مركز محمد بن راشد للفضاء
MOHAMMED BIN RASHID SPACE CENTRE

ESGRS NEWSLETTER

ESGRS
The Emirati Society of GIS and Remote Sensing

DECEMBER 2023 | EMIRATI SOCIETY OF GIS AND REMOTE SENSING | EDITION 1

EVENTS

STUDENTS AND YOUNG PROFESSIONALS EVENT AT SPACEOPS 2023

SpaceOps committee, MBRSC, Space Generation Advisory Council (SGAC), and ESGRS organized the “Students and Young Professionals (SYP)” program which was a part of SpaceOps 2023 Conference program to support young youth and enable them to take part in the space sector. The event included panel discussions, technical presentations, and a mentoring activity session.

MBRSC’S PALM TREES DETECTION WORKSHOP

The recently concluded Palm Trees Detection Workshop achieved success in immersing participants in the fusion of remote sensing and artificial intelligence. Tailored for researchers, GIS analysts, and professionals, the workshop effectively closed the gap between theoretical understanding and practical application. Attendees gained valuable insights, through the hands-on skills for palm trees detection through advanced technologies. Great experience and engagement highlighted the workshop's success, setting the stage for future innovative endeavors in the field.

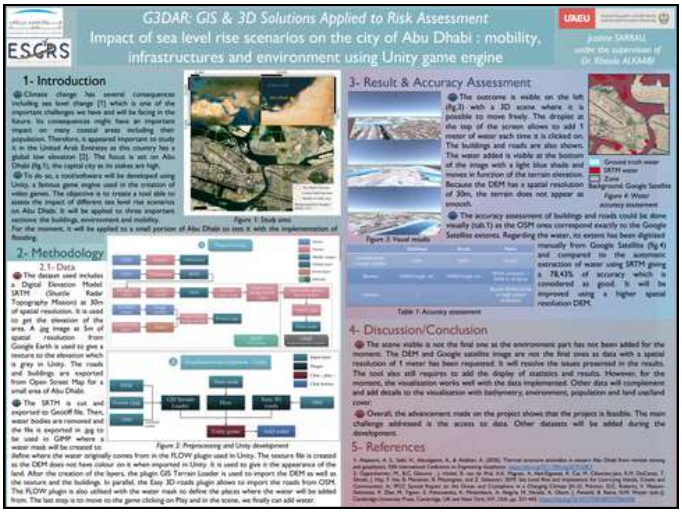
ESGRS CHALLENGE - EARTH OBSERVATION EDITION

ESGRS proudly reflects on the success of the ESGRS Challenge - Earth Observation Edition. This event unfolded as an inspiring chapter for university students passionate about GIS, Remote Sensing, and the Environment. The challenge inspired students to apply their expertise in GIS and Remote Sensing applications and provided a platform for exploring new frontiers and addressing real-world challenges. Participants, leveraging spatial data and advanced technologies, ingeniously crafted solutions with the potential to positively impact environmental issues, serving the greater good of humanity and Earth.

More than 60 proposals were submitted from both, inside and outside the UAE, however, only the top 6 projects were selected to proceed throughout the challenge. After the final presentation, 3 winners were announced and proudly presented their projects at the MBRSC Booth during the Dubai AirShow 2023.

