Yeshwanth Kumar Adimoolam
Doctoral Researcher

Personal Website: 🌐
LinkedIn: in
Github:
Google Scholar: 🎓

y.adimoolam@cyens.org.cy
ya.kumar@edu.cut.ac.cy
(+91) 9171 991 992
(+357) 94 044 992

SUMMARY

I am presently pursuing doctoral research at the Department of Multimedia and Graphic Arts, Cyprus University of Technology and also working as a Research Associate at the Visual Computing Group, CYENS Centre of Excellence. Working on intuitive solutions for real-world issues has always been a primary source of inspiration for me. My work primarily focuses on developing deep neural network architectures for 3D urban scene understanding, which involves many challenging tasks such as 3D and 2D segmentation, object detection, 3D reconstruction, etc.

WORK EXPERIENCE

Research Associate, Visual Computing Group
CYENS Centre of Excellence
January 2021 to present - 1 year and 5 months

TECHNICAL SKILLS

Languages : *Python, R, Matlab, Javascript, C++, HTML, CSS*

Software : *CloudCompare, LAStools, FARO Scene, ESA SNAP, Open3D, ArcGIS, QGIS, ERDAS Imagine, ENVI*

Database : *PostgreSQL, PostGIS*

Tools/Framework : *Tensorflow(Python), Pytorch, Keras, CUDA, Folium, Point Cloud Library, PDAL, Leaflet, GDAL, etc.*

Instruments/Techniques : *Terrestrial Laser Scanning, LiDAR, Point Cloud Processing, DGPS Survey, GIS Network Analysis, Machine Learning, Neural Networks, FARO Focus S 350, Garmin GPS, Satellite Image classification, Digital Image Processing, etc.*

EDUCATION

Cyprus University of Technology, *Limassol*
Doctor of Philosophy (PhD)*, 3D Scene Understanding
Presently pursuing

Indian Institute of Space Science and Technology, *Thiruvananthapuram*
Master of Technology (M. Tech), Geoinformatics
August, 2020   ***CGPA: 8.49/10.00***

Sri Venkateswaraa College of Technology, *Chennai*
Bachelor of Engineering (B. E.), Civil Engineering(CE)
May, 2017   ***CGPA: 7.79/10.00***

PUBLICATIONS

Yeshwanth Kumar, A., Noufia, M. A., Shahira, K. A., and Ramiya, A. M.: BUILDING INFORMATION MODELLING OF A MULTI STOREY BUILDING USING TERRESTRIAL LASER SCANNER AND VISUALISATION USING POTREE: AN OPEN SOURCE POINT CLOUD RENDERER, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XLII-2/W17, 421–426 https://doi.org/10.5194/isprs-archives-XLII-2-W17-421-2019, 2019.

ACHIEVEMENTS & CERTIFICATION

- **Qualified the national level Graduate Aptitude Test in Engineering (GATE) 2018 in Civil Engineering with a 90.56 percentile** by the National Coordination Board (NCB)-GATE, Department of Higher Education, Ministry of Human Resource Development (MHRD), Government of India.
  This allowed me to avail the MHRD scholarship throughout the duration of my Master of Technology degree.
  Scorecard earned on March 17, 2018 and valid up to March 16, 2021

- **Neural Networks and Deep Learning** by deeplearning.ai on *Coursera*.
  Certificate earned at Sunday, March 3, 2019 4:13 PM GMT
  Verify : *https://www.coursera.org/account/accomplishments/certificate/GYKQ2WMC8APK*

- **Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization** by deeplearning.ai on *Coursera*
  Ongoing

- **Secured highest GPA in 5 out of 8 semesters** among my class during my Bachelor's degree.

MASTER'S THESIS

Estimation of Above Ground Biomass for Indian Mangrove Forests from Terrestrial LiDAR data and high resolution satellite imagery using deep learning techniques.   (July 2020)

The primary objective of this study was to make accurate estimates of the biomass of mangrove forests in India. For this study, point cloud data acquired from a terrestrial laser scanner (TLS) was processed and analysed using machine learning techniques to estimate the volume of an individual tree along with its shape parameters (DBH, height, branching, etc). This study also involved using a breadth-first search segmentation approach to detect the number of pneumatophores in a forest plot. The outcomes of this study are:

i A machine learning pipeline to accurately estimate the above-ground biomass of an individual tree by generating a quantitative structure model from terrestrial laser point cloud data.

ii A pipeline to segment individual trees in a plot level TLS point cloud and estimate the above-ground biomass of forest plots as a sum of the AGB of individual trees and the AGB due to pneumatophores.

