Unlocking Societal Trends in Aadhaar Enrolment and Updates

UIDAI Data Hackathon 2026

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Trends • Stability • Anomaly Detection for Data-Driven Governance

Problem Statement

Context

Aadhaar enrolment and update data captures rich signals about population movement, identity lifecycle changes, and system-level operational stress. However, these signals remain underutilized in routine decision-making.

Problem Statement

While large volumes of Aadhaar enrolment, demographic update, and biometric update data are available, there is limited analytical integration to:

- Identify **meaningful temporal trends** in enrolment activity
- Measure **regional stability of Aadhaar records** across states and districts
- Detect **localized anomalies** indicating unusually high update pressure or data-quality challenges

As a result, potential early-warning indicators and governance insights remain hidden within aggregated statistics.

Objective

The objective of this project is to **unlock societal and operational trends** embedded in Aadhaar data by combining trend analysis, stability metrics, and anomaly detection to support informed decision-making and targeted system improvements.

Datasets Used

This project uses officially released UIDAI datasets covering Aadhaar enrolment and update activity across India.

1. Aadhaar Enrolment Dataset

• Captures new Aadhaar enrolments across age groups (0–5, 5–17, 18+)

• Time period: March 2025 to January 2026

• Geographic granularity: State, District, PIN code

• Volume: ~1.0 million aggregated records

2. Aadhaar Demographic Update Dataset

• Records updates to demographic attributes such as name, address, gender, and mobile number

• Time period: March 2025 to January 2026

• Geographic granularity: State, District, PIN code

• Volume: ~2.0 million aggregated records

3. Aadhaar Biometric Update Dataset

• Covers biometric updates including fingerprints, iris, and facial data

• Time period: March 2025 to January 2026

• Geographic granularity: State, District, PIN code

• Volume: ~1.8 million aggregated records

All datasets are aggregated and anonymized, ensuring privacy while enabling large-scale trend, stability, and anomaly analysis.

Methodology

This project applies a structured analytical pipeline to extract trends, stability metrics, and anomalies from Aadhaar datasets.

