

Aadhaar 2.0: Analyzing Data Privacy Risks in India's Upgraded Digital Public Infrastructure

India's Aadhaar system, the world's largest biometric identification program, is undergoing significant evolution with the development of what's being called "Aadhaar 2.0." As this critical component of India's digital public infrastructure (DPI) expands in capability and reach, it brings both enhanced functionality and renewed privacy concerns. This report analyzes the data privacy risks associated with Aadhaar 2.0, examining both the vulnerabilities and the safeguards built into this upgraded system that serves over 1.36 billion Aadhaar numbers[3].

The Evolution of Aadhaar to Aadhaar 2.0

Aadhaar was originally designed as a 12-digit individual identification system serving as proof of identity and address for Indian residents[1]. Since its inception, Aadhaar has transformed from a simple identification tool to the foundation of India's expansive digital public infrastructure, supporting over 70 million daily authentication transactions and enabling nearly 1,700 government welfare schemes[3].

Aadhaar 2.0 represents a significant upgrade with several new features designed to enhance security, privacy, and usability. The upgraded system introduces:

- Face ID authentication for biometric verification, eliminating the need for physical cards[4]
- QR code-based instant verification similar to UPI payments[4]
- Stronger privacy protections requiring user consent for data sharing[4]
- Enhanced biometric authentication and offline verification mechanisms[15]
- Virtual IDs and Limited KYC as privacy-enhancing features[15]
- Transaction alerts and usage pattern monitoring for security[6]
- Automatic deactivation of Aadhaar upon death (with family consent)[17]

Critical Data Privacy Risks in Aadhaar 2.0

Biometric Vulnerabilities and Identity Theft

Despite improvements, fundamental vulnerabilities persist in Aadhaar 2.0's biometric authentication system. Unlike passwords, biometrics cannot be changed if compromised. Research has identified several concerning weaknesses:

- Biometrics remain vulnerable to illegal harvesting and identity fraud as they are not secret information[16]
- Counterfeit biometrics, including silicon fingerprints, can potentially bypass authentication systems[8]
- Studies show the UIDAI system has difficulty differentiating between silicon fingerprints and live fingerprints[8]
- Face ID authentication, while convenient, introduces new potential attack vectors if facial recognition algorithms are compromised[4]

A particularly troubling investigation by Delhi Police revealed that individuals were able to generate multiple Aadhaar cards using different fingerprints but the same photograph, indicating a critical flaw in the facial biometric matching system[8].

Data Breaches and System Security

Aadhaar's massive centralized database remains a prime target for hackers. In January 2023, a major security incident revealed the system's vulnerabilities:

- A US-based cybersecurity firm reported that personal data of approximately 81.5 crore Indians, including Aadhaar and passport information, was exposed on the dark web[7][13]
- The compromised data was reportedly being offered for sale at \$80,000[7]

- The breach potentially originated from the Indian Council of Medical Research (ICMR) database, highlighting the risks of linking Aadhaar to multiple systems[7]

The Comptroller and Auditor General's investigation in April 2022 found that "UIDAI had not sufficiently safeguarded their data vaults" and that leaks were primarily occurring through client vendors with inadequate oversight[13].

Cross-Domain Correlation and Profiling

Aadhaar 2.0's expanded integration across domains creates significant privacy risks through potential linkage attacks:

- The use of a single identifier across multiple domains enables tracking of individual activities and potentially unauthorized profiling[16]
- When Aadhaar data is linked with government schemes and services, privacy risks multiply if leaks occur[5]
- Even with limited data fields, correlating Aadhaar-linked records across healthcare, financial, and other systems can create comprehensive individual profiles[5]

Surveillance and Unauthorized Tracking

The expansion of Aadhaar authentication into everyday transactions raises concerns about potential surveillance:

- Authentication and identification trails could be misused for tracking individuals without proper authorization[16]
- Records may reveal information on location, time, and context of service usage[16]
- The risk of state surveillance increases as Aadhaar becomes more deeply embedded in India's digital ecosystem[13]

Privacy Safeguards in Aadhaar 2.0

Virtual ID and Limited KYC

To address privacy concerns, UIDAI has introduced innovative features:

- Virtual ID: A temporary, revocable 16-digit random number mapped to a person's Aadhaar that can be used instead of sharing the actual Aadhaar number[11]
- Users can generate multiple Virtual IDs, with older ones automatically canceled when new ones are created[11]
- Limited KYC: Provides authorized agencies only with need-based or limited user details necessary for a particular service[11]
- These mechanisms reduce the risk of unauthorized access and data misuse during authentication processes[15]

