Deep Neural networks for image/data/video recognition and classification

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Description:

Integration of sensors (e.g., microphones or camera) with quick decision on-the-fly leads to many appealing applications in new generation embedded devices and systems. Example applications are in image/video recognition, identification, tagging, navigations, etc. Simply, such devices would assist the user with instant essential information from staggering images and/or data. Successful and streamlined designs of deep neural networks have demonstrated appealing capabilities, in particular image recognition and classification. Powerful capabilities can be tailored for the available processing resources (e.g., The Nvidia Jetson TX2 GPU development kit) or onto embedded low power co-processing FPGAs (e.g. xilinx's Zynq). This would provide local (& portable) capabilities for the smart device/phones-- off the cloud-- with added benefits of speedups and device security.

The Circuits, Systems, And Neural Networks (CSANN) lab at MSU will serve as a sponsor on this project. The lab will assist and can provide materials/models in Python and associated libraries and data for modular systems of neural networks as well as hardware platforms. Your team's task is to efficiently implement these models onto the smart device or on an attached embedded platform (e.g., attached custom pcb-board with power and communication via the usb i/o). The final project will include demos of the accuracy performance in recognition and classification of the device captured images and/or sounds. The team's project outcomes will be judged on their ability to satisfy several competing performance metrics: (i) classification or prediction (accuracy) performance, (ii) execution speed, (iii) added power consumption expense.