

## ABSTRACT

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*In the field of road safety engineering, the use of LiDAR (Light Detection and Ranging) technology has attracted much attention due to its potential in determining safe head impact distances in automobile collisions. This article discusses the application of a LiDAR system specifically aimed at determining the safe distance between the head and potential impact surfaces in the event of a collision, thereby reducing the risk of head trauma. Through an in-depth review of relevant literature and real case studies, the ability of LiDAR technology to accurately measure distances and detect potential impact hazards in the vehicle environment will be investigated. By analyzing real collision scenarios and performing simulations, the effectiveness of LiDAR-based approaches in predicting the severity of head impacts and designing safety systems that minimize the risk of injury will be highlighted. In addition, this research also addresses the challenges associated with LiDAR data processing, integration into vehicle safety systems, and regulatory considerations for widespread adoption. The findings of this research help to better understand the role of LiDAR technology in improving vehicle safety standards, with a particular focus on preventing head injuries and creating safer roadway environments.*

*Keywords: LiDAR, System Design, Impact, integrated*