

19. AI & ML for Urban Water body Monitoring

Aim

Characterization of urban water bodies through Water Spread Area(WSA) dynamics generated using Deep Learning(DL) techniques using open-source satellite data, tools, and technologies.

Scope

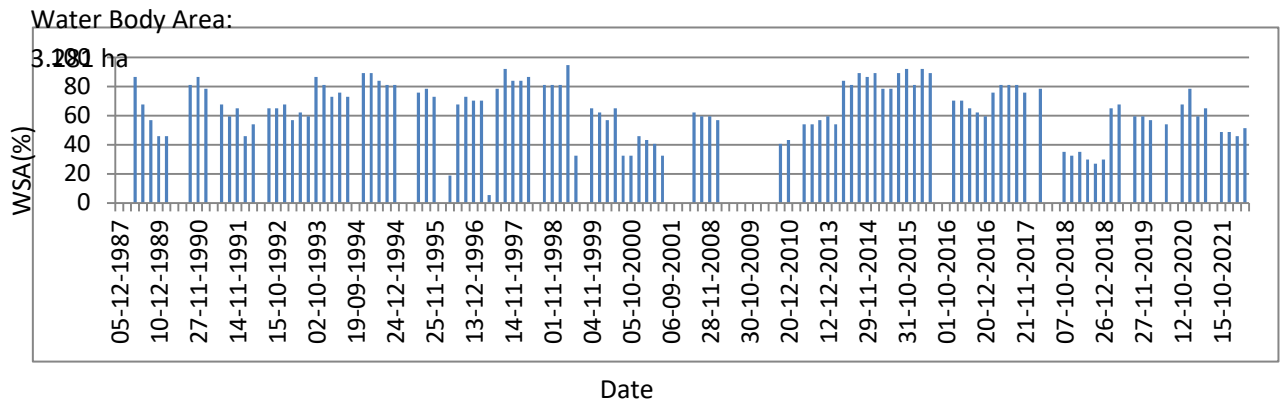
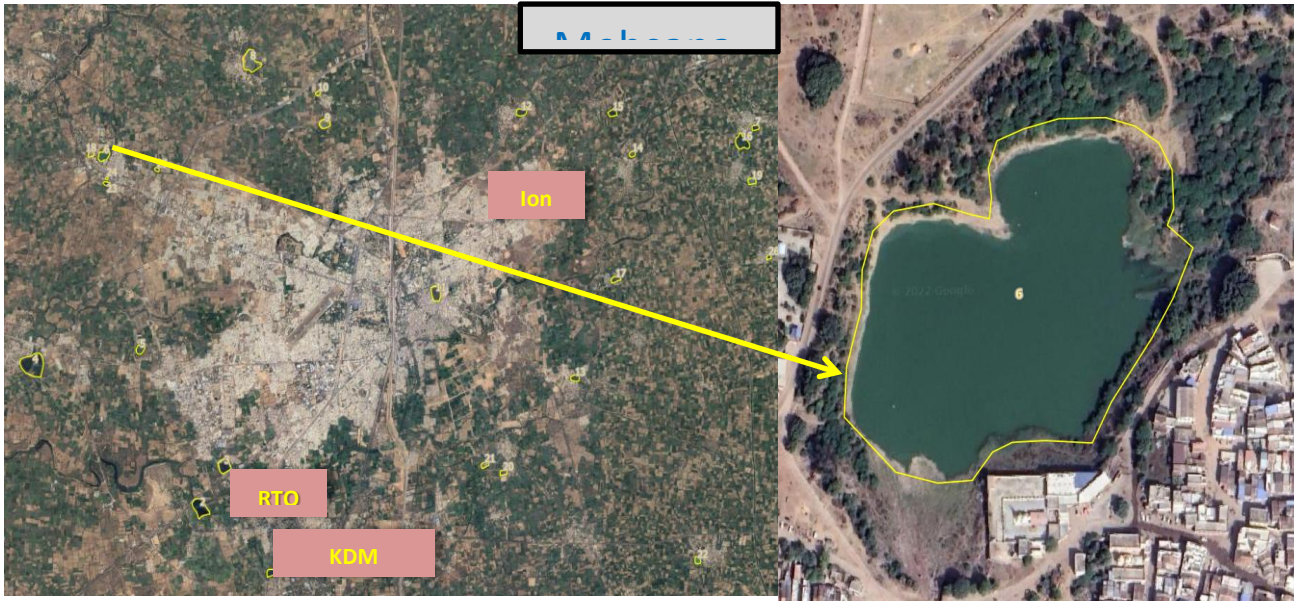
- Extraction of water body (vector) Layer from Survey of India Digital Database
- Development of DL model for computing multi-temporal WSA
- Operationally computing WSA statistics for 33yrs (1988-2021) using satellite data
- To assess the current status of the water body (persistent, rejuvenated, extinct, new, etc.) using computed statistics.

