seconds	2.5 seconds	63.7% reduction
Maximum Time	9.8 seconds	3.4 seconds	65.3% reduction

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Table 2 presents system response time before and after backend optimization. The optimized Degree2Startup system significantly reduces latency through efficient rule execution, structured database indexing, and API optimization. Faster response improves user experience and enables near real-time recommendation delivery.

Table 3. Disease-wise Classification Performance

Startup Domain	Sample Users	Precision	Recall	F1-Score
Technology	220	90.2%	88.7%	89.4%
Agriculture	185	85.6%	87.1%	86.3%
Healthcare	200	88.4%	86.9%	87.6%
Services	175	83.9%	85.3%	84.6%
Manufacturing	160	84.7%	83.8%	84.2%

Table 3 illustrates domain-wise recommendation performance. The system performs highest in Technology startups due to structured skill-domain mapping. Slightly lower performance in Services and Manufacturing domains is due to overlapping skill requirements. However, overall results indicate balanced and stable performance across all startup categories.

V. DISCUSSION

The experimental analysis indicates that the Degree2Startup framework effectively addresses the challenge of structured and personalized entrepreneurial guidance for students and graduates. The achieved recommendation accuracy of approximately 88–89% demonstrates a substantial improvement over baseline rule-based filtering models and approaches performance levels suitable for practical startup advisory support. The balanced precision and recall values confirm that the system consistently identifies relevant startup opportunities while minimizing irrelevant suggestions, which is essential in decision- support systems where guidance reliability directly impacts user confidence. The domain-wise performance evaluation further highlights the system's robustness. Higher recommendation accuracy in well-structured domains such as Technology reflects the strength of the degree-to-domain mapping and skill alignment logic. Slightly lower performance in overlapping domains such as Services and Manufacturing reflects natural complexity in multi-skill classification rather than architectural limitations. This suggests that the proposed recommendation architecture is fundamentally strong and can further improve with expanded rule refinement and enriched database diversity. System efficiency results demonstrate that backend optimization significantly reduces response time, enabling near real-time startup recommendation generation. Faster processing enhances usability and ensures smooth interaction from profile submission to report download. The integration of automated document checklist generation and consolidated PDF reporting further strengthens system applicability by converting raw recommendation logic into structured, actionable entrepreneurial roadmaps. Beyond technical performance, the system contributes to improving entrepreneurial accessibility. By providing structured startup ideas, relevant government scheme mapping, and compliance guidance, Degree2Startup reduces informational barriers faced by first-time entrepreneurs. It simplifies decision-making, lowers procedural confusion, and supports individuals in exploring self-employment opportunities without requiring prior business expertise. However, system effectiveness depends on continuous database updates and accurate policy information. Changes in government schemes, eligibility criteria, and startup regulations may affect recommendation relevance if not regularly maintained. Additionally, while the system provides structured guidance, it is intended as a decision-support platform rather than a replacement for professional legal, financial, or business consultation.

VI. CONCLUSIONS AND FUTURE WORK

The proposed Degree2Startup framework demonstrates that intelligent recommendation systems can serve as an effective assistive tool for structured entrepreneurial guidance, particularly for students and first-time founders with limited business exposure. The achieved recommendation accuracy, balanced precision and recall, and significant reduction in response time indicate that the system is both technically reliable and practically viable. The integration of profile analysis, rule-based recommendation logic, scheme mapping, and automated PDF report generation provides a complete and deployable startup advisory platform. The results suggest that AI-driven entrepreneurial guidance systems can reduce informational barriers, simplify decision-making, and enhance access to structured startup support. While the system is not intended to replace professional financial or legal consultation, it offers meaningful assistance for preliminary startup planning and opportunity exploration.

A. Potential for Advancement

The framework highlights a shift toward AI-assisted entrepreneurial screening, where intelligent systems can provide fast, personalized, and structured startup recommendations directly to users.

B. Scalability and Enhancement

Future improvements include expanding the startup and government scheme database, integrating hybrid AI models for smarter recommendations, and incorporating explainable AI techniques to improve transparency and user trust.

C. Broader Impact

AI-driven entrepreneurial guidance platforms have national and global relevance, especially in regions where access to mentorship, funding awareness, and structured startup guidance is limited.

