Shruthi Gowda

PhD Candidate | (Prev) Research Engineer

Researcher, Engineer & Tech Lead with 10 years of experience in Computer Vision, Machine Learning, Deep Learning and Embedded Software, in Autonomous Driving (ADS), Quality & Inspection and Healthcare applications.

Research Interests - Neuro-inspired AI, Cognitive Bias, Continual Learning, Robustness, Multi-Modality Learning

Contact

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Links : Webpage
Google Scholar
Github

Education

PhD
Eindhoven University of Technology (TU/e), Netherlands
2023-Present

MSc - Electrical and Computer Engineering
Universitat Politècnica de Catalunya (UPC), Spain & Université Catholique de Louvain (UCL), Belgium
2010 - 2012

Bachelor of Engineering - Electronics and Communication
Visvesvaraya Tech. University (VTU), India
2006 - 2010

Expertise

- DL: PyTorch, TensorFlow, ONNX
- Programming: C, C++, Python, LabVIEW, MATLAB, OpenCV
- Optimizations: SSE, Intel IPP, TBB, OpenVINO, Intel DAAL, TensorRT
- Others: OpenCL, Dockers, Kubernetes
- Certifications: Machine Learning & Deep Learning Specialization
- Process: Agile, Scrum

Experience

2019 - 2023
Advanced Research Lab | NavInfo Europe B.V, Netherlands
AI Research Engineer
Specialized in exploring, designing, and implementing state-of-the-art deep learning technologies to address challenging problems in the autonomous driving domain.
Research Highlights : Adversarial Robustness, Shortcut Learning, Continual Learning on the Edge, Cognition-inspired AI solutions

2013 - 2019
Vision R&D | National Instruments (NI), India
Senior Software Engineer
Led the development and release of the Vision Development Module, an advanced Computer and Machine Vision Library, with specialized features for visual defect detection in industrial inspection application.

2012 - 2013
Image and Signal Processing group | UCL, Belgium
Research Assistant
Worked on multi-view geometry, calibration and 3D vision.
Project - Virtual Viewpoint Reconstruction in a Multi-Camera Network

Projects

ENFIELD | European Union Horizon Project
Adaptive AI
Researching and developing effective and efficent AI algorithms that are lifelong learners, robust, fair and trustworthy. Collaborations with 15 other universities, research institutes and industries to enable adaptive AI in Europe.

SAFEXPLAIN | European Union Horizon Project
Safe and Explainable Critical Embedded Systems based on AI
Tech Lead of DL and Automotive use case - designed safety patterns, developed novel explainable AI components, a reliable and traceable system design for autonomous driving which adheres to FUSA standards

A Comprehensive Scene Understanding and Object Recognition Suite for ADS | NIE
Design of an extensive framework with training, evaluation and analysis functionality. Developed ADS product for accurate detection of road users, signs and precise localization of lanes and road markings

Patents

European Patent 22159288.4
AI Based Change Detection System for Executing a Method To Detect Changes In Geo-Tagged Videos To Update HD Maps.

US Patent 17/894,870
Method and System for Instilling Shape Awareness to Self-Supervised Learning Domain.

Dutch Patent 020065 NL-PD
LSFSL: Leveraging Shape Information in Few-shot Learning.

US Patent 019922 US-PD-VB/kk
Method to Add Inductive Bias into Deep Neural Networks.

US Patent 17/581,759
Deep Learning Based Multi-Sensor Detection System.

Dutch Patent 020050 NL-PD1
Cognitive Continual Learning System.

Awards & Honors

Engineering Excellence Award | 2016
In Recognition of leading innovative ideas and products | National Instruments, Texas.

Rookie of The Year Award | 2013
In Recognition for the outstanding achievement and contribution | National Instruments, Texas.

Erasmus Mundus Fellowship | 2010-2012
Fellowship offered by European Union to International Students to study in consortia of universities across Europe.

Pratibha Puraskar | 2006
Honor by the Indian Govt. for the top 0.1% of top scorers in Class 12.

Anonymizer for GDPR compilance | NIE
Shipped Anonymizer product for GDPR compliance. The product includes a perception module to detect, classify and blur the faces, license plates in videos.

Change Rate Detection for HD map updation | NIE
Designed and implemented a change rate analysis system to detect modifications in road traffic signs, traffic barriers, overhead structures, and lanes. Facilitated the updating of high-definition maps crucial for safe motion planning of autonomous vehicles.

Accelerated Deep Learning Inference | NI R&D
Led the development of a high-performance Deep Learning Optimized Inference Engine, integrating TensorFlow and Intel OpenVINO libraries for rapid deployment of models on NI embedded hardware for dense prediction applications.

Machine Vision Library for Industrial Inspection | NI R&D
Developed and shipped industrial defect inspection products as part of the NI Machine Vision library. Implemented robust computer vision and 3D vision techniques, contributing to reliable quality control and inspection processes.

Publications

Conserve-Update-Revise to Cure Generalization and Robustness Trade-off in Adversarial Training
ICLR 2024
Shruthi Gowda, Elahe Arani, Bahram Zonooz

Dual Cognitive Architecture: Incorporating Biases and Multi-Memory Systems for Lifelong Learning
TMLR 2023
Shruthi Gowda, Elahe Arani, Bahram Zonooz

Can We Break Free from Strong Data Augmentations in Self-Supervised Learning?
CoLLAs 2024
Shruthi Gowda, Elahe Arani, Bahram Zonooz

A Comprehensive Study of Real-Time Object Detection Networks Across Multiple Domains: A Survey |
TMLR 2022 with Survey Certification
Shruthi Gowda, Elahe Arani, Ratnajit Mukherjee, Haris Iqbal, Shabbir Marzban, Ahmed Badar, Terence Brouns, Bahram Zonooz

InBiaseD: Inductive Bias Distillation to Improve Generalization and Robustness through Shape-awareness
CoLLAs 2023
Shruthi Gowda, Elahe Arani, Bahram Zonooz

LSFSL: Leveraging Shape Information in Few-shot learning
CVPR 2023 - Workshop on Learning with Limited Labelled Data
Shruthi Gowda, Elahe Arani, Bahram Zonooz