



ALGORITHM FOR SURFACE SOIL MOISTURE MAPPING USING OPTICAL-THERMAL-MICROWAVE REMOTE SENSING

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TECHNOLOGY DETAILS

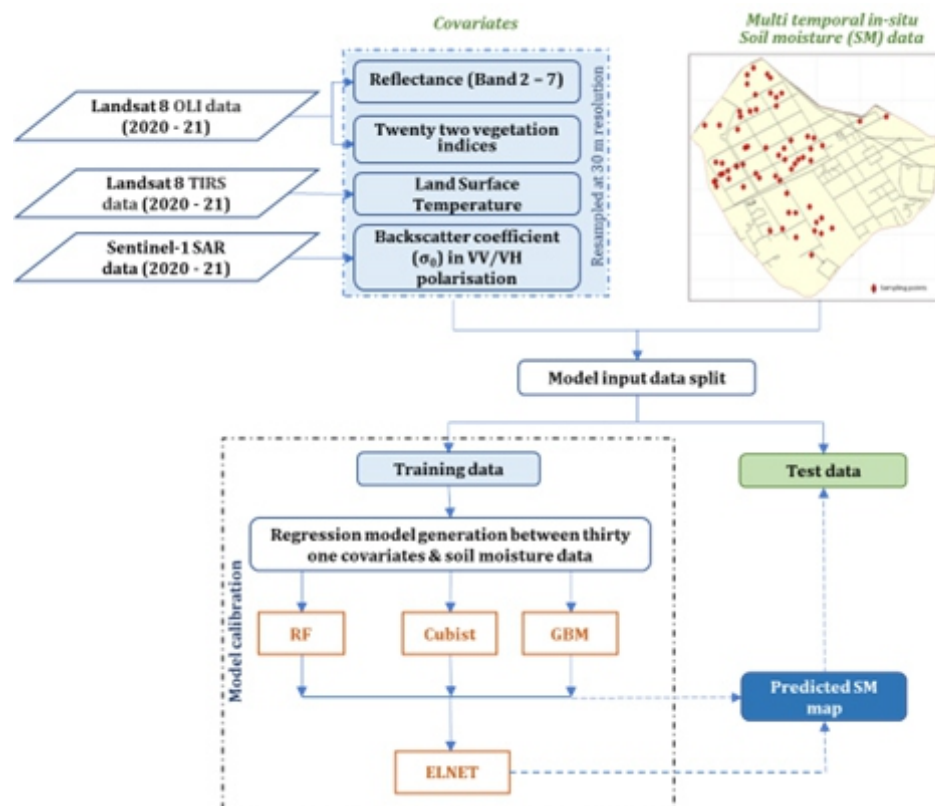
- Surface soil moisture (SSM) maps at 30 m spatial resolution were developed by fusing optical, thermal and microwave remote sensing and ground soil moisture data through bagging, boosting and stacking machine learning approaches
- Random forest (RF) showed the highest correlation coefficient ($r = 0.71$) and least root mean square error (RMSE = 5.17%) while

the cubist model had the least mean bias error (MBE = 0.21%) during independent validation

- Stacking of cubist, gradient boosting machine (GBM) and RF using elastic net (ELNET) as meta-learner further reduced the MBE (0.18%) and RMSE (5.03%) during the validation.
- **The remote sensing based protocols generated will help in efficient use of water which will enable the farmers to have more crops per unit area and achieve the Prime Minister's goal of "Per Drop More Crop".**

PUBLICATION

- Das, B., Rathore, P., Roy, D., Chakraborty, D., Jatav, R. S., Sethi, D., & Kumar, P. (2022). Comparison of bagging, boosting and stacking algorithms for surface soil moisture mapping using optical-thermal-microwave remote sensing synergies. *Catena*, 217, 106485. <https://doi.org/10.1016/j.catena.2022.106485> (NAAS Rating: 12.37)



Steps in surface soil moisture mapping



INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Certified that

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of

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has developed the technology

Algorithm for surface soil moisture mapping using optical-thermal-microwave remote sensing

16th July, 2024
New Delhi

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