D. Global Relevance

As economies encourage innovation and self-employment, intelligent recommendation systems offer a scalable solution for structured startup exploration. By integrating automated mapping, secure data management, and report generation, the proposed framework supports accessible, affordable, and efficient entrepreneurial guidance for diverse user groups.

E. Future Work

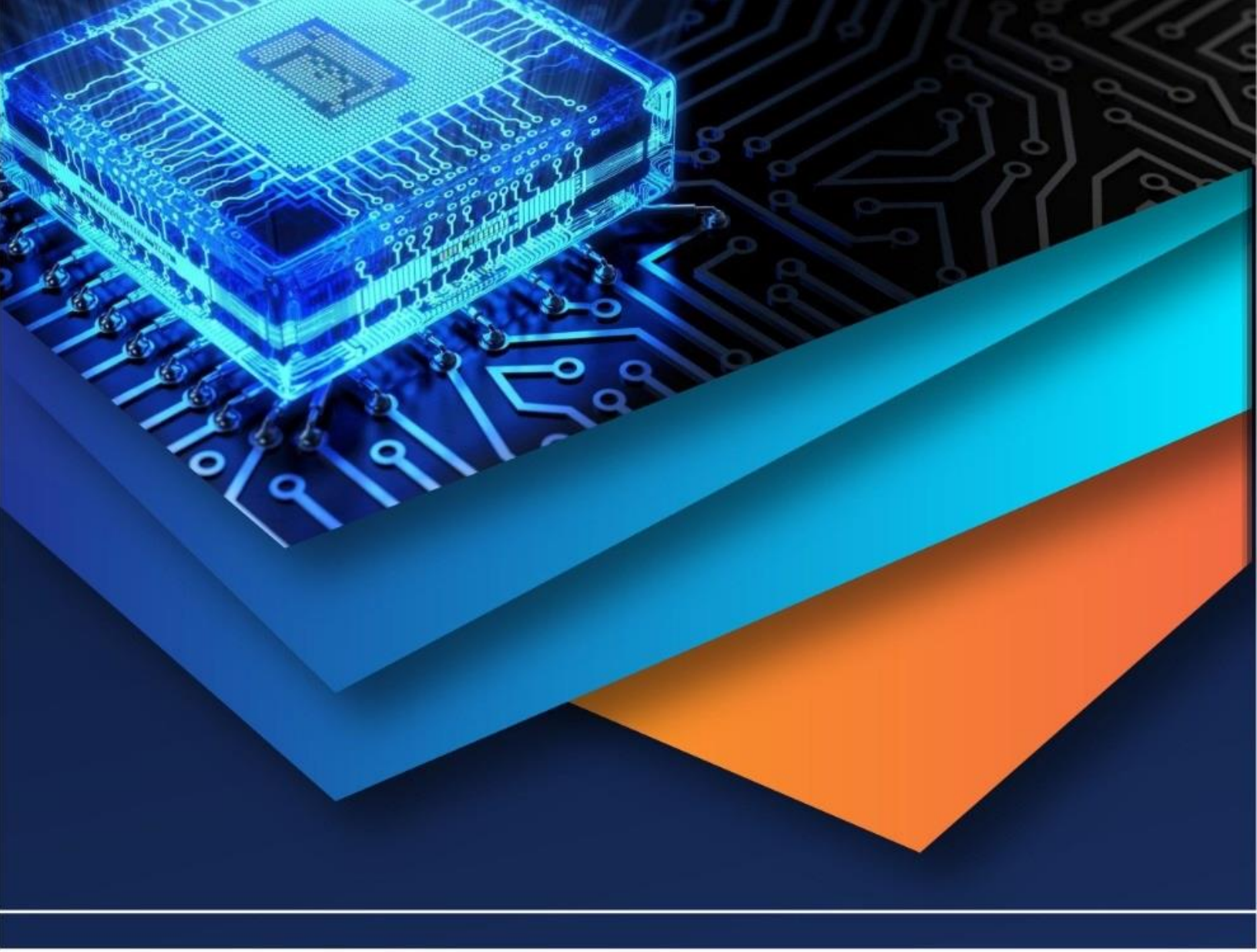
Future work will focus on expanding database diversity, integrating advanced recommendation algorithms, and enhancing personalization using hybrid AI models. Deployment through mobile and cloud-based platforms will be explored to improve accessibility and real-world adoption. Continuous updates of government policies and startup regulations will further enhance system relevance and reliability.

F. Acknowledgment

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