1. Data Preparation

• Integrated enrolment, demographic update, and biometric update datasets

• Standardized geographic identifiers and handled missing values

2. Aggregation and Trend Analysis

• Aggregated data at national, state, and district levels

• Analysed temporal enrolment trends and age-wise distributions

3. Aadhaar Stability Index

• Constructed a Stability Index to quantify record persistence

• Stability Index = 1 − (Demographic + Biometric Updates) / Total Enrolments

• Lower values indicate higher update frequency

4. Anomaly Detection

• Identified districts with unusually low Stability Index values

• Flagged bottom 5% districts using percentile-based thresholds

5. Visualization and Interpretation

• Used trend plots, distributions, state comparisons, and maps

• Translated analytical outputs into policy-relevant insights

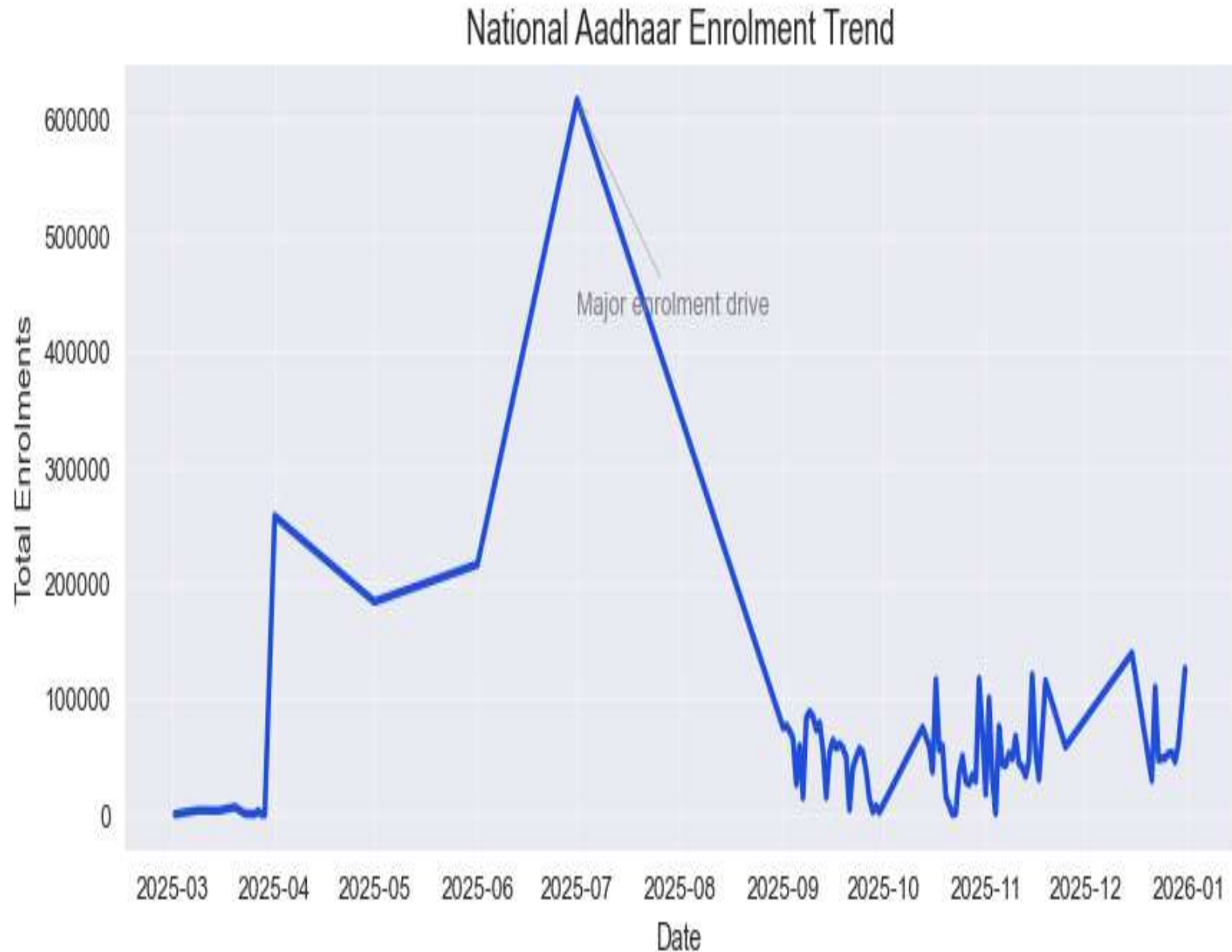# Episodic Trends in National Aadhaar Enrolment (2025–26)

Key Insight

Aadhaar enrolment activity is episodic, marked by sharp, short-lived spikes rather than sustained growth, indicating reliance on time-bound enrolment drives.

Interpretation

The pronounced mid-2025 surge followed by a rapid decline suggests enrolment behavior is driven by campaigns, deadlines, or scheme-linked triggers rather than continuous demand.

Policy Relevance

These patterns highlight the need to shift from campaign-centric enrolment toward sustained, regionally balanced outreach and infrastructure planning.

