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TPGIT Migrant worker Registration and Tracking System

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Abstract: ***Migrant workers form a significant part of Tamil Nadu's labour force, yet they continue to face challenges such as lack of official identification, language barriers, fragmented job information, and limited access to welfare support. Current labour management practices rely heavily on manual processes, leading to inaccurate records, delayed verification, and poor visibility of workforce distribution. To overcome these gaps, this project introduces an intelligent Migrant Worker Registration and Support Platform that digitally manages worker information, employment details, and welfare accessibility. The system enables fast and inclusive registration through a multilingual interface and generates a unique Migrant ID (MID) for each worker. QR-based identity verification allows employers and authorities to authenticate worker profiles quickly and securely. To analyze workforce concentration across Tamil Nadu, the OPTICS (Ordering Points To Identify the Clustering Structure) clustering algorithm is applied to location data, enabling the system to identify high-density migrant zones and emerging labour clusters in real time. The platform also supports document uploads, employer reporting, and role-based profile access to improve reliability and accountability. In addition, the system provides workforce trend analytics, helping policymakers forecast labour demands more accurately. A notification module ensures that workers receive timely updates on job opportunities and welfare schemes. These features collectively enhance transparency and enable proactive planning for migrant resource management. By combining digital identification, intelligent clustering, and centralized workforce mapping, the proposed system enhances transparency, strengthens labour governance, and ensures timely support for migrant workers across the state.***

Keywords: Migrant worker digital registration platform with QR-based ID, multilingual access, workforce analytics, and welfare support system .

I. INTRODUCTION

Migrant work refers to employment by individuals who move from their usual place of residence—either within a country or across borders—in search of better job opportunities. These workers are employed in sectors like agriculture, construction, domestic work, and services, often on a temporary or seasonal basis. Despite their important economic contributions, they frequently face challenges such as low wages, exploitation, and lack of legal protection. Migrant work includes international migration, inter-state movement, and seasonal employment, depending on the nature and duration of relocation.

II. SYSTEM ANALYSIS

A. Existing System

Existing systems for managing migrant workers in India are fragmented and inefficient. State labour portals operate independently without national integration, making cross-state tracking difficult. Aadhaar provides only basic identity verification and lacks employment-related data. Employment exchanges are outdated and have limited reach among migrant workers. NGO efforts, while valuable, are localized and not centrally coordinated. Additionally, employer-led registrations are private and non-standardized, resulting in poor data sharing and limited transparency for effective workforce management.

B. Proposed System

The proposed system is a digital platform to manage, monitor, and verify migrant workers across Tamil Nadu using features like multilingual registration, QR-based Migrant ID (MID), document validation, and geo-spatial analysis with OPTICS clustering. It enables workers to register easily in multiple languages, generates a unique ID for secure verification, and allows document submission with employer validation to ensure authenticity and accountability. Additionally, the system analyzes worker location data to identify labour clusters and migration patterns, helping authorities make data-driven decisions. With real-time notifications for job opportunities and welfare schemes, the platform improves transparency, efficiency, and overall labour management.

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III. DEVELOPMENT ENVIRONMENT

A. Hardware Requirement

Processor type	: Intel i5 processor or more
RAM	: 8GB
Storage	: 500GB HDD/SSD
Network	: Stable internet connection

B. Software Requirements

Operating System	: Windows 10 or 11
Language	: PHP 7.4 or higher or Python
Database	: MySQL 5.7
Frontend Framework	: React.js 17.0 or higher, HTML, CSS
Web Server	: WampServer or XAMPP (for local server setup)
Geolocation Services	: Google Maps API
Communication	: Email Service(SMTP, Send Grid,etc.),SMS Gateway API (Twilio, etc.)

IV. MODULES DESCRIPTION

A. TN Migrant Connect Web App

A centralized web platform that manages migrant worker data across Tamil Nadu, offering secure registration, verification, tracking, and workforce services with multilingual, mobile-friendly access and integrated analytics like OPTICS clustering and QR verification..

B. System Users (Authorities, Workers, Employers)

Provides role-based access where authorities monitor and plan workforce distribution, workers register and access jobs/welfare, and employers verify and manage workers efficiently.

C. Migrant Registration

Enables easy, multilingual online registration for workers to input personal, skill, and job details through a simple, mobile-friendly interface.

D. Unique ID & QR Code Generation

Generates a unique Migrant ID (MID) and QR code for each worker, allowing quick and secure identity verification by employers and authorities.

E. Document Management

Allows secure upload and validation of worker documents, ensuring authenticity and supporting transparent recruitment and welfare planning.

F. Employer Verification

Enables employers to verify workers via MID/QR and record employment details, improving accountability and workforce tracking.

G. Workplace Mapping

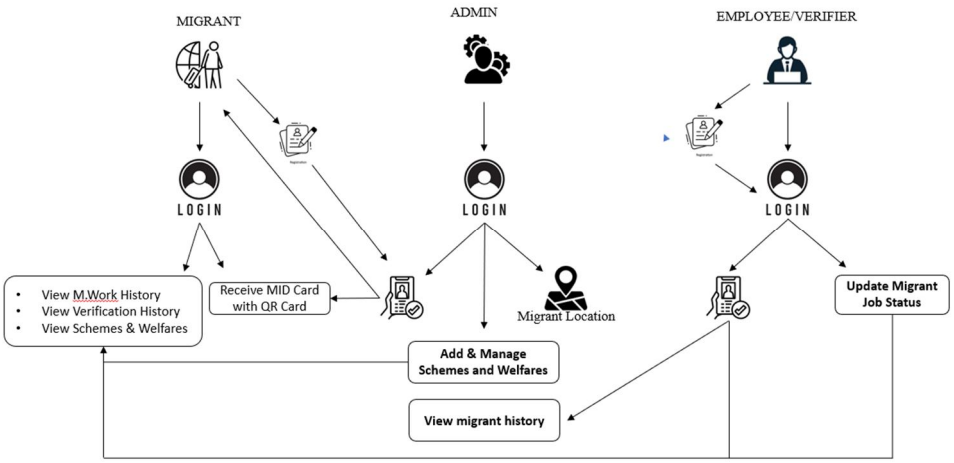
Uses OPTICS clustering to analyze worker distribution, identify labour clusters, and support data-driven workforce planning and resource allocation.

