PedGUARD: Pedestrian's Guiding Utility - Avoid Road Danger

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While the widespread use of mobile devices has brought convenience in many aspects, it has also caused an increase in the number of traffic accidents due to pedestrians preoccupied with their smartphone devices. According to the Ministry of Land, Infrastructure, and Transport, the percentage of pedestrian deaths from traffic accidents in South Korea is twice that of OECD countries and 62% of pedestrian accidents are caused by lack of attention and spatial awareness of pedestrians often referred to as "smombies." Smombies face 56% reduced range of vision and are 15% less likely to heed attention to what is in front. Previous studies have focused on alerting users of any incoming dangers when crossing the road. Yet objects such as manholes, construction sites, and fences on a sidewalk may pose a greater threat to the pedestrians. Such dangers are not limited merely to pedestrians, but also to the visually impaired and those lacking spatial awareness. Hazards with negligible height, including a non-embeddable manhole and construction sites, may cause greater danger to the mobility handicapped. To ensure not only the safety of "smombies" but also that of the mobility handicapped including the blind and the elderly, this research proposes PedGUARD: Pedestrian’s Guiding Utility – Avoid Road Danger based on a convolutional neural network-based model to detect hazards on the streets using low-performance mobile devices in a real-time environment.

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