National Aadhaar Enrolment Trend

State-wise Concentration of Aadhaar Enrolments

Key Insight:
Aadhaar enrolments are highly concentrated in a small number of states, with a steep decline beyond the top contributors.
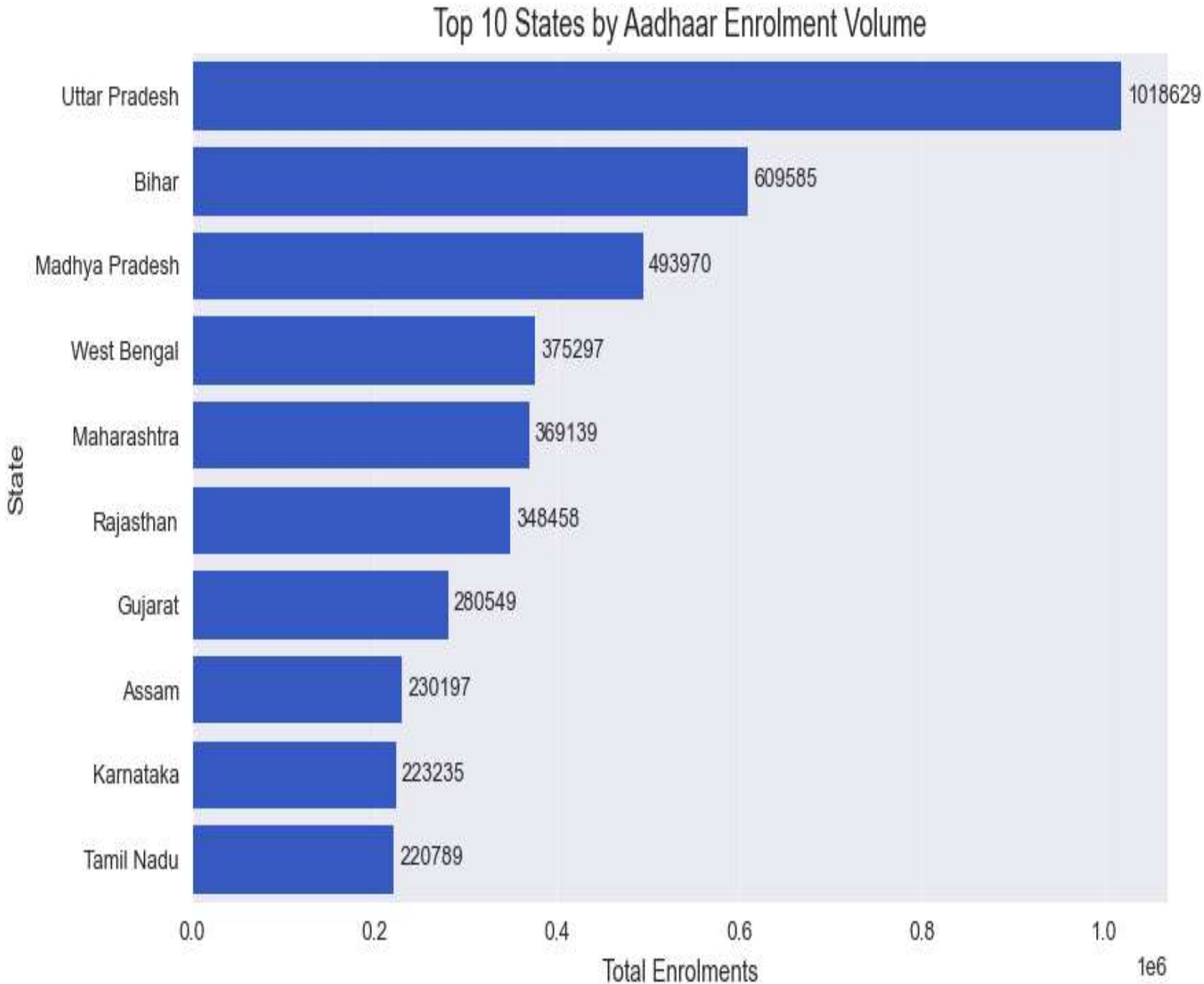
Interpretation:
The sharp drop after the leading states reflects uneven enrolment saturation rather than uniform national demand.

Policy Relevance:
Supports region-specific enrolment strategies and targeted infrastructure planning.

Supports region-specific enrolment strategies, optimized deployment of enrolment centers, and efficient allocation of field resources.

