NARASARAOPETA ENGINEERING COLLEGE (AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

2024-2025

Batch Number	BG-9
Team Members	P.Rishitha Sai Sri (22471A05C2) N.Mohana Sri Krupa (22471A05B0) R.Lakshmi (22471A05C5)
Guide	M.Sampath Kumar (Assistant Professor)
Title	**Deep Classification of Microplastics Through Image Fusion Techniques**
Domain/Technology	DEEP LEARNING
Base Paper Link	**https://link.springer.com/chapter/10.1007/978-3-031-43153-1_11**
Dataset Link	**https://github.com/beppe2hd/HMPD/tree/main**
Software Requirements	Browser: Any latest browser like Chrome Operating System: Windows 7 Server or later Python (COLAB)
Hardware Requirements	SystemType: Intel Core i5 or above RAM: 8 GB Number of cores:5 Number of Threads: 4

Abstract	Microplastics are a major source of water pollution, and their accurate identification is crucial for environmental monitoring. This study proposes a deep learning-based classification method using a novel image fusion technique that combines amplitude and phase images obtained through digital holography. The fused images, represented in HSL color space, are used to train state-of-the-art neural networks, including Vision Transformers. Experiments conducted on the Holography Micro-Plastic Dataset (HMPD) show improved classification accuracy compared to traditional methods, achieving up to 94.2% accuracy and 0.99 AUC. This approach offers a robust and efficient solution for automated microplastic detection.

Signature of the student(s) **Signature of the Guide** **Signature of the project coordinator**