SATELLITES' data based public HEALTH resource requirement forecasting and alerting system



• Dr Lalit Garg

- Prof Sandra Buttigieg
- Prof Charles Galdies
- Prof Neville Calleja
- o Mr. Bhushan Pawar





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SATELLITES' data based public HEALTH resource requirement forecasting and alerting system



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• Dr Lalit Garg

- Senior Lecturer, Department of Computer Information Systems, Faculty of Information & Communication Technology
- Honorary Lecturer, University of Liverpool, UK
- An expert in Health informatics and Extended health intelligence with an extensive publication profile.

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- Prof Sandra Buttigieg
- Professor and head of the Department of Health Services Management, Faculty of Health Sciences
- Head-Clinical Performance Unit, and Chair-Patien Safety and Quality Improvement Team, Mater Dei Hospital, Malta
- A world-renowned expert in Clinical performance and quality assurance in healthcare, patient safety clinical risk management





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- Prof Neville Calleja
- Associate Professor of public health in the Faculty of Medicine & Surgery
- Director of the Directorate for Health Information & Research (DHIR)





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• Prof Charles Galdies

- Associate Professor with the Division of Environmental Management and Planning within the Institute of Earth Systems
- Previously served as Chief Meteorological Officer of the Malta Meteorological Office
- Deputy Executive Director of the International Ocean Institute Headquarters





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 Permanent Representative of the Government of Malta with the World Meteorological Organisation

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- Mr Bhushan Dinkar Pawar
- PhD Scholar, Faculty of Information & Communication Technology
- Research Support Officer II, Satellite4Health
- Previously an assistant Professor in Department of Computer Science, ShivChhatrapati College, Cidco, N-3, Aurangabad, India





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Do you want to forecast the number of hospital admissions?

- To ensure bed availability Ο
- To estimate waiting time Ο
- To have healthcare professionals available Ο
- Analyzing climate change impact on public health Ο



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O-ORDINATION STRATEGY



What is risk to suffer from various diseases?

- To minimise the disease risk
- To assist correct diagnosis
- To take care of your health







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What about the length of stay estimation?

- To better capacity planning
- To have discharge planning
- To optimize resource utilization and management



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How to control disease outbreak and spread?

- To understand weather impact on disease spread
- To prepare health system
- To make public health policies
- Alert public



SPACE FUND

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GOVERNMENT MINISTRY FOR INNOVATION 4 OF POST COV

SEARCH, THE CO-ORDINATION STRATEGY





GOVERNMENT OF MALTA MINISTRY FOR RESEARCH, INNOVATION AND THE CO-ORDINATION OF POST COVID-19 STRATEGY



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Project objectives

- To find the most significant satellite imagery data parameters (primary climatic factors) influencing public health
- To investigate the effect of weather parameters on human health.
- To model the correlation between the satellite imagery and weather stations data
- To characterize the climatic factors' impact on the hospital admissions and patient length of stay.
- Factors on the hospital admissions and patient length of stay.
- To develop public health monitoring and resource requirement forecasting tools.





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Satellite Data

• Sentinel & LandSet

Land-surface temperature, land-surface reflectance's, and aerosol load overland to accessed through MERCAOR OCEAN5 hourly-mean, daily-mean, weekly-mean and monthly-mean wherever available) and the Copernicus Data and Information Access Services (DIAS).

O TERRA & AQUA

Level 2 Atmospheric stability indices, vertical temperature and moisture-profile data for the low atmosphere, aerosol thickness Accessed through MODIS,GSFC,NOAA.

• EUMETSAT

Cloud Cover, AIRMASS RGB.

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Satellite Data

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Ground station weather Data

• Environment and Resources Authority (ERA)

• Free Meteo

https://mt.freemeteo.com/weather/ .

• Weather parameters

Daily Average, Meximum Temperature, Minuimum Temperature. Temperature Variations, Humidity, UV Index, Sunshine Hours





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Hospital Data

- Mater Dei Hospital, Malta Ο
- **Discharge Data since 2012** Ο
- **Provided by Directorate for Health Information &** Ο **Research (DHIR)**





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Machine Learning Techniques

• Image analysis, data modelling and classification techniques

Wavelet transformation, singular vector decomposition (SVD), singular vector machines (SVMs), extreme learning machines (ELM), deep learning, and random forest, timeseries analysis

• **Prognostication and regression techniques** Regression analysis, tensor decomposition, Bayesian

probabilistic matrix factorisation, Hidden Markov Model Regression, PCA, ICA and phase-type survival trees.





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Machine Learning Techniques

• Programming Languages

Python, MATLAB, R, C/C++ and other Programming Languages and Statistical packages (if required)





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Dr Lalit Garg, Prof Sandra Buttigieg, Prof Neville Calleja, Prof Charles Galdies, Mr Bhushan Pawar



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