



INDIA INTERNATIONAL SCIENCE FESTIVAL 2023



SPACE HACKATHON

In Association with



राष्ट्रीय नवप्रवर्तन प्रतिष्ठान — भारत
National Innovation Foundation - India



Team Name: CODE MAVERICK

Name of College/University: TECHNO INDIA UNIVERSITY

Team Member Details:

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Problem Statement:

Strategic Aadhaar Centre Placement with Night Lights and Census Data

- Leveraging nighttime lights (NTL), population density, census data and existing Aadhaar centers → strategically identify optimal locations for new Aadhaar centers.

Brief about your approach:

- Using the census data to get rural-urban settlement map of India → Dividing the problem into two parts (One for urban and one for rural).
- Creating a Aadhaar center density map of India with existing Aadhaar center data.
- Creating an algorithm using NTL data, population density map, and the Aadhaar center density map to get locations for new Aadhaar centers for Urban Areas wherever needed.
- Creating an algorithm using the distance between a village and existing nearest Aadhaar centers to get locations for new Aadhaar Centers in Rural Areas wherever needed.

Detailed Proposal & Solution Approach

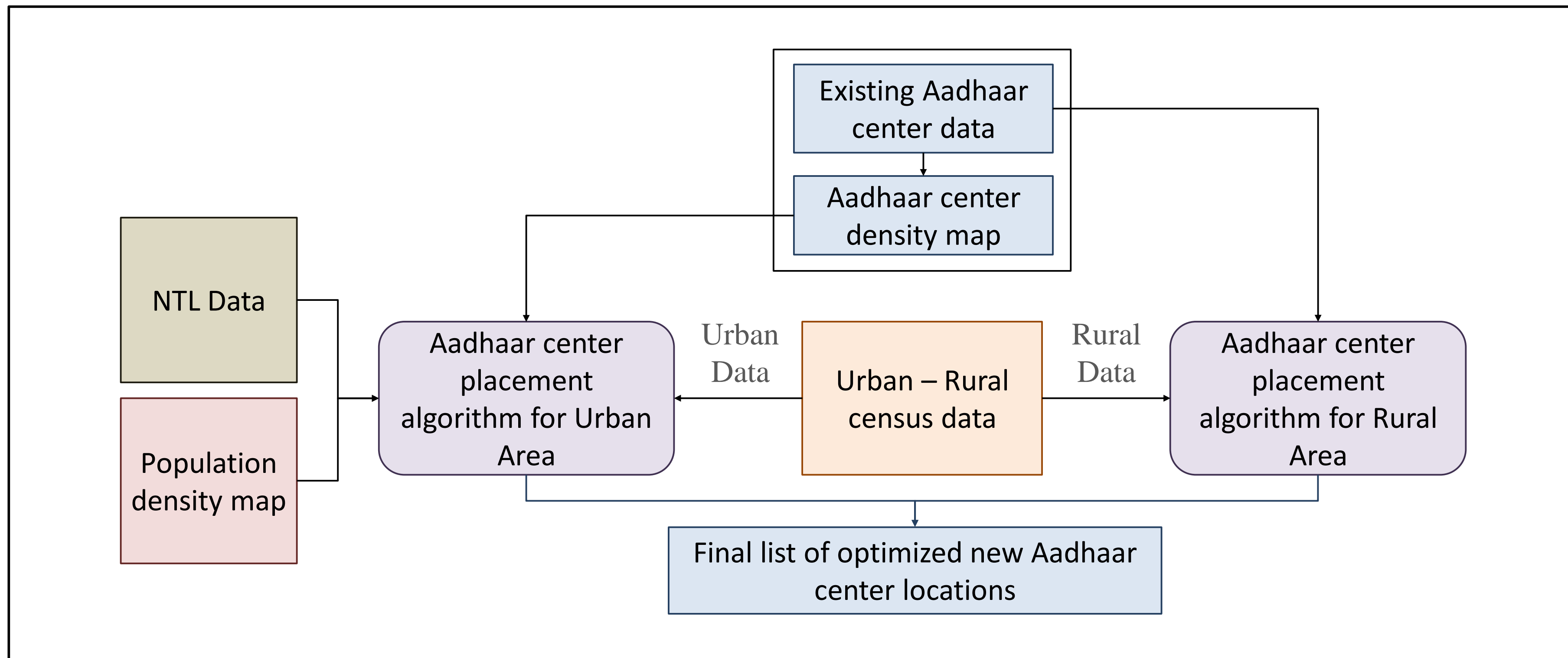


Fig.1 Flowchart for the strategic Aadhaar center location generation

Detailed Proposal & Solution Approach

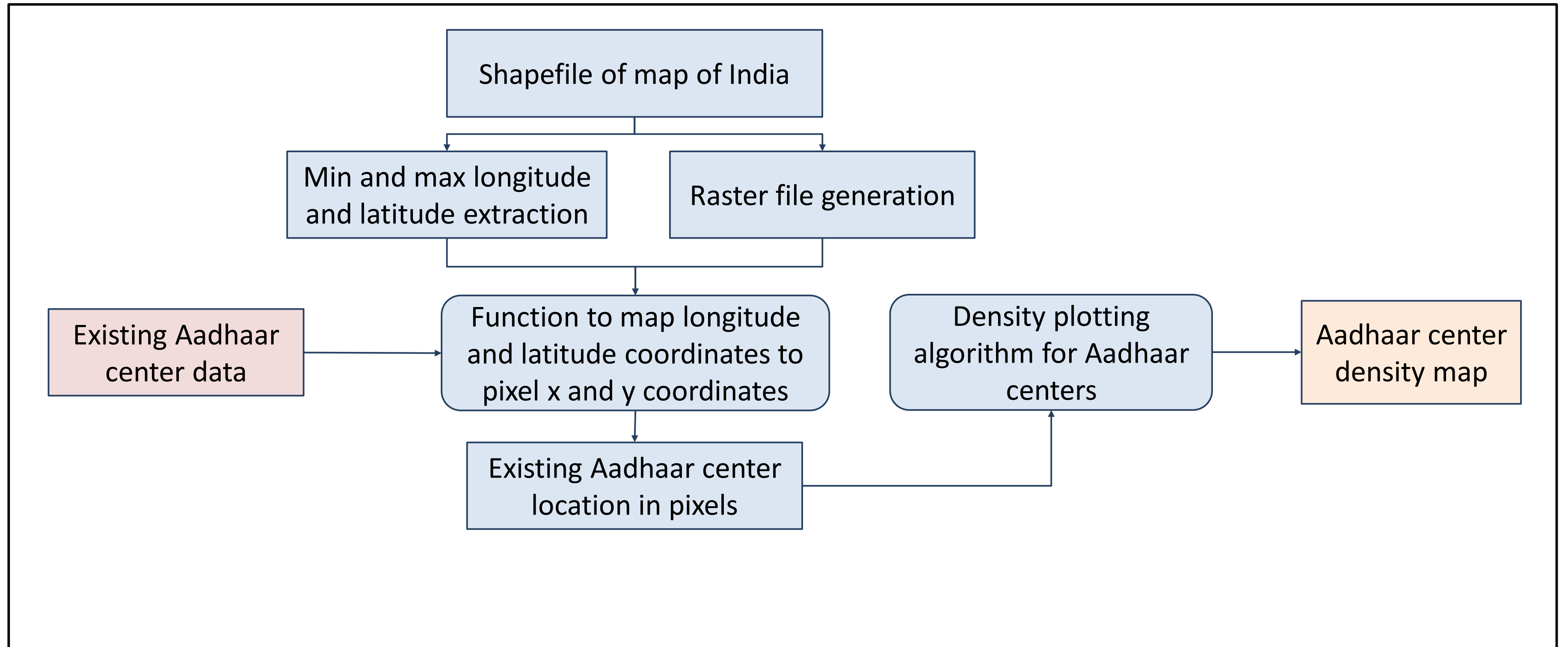


Fig.2 Aadhar Center Density map generation

Data Collection

- Obtain Nighttime Light (NTL) data and population density data from worldwideview.com.
- Overlay NTL and population density maps to create a comprehensive image.
