SAFETY- Passengers and Goods
SECURITY – Track, Rail, Bridges, Tunnels
SUSTAINABLE – Engines, Rolling Stock & Network
SMART – Communication Command & Control & Big Data

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PHOTONIC SENSING TECHNOLOGIES USING VIDUR & VEDA

SAFETY & SECURITY

Train Collision Avoidance system, Wheel Flattening, Weight Of Wagon, Fire And Smoke Detection In Passenger Compartment, Ventilation Effectiveness, Unmanned Crossing, Intrusion detection.

TRACK

Fractures, Fish Plate, Overlain Of Solid Material, Removal, Loosen Bolts, Sleepers' Removal, Ballast Erosion Etc.

Automation, Command & Control

Auto Pilot for braking, honking, & Alarming. Communicating to other trains on same track,

BRIDGES & TUNNELS

Real Time Structural Health Integrity Monitoring

MONITORING

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VEDA
Vibration Effectiveness Deflection Analysis

VIDUR
Vibration Intelligence Data Unravelling Remotely

VEDA is a cutting-edge <u>multi-functional</u> seismic monitoring technology that can <u>simultaneously detect</u> various aspects:

VIDUR is a breakthrough in technology that can monitor the Health and Quality of Rail <u>15 km Beforehand</u> while the Train is moving at High Speed.

- Online Track Monitoring for:
  - Vandalism, Blockades and Obstruction on Track.
- Tunnel Health Monitoring
- Rolling Stock Performance and Efficiency Monitoring

- Online Rail Monitoring for:
  - Damaged Rail (Fractures, Fish Plate Removal, Nut-Bolt Removal, Chipping, Shrinkages, etc.)
  - Soil Erosion (Flooding, Landslides, etc.)
- Structural Health Integrity of Bridges.
- Condition and Vibration Monitoring of Machines and Equipments.

Integrated Photonic Systems and Big Data Analytics with Command & Control for Predictive, Preventive, Prescriptive, and Geospatial Analysis.

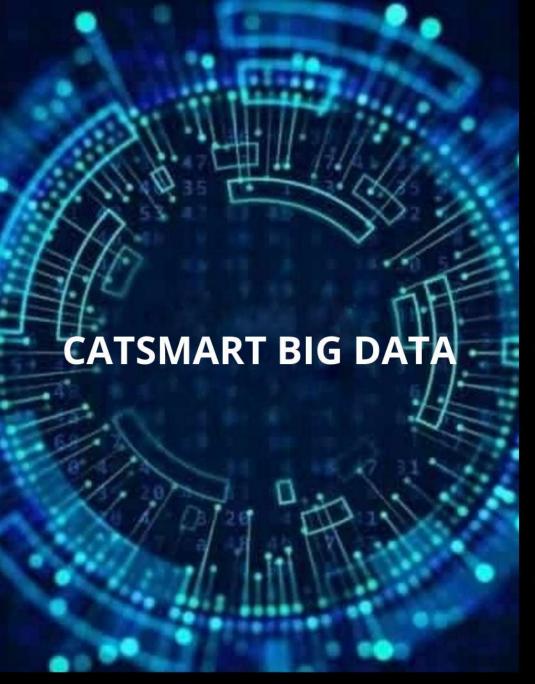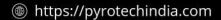**REAL-TIME ANALYSIS WILL PROTECT, PREVENT AND PRESERVE HUMAN AND ASSET LIFE.**

CATSMART BIG DATA

ENHANCING SAFETY AND EFFICIENCY THROUGH ADVANCED BIG DATA ANALYTICS

- **Big Data Analytics:** CATSMART BIG DATA Provides data-driven insights by analyzing large datasets for strategic decisions and enables real-time monitoring for immediate threat response.
- **Proactive Threat Management:** CATSMART BIG DATA Leverages real-time data to identify threats and automatically alerts authorities for risk mitigation.
- **Command & Control Integration:** CATSMART BIG DATA Facilitates centralized decision-making for coordinated incident responses and enhances communication for improved operational efficiency.
- **Geospatial Analysis:** CATSMART BIG DATA Utilizes GIS to map risks for improved situational awareness and optimizes resource allocation based on geographic data.
- **Prescriptive Analytics:** CATSMART BIG DATA Provides actionable recommendations to improve responses and outcomes.

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