Soumyaratna Debnath

Second Year Postgraduate (MTech Work & Study)
Department of Computer Science and Engineering
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Research Interests

Rendering based optimization and 3D shape analysis.
Broad areas: Computer Vision | Deep Learning | Computer Graphics | Meta-Heuristics

Educational Qualification

Degree	Institution	CPI / CGPA	Year
M.Tech W&S (CSE)	IIT Gandhinagar, Gandhinagar, Gujarat, India	9.25 / 10	2022-2025
B.Tech (CSE)	CGEC, Coochbehar, West Bengal, India	9.34 / 10	2018-2022
Class XII (CBSE Board)	APS Binnaguri, Binnaguri, West Bengal India	92.6 %	2018
Class X (CBSE Board)	APS Binnaguri, Binnaguri, West Bengal India	10 / 10	2016

Experiences

1. **Software Developer at IMS, IIT Gandhinagar** **Aug 2022 - Feb 2024**
   Developed and maintained modules of the Institute Management System (IMS), an ERP solution for IITGN to streamline operations across departments and facilities. Worked with Angular, DotNET, C# and MS-SQL
2. **Research Intern, Department of CSE, CGEC, West Bengal** **Sept 2020 – Feb 2022**
   Conducted research on meta-heuristics-based optimization for multi-level color image segmentation. Explored image processing for theme modulation and image-based steganography.

Publications

1. **ScribGen: Generating Scribble Art through Meta-heuristics**
   Under proceedings of International Conference on Pattern Recognition 2024
   Soumyaratna Debnath*, Ashish Tiwari and Shanmuganathan Raman*.
2. **CottonDAD: Cotton Data Analysis Dataset**
   Under proceedings of Neural Information Processing Systems (NeurIPS) 2024
   Mahek Vyas, ***Soumyaratna Debnath****, Akbar Ali, Jaidev Khalane, Reuben Devanesan, Prakram Rathore, Subramanian Sankaranarayanan, Pankaj Khanna, Shanmuganathan Raman*
3. **STEP: Simultaneous Tracking and Estimation of Pose for Humans and Animals**
   Under proceedings of Neural Information Processing Systems (NeurIPS) 2024
   Shashikant Verma, Harish Khatti, ***Soumyaratna Debnath****, Yamuna Swami and Shanmuganathan Raman*.
4. **A New Modified Red Deer Algorithm for Multi-level Image Thresholding**
   Published in 2020 Fifth International Conference on Research in Computational Intelligence and Communication Networks.
   Sourav De, Sandip Dey, ***Soumyaratna Debnath****, Abhirup Deb*
5. **Multilevel Image Segmentation Using Modified Red Deer Algorithm**
   Published in 2021 11th International Conference on Cloud Computing, Data Science & Engineering.
   Sandip Dey, Sourav De, Abhirup Deb, ***Soumyaratna Debnath***
6. **Modified Harris Hawk Optimization Algorithm for Multi-level Image Thresholding**
   Published as a Chapter in Hybrid Computational Intelligent Systems
   Soumyaratna Debnath*, Abhirup Deb, Sourav De, Sandip Dey*

Projects

1. **Analysis of Cotton Crop Fields using Aerial Imagery –** Utilized drone-captured images to monitor and analyze cotton crops in the agricultural fields. Implemented modules for cotton crop detection, segmentation, and cotton buds counting. Applied low-light enhancement, deblurring, and super-resolution to improve image clarity and utility. Designed and implemented an UI based web application to facilitate seamless interaction and data access.
2. **Tracking and Pose Estimation of Primates –** Developed a transformer-based architecture for tracking and estimating primate poses, enhancing real-time analysis and understanding of their movements for advanced wildlife monitoring and behavioral studies.
3. **ScribGen –** The project involved designing meta-heuristics algorithms that could interpret and transform simple inputs into complex, aesthetically pleasing scribble artworks.
4. **Augmented Reality based Product Catalog –** Developed an AR-based Android application that displays 3D models of furniture directly above the physical catalog, enabling users to visualize items in realistic detail and scale for enhanced decision-making.
5. **Picrypt It! –** Web based application designed to embed password-protected text within color images, utilizing encryption techniques such as Vernam Cipher and Playfair Cipher.

Achievements

1. Granted a copyright for “Picrypt It” for proposing a method for inscribing color images with password-protected texts.
2. Granted a copyright for “CameraSHOT” for proposing a method for image processing-based image theme modulation.
3. Qualified GATE 2021 (92.8 percentile) and GATE 2022 (96.11 percentile)
4. Secured third position in “Code Meets Art” competition (2024) organized by Dept of CSE, IIT Gandhinagar.
5. Selected as finalists in NanoArtography 2023, an internationally acclaimed science image competition, organized by Anasori Lab at Purdue University.
6. Awarded with Chairman Medal of Excellence (APS Binnaguri – 2018)