Top 10 States by Aadhaar Enrolment Volume

Age-wise Distribution of Aadhaar Enrolment Events

Key Insight

A significant majority of Aadhaar enrolments are concentrated in the 0–5 age group, while enrolments among adults (18+) form a relatively small share.
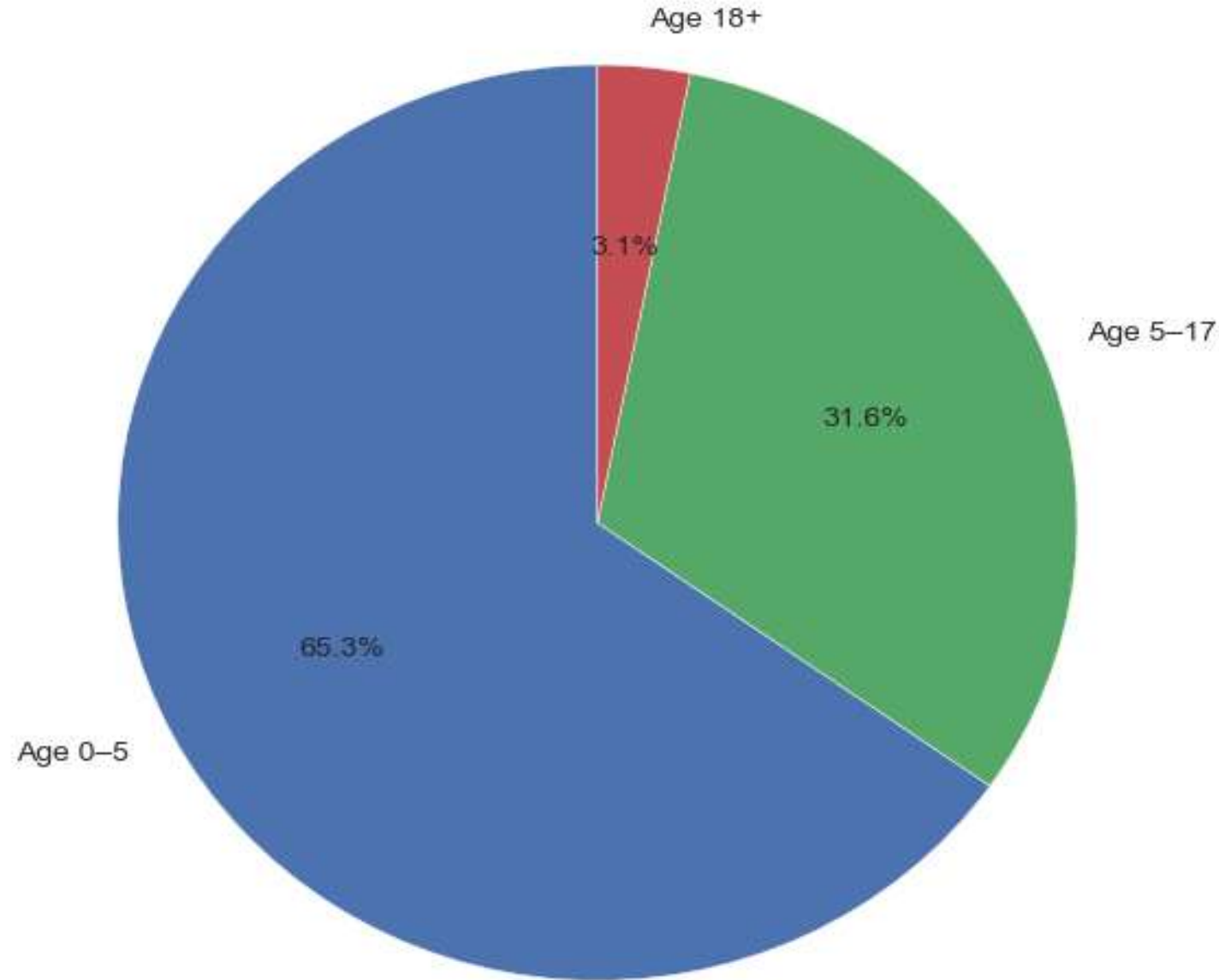
Interpretation

This pattern suggests a strong push toward early-age Aadhaar enrolment, likely driven by linkage with child-focused welfare schemes and services.

