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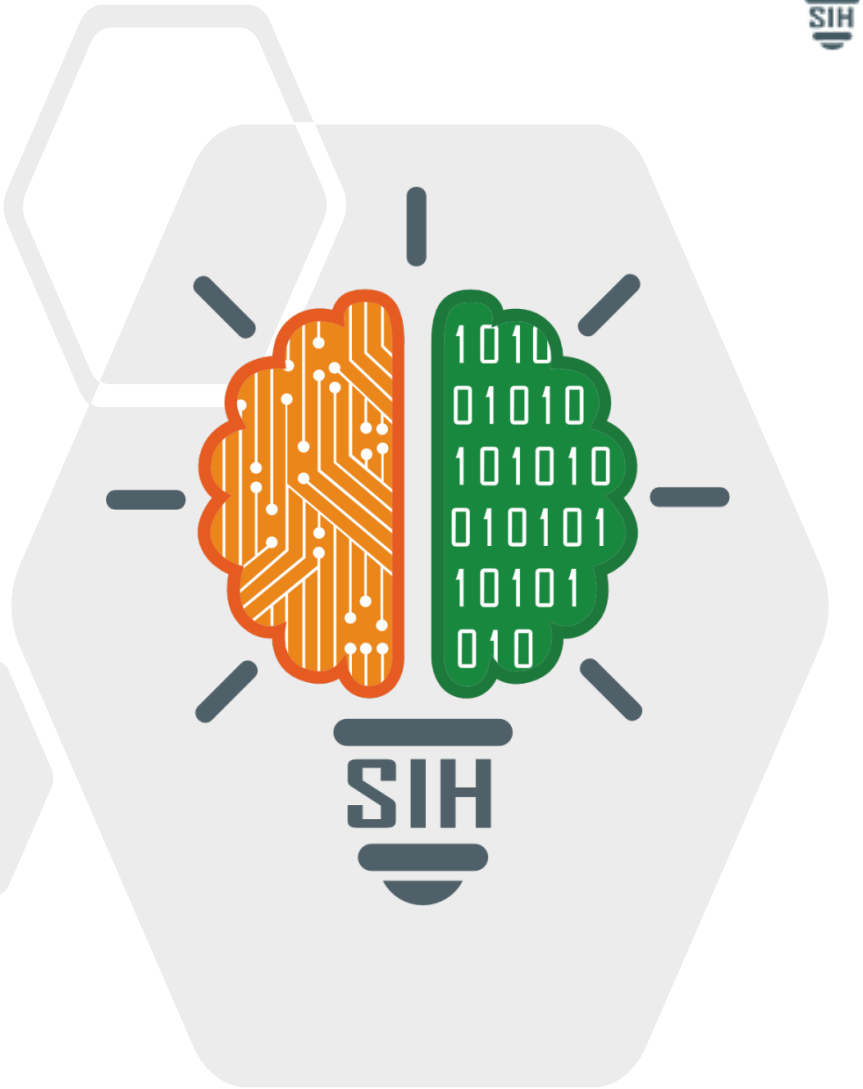
#H.A.S.H.



- **Problem Statement ID – 25080**
- **Problem Statement Title-Document Overload at Kochi Metro Rail Limited (KMRL)-An automated solution**
- **Theme- Smart Automation / Smart Cities**
- **PS Category- Software/Hardware - Software**
- **Team ID-**
- **Team Name - H.A.S.H.**

Document Overload at Kochi Metro Rail Limited (KMRL)-An automated solution

❖ Proposed Solution

Solution (Core Offering)

- A cloud-based, centralized platform built on the MERN stack integrated with AI/NLP to unify enterprise documents and data.
- AI-driven intelligent tagging, classification, summarization, and natural language search for a complete 360-degree data view.
- Automated workflows for approvals, digital signatures, and real-time status monitoring to streamline operations.
- Secure governance with immutable audit trails and automated version control ensuring data integrity and compliance.
- API-first architecture enabling seamless integration with existing systems like SharePoint and future-ready for IBM Maximo.