- **Technology/Tools:** ArcGIS, QGIS, LAStools, Cloudcompare, Python, ENVI, ERDAS Imagine 2018, etc.

BACHELOR'S THESIS

Experimental Investigations on Partial Replacement of Cement by Marble Powder in Hooked End Steel Fibre Reinforced Concrete cured using Magnetised Water (April 2017)

This project dealt with investigating the viability of using marble powder as a partial substitute for Ordinary Portland Cement (OPC) in concrete thereby reducing the demand and hence production of OPC. The manufacture of OPC is a process that has great environmental implications. This project aimed at finding alternate solutions to OPC which in turn would potentially reduce the environmental impact of the overall OPC manufacturing industry. At the end of the project, the following outcomes were realised:

i The partially replaced cement concrete was able to retain compressive strength of up to 40% of cement replacement.

ii At 10% replacement of cement with marble powder the compressive strength increased from 22 MPa to 40MPa.

- **Technology/Tools:** AutoCAD, Universal Testing Machine, Los Angeles Abrasion Testing Machine, etc..

PAST PROJECTS

Outreach Project: Estimation of Cultivated/Cultivable Area from Sentinel-2 Imagery using the Multi Layer Perceptron Algorithm for the Kanjirappuzha Irrigation Project of Kerala (June 2019)

The objective of this project was to calculate the ayacut area (cultivated and cultivable plots) in the command region of the Kanjirappuzha Irrigation Project in order to devise a plan to irrigate these plots. This project was part of an Outreach Programme to reach out to government institutes and offices. This project was carried out in coordination with the Irrigation Design and Research Board of the Irrigation Department, Government of Kerala. The work was successfully completed to the requirement and submitted.

A report of this work can be found here: http://dx.doi.org/10.13140/RG.2.2.10734.64326
- **Technology/Tools:** Python 3, ERDAS Imagine 2018, ENVI 5.3, ESA SNAP Toolbox - Sen2Cor plugin, ArcGIS, GDAL, scikit-learn

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Course Project: Land Use / Land Cover Classification of a Multi-spectral Satellite Image (Sentinel 2) using the Multi Layer Perceptron Algorithm (May 2019)

The purpose of this project was to implement the multi layer perceptron algorithm to perform a simple pixel based land use/land cover classification of the Chennai city region using Sentinel 2 multispectral imagery. This was carried out in Python and using other software tools (open source and proprietary).
- **Technology/Tools:** Python 3, ERDAS Imagine 2018, ENVI 5.3, FLAASH, ArcGIS, GDAL, scikit-learn

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Course Project: Building Information Modelling and 3D Digital Documentation of the IIST Library using Terrestrial LiDAR Scans

(Apr 2019)

In this project, it was required to perform Building Information Modelling of the IIST Library and make a 3D digital document which could be published in the web and accessed by anyone. This was carried out using terrestrial LiDAR surveys and open source point cloud processing software. It required a total of 54 scan stations to fully encompass the library (interior and exterior) and the resultant point cloud had a total of 87,789,548 points.
- **Technology/Tools:** FARO Focus 350 Terrestrial Laser Scanner, FARO Scene (Registration Software), CloudCompare, LAStools, Potree

- **Demo:** `https://youtu.be/fBwMUnGnPR0`

Course Project: Generation of a Dense Point Cloud and 3D Model of the IIST Vyom Rocket Replica using the Structure from Motion Technique (SfM) (Nov 2018)

In this project, RGB images obtained from a simple smartphone camera were used to generate a dense point cloud of the IIST Vyom Rocket Replica. This was in turn used to generate a textured mesh and 3D model of the same object using open source point cloud processing and mesh generation tool-kits.
- **Technology/Tools:** VisualSFM, COLMAP, Meshlab

ADDITIONAL ACTIVITIES

• Conducted an Awareness Programme regarding space sciences, technologies and research to government school students of classes XI and XII with an intent of encouraging them to pursue space sciences and research as a viable career option. The programmes were carried out at the following schools:
1. Dr. Ambedkar Govt. Hr. Sec. School, Egmore, Chennai-600008
2. Presidency Girls Hr. Sec. School, Egmore, Chennai-600008

REFERENCES

1. **Melinos Averkiou**
   MRG Leader, Visual Computing Group, CYENS CoE
   Contact: https://melinos.github.io/

2. **Charalambos Poullis**
   Associate Professor, Dept. of Computer Science and Software Engineering, Concordia University
   Contact: https://poullis.org/

3. **Andreas Lanitis**
   Professor, Dept. of Multimedia and Graphic Arts, Cyprus University of Technology
   Contact: https://www.cut.ac.cy/faculties/aac/mga/staff/elected-staff/andreas.lanitis/?languageId=1