

GAUTHAM KRISHNA GUDUR

@ gauthamkrishna.gudur@gmail.com +91 969.814.1161 in linkedin.com/in/gauthamkrishna-g bit.ly/2KCaKUj
📍 Chennai, India gauthamkrishna-g.github.io github.com/gauthamkrishna-g </> hackerrank.com/gauthamkrishna_g

RESEARCH & INDUSTRY EXPERIENCE

Data Scientist

ERICSSON R&D - GLOBAL AI ACCELERATOR (GAIA)

📅 Feb 2019 – Ongoing 📍 Chennai, India

- Incorporating Machine Learning for Network Intelligence broadly in the spaces of telecom, computer vision, reinforcement learning, NLP, IoT, time-series. Developing multiple patents and publications.
- Working on **online mobility prediction** of user equipment (UE) to eNodeBs in the 5G NetWork Data Analytics Function (NWDAF) using **uncertainty-aware Deep Bayesian Contextual Bandits** robust to concept drift.
- Successfully delivered **iSite (Intelligent Site Acceptance)** – a set of **on-mobile multi-object detection/localization** tasks like weatherproofing, mounting bracket for accurate detection of physical infrastructure failures at cell-sites, thereby replacing field technicians. Used YOLO, SSD, FasterRCNN networks; handled detection of blurred images.
- Improving **search recommendations** of customer issues from long-descriptions, slogans/symptoms and fine-tuning **transformer models** like BERT, RoBERTa; used **Active Learning** to handle sentence labeling.
- Our team created **E-ADF** – an **end-to-end framework for anomaly detection and time-series**, with a focus on existing/novel unsupervised machine learning algorithms, metrics, explainability, visualization, etc.

Independent Researcher

📅 Dec 2018 – Ongoing 📍 Chennai, India

- Currently working on **Incremental/Continual Learning** on the edge to handle **catastrophic forgetting** for audio sensing and HAR tasks.
- Developed a framework for **Federated Learning** with **heterogeneous labels and models** across devices by leveraging **Knowledge Distillation**.
- Currently developing an efficient framework for **Continual Learning** for **NLP** tasks, particularly **NMT**, on resource-constrained devices.
- Worked on incremental updation of incoming unlabeled data on-device using deep **Bayesian Active Learning** for Human Activity Recognition (HAR) and fall detection tasks.

Machine Learning Engineer

SMARTCARDIA (EPFL)

📅 May 2018 – Nov 2018 📍 Chennai, India (Remote)

- Developed machine learning, deep learning models for analyzing **biomarkers** like sleep apnea, troponin, haemoglobin, blood pressure, glucose, to provide unique insights into patients' health.
- Engineered features for imbalanced time-series clinical data, and modeled classification, regression architectures using **Gradient-boosted ensemble models** and **Recurrent Neural Networks (LSTMs)**.

Research & Teaching Assistant

SOLARILLION FOUNDATION

📅 Feb 2016 – Jun 2018 📍 Chennai, India

- Co-led a team of four to develop novel deep learning ensemble models for heterogeneous **Human Activity Recognition (HAR)** tasks on resource-constrained devices capable of incremental model updation.

RESEARCH INTERESTS

Machine Learning Resource-Efficient AI
On-Device ML Ubiquitous Computing
Computer Vision IoT NLP
Continual Learning Bayesian ML
Active Learning Healthcare
Activity Recognition AI4SocialGood
Reinforcement Learning Telecom

EDUCATION

B.Tech in Information Technology

Anna University

📅 Grad. Apr 2017 📍 Chennai, India

Cum. GPA: 7.41/10 - First Class

Thesis: Intelligent Bus Stop Recognition System. Advised by Prof. Srinivasan R.

