ABSTRACT

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Thesis title: **Analysis of left-turning motorbikes trajectories at traffic intersections**

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Motorbikes share a significant proportion of traffic in India. These are crucial for personal mobility, offering agility, compactness and efficiency, which makes them the preferred mode of transportation. This can be evident through the motorbike sales in India which vastly outnumber those of passenger cars. Despite their prevalence, there remain a significant gap in understanding motorbike dynamics in a traffic stream, especially during turning movements. This study used Closed Circuit Television Camera (CCTV) footage collected from Indian traffic intesections to understand turning behavior of motorbike users. This involved detection and tracking to extract the motorbike trajectories and classified into left, through and right movements with a focus on left-turning trajectories due to their relative isolation from other traffic flows. The analysis revealed that the motorbikes tend to move closer to mid-lane and are susceptible to crossing the lane marking. They shift towards the boundary as they move towards the intersection. Both Euler curves and the two-parameter spiral curve were fitted to trajectories, with latter providing more flexibility but an entirely satisfactory fit. Further analysis identified turn radius as a significant predictor of maximum curvature, indicating that a larger turn radius

results in lower maximum curvatures and wider turns. No significant relationship found between maximum curvature with average entry speed and average turning speed. The study findings enhance the understanding of motorbike behaviour during left turns, providing insights for safer infrastructure design, improved traffic management strategies, and the development of advanced driver assistance systems tailored for motorbikes.