How It Addresses the Problem

- Eliminates information silos with fast, AI-powered cross-departmental data access.
- Preserves institutional knowledge and reduces manual effort via automated summaries and tagging.

Innovation & Uniqueness

- Supports bilingual AI capabilities (English and Malayalam) with open-source NLP models.
- Employs smart AI linking to connect unstructured documents and scanned drawings to relevant assets.

TECHNICAL APPROACH

Technologies to be used:

- Core EIM Platform (MERN): MongoDB (for document storage), Express.js and Node.js (for building APIs and backend logic), and React (for the user-friendly UI and dashboards).
- Integration Frameworks: We will use REST APIs / GraphQL to connect our solution with existing enterprise systems and platforms like SharePoint for seamless two-way data synchronization.
- AI & NLP: We will use free and open-source models like BERT, LASER, and Indic NLP for document tagging, intelligent search, and handling both English and Malayalam languages.
- Cloud & Mobility: The application will be deployed on a cloud platform (e.g., AWS, Azure, or GCP) and will feature a responsive React app for seamless access on mobile devices and desktops.

Methodology & Process:

- Foundation: First, we will audit existing information workflows to design an optimal MongoDB schema and set key performance indicators (KPIs) for success.
- Core Processes: We will then digitize existing paper-based workflows and build core features such as approval and version control within our MERN stack.
- Knowledge Integration: Our AI models will be integrated to enable advanced functionalities like automatic tagging and bilingual search.
- Expansion: The final phase will involve a gradual rollout to all KMRL depots, onboarding users, and conducting comprehensive change management.

FEASIBILITY AND VIABILITY

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Feasibility

- We can build it quickly: Our platform is a modern, cloud-based system that uses free and open-source technology.
- It's ready to connect: We designed it to easily link with other systems like SharePoint using simple APIs.
- We'll use proven AI: The AI we use is well-known and works for tasks like tagging, searching, and summarizing documents.
- Potential Challenges & Risks
- People might resist the change: Some employees may be slow to adopt the new system.
- Language is difficult: Malayalam is a tricky language for AI, so we need a specialized approach to make sure it works well.
- Losing expert knowledge: When experienced employees retire, their knowledge might be lost.
- Integrating with other systems: Connecting to different existing systems can be complicated**.**

Strategies to Overcome

- Gradual rollout: We will introduce the system in phases to avoid big disruptions.
- Focus on training: We'll provide good training and support to help people get used to the new system.
- Custom AI: We will build our own AI models that are specifically trained for Malayalam to ensure accuracy.
- Capture knowledge: We'll use new features to record and store important information from employees.
- API-first approach: We will use APIs to make connecting to other systems faster and simpler.

IMPACT AND BENEFITS

Potential Impact on Target Audience

•Front-line Managers/Engineers: Rapid AI summaries → faster decisions on trains, maintenance, staffing.

•All Employees: Bilingual NLP (English + Malayalam) → inclusive access & search.

•Cross-functional Teams: Breaks silos → prevents procurement/engineering mismatches.

•Long-tenured Employees: Become “knowledge advisors” → structured transfer of expertise.

Benefits

•Economic: Cuts productivity loss, printing costs; audit trails reduce audit time/cost.

•Social/Operational: Single source of truth; boosts efficiency, safety, collaboration culture.

•Compliance & Risk: Automated versioning + audit logs → secure traceability, reduced penalties.

•Environmental: Digital-first approach → less paper & storage energy → greener operations.

RESEARCH AND REFERENCES

- Research papers on AI-based Document Processing & NLP (Google Research, Microsoft Research, IEEE).
- Indian language NLP models (IndicBERT, AI4Bharat) for bilingual Malayalam–English support.
- Open-source tools: Tesseract OCR, PaddleOCR, Elasticsearch, Haystack.
- Case studies of Document AI in transport/logistics (McKinsey, Deloitte).
- Government guidelines: KMRL docs, MoHUA digital policies, CRMS directives.
- Inspiration from enterprise solutions: Google DocAI, LangChain, LlamaIndex.

FLOWCHART

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