Oxford Machine Learning Summer School (OxML 2020) [Accepted]

📅 Aug 2020 📍 Oxford, UK (Virtual)

Eastern European Machine Learning Summer School (EEML 2020)

📅 July 2020 📍 Warsaw, Poland (Virtual)

HSC (Class XII)

DAV Higher Secondary School, Gill Nagar

📅 Grad. May 2013 📍 Chennai, India

Scored an overall of 94.25%.

SKILLS

Programming

Expert Python C/C++
Intermediate Java SQL HTML/CSS
JavaScript Bash
Basic Android R

Hardware & Software

LaTeX Git Arduino Raspberry Pi

Tools & Frameworks

NumPy Scikit-learn TensorFlow
PyTorch Keras OpenCV Docker
PySpark Flask

- Developed a **Movie Occupancy Prediction** engine by engineering dynamically adaptive behavioral features of the crowd from terabytes of transactional data, and employed tree-based ensemble models and branched LSTMs (with ± 6 MAPE). Deployed the beta application into production for a *top 3 Indian movie multiplex chain*.
- Led a team of five and designed a user-independent *on-device* **Dynamic Gesture Recognition** system using accelerometers with machine learning approaches on a low-cost *Raspberry Pi Zero* (\$5).
- *Mentored students* to help them develop problem-solving approaches in embedded programming for their assignments and research project.

Undergraduate Student Researcher

SSN COLLEGE OF ENGINEERING

📅 Feb 2015 – Mar 2017

📍 Chennai, India

- Developed an on-device vision-based **Intelligent Bus Stop Recognition System** using light-weight CNNs. Utilized data augmentation, *Incremental Bayesian Active Learning* strategies to handle bus stop scalability and adaptability to dynamic Indian environments.
- Worked on a funded HCI research project – **Neurocinematics**, to classify real-time cognitive responses of film viewers from EEG.
- Worked on choosing the best-suited mote for two IoT scenarios, by analyzing their *RPL performance* metrics on a *Contiki testbed*.

PUBLICATIONS

👥 Conferences/Journals/Workshops

- **Gautham Krishna Gudur**, Bala Shyamala Balaji, Perepu Satheesh Kumar, "Resource-Constrained Federated Learning with Heterogeneous Labels and Models", **ACM KDD 2020** - 3rd International Workshop on Artificial Intelligence of Things (**AIoT '20**).
- Sundararaman V, Ateendra Ramesh, Sharan Sundar S, Aashish Kumar Jain, **Gautham Krishna Gudur**, Vineeth Vijayaraghavan, "A Dynamically Adaptive Movie Occupancy Forecasting System with Feature Optimization", **IEEE ICDM 2019** - Workshop on Learning and Mining with Industrial Data (**LMID '19**).
- Raghavan A K, Venkatesh Umaashankar, **Gautham Krishna Gudur**, "Label Frequency Transformation for Multi-Label Multi-Class Text Classification", **KONVENS 2019** - GermEval Workshop '19.
- **Gautham Krishna Gudur**, Ateendra Ramesh, Srinivasan R, "A Vision-based Deep On-Device Intelligent Bus Stop Recognition System", **ACM UbiComp 2019** - 8th International Workshop on Pervasive Urban Applications (**PURBA '19**).
- **Gautham Krishna Gudur**, Prahalathan Sundaramoorthy, Venkatesh Umaashankar, "ActiveHARNet: Towards On-Device Deep Bayesian Active Learning for Human Activity Recognition", **ACM MobiSys 2019** - 3rd International Workshop on Embedded and Mobile Deep Learning (**EMDL '19**).
- Prahalathan Sundaramoorthy, **Gautham Krishna Gudur**, Manav Rajiv Moorthy, R Nidhi Bhandari, Vineeth Vijayaraghavan, "HARNet: Towards On-Device Incremental Learning using Deep Ensembles on Constrained Devices", **ACM MobiSys 2018** - 2nd International Workshop on Embedded and Mobile Deep Learning (**EMDL '18**).
- **Gautham Krishna G**, Karthik Subramanian Nathan, Yogesh Kumar B, Ankith A Prabhu, Ajay Kannan, Vineeth Vijayaraghavan, "A Generic Multi-modal Dynamic Gesture Recognition System Using Machine Learning", **IEEE Future for Information and Communication Conference (FICC 2018)**.