Present status

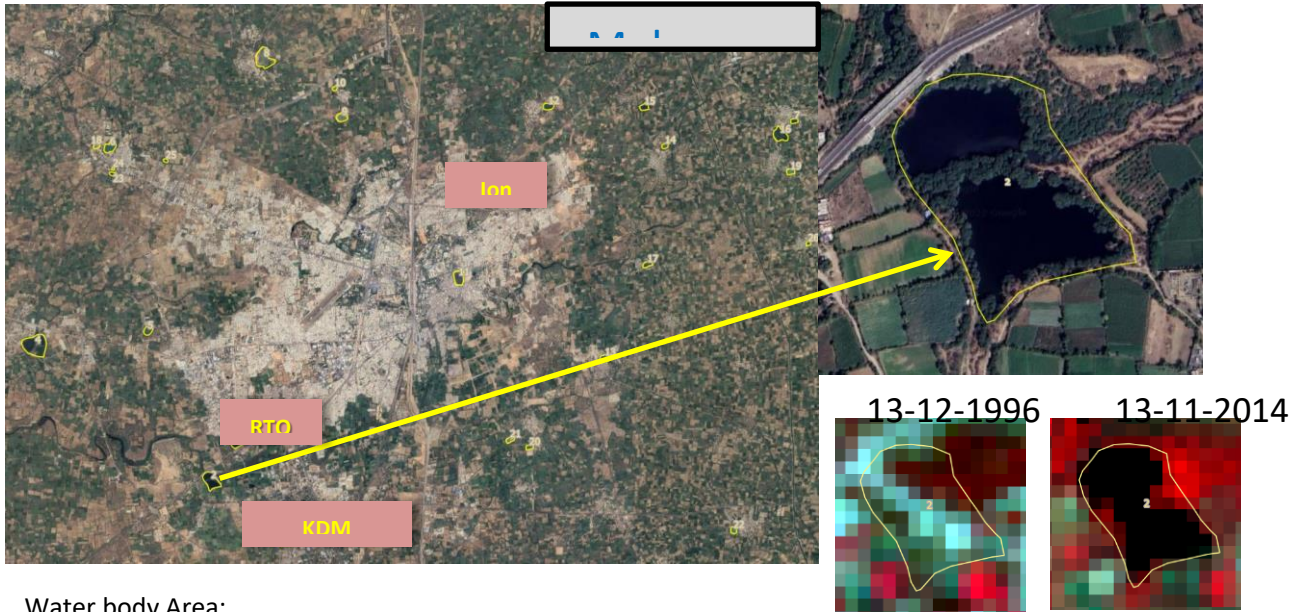
- Developed module for automatically identifying suitable satellite data scenes for the study area from online open source data.
- Developed DL-based framework for processing and analysis by integrating open source technologies (python and corresponding libraries), Google Earth Engine, and Google Colab using AI & ML framework (Tensor Flow, Keras, etc.)
- Tested and successfully implemented for Mehsana town of Gujarat, India, by automatically Processing about 150 satellite data scenes online with a turnaround time(TAT) of 2 hours.
- The DL framework is being extended to other Urban cities/towns as part of Urban water security.

Challenges

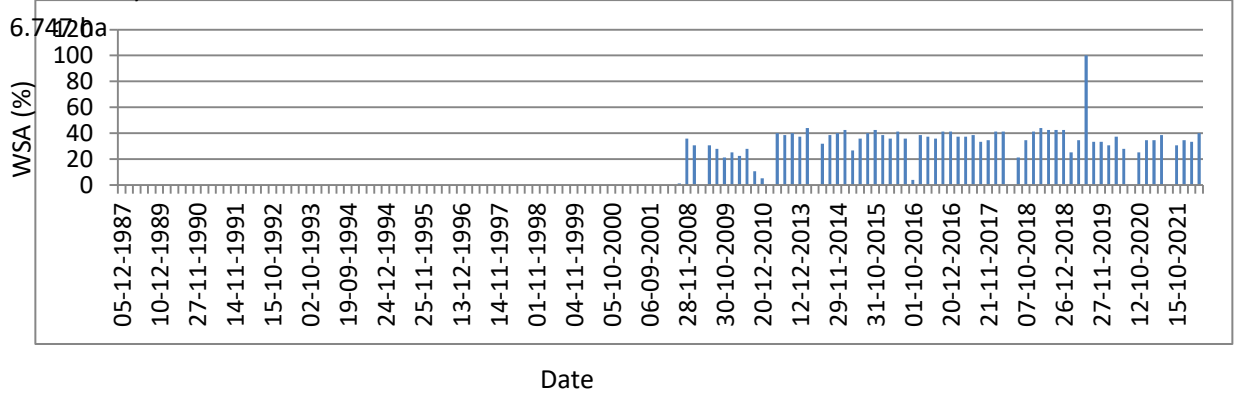
- Automation of characterization of urban water bodies based on multi-temporal WSA statistics into different categories such as persistent, rejuvenated, extinct, new, etc.,
- Testing and updating the DL framework for other geographical regions of India.



Example of a Persistent water body over 33 years - Mehsana Town



Water body Area:



Example of a newly formed water body apparently in the year 2008 - Mehsana Town