Enhanced Security Architecture

The upgraded system incorporates several technical safeguards:

- Secure sharing features that allow users to share only required portions of their Aadhaar data[4]
- Real-time authentication using facial recognition for immediate verification[4]
- QR code-based verification eliminating the need for physical documents or photocopies[4]
- UIDAI's collaboration with the Society for Electronic Transactions and Security (SETS) for R&D in advanced cybersecurity technologies, including Quantum Security and Cryptography[3]

Alignment with Data Protection Legislation

A significant development for Aadhaar 2.0 is its planned alignment with India's new data protection framework:

- Union Minister for Electronics and IT, Ashwini Vaishnaw, has instructed UIDAI to draft revised Aadhaar legislation aligned with the Digital Personal Data Protection (DPDP) Act, 2023[10]
- This alignment aims to strengthen privacy standards and data protection requirements within the Aadhaar ecosystem[10]
- The timing is particularly important as previous Aadhaar legislation was enacted before India had a comprehensive data protection law[10]

Proactive Security Monitoring

Proposed security measures for Aadhaar 2.0 include sophisticated monitoring systems:

- Abnormal Usage Pattern Tracking: Similar to multinational bank systems, UIDAI would identify suspicious transactions based on unusual usage patterns[6]
- Transaction Alerts: Immediate notifications to users whenever their Aadhaar is used for verification, AePS, or other services[6]
- Linkage Summaries: Providing users with comprehensive information about where their Aadhaar is being used[6]
- These measures could significantly improve user control and awareness of how their Aadhaar data is being utilized[6]

Broader Implications for India's Digital Public Infrastructure

The Privacy-Convenience Balance

Aadhaar 2.0 highlights the fundamental tension in digital identity systems between convenience and privacy:

- Well-designed DPI can improve user control over personal data through minimalist data collection principles and privacy-preserving features[9]
- However, the scale and integration of Aadhaar across diverse services magnifies both benefits and potential harms from any privacy breaches[6]
- The centralization of identity verification creates a single point of failure that requires robust safeguards[14]

Vulnerabilities in the Aadhaar Ecosystem

Many privacy risks emerge not from the core Aadhaar system itself but from its ecosystem:

- Research shows leaks often emanate from client vendors and village-level operatives involved in data collection and storage[13]
- The mixing of high-value identity verification (banking) and low-value transactions (hotel check-ins) increases the attack surface[6]
- Paper documents containing Aadhaar information are frequently misplaced or improperly disposed of[6]
- Online records maintained by various organizations may be compromised through keystroke-logging or data transmission interception[6]

Conclusion: Balancing Innovation and Privacy Protection

Aadhaar 2.0 represents a significant advancement in India's digital public infrastructure, but its success will ultimately depend on how effectively it balances innovation with

privacy protection. The system introduces valuable privacy-enhancing features like Virtual IDs and limited KYC, while also expanding capabilities through face authentication and digital verification.

However, persistent challenges remain. Biometric data remains inherently vulnerable due to its immutable nature. The centralized database continues to present an attractive target for cyber attacks. Cross-domain correlation risks increase as Aadhaar becomes more deeply integrated across services. Most importantly, the regulatory framework must evolve alongside the technology to ensure proper governance and accountability.

For Aadhaar 2.0 to truly succeed as a privacy-respecting system, implementation of the proposed security features must be rigorous, oversight of the entire ecosystem must be strengthened, and user education about privacy rights and protective measures must be prioritized. The alignment with India's new data protection framework represents a positive step, but continuous evaluation and improvement will be necessary to address evolving privacy risks in this critical component of India's digital future.

Sources

[1] What is Aadhaar? (2) - Unique Identification Authority of India

<https://www.uidai.gov.in/en/2-uncategorised/14381-what-is-aadhaar-2.html>

[2] Aadhaar Card Update Online - Correction Name, Address & DOB

<https://www.bankbazaar.com/aadhar-card/updating-aadhar-details.html>

[3] UIDAI and SETS join hands to conduct R&D in deep-tech ... - PIB

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=1910127>

[4] New Aadhaar app announced: Check new features, download ...

<https://www.moneycontrol.com/technology/new-aadhaar-app-announced-check-new-features-download-details-and-more-article-12990244.html>

[5] A critical survey of the security and privacy aspects of the Aadhaar ...

