



যাদবপুর বিশ্ববিদ্যালয়
JADAVPUR UNIVERSITY



Analysis of SAR images of the Sundarban region for deforestation detection

Context:

Sundarbans, UNESCO world heritage site, is a mangrove area in the delta formed by the confluence of the Ganga, Padma, Brahmaputra and Meghna Rivers in the Bay of Bengal. The site is intersected by a complex network of tidal waterways, mudflats and small islands of salt-tolerant mangrove forests.

This is also home to many endangered species like the Royal Bengal Tiger, Crocodile and numerous faunae. This is one of the most cyclone prone region of India where presence of this mangrove safeguards eastern part of India from the effect of cyclone. These forests also act as protection from soil erosion in the coastal region.

The sundari tree that populates the region is important for survival of various fauna of this region especially big mammals like royal Bengal tiger and spotted deer due to the characteristic of the tree. Other mangroves trees are relatively smaller in nature and grow in saline water, creating a bush type low height canopy near the canals, causing a hindrance to the movement of wild animals.

However, for the past couple of decades the mangroves of Sundarban are facing threats due to several natural and manmade causes. Due to global warming the number of cyclones and their intensity has increased in the Bay of Bengal. Cyclone Sidr (2007), Aila (2009), Amphan (2020) destroyed almost 40% of the forest.

Developing a strategy of active monitoring of the Sundarban forest, would allow to follow in real time the evolution of its state. Detecting the deforestation, would allow to identify the cause and to plan a remedy to finally protect the fauna but also the flora.

Internship proposal and main tasks to be carried out:

The candidate will carry out an appropriate survey of the state of the art on SAR image processing approaches in a deforestation context. The candidate will then investigate relevant classical features extraction methods and those based on machine learning techniques. The last step will focus on the development of a method that combines classical features from a SAR image with a deep learning architecture to characterize the state of the forest.

Internship duration: 6 months

Required skills: To carry out this research work, the candidate need to have the following skills:

- Artificial intelligence, machine learning
- Data and image processing

- Computer science
- Applied mathematics (modeling and scientific calculations)

Application deadline: May 15th 2022

Internship remuneration: \approx 600 €/month

Internship supervision:

Khalifa DJEMAL and Amir FEIZ: University of Paris Saclay, France

Soham SARKAR: RCC Institute of Information Technology, Kolkata, India

Sheli Sinha CHAUDHURI: University of Jadavpur, Kolkata, India

Internship contacts:

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References:

[1] Abdelkader Horch, Khalifa Djemal, Abdelkader Gafour and Nasreddine Taleb, Supervised fusion approach of local features extracted from SAR images for detecting deforestation changes. IET Image Processing, 13 pages, DOI: 10.1049/iet-ipr.2019.0122, september 2019.

[2] Sahana, M., Rehman, S., Patel, P.P. et al. Assessing the degree of soil salinity in the Indian Sundarban Biosphere Reserve using measured soil electrical conductivity and remote sensing data-derived salinity indices. Arab J Geosci 13, 1289 (2020). <https://doi.org/10.1007/s12517-020-06310-w>

[3] Samanta, S.; Hazra, S.; Mondal, P.P.; Chanda, A.; Giri, S.; French, J.R.; Nicholls, R.J. Assessment and Attribution of Mangrove Forest Changes in the Indian Sundarbans from 2000 to 2020. Remote Sens. 2021, 13, 4957. <https://doi.org/10.3390/rs13244957>