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Name: Dr. Shamama Anwar (Principal Investigator) & project Team

Department: Computer Science & Engineering

Funding Agency: **DHR**

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Tenure: 3 Years

Project Title: Spatio-temporal predictive modelling of mental-wellbeing using GIS, climate and environmental determinants in India

Funded by: Department of Health Research (DHR) under the Grant-in-aid (GIA) Scheme for Inter -Sectoral Convergence and Coordination for Promotion and Guidance on Health Research.

Summary: This project aims to develop a comprehensive understanding of how climate, environmental, and socio-economic factors influence mental well-being across different regions of India. With increasing climate variability, pollution, and urban environmental stressors, there is a growing need to examine their impact on psychological well-being in the general population. The research is led by Birla Institute of Technology (BIT), Mesra in collaboration with Ranchi Institute of Neuro-Psychiatry & Allied Sciences (RINPAS), BIT Noida, National Institute of Technology Sikkim, and National Institute of Technology Calicut. The multi-site design will enable data collection across diverse climatic zones including eastern, urban, Himalayan, and coastal regions, allowing the study to capture regional variability in environmental exposures and mental well-being outcomes.

The project will combine questionnaire-based assessments with objective physiological and behavioral measurements. Participants will be monitored using wearable devices to capture activity patterns, while portable electroencephalography (EEG) systems will record neurophysiological signals associated with cognitive load, stress, and emotional responses under different environmental conditions. Environmental variables will also be measured to understand their interaction with mental well-being indicators.

Using Geographic Information Systems (GIS) along with AI and ML techniques, the project will develop spatio-temporal predictive models to identify environmental determinants of mental well-being and forecast potential risk hotspots. The findings will be integrated into an interactive GIS-based dashboard that can assist policymakers and public health planners in monitoring trends, identifying vulnerable regions, and designing targeted interventions to promote climate-resilient mental health strategies in India.

Project Team:



Dr. Supreeti Kamilya (Co-P.I.)
Dept. CSE



Dr. Kirti Avishek (Co-PI)
Dept. Remote Sensing



Dr. Swati Prasad (Co-PI)
Dept. CSE (off Cam. Noida)



Dr. Amool Ranjan Singh (Co-PI)
Department of Clinical Psychology
(RINPAS)



Dr. Sangram Ray (Co-PI)
Dept. CSE (NIT) Sikkim



Dr. Raju Hazari (Co-PI)
Dept. CSE (NIT, Calicut)