<https://www.sciencedirect.com/science/article/abs/pii/S016740482400083X>

[6] Aadhaar 2.0: Reinforcing the Foundation for Digital Atmanirbharta

<https://organiser.org/2024/03/17/227150/bharat/aadhaar-2-0-reinforcing-the-foundation-for-digital-atmanirbharta/>

[7] Aadhaar Data Breach - Data of 81 Crore Indians Exposed <https://logix.in/blog/massive-aadhaar-data-breach/>

[8] How crooks are exploiting gaps in Aadhaar system in Delhi
<https://timesofindia.indiatimes.com/city/delhi/how-crooks-are-exploiting-gaps-in-aadhaar-system-in-delhi/articleshow/98744284.cms>

[9] DPI and Privacy / Security | Centre for Digital Public Infrastructure
<https://docs.cdpi.dev/mythbusters-and-faqs/dpi-and-privacy-security>

[10] DPDP Act Newsletter | Latest Privacy News & Updates on data privacy
<https://www.dpdconsultants.com/newsletter.php?id=18&title=Aadhaar+Law+Set+for+Overhaul+to+Align+with+DPDP+Act%2C+Says+Union+Minister+Ashwini+Vaishnav>

[11] UIDAI introduces concept of 'Virtual ID' to address privacy concerns
<https://timesofindia.indiatimes.com/india/uidai-introduces-concept-of-virtual-id-to-address-privacy-concerns/articleshow/62444305.cms>

[12] Aadhaar Registered Devices Technical Specification Version 2.0 ...
<https://uidai.gov.in/en/ecosystem/authentication-devices-documents/authentication-document/16294-aadhaar-registered-devices-technical-specification-version-2-0-revision-7-of-jan-2022.html>

[13] Aadhaar data bust raises fresh safety and privacy concerns
<https://www.newindianexpress.com/opinions/editorials/2023/Nov/02/aadhaar-data-bust-raises-fresh-safety-and-privacy-concerns-2629475.html>

[14] Finding security in digital public infrastructure - Atlantic Council
<https://www.atlanticcouncil.org/in-depth-research-reports/issue-brief/finding-security-in-digital-public-infrastructure/>

[15] Impact of 'Aadhaar 2.0' in Elevating "Financial Inclusion" in India
<https://www.linkedin.com/pulse/impact-aadhaar-20-elevating-financial-inclusion-india-rastogi--okwuf>

[16] Privacy Concerns with Aadhaar - Communications of the ACM
<https://cacm.acm.org/research/privacy-concerns-with-aadhaar/>

[17] Aadhaar is getting a new feature soon, and it's important
<https://economictimes.com/news/india/aadhaar-is-getting-a-new-feature-soon-and-its-important/aadhaar-2-0/slideshow/98810464.cms>

[18] What are the privacy protections in place to protect the right to ... - uidai
<https://uidai.gov.in/en/289-faqs/your-aadhaar/protection-of-individual-information-in->

uidai-system/1942-what-are-the-privacy-protections-in-place-to-protect-the-right-to-privacy-of-the-resident.html

[19] Govt To Launch Jan Aadhaar 2.0 Soon With New Features

<https://timesofindia.indiatimes.com/city/jaipur/govt-to-launch-jan-aadhaar-2-0-soon-with-new-features/articleshow/103098069.cms>

[20] Security in UIDAI system - Unique Identification Authority of India

<https://uidai.gov.in/en/my-aadhaar/about-your-aadhaar/security-in-uidai-system.html>

[21] Aadhar is Getting a HUGE Update! - YouTube

<https://www.youtube.com/watch?v=FrTScFdsrGQ>

[22] How to Update Aadhaar Card Online for Free? - ClearTax <https://cleartax.in/s/aadhaar-card-update-last-date>

[23] UIDAI's relentless initiatives lead to strengthening of Aadhaar ... - PIB

<https://pib.gov.in/PressReleaselframePage.aspx?PRID=1909255>

[24] UIDAI launches new Aadhaar app for simplified Aadhaar verification

<https://economictimes.com/wealth/save/uidai-launches-new-aadhaar-app-for-simplified-aadhaar-verification-check-key-features/new-aadhaar-app/slideshow/120127730.cms>

[25] New Aadhaar App Launch: From QR Code Verification To Face ID ...