SERVICES & HONORS

Services

- **Reviewer** - Machine Learning for Health Workshop (**ML4H 2019**), **NeurIPS 2019**
- **Reviewer, PC Member** - GermEval 2019, KONVENS 2019
- Technical Reviewer of the book titled "Hands-On Meta Learning With Python"
- Event Organizer of "Data Nuggets" - a Data Science event, **Invente 2016**

Honors and Awards

- Undergraduate **Financial Research Grant of ₹24,000** from SSN College of Engineering
- **Winner** of **GermEval** Shared Task 1 Challenge (Subtask (a)), **KONVENS 2019** in Post-Evaluation Phase
- **97th percentile** in **HackerRank (Algorithms Domain)**
- Full fee waiver to attend Oxford Machine Learning Summer School (**OxML2020**)
- Top 10 percentile in **42nd National Mathematics Talent Competitions**
- Certification of Merit for Grade A1 in all subjects in **AISSE**
- Completed all 10 levels of **UCMAS Mental Arithmetic (Abacus)**
- Division Level Badminton Player (**U-19**)

MOOCS

- **University of Washington | Coursera**
Machine Learning Specialization (4 courses)
A Case Study Approach Regression
Classification Clustering & Retrieval
- **NRU HSE | Coursera**
Bayesian Methods for Machine Learning
- **University of Alberta | Coursera**
Fundamentals of Reinforcement Learning
- **Stanford University | Coursera**
Machine Learning
- **UC San Diego | Coursera**
Algorithmic Toolbox Data Structures
- **John Hopkins University | Coursera**
R Programming
- **Google | Udacity** - Deep Learning
- **Stanford University** - CS231n

- **Gautham Krishna G**, Krishna G, Bhalaji N, "Electroencephalography Based Analysis of Emotions Among Indian Film Viewers", Springer, International Conference on Advanced Informatics for Computing Research (ICAICR 2017).
- **G Gautham Krishna**, G Krishna, N Bhalaji, "Analysis of Routing Protocol for Low-power and Lossy Networks in IoT Real Time Applications", Procedia Computer Science, Elsevier, *ICRTCSE 2016*.

Posters/Extended Abstracts

- **Gautham Krishna Gudur**, Prahalathan Sundaramoorthy, Venkatesh Umaashankar "Handling Real-time Unlabeled Data in Activity Recognition using Deep Bayesian Active Learning and Data Programming", *MobiUK 2019*, University of Oxford.
- N Bhalaji, G Krishna, **G Gautham Krishna**, "Neurocinematics: The Intelligent Review System.", 3rd International Conference on Cognition, Brain and Computation (*CBC 2015*), Indian Institute of Technology (IIT), Gandhinagar.

PATENTS

- System and Method to Explore Heterogeneous Labels and Models in Federated Learning [*Filed*].

NOTABLE PROJECTS

Modeling Scalable Social Media Comments

Working on modeling scalable and ambiguous (multilingual, short) topics of interest – *topic modeling from noisy comments* in movies/TV shows using *data programming*. An illustrated heat map of the closely-knit social media topics and their summary is showcased to the user.

Data Programming for Sensor Label Generation

Working on leveraging heuristic data labeling functions which are fed into a generative model and fine-tuned by a discriminative model - a *weakly supervised data programming paradigm*, aimed at *ground truth generation* for mobile, wearable sensing tasks.

Gest-Face

Developed a simple Gesture & Facial recognition application to identify real-time simple hand gestures, and faces of users (and total counts).

Speed Control of DC Motor using Arduino

Devised a feedback based Proportional controller algorithm to self-stabilize the error between reference and measured speed (± 4 RPM) of a 12V DC Motor with external load using AtMega328 MCU.