Policy Relevance

Early-age enrolment improves long-term identity coverage but also highlights the importance of ensuring high-quality biometric capture to reduce future update and correction requirements.

Note: Distribution reflects enrolment events during the selected period, not population coverage.

Age-wise Distribution of Aadhaar Enrolments

- Age 18+ : 3.1%
- Age 5–17 : 31.6%
- Age 0–5 : 65.3%

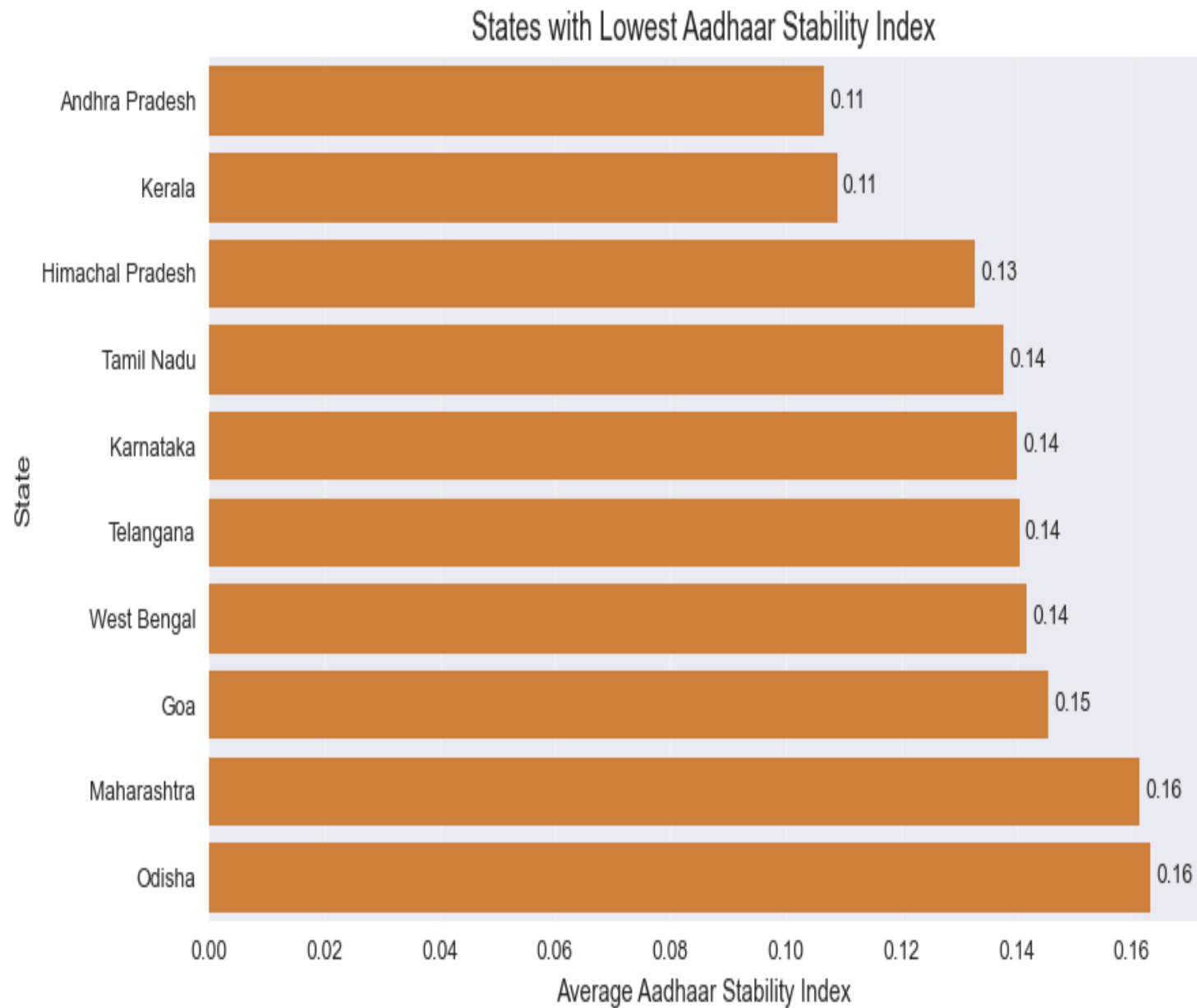# States with Lowest Aadhaar Stability Index

Key Insight

Several states exhibit consistently low Aadhaar Stability Index values, indicating higher levels of demographic and biometric update activity relative to enrolment volumes.