<https://www.youtube.com/watch?v=QA2lj-DwWeM>

[26] Aadhaar Card Update Online and Offline from UIDAI - Bajaj Finserv

<https://www.bajajfinserv.in/aadhaar-update>

[27] Unique Identification Authority of India | Government of India - uidai

<https://uidai.gov.in/en/about-uidai/unique-identification-authority-of-india.html>

[28] Modi govt launches game-changing new Aadhaar app with face ID ...

<https://www.hindustantimes.com/india-news/modi-govt-launches-game-changing-new-aadhaar-app-with-face-id-qr-code-features-all-you-need-to-know-101744136361867.html>

[29] Govt launches Game-changing new Aadhaar app - YouTube

<https://www.youtube.com/watch?v=6ySq1ph6kkQ>

[30] Updating Data on Aadhaar - Unique Identification Authority of India

<https://uidai.gov.in/en/my-aadhaar/about-your-aadhaar/updating-data-on-aadhaar.html>

[31] Chief Secretary UT Ladakh Reviews Aadhaar Penetration, Directs ...

<https://ladakh.gov.in/chief-secretary-ut-ladakh-reviews-aadhaar-penetration-directs-roadmap-to-cover-left-out-population/>

- [32] New Aadhaar App Launched: Face ID Authentication, Physical ...
<https://www.ndtv.com/india-news/new-aadhaar-app-launched-features-face-id-authentication-physical-copies-not-needed-ashwini-vaishnaw-8119051>
- [33] [PDF] privacy and security risks with aadhar card: study of media ...
<https://digikogu.taltech.ee/et/Download/14c088ff-88dc-4406-8a2a-ee801f1e4029>
- [34] Impact of 'Aadhaar 2.0' in Elevating "Financial Inclusion" in India
<https://www.linkedin.com/pulse/impact-aadhaar-20-elevating-financial-inclusion-india-rastogi--okwuf>
- [35] Aadhaar data leak | Personal data of 81.5 crore Indians on sale on ...
<https://economictimes.com/tech/technology/aadhar-data-leak-personal-data-of-81-5-crore-indians-on-sale-on-dark-web-report/articleshow/104856898.cms>
- [36] Aadhaar Data Leak: Risks and Solutions Uncovered - CertPro
<https://certpro.com/aadhaar-data-leak/>
- [37] Aadhaar and the Right to Privacy - BYJU'S <https://byjus.com/free-ias-prep/aadhaar-and-the-right-to-privacy/>
- [38] Govt launches new Aadhaar app with face ID, strong focus on privacy
<https://www.fortuneindia.com/business-news/govt-launches-new-aadhaar-verification-app-with-face-id-know-key-features/121705>
- [39] [PDF] Gemalto retracts its Aadhaar data breach release - uidai
<https://uidai.gov.in/images/news/Gemalto-retracts-its-Aadhaar-data-breach-release-Regrets-ELETS-BFSI-post.pdf>
- [40] Privacy Concerns: Addressing Aadhaar Card KYC Security Issues
<https://www.cashfree.com/blog/privacy-concerns-addressing-aadhaar-card-kyc-security-issues/>
- [41] Aadhaar Data Breach Largest in the World, Says WEF's Global Risk ...
<https://www.moneylife.in/article/aadhaar-data-breach-largest-in-the-world-says-wefs-global-risk-report-and-avast/56384.html>
- [42] Massive Aadhaar Data Breach - Drishti IAS <https://www.drishtiiias.com/daily-updates/daily-news-analysis/massive-aadhaar-data-breach>
- [43] Aadhar Card Vulnerabilities: Understanding scams and protective ...
<https://www.linkedin.com/pulse/aadhar-card-vulnerabilities-understanding-scams-protective-umi1f>