ESGRS CHALLENGE - EARTH OBSERVATION EDITION - WINNERS' POSTERS

First Place



Project Title

G3DAR: GIS & 3D Solutions Applied to Risk Assessment

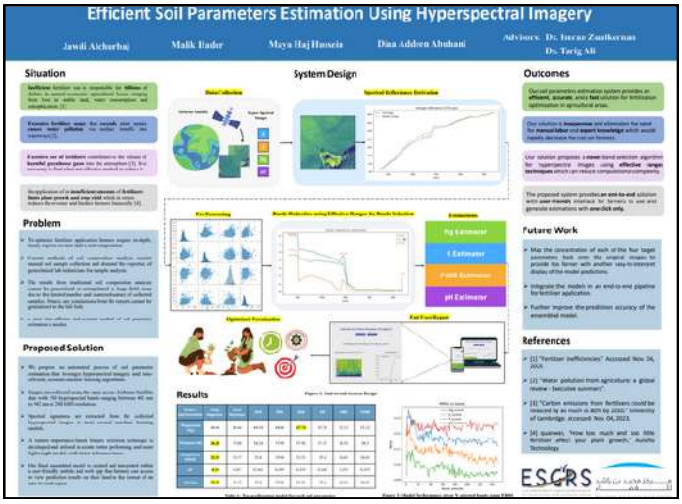
Student

Justine Sarrau

University

United Arab Emirates University

Second Place



Project Title

Efficient Land Soil Parameters Estimation of Airborne Hyperspectral Satellite Images

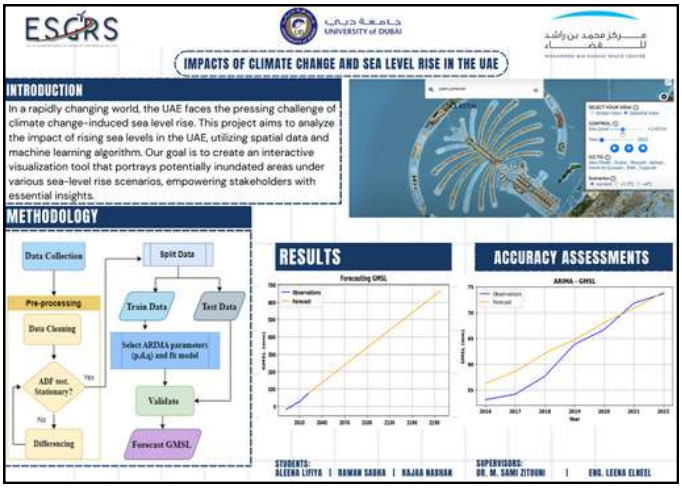
Student

Diaa Abuhani, Maya Hussain, Malik Hader, and Jawdi Alchurbaji

University

American University of Sharjah

Third Place



Project Title

Impacts of Climate Change and Sea Level Rise in the UAE

Student

Aleena Lifiya, Rajaa Nabhan, and Rawan Sabha

University

University of Dubai

DEEP LEARNING CAMP 2023

Our highest-demand event was held again this year, in a new version focusing on Buildings change detection using satellite imagery. The Deep Learning Camp, successfully concluded, offering participants a comprehensive exploration of building change detection techniques through remote sensing and deep learning. Highlights included foundational lessons in remote sensing, an in-depth examination of deep learning and CNN fundamentals, and practical demonstrations on creating new effective models and algorithms for building change detection. Attendees engaged in hands-on exercises, including labeling custom datasets and connected with a diverse community of technology and environmental enthusiasts. The camp exceeded expectations, equipping participants with valuable skills and fostering a network of innovation.

WEBINARS OF 2023

1. **Earth Observation Data to Serve Humanity**
   VIEW RECORDING

2. **The Usage of Cloud Technology in GeoAnalytics**
   VIEW RECORDING

3. **Geospatial Analytics Platform – Space Data Center**
   VIEW RECORDING

4. **The National Space Science and Technology Center**
   VIEW RECORDING

5. **Sharjah Electricity, Water, and Gas Authority – GIS Intelligence System**
   VIEW RECORDING

6. **CNN-based Boundary Detector for Remote-sensing Images**
   VIEW RECORDING

7. **Deep Learning Techniques for Large-Scale Date Palm Tree Mapping from Multiscale Remotely Sensed Data**
   VIEW RECORDING

8. **Elevating Urban Insight: Building Change Detection with KhalifaSat and Deep Learning**
   VIEW RECORDING

PAPER HIGHLIGHT

Spatial and Temporal Inversion of Land Surface Temperature along Coastal Cities in Arid Regions

Authors: Rami Al-Ruzouq[1,2], Abdallah Shanableh[1,2], Mohamad Ali Khalil[2,*], Waleed Zeiada[1,2,3], Khaled Hamad[1,2], Saleh Abu Dabous[1,2], Mohamed Barakat A. Gibril[2,4], Ghadeer Al-Khayyat[2], Kamil E. Kaloush[5], Saeed Al-Mansoori[6], and Ratiranjan Jena[2].

