Parul Pandey

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Education

Rutgers University — **New Brunswick, NJ**
Ph.D., Electrical and Computer Engineering — *Aug. 2011–Nov. 2018*
Thesis: Enabling computationally-intensive applications on resource-constrained platforms via approximation

University of Utah — **Salt Lake City, Utah**
MS, Electrical and Computer Engineering — *Aug. 2009–May 2011*

Research Projects

Adaptive algorithm selection for computer vision applications — *May 2016–Present*

- Designed ApproxDroid a Markov decision based framework *[Python]* to select the best object detection algorithm-parameter combination based on the nature of input data in an incoming video.
- Demonstrated decrease in execution time of detection application by 20%-70% with an accuracy loss of 0%-2% in comparison to existing works on public datasets.
- Application in speeding up computer vision techniques running on resource-limited autonomous systems *[Robots/Drones/Raspberry Pi]*.

Accelerating computer vision applications via approximation — *Sep 2014–Nov 2015*

- Developed approximation-based novel techniques to reduce execution time of computationally-intensive computer vision applications on resource-constrained Android mobile devices with nominal loss in accuracy.
- Developed a novel workflow representation scheme to represent approximated tasks in an application and a light-weight algorithm *[Java]* to select approximated tasks that meet application deadline or battery requirements.
- Demonstrated a decrease of up to 40% in execution time for 5% loss in accuracy for image processing (Canny edge detection) and feature extraction (Histogram of Gradient and Scale-invariant Feature Transform) techniques.

Energy Efficient Dictionary Learning — *May 2014–Aug 2014*

- Implemented a middleware *[Java]* to reduce latency and energy consumption of applications running on a mobile device by using computational capability of other mobile/static devices in the proximity.
- Implemented a resource-to-task mapper for a distributed framework *[Android AllJoyn IoT Framework]* to offload tasks from a device with limited computational capability to other devices in vicinity in a round-robin fashion.

Accelerating mobile applications via distributed computing — *May 2014–Aug 2014*

- Implemented a middleware *[Java]* to reduce latency and energy consumption of applications running on a mobile device by using computational capability of other mobile/static devices in the proximity.
- Implemented a resource-to-task mapper for a distributed framework *[Android AllJoyn IoT Framework]* to offload tasks from a device with limited computational capability to other devices in vicinity in a round-robin fashion.

Technical Skills

Languages: MATLAB, Python, Java, C/C++ **Platform**: Raspberry Pi, Android, Windows, Linux
Libraries: OpenCV, VLFeat, NumPy, SciPy, Scikit-learn, TensorFlow, Git

Selected Publications (Click here for complete list)

- **P. Pandey**, Q. He, D. Pompili, and R. Tron, "Light-weight Object Detection and Decision Making via Approximate Computing in Resource-constrained Mobile Robots", in *Proc. of IEEE International Conference on Intelligent Robots and Systems (IROS)*, 2018.
- **P. Pandey**, M. Rahmati, D. Pompili, and W. Bajwa, "Robust Distributed Dictionary Learning for In-network Image Compression," in *Proc. of IEEE International Conference on Autonomic Computing (ICAC)*, 2018.
- **P. Pandey** and D. Pompili, "MobiDiC: Exploiting the Untapped Potential of Mobile Distributed Computing via Approximation," in *Proc. of IEEE Pervasive Computing and Communications Conference (PerCom)*, 2016.
- H. Viswanathan, **P. Pandey**, and D. Pompili, "Maestro: Orchestrating Concurrent Workflows Execution in Mobile Device Clouds", in *Proc. of IEEE International Conference on Autonomic Computing (ICAC)*, 2016.

Awards

- *Best Paper Award* at IEEE Wireless On-demand Network Systems & Services (WONS), 2017.
- *Best Application Paper Award* at IEEE Transactions on Automation Science and Engineering (T-ASE), 2016.
- Grace Hopper Celebration Scholar, 2014 and Rutgers *ECE Research Excellence* Award, 2013.