Interpretation

Lower stability suggests increased identity churn, which may arise from factors such as population mobility, address changes, or biometric corrections following early-age enrolment.

Policy Relevance

Identifying low-stability states allows UIDAI to proactively target data-quality audits, strengthen update infrastructure, and plan capacity for regions experiencing sustained identity update pressure.

States with Lowest Aadhaar Stability Index

State	Average Aadhaar Stability Index
Andhra Pradesh	0.11
Kerala	0.11
Himachal Pradesh	0.13
Tamil Nadu	0.14
Karnataka	0.14
Telangana	0.14
West Bengal	0.14
Goa	0.15
Maharashtra	0.16
Odisha	0.16

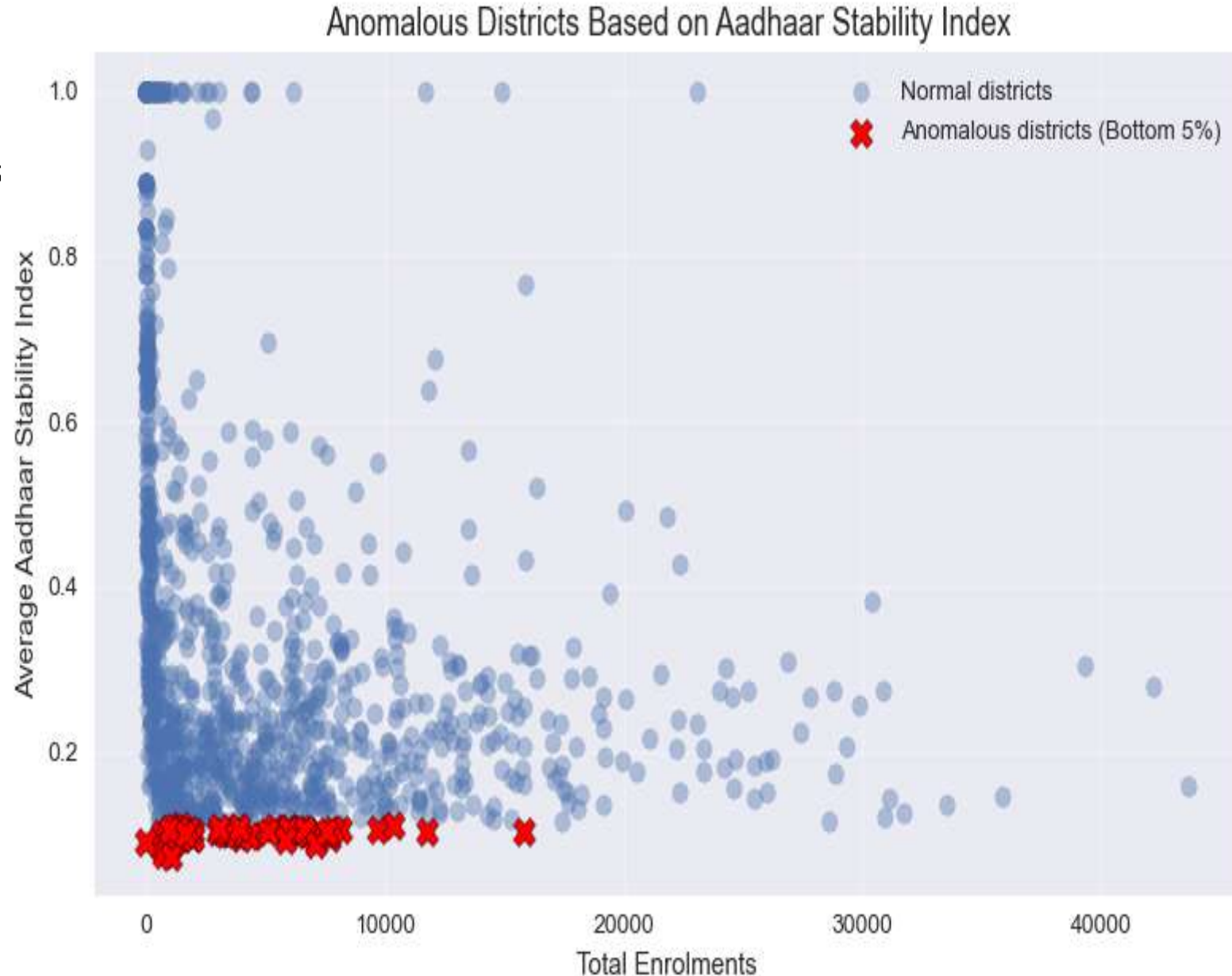# Anomalous Districts Identified Using Aadhaar Stability Index