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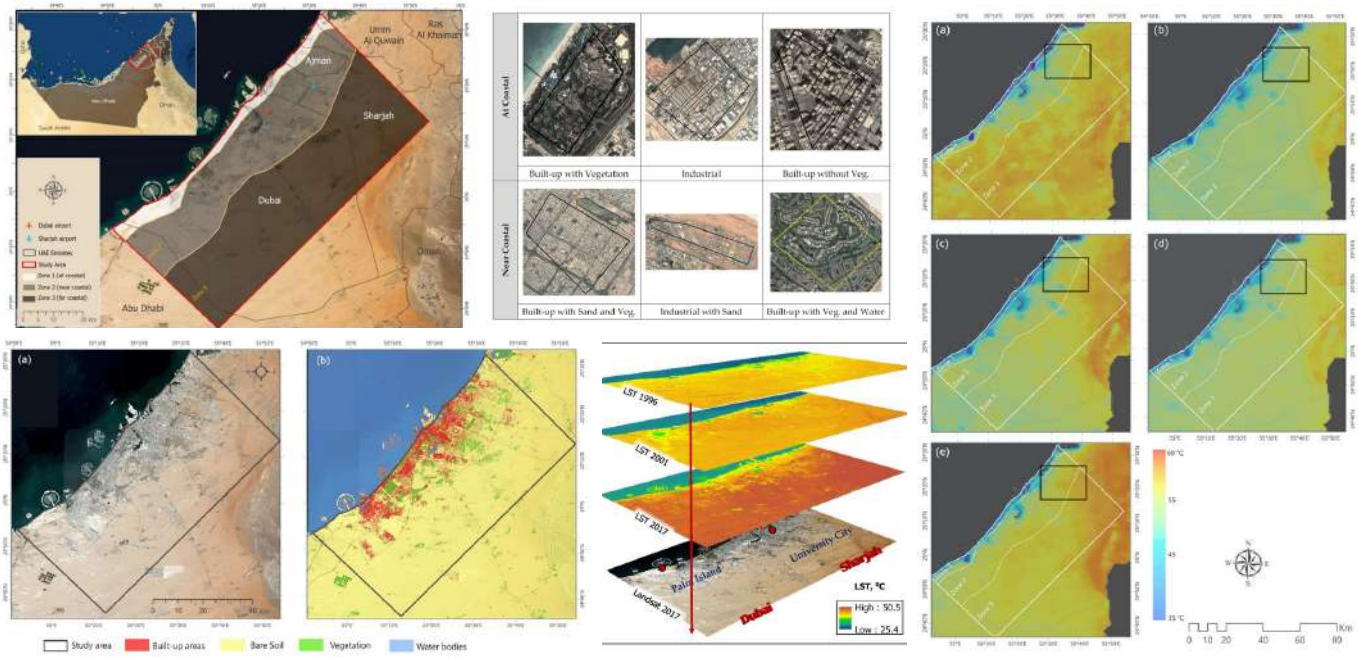
Abstract:

Climate change is undoubtedly affecting the global weather of the Earth. Rapid human civilization has mainly caused this in the last few decades. This research examined the spatial and temporal land surface temperature (LST) in the United Arab Emirates (UAE) coastal cities located in an arid region that faced massive urbanization over the last 50 years. We estimated the LST using by-products of Landsat and MODIS images covering 2000 until 2020. The assessment of LST was performed in two contexts, i.e., spatially and temporally, covering daytime vs. nighttime during the summer and winter seasons. Additionally, a supervised classification technique was adopted to extract the land use and land cover in the study area from the late 1970s until 2018. Unexpectedly, the results indicated that daytime LST in districts near the coastlines (heavily urbanized areas) are lower than the ones far away from the coast (about 9 °C). This observation represents the spatial LST inversion in the study area. Nevertheless, this difference was not observed during nighttime LST temporally, the daytime LST did not increase significantly during either summer or winter seasons. However, the nighttime LST has increased temporally by about 17% since 2000 (the temporal LST inversion). Both LST inversions could be attributed to the uniqueness of the study area, given that bare land desert was replaced by vegetation, high-rise buildings, and industrial activities. Additionally, the wind breeze blowing from the gulf might potentially contribute to cooling the coastal urban area during the daytime. Furthermore, in-depth zonal statistics were conducted to visualize the effect of land use on LST. The study observed that fully built-up areas with vegetation have lower LST than built-up areas without vegetation or a combination of sand and vegetation. The research outcomes are invaluable for decision-makers and researchers in achieving sustainable urban development.



