Arulkumar S, M.S

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Education

Jul 2015 –	M.S & PhD (Computer Science and Engineering - CGPA: 9.30*) in Machine Learning and Computer Vision Indian Institute of Technology Madras
Aug 2006 – Apr 2010	B.E., (Computer Science and Engineering - CGPA: 9.02) Coimbatore Institute of Technology, Anna university
Jul 2005 – Apr 2006	12th Standard School Education (Percentage: 92.42%) Gandhiji Government Higher Secondary School, Sokkampalayam
Jul 2003 – Apr 2004	10th Standard School Education (Percentage: 95.6%) Gandhiji Government Higher Secondary School, Sokkampalayam

Employment History

May 2010 – Jul 2015 — Senior Software Engineer, Automotive Domain (Passive Safety - Airbags)

Robert Bosch Engineering and Business Solutions Ltd (Bangalore, Coimbatore)
Robert Bosch GmBH (Ditzingen, Germany)

- Development of Test framework for Airbags ECUs (Languages used: VC++.Net, C#.Net, C++, Perl, Java)
- Application drivers using CAN Flexray protocols for ECU Diagnosis
- Vehicle crash emulation, evaluation and verification according to Airbags ECU requirements

Research Publications

Conference Proceedings

1. Arulkumar, S., Prashanth, B., & Anurag, M. (2018). NCC-Net: Normalized Cross Correlation Based Deep Matcher with Robustness to Illumination Variations. In IEEE Winter Conference on the Applications of Computer Vision 2018. Nevada, United States.
2. Ashish, M., Vinay, V., Arulkumar, S., Shiva Krishna, R., Piyush, R., & Anurag, M. (2018). A Probabilistic Model for Zero-Shot and Few-Shot Action Recognition with Domain Adaptation. In IEEE Winter Conference on the Applications of Computer Vision 2018. Nevada, United States.
3. Arulkumar, S., Moitreya, C., & Anurag, M. (2016). Deep Neural Networks with Inexact Matching for Person Re-Identification. In Proceedings of the Neural Information Processing Systems (NIPS) - 2016. Barcelona, Spain. Code : `https://github.com/InnovArul/personreid_normxcorr` [paper][code][video][poster].
4. Arulkumar, S., Vismay, P., Ashish, M., Prashanth, B., & Anurag, M. (2016). Bi-modal First Impressions Recognition using Temporally Ordered Deep Audio and Stochastic Visual Features. In Proceedings of the European Conference on Computer Vision Workshop (ECCVW) - 2016 on Apparent Personality Analysis. Amsterdam, The Netherlands. Code: `https://github.com/InnovArul/first-impressions` [paper][code].

Research Area of Interest

1. Machine learning in Computer Vision, Deep learning
    - Person Detection, Tracking and Identification in Surveillance systems
    - Action Recognition
2. Robotic vision, Autonomous Intelligent systems, Self-Driving Cars

Relevant courses

Pattern Recognition
Artificial Neural Networks
Advanced Signal Processing (Machine Learning for Computer Vision)
Kernel Methods
Linear Algebra and Random Processes
Advanced Data Structures and Algorithms

Skills

Languages	Reading, writing and speaking competencies in English, Tamil.
Coding	Lua, GPU programming (Cuda C++), Python, Perl, VC++.Net, C#.NET, Java, R
Frameworks	Torch, Caffe
Databases	Mysql
Web Dev	Html, CSS, JavaScript

Miscellaneous Experience

Awards and Achievements

Sep 2016	Received Travel Grant from Google for NIPS-2016 paper
Aug 2016	Ranked 2 nd in the ICPR-2016(team: evolgen): ChaLearn Looking at People : First Impressions and Personality Traits recognition challenge (second round)
Jul 2016	Ranked 2nd in the ECCV-2016(team: evolgen): ChaLearn Looking at People : First Impressions and Personality Traits recognition challenge (first round)
Apr 2006	Secured school First in Higher secondary school examination
Apr 2004	Secured school Third in Secondary school examination

Certifications

Jul 2016	Deep learning Summer school: Attended summer school for Deep learning conducted at IIIT Hyderabad, India.