Key Insight

A small subset of districts (bottom 5%) exhibits significantly lower Aadhaar Stability Index values compared to the national distribution, despite varying enrolment volumes.

Interpretation

These anomalous districts experience disproportionately high demographic and biometric update pressure, indicating localized identity churn, migration effects, or data-quality challenges.

Policy Relevance

Early identification of such districts enables proactive administrative review, targeted infrastructure deployment, and focused data-quality interventions before systemic issues escalate.

Anomalous Districts Based on Aadhaar Stability Index

State-wise Aadhaar Stability Index in India

Key Insight

The Aadhaar Stability Index reveals clear regional variation across India, with certain states exhibiting significantly lower stability compared to others.
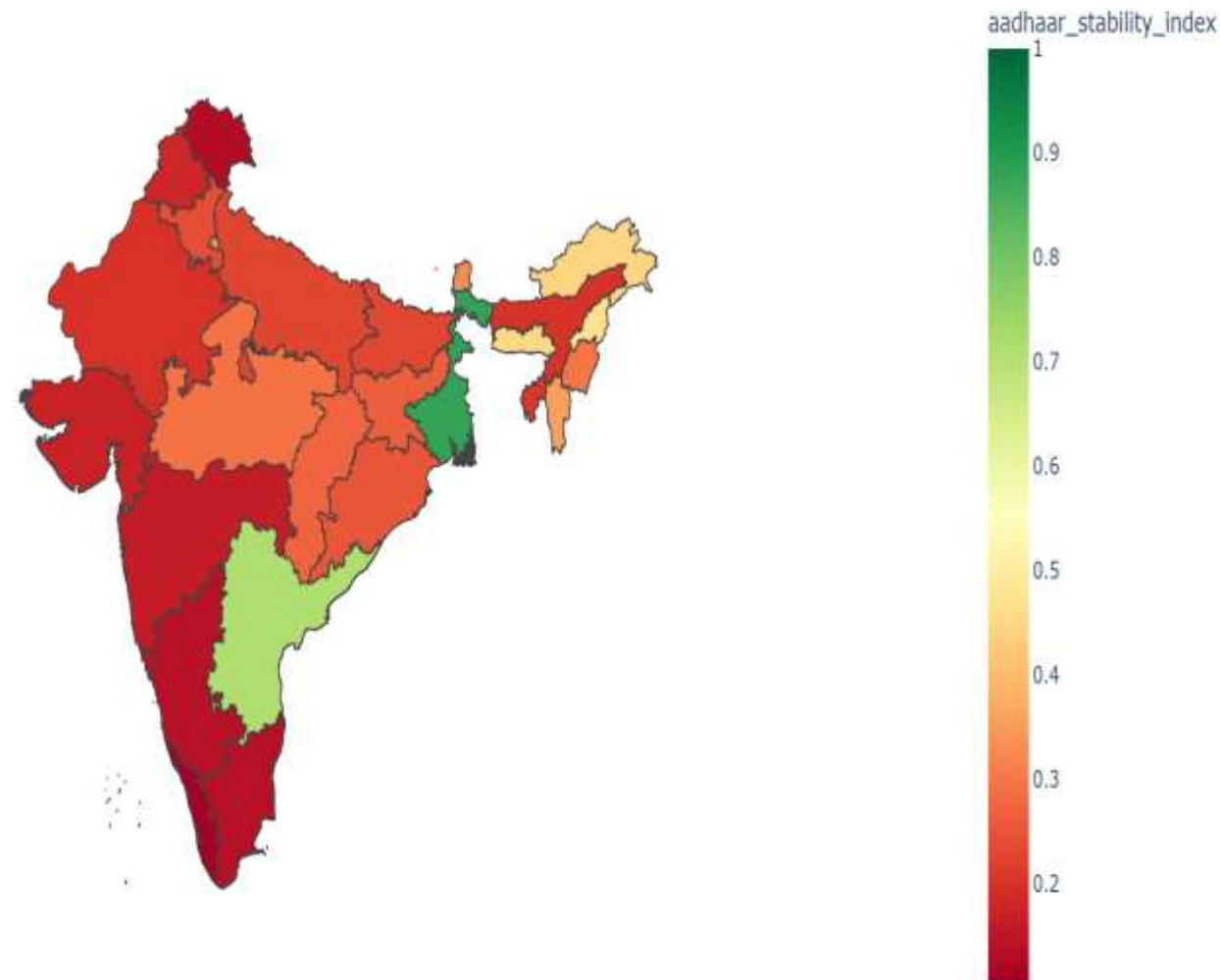
Interpretation

