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TITLE PAGE

- **Problem Statement ID –** SIH25070
- **Problem Statement Title-** Secure Data Wiping for Trustworthy IT
- **Theme-** Miscellaneous
- **PS Category-** Software
- **Team ID-** 88887
- **Team Name (Registered on portal)-** Data Morphs

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IDEA TITLE

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Solution

- Develop a **secure, cross-platform data wiping application** (Windows, Linux, Android, Offline ISO/USB).
- **One-click interface** for easy use by the general public.
- **Tamper-proof wipe certificate** (PDF + JSON, digitally signed).
- Supports **hidden storage erasure** (HPA, DCO, SSD sectors).
- **Third-party verifiable** and aligned with **NIST SP 800-88 standards**.

Problem Resolution

- Eliminates **fear of data breaches** → users can recycle devices without risk.
- Reduces **hoarding of unused IT assets** (₹50,000+ crore locked value).
- Simplifies data sanitization → no need for complex or expensive tools.
- Ensures **trust, transparency, and compliance** in e-waste recycling workflows.

Unique Value Proposition (UVP)

- **First open, verifiable, and user-friendly data wiping tool** in India.
- **Proof of erasure** builds confidence among individuals, enterprises, and recyclers.
- **Cross-platform + offline support** → usable anytime, anywhere.
- Drives **safe e-waste management** and strengthens **India's circular economy**.

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TECHNICAL APPROACH

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Technical Approach

- **Algorithm Development:** Implements **NIST SP 800-88 and DoD wipe standards**, covering HDDs, SSDs, and hidden areas (HPA/DCO), ensuring complete and compliant erasure.
- **Mobile App Development:** Cross-platform app for **Windows, Linux, Android**, with a simple **one-click interface** and **offline ISO/USB** support for devices without OS.
- **Encryption & Security:** Generates **digitally signed, tamper-proof certificates** using **RSA/ECC**, with encrypted logs and integrity checks for trust and compliance.
- **Cloud Services:** Provides a **verification portal** for wipe certificates, with **secure storage, audit trails, and enterprise integration** for large-scale use.

Product Status

- **Implemented:** Core wipe algorithms, prototype desktop app, basic certificate generation.
- **In Progress:** Mobile app UI, ISO/USB boot support, cloud verification backend.
- **Planned:** Enterprise integration and large-scale pilot testing.

Prototype

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FEASIBILITY AND VIABILITY

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Analysis of Idea

- Technically possible using secure wipe standards (NIST, DoD).
- Works across platforms: Windows, Linux, Android, Offline ISO/USB.
- Meets real need: users fear data breaches, so assets are hoarded.
- Economically viable: unlocks value of unused IT assets.
- Environment friendly: promotes safe e-waste recycling.
- Scalable: can serve individuals, recyclers, enterprises.
- Trustworthy: verifiable certificates build confidence.
- Aligns with national goals: supports India's **circular economy** initiatives.

Challenges & Risks

- Different hardware types (HDD, SSD, Android)
- Low user awareness and adoption
- Building trust and compliance proof
- Managing cloud and scalability

Strategies

- Modular algorithms for all devices
- Simple one-click interface + awareness efforts
- Tamper-proof certificates with signatures
- Scalable cloud backend with APIs

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IMPACT AND BENEFITS

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Potential on Target Audience

- **General Users:** Can safely recycle old laptops, smartphones, and other devices without worrying about personal or sensitive data being recovered.
- **Enterprises & Organizations:** Enables secure disposal of IT assets, reducing storage costs and legal compliance risks.
- **Recyclers & IT Asset Disposal Firms:** Provides verifiable, tamper-proof proof of data erasure, building trust with clients.
- **Government & NGOs:** Supports e-waste management initiatives and policies, encouraging sustainable and circular economy practices.

Benefits of the Solution

- **Builds User Confidence:** One-click, secure wiping ensures data is permanently erased.
- **Reduces Asset Hoarding:** Unlocks the value of unused IT devices, preventing millions of rupees of IT assets from being locked away.
- **Promotes Safe E-Waste Management:** Prevents environmental hazards caused by improper disposal of electronic devices.
- **Supports Circular Economy:** Recycled devices can be reused, refurbished, or safely dismantled, contributing to a sustainable lifecycle.
- **Transparent & Auditable:** Digitally signed certificates allow third-party verification, enhancing trust and compliance.

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RESEARCH AND REFERENCES

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- **Forti, V., Baldé, C.P., Kuehr, R., Bel, G. (2020).** *The Global E-Waste Monitor 2020: Quantities, flows, and circular economy potential*. United Nations University.
  Supports understanding of the e-waste problem and the need for device recycling.
- **National Institute of Standards and Technology (NIST, 2014).** *Guidelines for Media Sanitization (SP 800-88 Rev.1).*
  Provides standards for secure and verifiable data wiping, forming the basis of the solution's algorithms.
- **Department of Defense (DoD 5220.22-M, 1995).** *National Industrial Security Program Operating Manual.*
  Guidelines for overwriting data to ensure irrecoverable erasure, used in the solution design.
- **Bhattacharya, J., Sharma, S. (2019).** *E-Waste Generation and Management in India: Challenges and Opportunities*. Journal of Environmental Management, 232, 121–131.
  Highlights India-specific e-waste challenges that the solution addresses.
- **Manhart, A., et al. (2017).** *Circular Economy in Electronics: Enabling Secure Data Erasure and Asset Reuse*. Resources, Conservation & Recycling, 124, 156–165.
  Supports the solution's goal of safe reuse and refurbishment of IT devices.
- **Singh, A., Gupta, R. (2021).** *Secure Mobile Data Wiping Techniques for Consumer Devices*. International Journal of Information Security, 20(3), 345–359.
  Informs the mobile app design and cross-platform functionality of the solution.
- **Cui, J., et al. (2018).** *Data Sanitization and Verification Methods for Recycled IT Assets*. Journal of Cleaner Production, 196, 1234–1245.
  Supports implementation of tamper-proof wipe certificates and verification systems.