URBANSENTINEL

"INTEGRATING URBANIZATION DYNAMICS FOR ENHANCED NATURAL CALAMITY PREDICTION AND MITIGATION"

BEST ENGINEER HACKATHON

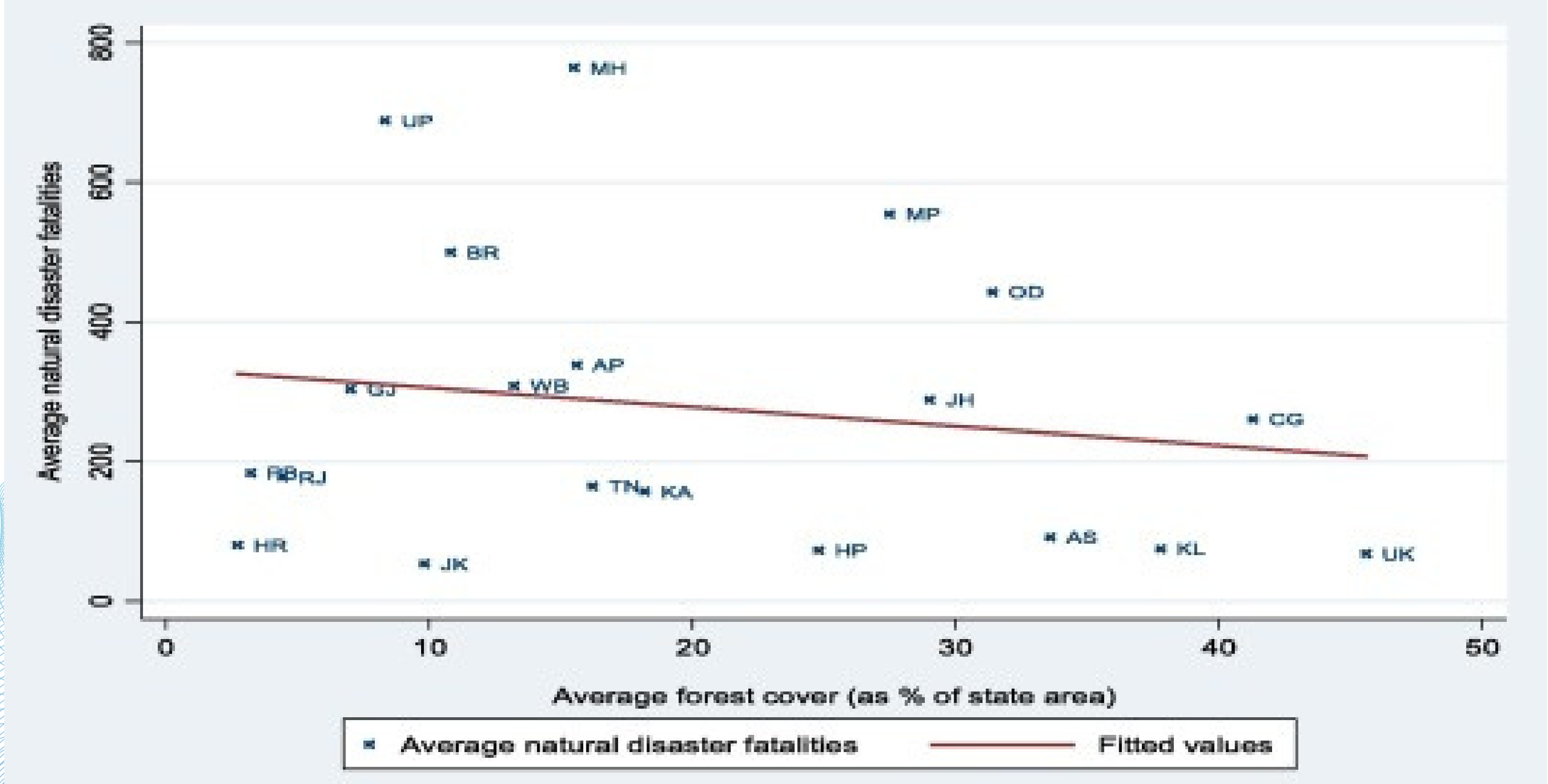
PROBLEM WITH EXISTING MODELS

CURRENT DISASTER PREDICTION MODELS OFTEN FAIL TO CONSIDER THE INTRICATE URBANIZATION INSIGHTS AND PHYSICAL CHARACTERISTICS OF THE LAND CRUCIAL FOR ACCURATE FORECASTING AND EFFECTIVE DISASTER MANAGEMENT

ENHANCEMENT WITH URBANISATION INSIGHTS

BY INTEGRATING URBANIZATION INSIGHTS AND HUMAN INTERVENTION STRATEGIES, OUR MODEL OFFERS MORE ACCURATE PREDICTIONS AND ENABLES PROACTIVE DISASTER MITIGATION EFFORTS IN URBAN AREAS.

