A Project report submitted
in partial fulfilment of the requirements
for the degree of

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE AND ENGINEERING

from

IIT DELHI

PROJECT NAME:

"5G NETWORK VISUALIZATION IN INDIA"

BY:

ANKIT GARG

2020CS10322

UNDER THE MENTORSHIP OF

Mr. TARUN MANGLA

Asst. Professor

IIT Delhi

Project Scope:

Context: Why is 5G Network Visualization Important in India?

5G technology is set to bring faster internet speeds, better connectivity, and new opportunities in areas like healthcare, education, autonomous vehicles. communication and entertainment. In India, 5G is expected to make a big impact. To make the most of this technology, we need to visualize where 5G is available, how well it's performing, and its effects on different regions. Visualization tools will enable stakeholders and government to make informed decisions, optimize network performance, and ensure that the benefits of 5G are equitably distributed across urban and rural areas.

Objectives of the Project

1. **Mapping:** Create an interactive map showing where 5G coverage is available in India.

2. **Performance Monitoring**: To visualize key performance indicators (KPIs) of 5G networks, such as speed, latency, and connectivity.

3. **Impact Analysis**: To assess the socio-economic impact of 5G deployment in different regions (rural and urban areas).

4. **Comparison of Networks Operators:** Compare the number of Airtel and Jio network operators provided in different regions.

Step Wise Building of Project:

1. **Data Collection:** First, we will download data on 5G coverage networks in India from the Open Cell ID and Kaggle websites. We will then convert this data into CSV files for easy processing and analysis.

2. **Development:** Next, we will develop a website using the Folium library to create maps and visualizations. For the backend, we will use the Flask framework with Python, and for the front-end, we will use HTML.

3. **Visualization and Analysis:** Finally, we will create an interactive map showing 5G network coverage across different regions in India. We will create tools to analyse the socio-economic impact of 5G deployment and generate heatmaps to show the concentration of cell towers in different regions.

4. **Comparison of Network Operators**: We will also compare the number of Airtel and Jio network operators provided in different regions. This comparison will include data on 2G, 3G, and 4G cell towers to give a comprehensive view of the network infrastructure in India.