



Design and Development of a Smart Pen for Dyslexics

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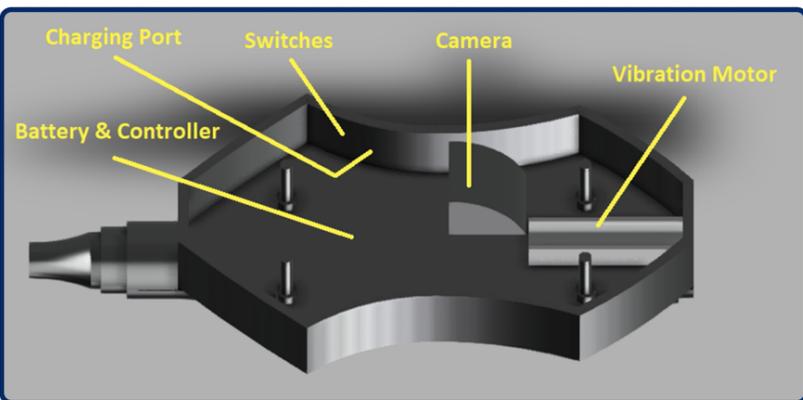
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Abstract

Dyslexia, -'the Gifted Brain' with 'the 'different learning style' feel difficult to cope up with normal reading and writing. The proposed smart pen aims to bring out their hidden intelligence by making them learn in an alternative manner via an integrated GPU based expert system. The deep learning GPU processor builds a semantic network of texts based on Artificial Neural Network. The GPU processor does mapping between input and hidden layers to generate output layers of combinations of texts. The texts written are recognized as 3D vectors, converted to 2D vectors, generate trigonometric ratios and these input parameters are forwarded to the expert system. The GPU processor executes a deep learning network through the artificial neurons, the perceptrons built by the semantic network. The supervised machine learning algorithm, the Support Vector Machine, classifies the text into semantic and non semantic use cases based on the margin classifier. The Smart Pen communicates with GPU, vibrator, WiFi module and it encloses battery, refill.



Novelty

- The Smart Pen combines features of vibration and correction of errors in writing.
- Recognition of different handwriting styles.
- Semantic knowledge based network built on artificial neural network.
- Communication with GPU server.

Outcomes

- Develop a real time Expert System using CNN (Convolutional Neural Network) algorithm.
- Develop a Semantic knowledge based system using SVM (Support Vector Machine) for spell check.
- Design a Smart Pen as an assistive system for dyslexics.

Methodology & Systems Approach Adopted

The misspelt handwritten text is compared with the actual texts by mapping the input and hidden layers of artificial neural network. They are classified as semantic or non-semantic based on the knowledge engineering process. In case of any errors, the non-semantic text creates an alarm by the vibrator module. After evaluating the training data sets, the testing data sets of combination of the words in dictionary are generated. For retrieval of images, the image is annotated and letters are matched with images stored in the database (JSON format) by Content Based Image Retrieval (CBIR). WiFi module is integrated for wireless interaction with the display unit.



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