Lower stability values indicate higher frequency of demographic and biometric updates, potentially driven by population mobility, address changes, or enrolment lifecycle transitions.

Policy Relevance

State-level visibility of Aadhaar stability enables UIDAI to prioritize administrative oversight, allocate infrastructure efficiently, and plan targeted data-quality interventions in regions experiencing sustained identity update pressure.

Note: Jammu & Kashmir is not displayed due to the absence of state-level records in the provided UIDAI dataset for the selected period.

India: Aadhaar Stability Index by State

Policy Insights and Recommendations

Integrated analysis of enrolment trends, age composition, stability metrics, and anomalies highlights actionable policy directions for UIDAI.

1. Transition from Campaign-Based to Sustained Enrolment

- Enrolment spikes indicate reliance on time-bound drives

- Shift toward continuous, regionally balanced enrolment planning

2. Prioritize High-Pressure, Low-Stability Regions

- Low Stability Index signals elevated identity update churn

- Target these regions for administrative oversight and capacity strengthening

3. Strengthen Early-Age Enrolment Quality

- High enrolment share in 0–5 age group

- Emphasize biometric quality and validation to reduce future corrections

4. Use Stability Index as an Early-Warning Signal

- Detect abnormal update pressure from migration or data-quality issues

5. Enable Data-Driven Resource Allocation

- Guide deployment of enrolment centres and update infrastructure based on demand and stability patterns

Conclusion and Impact

Conclusion

This project demonstrates how integrated analysis of Aadhaar enrolment, demographic updates, and biometric updates can uncover meaningful societal and operational patterns that are not visible in isolated statistics.

Key Contributions

• Identified episodic enrolment trends and regional concentration patterns

• Developed the Aadhaar Stability Index to quantify record persistence

• Detected low-stability states and anomalous districts facing elevated update pressure

• Linked analytical findings to actionable, policy-relevant insights

Impact for UIDAI

The proposed Stability Index and anomaly detection framework provide UIDAI with a scalable, data-driven approach to:

• Monitor identity system health proactively

• Anticipate infrastructure and staffing requirements

• Support evidence-based governance and planning

Future Scope

This framework can be extended with predictive modeling, real-time dashboards, and integration with additional administrative datasets to enable continuous monitoring and early-warning decision support.