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Digi-Buddy: A Smart Cane with Artificial Intelligence and Real-Time Assistance

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Abstract : Vision is considered as the most important sense in humans, without which leading a normal can be often difficult. There are many existing smart canes for visually impaired with obstacle detection using ultrasonic transducer to help them navigate. Though the basic smart cane increases the safety of the users, it does not help in filling the void of visual loss. This paper introduces the concept of Digi-Buddy which is an evolved smart cane for visually impaired. The cane consists for several modules, apart from the basic obstacle detection features; the Digi-Buddy assists the user by capturing video/images and streams them to the server using a wide-angled camera, which then detects the objects using Deep Convolutional Neural Network. In addition to determining what the particular image/object is, the distance of the object is assessed by the ultrasonic transducer. The sound generation application, modelled with the help of Natural Language Processing is used to convert the processed images/object into audio. The object detected is signified by its name which is transmitted to the user with the help of Bluetooth hear phones. The object detection is extended to facial recognition which maps the faces of the person the user meets in the database of face images and alerts the user about the person. One of other crucial function consists of an automatic-intimation-alarm which is triggered when the user is in an emergency. If the user recovers within a set time, a button is provisioned in the cane to stop the alarm. Else an automatic intimation is sent to friends and family about the whereabouts of the user using GPS. In addition to safety and security by the existing smart canes, the proposed concept devices to be implemented as a prototype helping visually-impaired visualize their surroundings through audio more in an amicable way.

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