- Plot existing Aadhaar centers on the overlaid map using the provided CSV file.
- Overlay a political map for district delineation.



Fig 2. NIL (Night Lights) Data Image

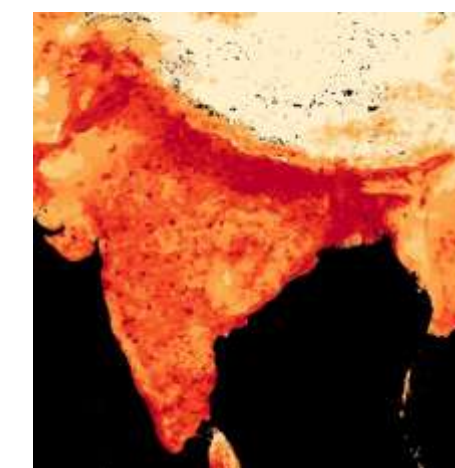


Fig 3. Population Density

For Urban Area:

☐ Urbanization and Population Density:

- Use NTL data and population density data to identify urban areas.

☐ Analysis of Existing Centers:

- Conduct a spatial analysis of existing Aadhaar centers to identify gaps in coverage and areas with high demand but limited accessibility.

Rural Area:

☐ Accessibility Metrics:

- Calculate travel distances and times from potential locations to existing Aadhaar centers,
- Technological Infrastructure Consider the availability of reliable internet connectivity

Tools and devices used on development:

- Geospatial Data Platforms: ArcGIS, Google Earth Engine, or QGIS for handling and analyzing geospatial data.
- Hardware: Standard computer hardware, including laptops or workstations for data analysis, modeling, and development.

Technologies involved/used:

- Programming Language: Python for its versatility, extensive libraries (Pandas, NumPy, GeoPandas), and suitability for data processing and analysis.
- Data Visualization: Tableau, Matplotlib, or Seaborn.
- Statistical Analysis: R or Python's StatsModels for demographic analysis and deriving insights from census data.

References/Acknowledgement

- <https://www.arcgis.com/home/item.html?id=cba8bddfa0ab43ddb35a7313376f9438>
- https://data.gov.in/search?title=urban_shapefile
- <https://worldview.earthdata.nasa.gov/>



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THANK YOU

