Tourist Mobility Forecasting with Region-based Flows and Regular Trips

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Presenter information

Fernando Terroso-Sáenz obtained his B.S. and PhD in Computer Science from the University of Murcia in 2009 and 2013. Since 2023 he is lecturer in Computer Science at the Technical University of Cartagena. He has published more than 50 articles in international journals and congresses. His research areas include smart mobility, human-generated data analysis and mobile sensing.

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Importance of Tourism Flow Prediction

1 **Sector Planning**

Enables better resource allocation and strategy development.

2 **Economic Impact**

Aids in forecasting revenue and employment needs.

3 **Infrastructure Management**

Helps anticipate strain on local services.

Previous Approaches

1

Univariate Models

Traditional time-series forecasting with limited data sources.

2

Heterogeneous Data Integration

Incorporating diverse data types for improved predictions.

3

Current Research

Combining general mobility with specific tourist flows.

Case Study: Region of Murcia

Location

Southeastern Spain, known for beaches and agriculture.

Tourism Growth

45% increase in visitors from 2021 to 2022.

Research Focus

Predicting tourist flows using combined mobility data.

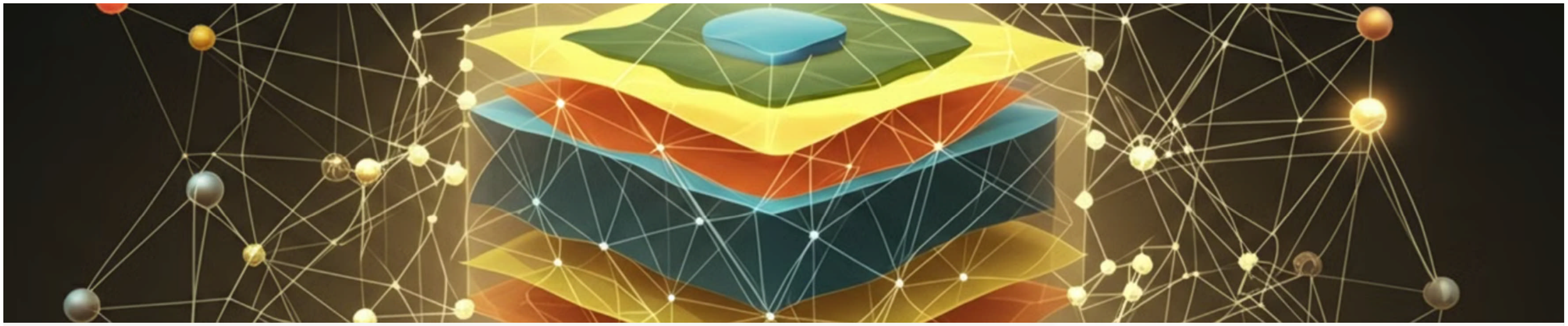
Data Sources

Tourist Mobility Dataset (TMD)

Mobile network events capturing national and international tourists.

General Human Mobility Dataset (GMD)

Broader movement patterns from Spanish Ministry of Transport.



Predictive Model: CNNLSTM

1

Input Layer

TMD and GMD data ingestion.

2

CNN Component

Extracts spatial features from input data.

3

LSTM Component

Processes temporal patterns for prediction.

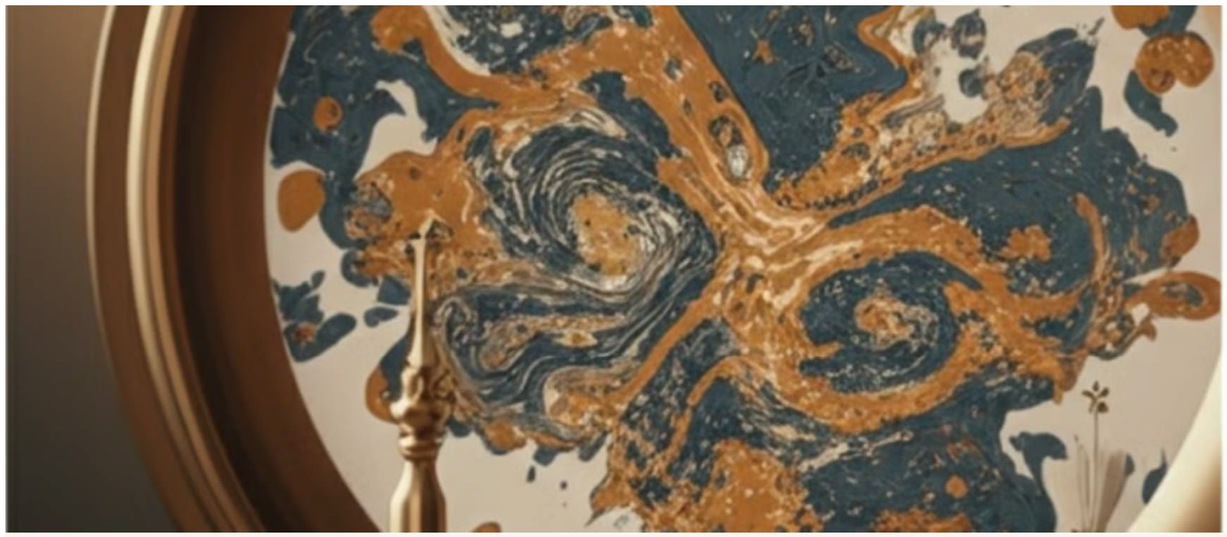
4

Output Layer

Forecasts tourist numbers up to 8 weeks.

Model Evaluation

Metric	Description
MAE	Average absolute error
RMSE	Root mean square error
MAPE	Mean absolute percentage error



Key Findings

1 **Accuracy Improvement**

Up to 46% RMSE reduction with GMD.

2 **Long-term Forecasting**

Better performance for 4+ week predictions.

3 **Distance Thresholds**

400km and 800km GMD flows most beneficial.

Future Research Directions

Geographical Expansion

Apply model to other Spanish regions.

Data Integration

Incorporate weather and event data for predictions.

Smart Tourism

Develop real-time adaptive tourism management systems.

Thank you very much!

Questions?