LANDSCAPE / HOTSPOT ANALYSIS AND PREDICTION

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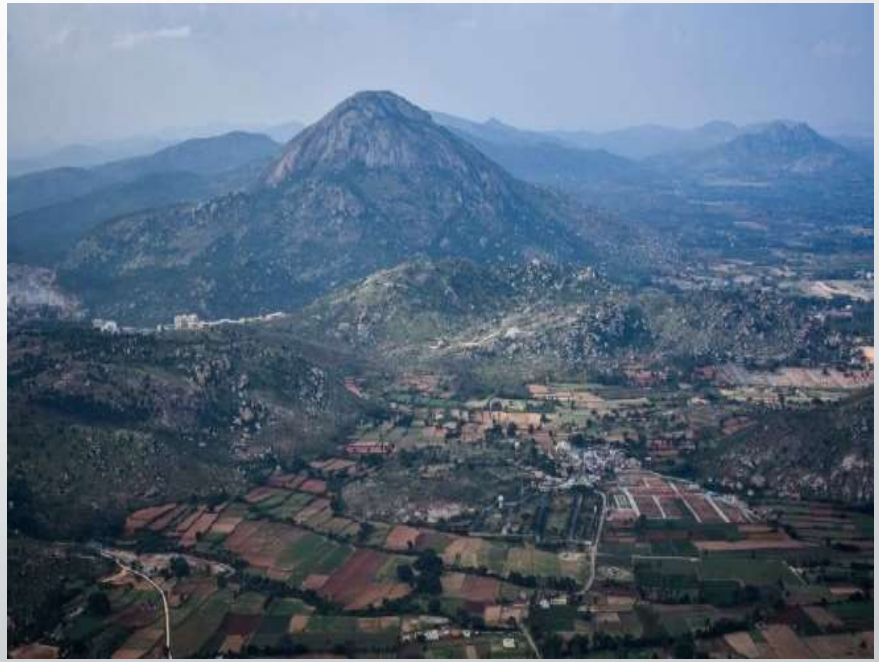
GLOSSARY

- INTRODUCTION
- LANDSCAPES OF INDIA
- IMPORTANCE OF LANDSCAPE ANALYSIS
- PROBLEMS IN LANDSCAPES
- ML TOOLS USED
- PROCESS DESCRIPTION
- FUTURE USES

INTRODUCTION

A LANDSCAPE IS A PART OF EARTH'S SURFACE THAT CAN BE VIEWED AT ONE TIME FROM ONE PLACE.

BIODIVERSITY HOTSPOTS ARE REGIONS THAT CONTAIN A HIGH LEVEL OF SPECIES DIVERSITY, MANY ENDEMIC SPECIES AND ENDANGERED SPECIES.



LANDSCAPES OF INDIA

THERE ARE MANY TYPES OF LANDSCAPES. SOME COMMON LANDSCAPES OF INDIA ARE

- THE GREAT HIMALAYAS
- INDO-GANGETIC PLAINS
- PENINSULAR PLATEAU
- WESTERN AND EASTERN GHATS
- THAR DESERT
- COASTAL PLAINS
- ISLANDS
- TROPICAL AND MANGROVE FOREST

IMPORTANCE OF LANDSCAPE ANALYSIS

- ENVIRONMENTAL MANAGEMENT
- BIODIVERSITY CONSERVATION
- AGRICULTURAL PLANNING
- NATURAL RESOURCES MANAGEMENT
- URBAN PLANNING
- DISASTER RISK REDUCTION
- CLIMATIC CHANGE STUDIES
- ECOSYSTEM SERVICES

PROBLEMS IN LANDSCAPES

- ENVIRONMENTAL DEGRADATION
- INSUFFICIENT RESOURCE
- INCREASED VULNERABILITY TO DISASTER
- LOSS OF ECOSYSTEM SERVICES
- UNPLANNED URBANIZATION
- AGRICULTURAL LOSS
- CULTURAL LOSS
- CLIMATE CHANGE IGNORANCE

MACHINE LEARNING TOOLS AND PROCESS

- SATELLITE IMAGERY
- SCI-KIT LEARN LIBRARY
- FEATURE SELECTION
- DATA PREPROCESSING TOOL
- SPATIAL AUTOCORRELATION
- MODEL SELECTION
- MODEL TRAINING
- HYPERPARAMETER TESTING
- VALIDATION AND TESTING
- POST PROCESSING
- VALIDATION AND VISUALIZATION