STATISTICS ON NATURAL CALAMITIES INCREASE IN URBANISATION



URBANISATION AS KEY ROLE

1. OUR PROJECT AIMS TO CAPTURE THE COMPLEX INTERPLAY BETWEEN URBAN DEVELOPMENT AND NATURAL DISASTERS.
2. IT ALLOWS US TO NOT ONLY PREDICT DISASTERS MORE ACCURATELY BUT ALSO TO UNDERSTAND HOW URBANIZATION PROCESSES CAN EXACERBATE OR MITIGATE THE IMPACTS OF THESE EVENTS.
3. OUR GOAL IS TO DEVELOP A MODEL THAT CAN HELP URBAN PLANNERS AND POLICYMAKERS MAKE MORE INFORMED DECISIONS TO CREATE SAFER AND MORE RESILIENT CITIES.

METHODOLOGY

01 DATA COLLECTION

02 EXPLORATORY DATA ANALYSIS AND ANOMOLY DETECTION

03 SELECTION OF ALGORITHM AND CREATION OF DEEP LEARNING MODEL

04 DEPLOYING THE MODEL

05 INTEGRATION WITH THE REAL TIME LIVE DATA FEED

06 IMPACT AND FUTURE

CLASSIFICATION OF REQUIRED DATASET

01

CLIMATE DATA

TEMPERATURE,AIR QUALITY ,WIND ,HUMIDITY

02

URBANISATION DATA

URBANISATION FACTOR, FACTORY CONTAMINATIONS , INDUSTRIAL SECTOR DISTRICTS,POLLUTION FACTOR

03

NATURAL OCCURANCE DATA

SEASONAL RAINFALL , EARTHQUAKE OCCURANCE , SOIL AND LAND TYPE

04

ANALYSIS

EXPLORATORY DATA ANALYSIS AND ANAMOLY DETECTION

RESULTS OF FEATURE ENGINEERING

City

Disaster

Occurred Time

Rainfall

Urbanization factor

Factory Contamination

Population Density (people/km^2)

Climate Season

Earthquake Occurance

Presence Proximity to Water Bodies Region

DATASET FEATURES AND ITS PREDICTION

DISASTER TYPE WITH ITS LOCATION

DATASET SAMPLE

cities should be in tamilnadu

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A1 City

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	City	Disaster	Time	Rainfall (mm)	Urbanization (%)	Factory Contami	Population Dens	Climate	Season	Earthquake Pres	Proximity to Water Bodies (km)	Region	
2	Chennai	Flood	2021-11-29 00:0	250	89	18	25,629	Tropical Monsoo	Northeast Monsc	No	0 (Coastline)	Coastal region	
3	Madurai	Landslide	2019-08-06 14:3	70	58	12	4,499	Tropical Savanna	Southwest Mons	No	In Hills (near city)	southern region	
4	Coimbatore	Earthquake	2018-07-11 17:4	1.5	78	22	5,519	Tropical Savanna	Summer	Yes	120 (Western Ghats)	western region	
5	Trichy	Fire	2017-04-21 10:1	5	72	15	4,866	Tropical Savanna	Summer	No	1 (Cauvery River)	western region	
6	Salem	Flood	2015-12-01 06:0	180	65	10	3,218	Tropical Savanna	Northeast Monsc	No	Near tributaries of Cauvery River	western region	
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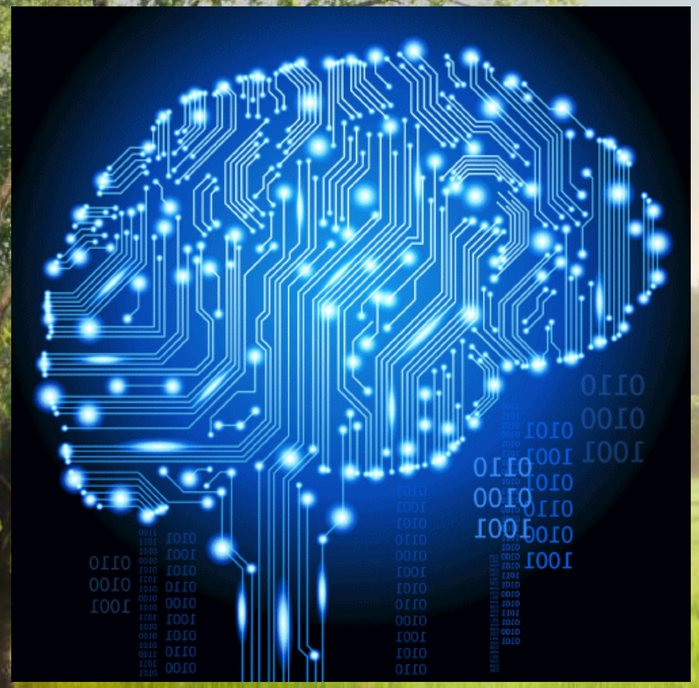
SAMPLE DATA HAS BEEN GENERATED*