- [44] Common Horizons: The Role of Digital Public Infrastructure in ...
<https://www.dataprivacybr.org/en/common-horizons-the-role-of-digital-public-infrastructure-in-finance-identity-and-climate-justice/>
- [45] Top 10 operational impacts of India's DPDPA – Data protection ...
<https://iapp.org/resources/article/operational-impacts-of-indias-dpdpa-part9/>
- [46] India's DPI Power: Aadhaar to Become India's Most Powerful Digital ...
<https://www.tice.news/tice-dispatch/indias-dpi-power-aadhaar-to-become-indias-most-powerful-digital-identity-tool-8940855>
- [47] A critical survey of the security and privacy aspects of the Aadhaar ...
<https://www.sciencedirect.com/science/article/abs/pii/S016740482400083X>
- [48] IDR Explains | Digital public infrastructure (DPI)
<https://idronline.org/features/technology/idr-explains-digital-public-infrastructure/>
- [49] India's Digital Public Infrastructure (DPI): A Comprehensive Overview
<https://www.linkedin.com/pulse/indias-digital-public-infrastructure-dpi-overview-garima-singh-swurf>
- [50] Digital Public Infrastructure as a Catalyst for Private Sector Innovation
<https://www.orfonline.org/research/digital-public-infrastructure-as-a-catalyst-for-private-sector-innovation>
- [51] [PDF] A Governance Framework for Digital Public Infrastructure
<https://www.cse.iitd.ernet.in/~aseth/t20-policy-brief.pdf>
- [52] Centre for Digital Public Infrastructure (CDPI) <https://cdpi.dev>
- [53] Data protection laws in India <https://www.dlapiperdataprotection.com/?t=law&c=IN>
- [54] 138.04 crore Aadhaar numbers have been generated - PIB
<https://pib.gov.in/PressReleaselframePage.aspx?PRID=2037598>
- [55] Aadhaar and the rise of Digital Public Infrastructure in India
<https://www.reframetech.de/en/2024/11/13/aadhaar-and-the-rise-of-digital-public-infrastructure-in-india/>
- [56] Revise Aadhaar Law To Align With DPDP Act: Ashwini Vaishnaw
<https://inc42.com/buzz/revise-aadhaar-law-to-align-with-data-act-ashwini-vaishnaw-to-uidai/>

[57] Constitutionality of Aadhaar Act: Judgment Summary

<https://www.scoobserver.in/reports/constitutionality-of-aadhaar-justice-k-s-puttaswamy-union-of-india-judgment-in-plain-english/>

[58] The Indian Supreme Court's Aadhaar judgment — A privacy analysis

<https://iapp.org/news/a/the-indian-supreme-courts-aadhaar-judgement-a-privacy-perspective>

[59] In case of VID, do I need to provide consent for authentication? - uidai

<https://uidai.gov.in/en/284-faqs/aadhaar-online-services/virtual-id-vid/1898-in-case-of-vid,-do-i-need-to-provide-consent-for-authentication.html>

[60] Govt plans amendment to Aadhaar Act for enhanced privacy and ...

<https://legal.economictimes.indiatimes.com/news/law-policy/govt-plans-amendment-to-aadhaar-act-for-enhanced-privacy-and-consent-controls/120331146>

[61] Revise Aadhaar to align with data privacy act, UIDAI told

<https://economictimes.com/tech/technology/revise-aadhaar-to-align-with-data-privacy-act-uidai-told/articleshow/120136577.cms>

[62] Aadhar Case and Right to Privacy in India - iPleaders <https://blog.ipleaders.in/aadhar-right-privacy/>

[63] Obtain residents' informed consent before conducting Aadhaar ... - PIB

<https://pib.gov.in/PressReleaselframePage.aspx?PRID=1892991>

[64] What are the Data protection and privacy measures taken by UIDAI

<https://uidai.gov.in/en/289-faqs/your-aadhaar/protection-of-individual-information-in-uidai-system/1943-what-are-the-data-protection-and-privacy-measures-taken-by-uidai.html>

[65] Supreme Court Verdict on Aadhaar - Shankar IAS Parliament

<https://www.shankariasparliament.com/current-affairs/supreme-court-verdict-on-aadhaar-i>

[66] [PDF] Aadhaar Notice and Consent Guidelines - uidai

https://uidai.gov.in/images/resource/Final_Aadhaar_Notice_and_Consent_Guidelines.pdf

[67] Privacy Policy - Unique Identification Authority of India <https://uidai.gov.in/en/privacy-policy.html>

[68] Aadhaar Virtual Id - Features and Procedure - IndiaFilings

<https://www.indiafilings.com/learn/aadhaar-virtual-id/>

[69] [DOC] UIDAI_FAQ_on_offline_verificati...

https://uidai.gov.in/images/UIDAI_FAQ_on_offline_verification_process_of_Aadhaar_and_role_of_OVSEs_06032022.docx

[70] About Aadhaar Paperless Offline e-kyc - uidai

<https://uidai.gov.in/en/ecosystem/authentication-devices-documents/about-aadhaar-paperless-offline-e-kyc.html>

[71] How to generate or retrieve your Aadhaar Virtual ID for secure ...

