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VI. Machine Learning techniques to build a cost-effective framework for fault-tolerant training of RRAM based neural computing systems.

An RRAM-based computing system (RCS) is widely used in neuromorphic computing systems due to its fast computation and low cost. However immature fabrication processes cause a high rate of hard faults. Also, the limited endurance of RRAMs restricts the life

of RCS. We are using Machine Learning techniques to build a cost-effective framework for fault-tolerant training of RRAM based neural computing systems.

Physical design flow is an extremely time-consuming process when it comes to optimizing the designs. Due to multiple back and forth within the flow makes it a heavily time-consuming process and increases the turn around time of the final product. We are using ML and AI to reduce the turn around time and the cost. [Funding Acknowledgment – DRDO ERIPR Project]



Reforming Video Analytics
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In recent years, the amount of visual data in the computer vision community is proliferating due to the reducing size and increasing reach of sensors. The understanding and analysis of visual data is hence indispensable to solve various computer vision tasks. We, VIGIL group at IIT Hyderabad, focus on cutting-edge visual understanding tasks includes surveillance video analytics for smart cities, fine-grained action recognition, spontaneous facial expression recognition, scalable and distributed methods for large scale visual computing, remote imagery analysis on satellite and radar data, a semantic description of video activities, autonomous vehicle technology, weather forecasting using a live camera, radar and satellite data, content-driven advertisement insertion, as well as anomaly detection in fine-grained actions. We focus on solving various computer

vision tasks by constructing a semantically meaningful representation of videos. Our recent collaborations have included projects with OPPO India to address video blurring and de-duplication of images, as well as with Weathernews, Japan, to address the problem of precipitation now-casting by analyzing weather and road scenes. We have harvested datasets such as SkyEye, IITH-accident database (IITH-AD), and IITH-1 to investigate road user's collision behaviors. SkyEye dataset was introduced to detect collision prone vehicle behavior at intersections and contains 1 hour of continuous aerial footage from 4 major intersections in the city of Ahmedabad in India. IITH-AD and IITH-1 are captured from surveillance videos to investigate road traffic accidents. Our research has resulted in direct application and deployment in real-world applications, as well as publications at top-tier venues of high impact.