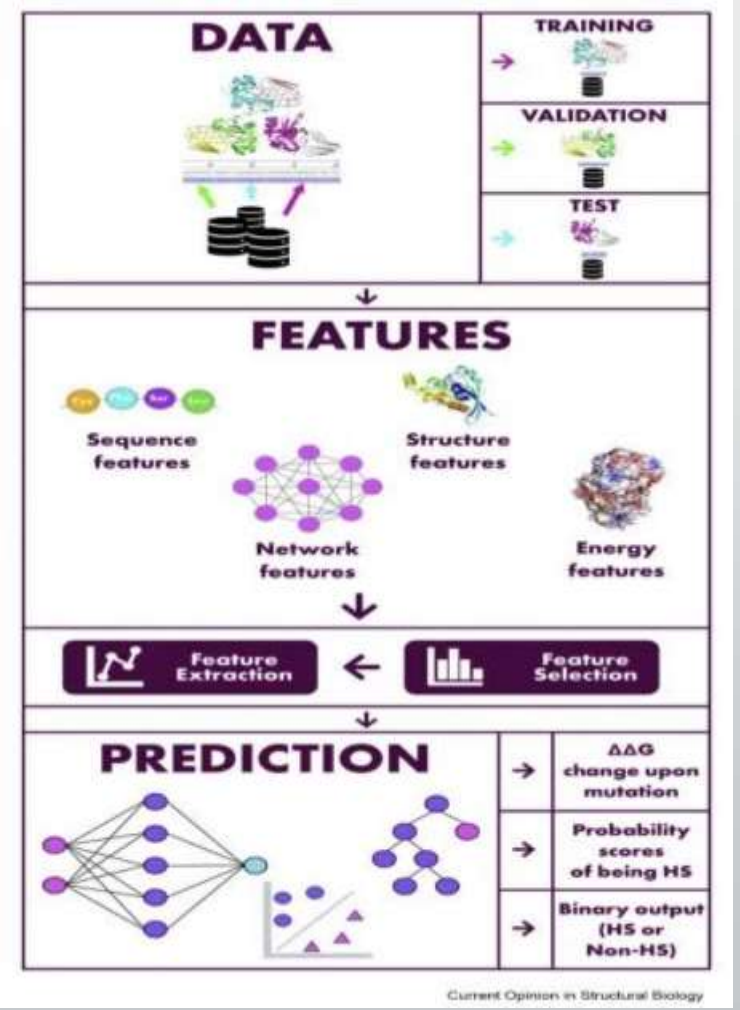
PROCESS DESCRIPTION

- DATA COLLECTION

SCIKIT-LEARN IS A VERSATILE MACHINE LEARNING LIBRARY USED IN PYTHON IT PROVIDES SIMPLE AND EFFICIENT TOOLS FOR DATA ANALYSIS AND MODELING,INCLUDING VARIOUS ALGORITM. DATA IN THE FORM OF SATELITE IMAGES ARE GIVEN AS INPUT TO THE TRAINING KIT AND IT IS VALIDATED BY VARIOUS TESTING AND SENT TO FEATURES PROCESS.

- FEATURE SELECTION

IN FEATURE SELECTION THERE ARE MANY FEATURES LIKE TREES,DESERT,WATERFALL,HILLY REGIONS,COASTAL AREAS ETC ARE FEED AND WITH THE USE OF MACHINE LEARNING THE DEVICE PROCESS THE SATELLITE IMAGE AND COMPARE THESE IMAGES TO SELECT THE NECESSARY FEATURE BY EXTRACTING IT FROM LIBRARY



