Smart Vision: A Virtual Model for Assisting the Visually Impaired

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Abstract: *Globally, millions face challenges in independent navigation and environmental interaction due to visual impairments. Existing solutions provide basic navigation support but lack a comprehensive approach integrating real- time object detection, crowd analysis, weather updates, and currency recognition. This paper presents Smart Vision — a virtual model that simulates an all-in-one assistive solution for visually impaired users. By using computer vision, deep learning, and audio feedback systems, Smart Vision enhances environmental awareness through real-time analysis and intuitive output. The system employs YOLOv5 for object detection, lightweight CNN models for currency recognition, and IoT-based simulated data for weather analysis. The virtual model allows for cost-effective, hardware-independent development and iterative testing, forming a strong foundation for future wearable assistive devices. The project demonstrates the potential of technology to improve safety, autonomy, and quality of life for visually impaired individuals.*

Keywords: Smart Vision, Assistive Technology, Object Detection, Crowd Estimation, Currency Recognition, Virtual Model, Visually Impaired Assistance