

# **3D Computer Vision**

**P. Sinha, F. Saikh, N. Ansari**

Shri G.P.M. Degree College of Science and Commerce, Andheri, Mumbai, Maharashtra

**Abstract:** *3D computer vision is a multidisciplinary field at the intersection of computer science, mathematics, and image processing, dedicated to the task of extracting three-dimensional information from two-dimensional image data. It plays a pivotal role in enabling machines to understand and interact with the three-dimensional world, mirroring the human ability to perceive depth and spatial relationships.*

*This abstract summarizes the key facets and challenges of 3D computer vision. It outlines the fundamental processes involved, such as image acquisition, feature extraction, camera calibration, and 3D reconstruction. Furthermore, it delves into the various applications spanning diverse domains like robotics, augmented reality, autonomous navigation, and medical imaging.*

*The challenges inherent to 3D computer vision are multifaceted. They encompass issues related to sensor limitations, occlusions, lighting conditions, and the need for robust algorithms that can handle real-world variability. Recent advancements in deep learning have revolutionized the field, enabling the development of sophisticated neural networks for tasks like object detection, pose estimation, and scene understanding.*

*As the demand for 3D understanding in machines continues to grow, this abstract concludes by emphasizing the importance of ongoing research in areas such as multi-modal fusion, semantic 3D scene analysis, and efficient real-time processing. These advances hold the promise of enhancing our machines' ability to perceive and interact with the three-dimensional world, paving the way for innovative applications across numerous domains.*

**Keywords:** 3D computer vision