MEMBER INSIGHTS

Remote Sensing from Pixels to Sustainability

In an era characterized by technological marvels, the journey from pixels to sustainability represents a profound exploration of our ability to harness innovation for the greater good. Let us embark on this journey by first understanding the essence of remote sensing. At its core, remote sensing is a technological marvel that allows us to gather information about the Earth's surface without direct physical contact. Satellites, aircraft, and drones equipped with advanced sensors capture data in the form of images or measurements, providing us with a comprehensive view of our planet.

The story begins with pixels, the smallest unit of an image. These pixels, once mere dots on a screen, have evolved into powerful agents of change. Through the lens of remote sensing, each pixel becomes a gateway to understanding our environment in unprecedented detail. The technology has progressed far beyond pixel capture, becoming a linchpin in our collective pursuit of sustainability.

Environmental monitoring stands out as a primary arena where remote sensing plays a transformative role. It grants us a bird's-eye view of the Earth's surface, allowing us to track deforestation, monitor wildlife habitats, and understand the impact of human activities on ecosystems. The aerial perspective afforded by remote sensing offers a panoramic understanding of ecological processes across vast expanses.

In the realm of natural resource management, remote sensing emerges as a guiding light. It enables the monitoring of forest health, assessment of water quality, and tracking of changes in land cover. By leveraging this technology, resource managers can make informed decisions, striking a delicate balance between the exploitation and preservation of critical ecosystems. It is a testament to our ability to use innovation to safeguard the very resources upon which our existence depends.

Consider, too, the crucial role remote sensing plays in disaster response and mitigation. From assessing the extent of damage caused by natural disasters to aiding in search and rescue operations, this technology facilitates rapid and accurate information dissemination. In times of crisis, remote sensing becomes a beacon of hope, minimizing the impact on human lives and the environment.
And then, as we confront the complexities of climate change, remote sensing emerges as an invaluable ally. It provides climate scientists with essential data, enabling the monitoring of temperature changes, sea levels, and variations in ice cover. Armed with this information, we can model climate patterns and predict future scenarios, paving the way for informed strategies to address the challenges of a changing climate.

In conclusion, the evolution of remote sensing from pixels to sustainability is a testament to human ingenuity and our ability to use technology for the betterment of our planet. As we stand at the intersection of innovation and environmental stewardship, let us recognize the profound impact that remote sensing has on our journey towards a more sustainable future. By unlocking the potential of pixels, we pave the way for a world that is not only technologically advanced but also resilient, environmentally conscious, and committed to the well-being of future generations.

Eng. Saeed Al Mansoori
Director of the
Remote Sensing Department
at MBRSC

Saeed Al Mansoori is the Director of the Remote Sensing Department at Mohammed Bin Rashid Space Centre (MBRSC). He is the head of the MBRSC Lab at the University of Dubai. He has received B.Sc. degree in Communication Engineering from Khalifa University of Science, Technology and Research (KUSTAR), Sharjah, UAE in 2010 and the M.Sc. degree in Electrical Engineering from American University of Sharjah (AUS) in 2016. Saeed's research interests include signal and image processing, artificial intelligence, remote sensing, GIS, etc. He is a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE), a Senior Member of the international society for optics and photonics (SPIE) and a Fellow of the Institution of Engineering and Technology (IET). He has authored or co-authored more than 75 papers in international conferences and journals.