- ML PIPELINING

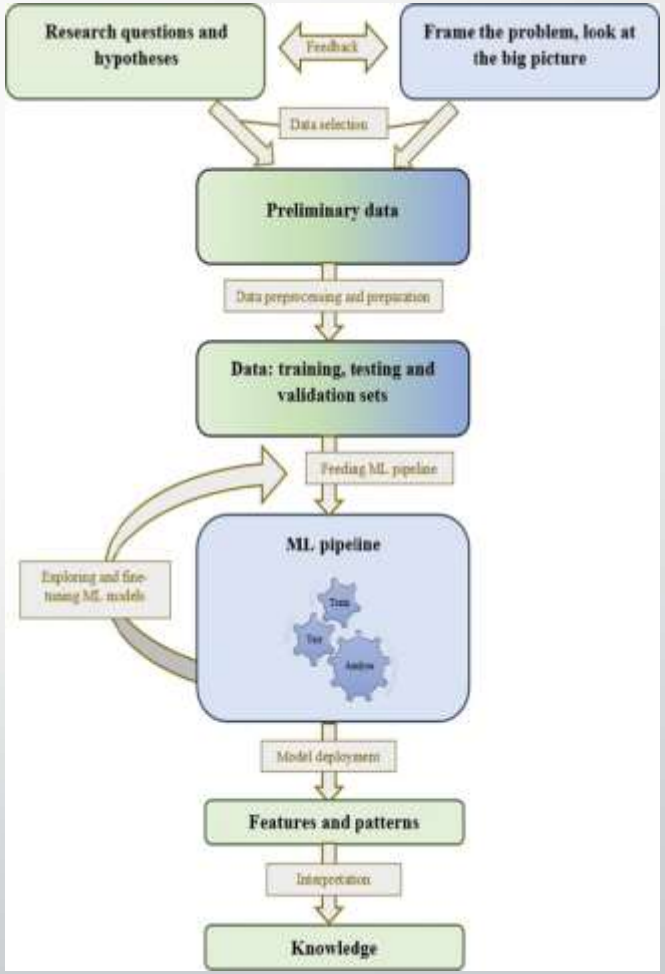
IT HAS THREE PROCESS NAMELY TRAINING OF THE TOOLS,TESTING AND ANALYSIS PROCESS. APACHE KAFKA IS USED FOR PIPELING PURPOSE. LABELING OF THE DATA IS DONE FOR PRE IMAGES OF TREES,HILLS,DESERTS,WATERFALL,SEA ETC WHICH ARE TRAINED TO THE MACHINE LEARNING AND TESTED.SPATIAL ANALYSIS IS DONE BY AUTOCORRELATION. VALIDATION AND TESTING PROCESS ARE ESSENTIAL TO BE SUCCESS.

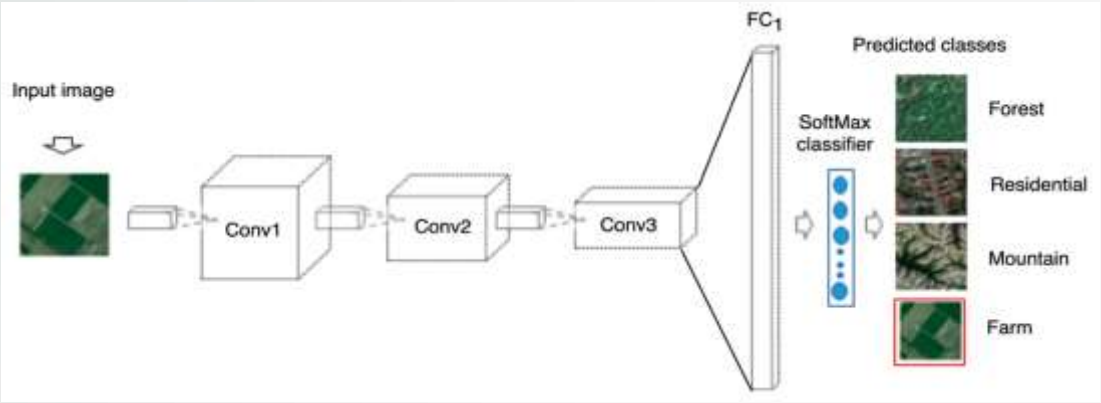
- HOTSPOT ANALYSIS

HOTSPOT ANALYSIS INCLUDES USE OF TRAINED MODEL TO PREDICT THE FEATURES OF SATELLITE IMAGES.

- PREDICTION

THE DATA PREDICTION IS DONE BY THE PREDICTION TOOL OF SCI-KIT LIBRARY. AFTER FINDING THE EXACT FEATURE LIKE DESERT,HILL ETC, THE PREDICTION TOOL OBSERVES THE PREVIOUS YEAR DATA OF THESE REGIONS AND CALCULATE THE △G DEVIATION. THEN PROBABILITY OF THE LANDSCAPES ARE CALCLUATED BY RATE OF DEVIATION





- POST PROCESSING

POST PROCESSING INTERPRET THESE RESULTS AND APPLY FILTERS TO PRODUCE HIGH ACCURACY RESULT.FINE TUNING OF THESE PARAMETERS SHOW MORE ACCURATE OUTPUT

- MONITORING AND UPDATING

IMPLEMENTING A SYSTEM TO STORE THESE DATA AND MONITORING THESE CHANGES AND UPDATING IT TO THE SYSTEMS

THANK YOU