NeoEyes: Smart Glasses for the Blind Based on Vietnamese Character Recognition System

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It goes without saying that the blind are in serious need of getting information by studying and working independently. Despite a vast array of state-of-the-art devices such as Braille books and reading machines, there is still a limit to the amount of available supporting equipment with flexible and more comfortable applicability to Vietnamese language offered at a reasonable price. The objective of this project is to develop practical and smart glasses for visually impaired users based on an integrated recognition system of Vietnamese diacritical characters. The glasses are composed of a movable camera which captures and transfers the text images to a smartphone. The data is then analyzed and processed by a system which has the ability to recognize text and deliver audio. For enhancing image quality, selected filtering methods in pre-processing and post-processing are used. To measure distance and adjust brightness, a proximity sensor and a light sensor are integrated in the device. The recognition system is developed based on the combination of Google Vision API and Tesseract OCR. This unique solution optimizes the speed and the quality of Vietnamese characters recognition. The prototype when tested in normal conditions reached an accuracy rate of 89%. The project's products have already been used in training courses for visually impaired students and got considerably positive feedbacks. Hence, it is intended that the prototype will be technologically transferred to the national non-profit project for the Vietnamese visually impaired community.