CHENNAI RAMAPURAM SRM INSTITUTE OF SCIENCE & TECHNOLOGY (Deemed to be University u/s 3 of UGC Act, 1956)

Ref. No.: SRMG/CRC/

CENTRE FOR RESEARCH & CONSULTANCY

APPLICATION FORM FOR APPLYING NATIONAL / INTERNATIONAL PATENTS PROJECTS

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3	**Designation**	Student – III Year CSE
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6	**Designation**	Assistant Professor/Computer Science and Engineering
7	**Area of Research / Expertise**	Artificial Intelligence, Operations Research, Railway Traffic Management Systems, Optimization Algorithms, Decision-Support Systems, Constraint Programming
8	**Title of the Patent**	A Safety-Constrained Advisory System for Optimizing Train Movement and Section Throughput
9	**Patent Type (National / International)**	National

Brief description of the Patent: The present invention relates to a computer-implemented railway traffic optimization and advisory system designed to maximize section throughput while preserving existing signaling authority. The system comprises a data ingestion and digital twin simulation module, a safety constraint validation engine, a combinatorial optimization module utilizing constraint programming and mixed-integer linear programming, a disruption detection and re-planning mechanism, and a coordinated dual-end advisory generation system. The invention computes optimal train meets, crossings, platform assignments, and precedence decisions under real-time operational constraints and generates synchronized advisories for traffic controllers and station masters without directly controlling railway signals. The system improves punctuality and section utilization without requiring infrastructure modification.

Signature of Co- Inventor

Signature of Inventor

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Remarks

Research Office