Integrated forecasting Decision Support System

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Weather Forecasting Services to Various Socio-economic Sectors

In the service of nation since 1875
Information Management

- Data collection
- Data monitoring
- Data quality Control
- Metadata Management
- Database Management
- Data Archival / Retrieval
- Data generation (Basic data, derived products generation)
- Data Visualization
- Bulletin & report generation
- Data Supply
Integrated Decision Support System

- Climate Services to support weather forecast
- Weather Forecasting
- Sectorial Application
- Visualization and Display
- Dissemination
- Public Weather Services
Weather Analysis and Forecast Enabling System: Decision Support System (DSS)

MICS
(Meteorological Information Communication System)

DIPS (Data Information Processing System)

SIVS (Synthesized Integrated Visualization System)

CLIS (Climatological Information System)

WIGPADS (Weather Information Generation, Presentation Dissemination System)

PWIS (Public Weather Information System)
High level architecture for Decision support system

Real time data from various Observational Networks

Data Acquisition & Processing
- Web services
- Database
- Flat Files
- Geo-Spatial Layers

DSS Tools /Modules
- Risk Analysis
- Climatology Services
- SOP

Visualization
- Regional Services
- Bulletins Generation

Dissemination
- GTS
- CAP
- Social Media
- Website /APIs
- RSS feed
- Push notification
- Email
- SMS
- FAX
Tools and technologies

- Geospatial technologies
- Automation using python
- AI/ML
  - Data generation
  - Prediction
- IoT (Internet of Things)
Geospatial tools

Back-End

- Geospatial Database
  - PostgreSQL
  - Automating the entire process in python
    - Manipulation and Integration of geospatial layers
    - Converting to formatted CSV, geojson and cumulative rainfall
    - Maintaining the database
  - Library – Pandas, PSYCPG2, Geopandas, GDAL, datetime etc.

- GDAL
- NumPy
- TensorFlow
- TensorFlow

Front-End

- GeoServer & OpenLayers
- Mapping APIs
- GeoPandas
- Matplotlib
- Preprocessing libraries
- JS
- HTML
WebGIS Architecture

Input Data Collection
- GPS Data
- AutoCAD files
- Excel sheets/CSV
- Printed Maps

Data Preprocessing
- File format conversion
- Georeferencing

GIS and MIS Data integration

Data insertion into Spatial databases (PostgresSql, Oracle etc)
AI/ML and IoT

• Data generation
  - LULC preparation
• Data prediction
  - Rainfall
    - Cyclone feature identification
• Pattern recognition
  - Adaptation of Dvorak Technique
• Downscaling
• Rainfall estimation from Radar images
• Warning dissemination
Major functionalities

- Geovisualization of all layers (Web and Mobile)
- Data monitoring
- Data processing
- Data Analysis Tools
- Impact Analysis Tools
- Automatic text and sms warning alerts
- Automatic Bulletin generation
Decision support system for weather monitoring and forecasting
Decision support system for Sectoral Applications

DECISION SUPPORT SYSTEM FOR WEATHER FORECASTING

- Thunderstorm Module
- Heavy Rainfall Module
- Heatwave/Coldwave Module
- Cyclone Module
- Model-Display Module
- Dynamic Meteogram
- Drms Module
- Marine (Sea Area) Module
- Marine (Fleet Area) Module
- Marine (GMDSS) Module
- Marine (Coastal) Module
- Marine (2° Sea Area) Module
- Swfp
- Fisherman Warning
- Lopar Identification
- Transport Service Module
- Tourism Module
- Lightning Report
WebGIS applications & GIS products

- Meteorological Observation
- NWP Model
- Dynamic Meteogram
- Heavy Rainfall
- Cyclone Module
- Marine weather Services
WebGIS applications & GIS products

- Severe Weather Forecasting Program - South Asia
- Heat wave/Cold wave
- Nowcast/Thunderstorm
- District wise Rainfall Monitoring Scheme (DRMS)
- Surface Transport
- Coastal Weather Forecast
Warning dissemination using GIS
Warning dissemination using GIS
THANK YOU