H. Notification & Support

Sends real-time updates on jobs, verification, and welfare schemes while providing legal aid and support services in multiple languages.

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V. SYSTEM ARCHITECTURE



VI. CONCLUSION

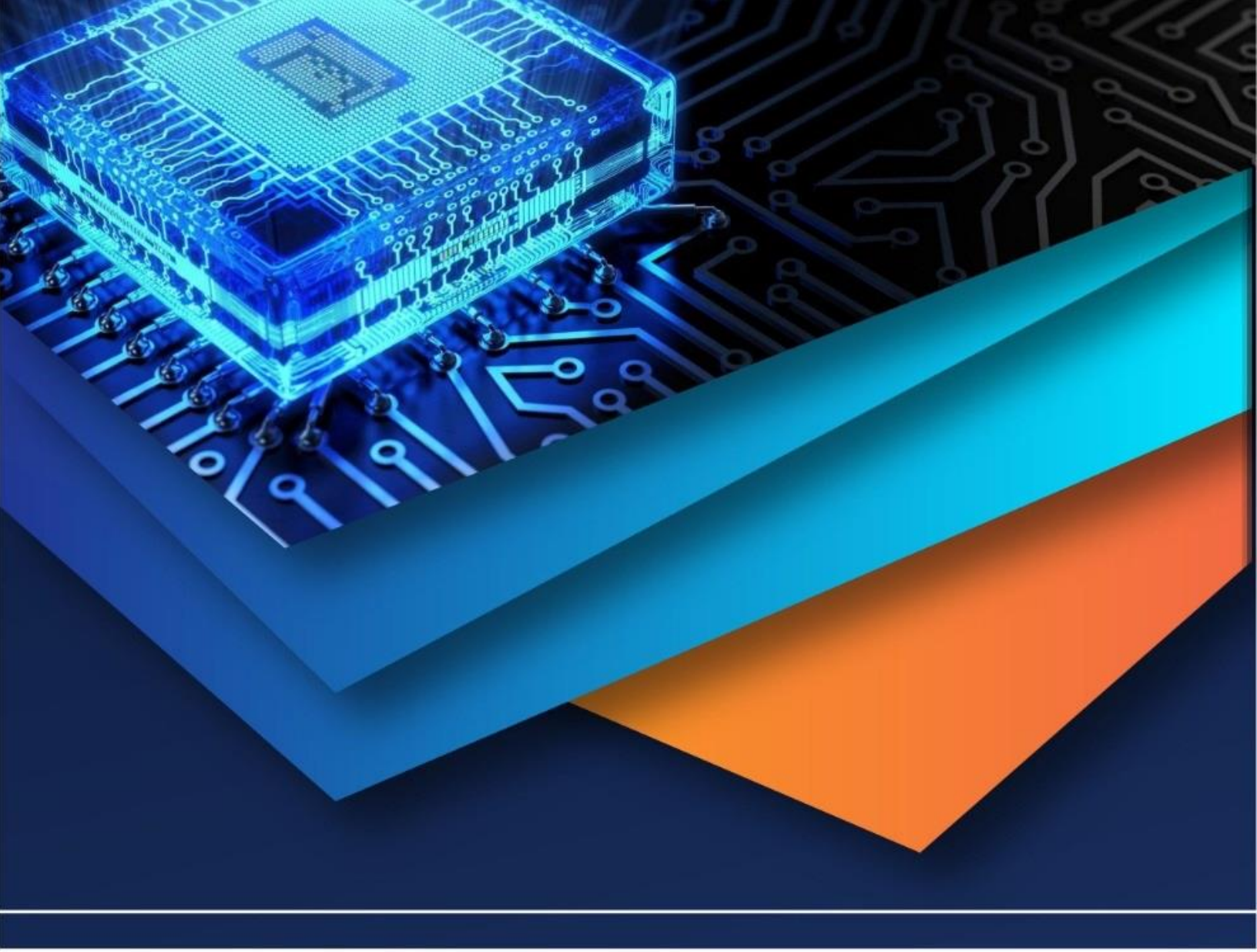
In conclusion, this project delivers a comprehensive digital solution for managing migrant workers in Tamil Nadu through multilingual registration, MID generation, QR-based verification, and secure document validation. It improves transparency, workforce tracking, and accountability with features like employer verification and workplace mapping using OPTICS clustering for data-driven decision-making. The system benefits authorities, employers, and workers by enabling efficient management, easy verification, and better access to welfare services. Built with reliable technologies, it ensures scalability and usability, while future enhancements can further expand its capabilities and reach.

VII. FUTURE ENHANCEMENT

Future enhancements include developing a mobile application for easier access, implementing an automated grievance system for real-time issue reporting, integrating blockchain technology for secure and tamper-proof data management, and adding AI-powered multilingual voice assistance to improve accessibility for low-literacy migrant workers.

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