<https://www.moneycontrol.com/news/business/personal-finance/how-to-generate-or-retrieve-your-aadhaar-virtual-id-for-secure-transactions-12851393.html>

[72] UIDAI urges verification entities to adhere to Aadhaar usage hygiene

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=1889996>

[73] Aadhaar Paperless Offline e-kyc - Unique Identification Authority of ...

<https://uidai.gov.in/en/2-uncategorised/11320-aadhaar-paperless-offline-e-kyc-3.html>

[74] mAadhaar – Apps on Google Play

<https://play.google.com/store/apps/details?id=in.gov.uidai.mAadhaarPlus>

[75] What is Virtual ID, and how is it different from Aadhaar? - Moneyview

<https://moneyview.in/insights/difference-between-aadhaar-id-and-aadhaar-virtual-id>

[76] Offline Aadhaar Data Verification - Paisabazaar <https://www.paisabazaar.com/aadhaar-card/offline-aadhaar-data-verification/>

[77] Aadhaar and privacy: UIDAI brings Virtual IDs, Limited KYC to ...

<https://www.businesstoday.in/latest/policy/story/aadhaar-privacy-uidai-virtual-id-limited-kyc-protect-india-cardholder-99635-2018-01-10>

[78] mAadhaar – Apps on Google Play

<https://play.google.com/store/apps/details?id=in.gov.uidai.mAadhaarPlus>

[79] What is digital public infrastructure? - Gates Foundation

<https://www.gatesfoundation.org/ideas/digital-public-infrastructure>

[80] Digital public infrastructure | United Nations Development Programme

<https://www.undp.org/digital/digital-public-infrastructure>

[81] A human rights-centered approach to digital public infrastructure

<https://www.accessnow.org/guide/digital-public-infrastructure/>

[82] Digital public infrastructure can bring enormous benefits – or pose ...

<https://dial.global/dpi-can-bring-benefits-or-risks-safeguards-make-the-difference/>

[83] DPI: Achievements Diary 2024 - Protean eGov Technologies Limited

<https://proteantech.in/articles/dpi-2-0-2-4-developments/>

[84] RegTech and Digital Public Infrastructure: Navigating Compliance in ...

<https://corporate.cyrilamarchandblogs.com/2024/11/regtech-and-digital-public-infrastructure-navigating-compliance-in-indias-digital-landscape/>

[85] [PDF] Aadhar Data Privacy Policy Of Department of Posts India

https://www.indiapost.gov.in/VAS/Pages/News/IP_06012024_Adhaar_English.pdf

[86] Comply with DPDPA and Aadhaar as one | India - Law.asia <https://law.asia/aadhaar-dpdpa-compliance/>

[87] The Digital Personal Data Protection (DPDP) Act, 2023 - LinkedIn

<https://www.linkedin.com/pulse/digital-personal-data-protection-dpdp-act-2023-indian-kulkarni-txntf>

[88] Govt to amend Aadhaar law to align with data privacy Act - India News

<https://www.financialexpress.com/india-news/govt-to-amend-aadhaar-law-to-align-with-data-privacy-act/3804585/>

[89] Initial analysis of Indian Supreme Court decision on Aadhaar

<http://privacyinternational.org/long-read/2299/initial-analysis-indian-supreme-court-decision-aadhaar>

[90] Take Residents' Informed Consent Before Aadhaar Authentication

<https://www.outlookbusiness.com/news/take-residents-informed-consent-before-aadhaar-authentication-uidai-to-requesting-entities-news-256120>

[91] Virtual ID (VID) - Unique Identification Authority of India

<https://uidai.gov.in/en/contact-support/have-any-question/284-english-uk/faqs/aadhaar-online-services/virtual-id-vid.html>

[92] How to Safeguard Your Privacy with Aadhaar Virtual ID? - Paytm

<https://paytm.com/blog/aadhaar-card/aadhaar-virtual-id-guide/>

[93] Unlocking the power of Virtual Aadhaar ID - Bajaj Finserv

<https://www.bajajfinserv.in/unlocking-the-power-of-virtual-aadhaar-id>

[94] Offline Aadhaar Data Verification - Paperless Offline e-KYC

<https://www.coverfox.com/aadhar-card/offline-aadhaar-data-verification/>

[95] What are the privacy protections in place to protect the right to ... - uidai

<https://uidai.gov.in/en/289-faqs/your-aadhaar/protection-of-individual-information-in>

[uidai-system/1942-what-are-the-privacy-protections-in-place-to-protect-the-right-to-privacy-of-the-resident.html](#)