LONG SHORT TERM MEMORY

- **LSTM networks can capture complex temporal patterns in your data, which is essential for understanding the dynamics of urbanization and its impact on disaster occurrences over time. By analyzing sequential data, LSTM networks can identify trends, seasonality, and other patterns that may affect the occurrence of disasters.**

- Our dataset includes time series data, such as changes in temperature, precipitation, or other climate variables, LSTM networks are well-suited for modeling this type of data. They can learn from past observations to make predictions about future events, making them valuable for forecasting disasters based on historical data



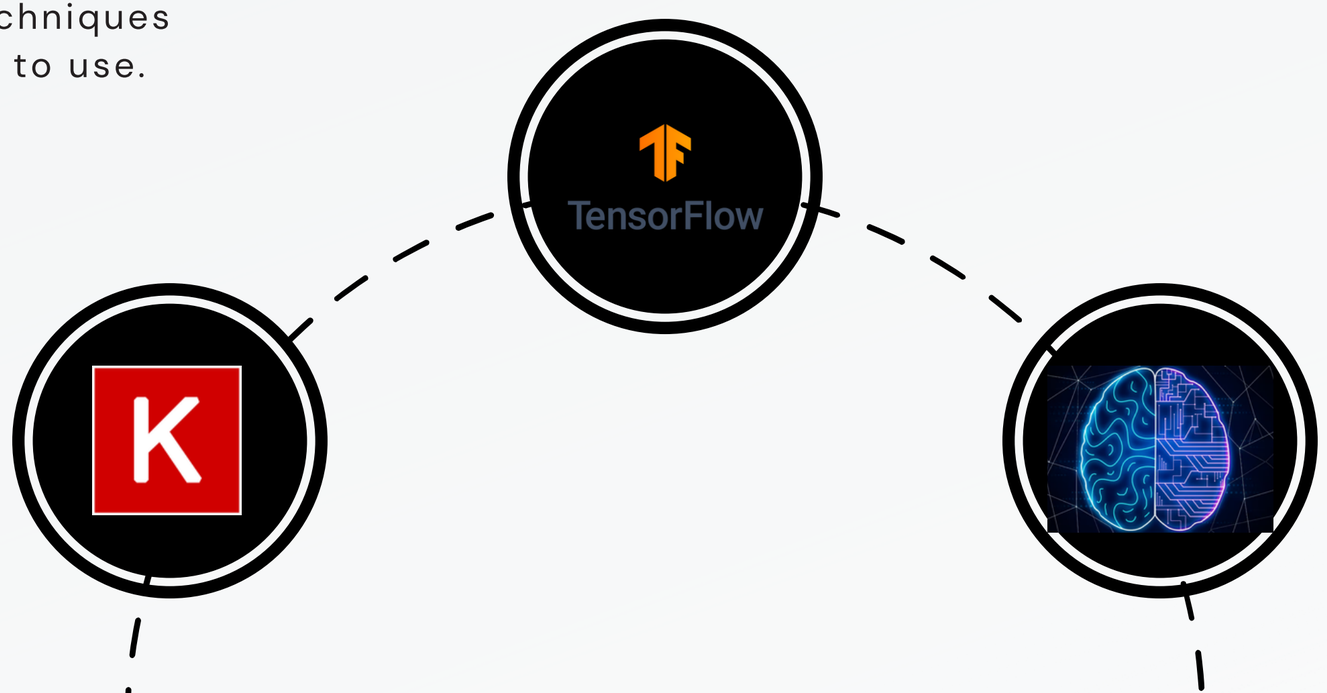
DEEP LEARNING AND LSTM

Model Architecture

Define the architecture of your LSTM model, including the number of layers, units (neurons) per layer, activation functions, and any regularization techniques (e.g., dropout) you want to use.

Model Training

- Train your LSTM model using the training data.
- Monitor the training process using the validation data to avoid overfitting.



evaluation

- Evaluate the performance of your trained LSTM model using the test data.
- Calculate relevant metrics (e.g., accuracy, precision, recall) to assess the model's performance.

IMPACT AND FUTURE PLANS

IMPACT:

Enhanced understanding of vulnerability hotspots, informed urban planning, and targeted interventions to mitigate risks and build resilience in the face of evolving environmental challenges

FUTURE PLAN:

Enhancing research, impact, and sustainability through expanded data collection, collaborative partnerships, policy advocacy, capacity building, technology integration, community engagement, impact assessment, scaling up successful interventions, and knowledge sharing