

(54) Title of the invention : AUTOMATED ROAD EXTRACTION FROM HIGH-RESOLUTION SATELLITE IMAGES USING SEGMENTATION TECHNIQUES

<p>(51) International classification :G06T0007130000, G06T0005000000, G06T0007000000, G06T0007155000, G06T0007181000</p> <p>(86) International Application No :NA Filing Date :NA</p> <p>(87) International Publication No : NA</p> <p>(61) Patent of Addition to Application Number :NA Filing Date :NA</p> <p>(62) Divisional to Application Number :NA Filing Date :NA</p>	<p>(71)Name of Applicant :  <b>1)Mr.PV Ramana Murthy</b>  Address of Applicant :Assistant Professor, Computer science Engineering Dept., Malla Reddy Engineering College, Maisammaguda (Post. Via. Kompally), Medchal-Malkajgiri-500100. Maisammaguda -----  <b>2)Malla Reddy Engineering College</b>  Name of Applicant : NA  Address of Applicant : NA  (72)Name of Inventor :  <b>1)Mr.PV Ramana Murthy</b>  Address of Applicant :Assistant Professor, Computer science Engineering Dept., Malla Reddy Engineering College, Maisammaguda (Post. Via. Kompally), Medchal-Malkajgiri-500100. Maisammaguda -----  <b>2)Dr. Y.L. Malathi Latha</b>  Address of Applicant :Associate Professor, Dept. of Information Technology, Stanley college of Engineering &amp; Technology for Women, chapel Road, Nampally, Hyderabad- 500001. Nampally -----  <b>3)Mr.P. Srikanth</b>  Address of Applicant :Assistant Professor, Computer Science Engineering Dept., Malla Reddy Engineering College, Maisammaguda (Post. Via. Kompally), Mechal-Malkajgiri-500100. Maisammaguda -----  <b>4)Dr. S. Sandhya rani</b>  Address of Applicant :Associate Professor, Computer Science Engineering Dept., Malla Reddy Engineering College, Maisammaguda (Post. Via. Kompally), Mechal-Malkajgiri-500100. Maisammaguda -----  <b>5)Dr Arun Kumar Kandra</b>  Address of Applicant :Professor, Computer Science Engineering Dept., Malla Reddy Engineering College, Maisammaguda (Post. Via. Kompally), Mechal-Malkajgiri-500100. Maisammaguda -----  <b>6)Mr. K. Mani Raju</b>  Address of Applicant :Assistant Professor, Computer science Engineering Dept., Malla Reddy Engineering College, Maisammaguda (Post. Via. Kompally), Mechal-Malkajgiri-500100. Maisammaguda -----  <b>7)Ms. Aenugu Rasagnya</b>  Address of Applicant :Assistant Professor, Computer Science Engineering Dept., Malla Reddy Engineering College, Maisammaguda (Post. Via. Kompally), Mechal-Malkajgiri-500100. Maisammaguda -----  <b>8)Ms. Ganeswari Bodana</b>  Address of Applicant :Assistant Professor, Computer Science Engineering Dept., Malla Reddy Engineering College, Maisammaguda (Post. Via. Kompally), Mechal-Malkajgiri-500100. Maisammaguda -----  <b>9)Ms. Nagma Begum</b>  Address of Applicant :Assistant Professor, Computer Science Engineering Dept., Malla Reddy Engineering College, Maisammaguda (Post. Via. Kompally), Mechal-Malkajgiri-500100. Maisammaguda -----  <b>10)Ms Gattupalli Priyanka</b>  Address of Applicant :Assistant Professor, Computer Science Engineering Dept., Malla Reddy Engineering College, Maisammaguda (Post. Via. Kompally), Mechal-Malkajgiri-500100. Maisammaguda -----</p>
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(57) Abstract :  
Our proposed solution introduces a comprehensive and innovative automated road extraction system that addresses the complex task of identifying urban road features within high-resolution satellite images. By seamlessly integrating a series of advanced techniques, the proposed solution achieves a level of precision and efficiency previously unattainable. At the core of this novel framework lies a hypergraph-based pre-processing technique, meticulously designed to enhance image quality by eliminating noise and rectifying geometric distortions. This preparatory step sets the stage for subsequent stages, ensuring a robust foundation for accurate feature extraction. Our solution's unique prowess emerges from the fusion of the Canny edge detection algorithm with hypergraph integration. This amalgamation not only identifies edges exhibiting rapid changes in image intensity but also leverages hypergraph's intricate pixel relationships to enhance edge detection accuracy. The outcome is a robust edge detection process, forming a cornerstone for precise and comprehensive feature segmentation. Moving beyond edge detection, the proposed solution capitalizes on the power of the Hough Transform method for line extraction. This technique adeptly identifies linear line segments within detected edges, effortlessly accounting for variations in orientation and position. The method's adaptability enhances the system's capacity to accurately recognize straight road segments, elevating the overall fidelity of road feature extraction. An exemplary innovation of the proposed solution is the Progressive Probabilistic Hough Transform (PPHT), designed to address the critical task of parallel line extraction. This technique revolutionizes the identification of parallel road structures, a paramount consideration in urban environments. By accommodating gaps within predefined thresholds, PPHT excels at comprehensively identifying parallel road features, thereby bolstering the system's effectiveness in intricate urban settings. Moreover, the proposed solution presents a dedicated centerline extraction algorithm, serving as a refined culmination of the edge detection and line extraction stages. This algorithm exhibits precision in extracting road centerlines, offering a clear and concise representation of road features within complex urban landscapes.

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