Personal Details

Nationality	Indian
Marital Status	Single
Languages known	English, Tamil

Academic References

Prof Dr.Anurag Mittal
Associate Professor
Department of CSE
Indian Institute of Technology Madras
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Prof Dr.Hema A Murthy
Professor
Department of CSE
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List of Projects

Aug 2009 – Mar 2010

Bachelor Dissertation: Trickle Algorithm for Wireless sensor networks (WSN) code updation
Venue: Coimbatore Institute of Technology, Coimbatore

- My contribution involves Conceptualization and Implementation of code updation algorithm for Wireless sensor networks
- The algorithm is implemented and the performance is analyzed using OMNet++ component simulation platform (Language: C, C++)

Jun 2010 – Mar 2011

Trecker: Automotive Project Release Management Tracking application
Venue: Robert Bosch Engineering and Business Solutions Limited(RBEI), Bangalore

- Retrieval and analysis of available projects, status of Source files from MKS Source Integrity (Source code management platform)
- My contribution includes development of modules to track release of Airbags ECU project components and source files, Bug tracking analysis, installer creation and deployment
- Languages used: Perl, Excel, VBA, MKS Command line tools

Apr 2011 – Dec 2012

Automotive Airbags ECU testing - software development [Robert Bosch Engineering and Business Solutions Limited]
Venue: Robert Bosch GmBH, Ditzingen & RBEI, Bangalore

- Software Driver development for Vehicle emulation (using LabCar), ECU diagnosis (Production and Customer versions - ISO 15765 protocol specification), Embedded tools development using CAN, Flexray protocol
- My contribution includes Requirements management, Design, Implementation and Testing of Modules for CAN communication, Diagnosis request response validation
- Languages used: VC++.Net, C++, C#.Net, CANoe 7.0, CANoe 7.5

Jan 2013 – May 2015

Automotive Airbags ECU (Software and System) testing - Unified framework development for Crash test
Venue: Robert Bosch GmBH, Ditzingen & RBEI, Bangalore

- Development of Unified framework for Software and System requirements testing (especially Crash Injection testing) of Airbags ECU
- My contribution: Vehicle crash emulation (crash retrieval, injection using Sensor emulators), evaluation (using Transient recorders) and verification according to Airbags ECU requirements
- Vehicle environment emulation during crash injection (using LabCar), ECU diagnosis (Production and Customer versions - ISO 15765 protocol specification) using CAN, Flexray protocols
- Languages used: VC++.Net, C++, Perl, C#.Net, CANoe 7.0, CANoe 7.5

List of Projects (continued)

Nov 2015 – Apr 2016

- Person Re-Identification using Single image
  Venue: IIT Madras, Chennai
  - The goal is to implement a model to search for a given person in the list of persons observed from multiple cameras.
  - My contribution: Conceptualization and Implementation of a deep learning model, Implementation of Novel matching layer (Normalized correlation layer) in CUDA C++
  - Source code is available at `https://github.com/InnovArul/personreid_normxcorr`
  - Technologies used: Torch (Lua), C++, CUDA programming, MATLAB

May 2016 – Jul 2016

- ChaLearn ECCV-2016 Workshop: First impressions prediction challenge
  Venue: IIT Madras, Chennai
  - The goal is to design a machine learning model to predict the first-impressions of a person from a 15 seconds video using multi-modal features (Audio features and Visual frames)
  - My contribution: Design and Implementation of 3D convolution based Two-input Deep learning model
  - Source code is available at `https://github.com/InnovArul/first-impressions`
  - Languages used: Torch (Lua), C++, Python
  - Achievements: Ranked 2^{nd} in the ECCV-2016(team: evolgen): ChaLearn Looking at People : First Impressions and Personality Traits recognition challenge (first round), ICPR-2016 challenge (second round)

Nov 2016 – Aug 2017

- Illumination invariant deep architectures for Patch Matching
  Venue: IIT Madras, Chennai
  - Patch matching is a core computer vision task used in problems such as Tracking, 3D Reconstruction, Stereo and Optical flow algorithms. The goal is to design a deep learning model to predict the matching probability of given two patches.)
  - My contribution: Design and Implementation of 4 variants of Deep architectures based Normalized cross correlation
  - Languages used: C++, Python