

# **RESILIENCE OF DELHI ROAD NETWORKS TO TRAFFIC DISRUPTIONS**

BY

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under the guidance of

**Dr. Krishnan Rajkumar, School of Engineering JNU, Delhi**

in the partial fulfilment of the requirements  
for the award of the degree of

**Bachelor of Technology**

(a part of Five-Year Dual Degree Course)



**School of Engineering**  
**Jawaharlal Nehru University, New Delhi**  
**October, 2023**

**JAWAHARLAL NEHRU UNIVERSITY**  
**SCHOOL OF ENGINEERING**

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**CERTIFICATE**

This is to certify that the synopsis entitled “**RESILIENCE OF DELHI ROAD NETWORKS TO TRAFFIC DISRUPTIONS**” being submitted by **Mr. M. Satya Sai Teja** (Enrolment No. 20/11/EC/011) in fulfilment of the requirements for the award of the **Bachelor of Technology** (part of Five-Year Dual Degree Course) in **Computer Science Engineering**, will be carried out by him under my supervision.

In my opinion, this work fulfills all the requirements of an Engineering Degree in respective stream as per the regulations of the School of Engineering, Jawaharlal Nehru University, Delhi. This thesis does not contain any work, which has been previously submitted for the award of any other degree.



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This is to certify that the synopsis entitled “**RESILIENCE OF DELHI ROAD NETWORKS TO TRAFFIC DISRUPTIONS**” being submitted by **Mr. Vaibhav Tripathi** (Enrolment No. 20/11/EC/018) in fulfilment of the requirements for the award of the **Bachelor of Technology** (part of Five-Year Dual Degree Course) in **Computer Science Engineering**, will be carried out by him under my supervision.

In my opinion, this work fulfills all the requirements of an Engineering Degree in respective stream as per the regulations of the School of Engineering, Jawaharlal Nehru University, Delhi. This thesis does not contain any work, which has been previously submitted for the award of any other degree.



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This is to certify that the synopsis entitled “**RESILIENCE OF DELHI ROAD NETWORKS TO TRAFFIC DISRUPTIONS**” being submitted by **Mr. Rupesh Kumar Dubey** (Enrolment No. 20/11/EC/041) in fulfilment of the requirements for the award of the **Bachelor of Technology** (part of Five-Year Dual Degree Course) in **Computer Science Engineering**, will be carried out by him under my supervision.

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In my opinion, this work fulfills all the requirements of an Engineering Degree in respective stream as per the regulations of the School of Engineering, Jawaharlal Nehru University, Delhi. This thesis does not contain any work, which has been previously submitted for the award of any other degree.



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# Synopsis

## Title: Resilience of Delhi Road Networks to Traffic Disruptions

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**Problem Statement:** Road networks are complex systems that are essential for movement of people and goods. They are also highly interconnected, making them vulnerable to disruptions caused by accidents, natural disasters, or infrastructure failures. These disruptions can have a significant impact on the economy and society, and can lead to many problems.

**Objective of Project:** The objective of this project is to examine the Resilience of road networks to traffic disruptions from a network science perspective. This will involve analyzing the network's structure and investigating strategies for improving the network's robustness.

**Background:** Network science is a field of study that examines the structure and function of complex networks, with Road networks being a prime example. This knowledge allows us to assess the resilience of Road networks, referring to their ability to maintain connectivity and function at an acceptable level despite disruptions.

**Outcome:** The outcome of this project will be a better understanding of the network science factors that contribute to the resilience of road networks. This knowledge can be used to develop strategies for improving the resilience of existing networks, and to design new Road networks that are more resilient to disruptions.

**Proposed Methodology:** This project will be implemented using the following steps:

1. Data collection: Road maps and public Road data will be collected from the Open transit data - Delhi website, OSM (Open street map) and various sources.
2. Network analysis: The degree distribution, betweenness centrality, and scale-free property of the Road network will be analyzed.
3. Disruption scenarios : Disruptions such as road closures or malignant accidents will be simulated and their impact on network connectivity will be measured.
4. Robustness metrics : Robustness metrics such as accessibility, network efficiency and shortest route will be calculated post-disruptions.
5. Recovery strategies : Strategies for rerouting will be explored.
6. Urban planning : The results of the project will be summarized and recommendations for improving urban planning based on resilience analysis will be proposed.

**Conclusion:** This project will use network science tools and techniques to analyze the resilience of road networks to disruptions. The results will provide new insights into the network science factors.

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