

# Gautham Krishna Gudur

@ gauthamkrishna@utexas.edu    gauthamkrishna-g.github.io    Google Scholar    github.com/gauthamkrishna-g  
Austin, TX    +1 512-228-0520    linkedin.com/in/gauthamkrishna-g    hackerrank.com/gauthamkrishna\_g

## RESEARCH & INDUSTRY EXPERIENCE

### Graduate Research Assistant

University of Texas at Austin [Advisor: Prof. Edison Thomaz]

Aug 2023 – Present    Austin, TX, USA

- Working on efficient and human-centric machine learning.
- Developing *continual sparse learning* techniques to alleviate *catastrophic forgetting* in resource-constrained settings.
- Enabling efficient Open-Vocabulary Object Detection using VLMs.
- Worked on Federated Learning robust to concept/label drift.

### Independent Research

Dec 2018 – Present

- Analyzing the effect of *simplicity bias in curriculum learning*.
- Leveraging *explainable components* of deep neural networks to aid in efficient sample selection for curriculum and active learning settings.
- Analyzed the *effect of calibration on sample prioritization* in deep neural networks, thereby accelerating training [Mentored by Prof. Emtiyaz Khan].
- Developed *zero-shot federated learning* frameworks to handle new heterogeneous classes and models for mobile and audio sensing tasks.
- Worked on *deep Bayesian active learning* for on-device mobile sensing; currently incorporating *adaptive acquisition* for active learning.

### Data Scientist III

ERICSSON R&D - GLOBAL AI ACCELERATOR (GAIA)

Feb 2019 – Apr 2023    Chennai, India

- Incorporated machine learning for network intelligence in telecom resulting in multiple publications, patents, and deployed products. [Mentors: Dr. Shrihari Vasudevan and M J Prasath (Director)]
- Telecom:** Contributed to 3GPP standardization for *Federated Learning* and multi-vendor model sharing; positioned Ericsson’s AI-Native design principles. Created spatiotemporal models for predicting indoor building connectivity (< 5% error); improved mobility prediction of user devices in 5G Network Data Analytics Function (NWDAF).
- Created *E-ADF [Ericsson Blog]* – an end-to-end unsupervised anomaly detection framework with data-efficient Bayesian model selection and dynamic threshold optimization.
- Created *E-LangHub (Ericsson NLP Hub)* with telco-rich data, state-of-the-art models, services. Improved capabilities of *AIB (Automated Intelligent Knowledge Base)* from customer symptoms using LLMs and active learning; worked on telco-specific language translation.
- Successfully delivered *iSite (Intelligent Site Acceptance)* – a set of tasks for object detection of physical infrastructure failures at cell-sites, thereby replacing field technicians; handled detection of blurred images.

### Machine Learning Engineer

SMARTCARDIA (EPFL) [Mentor: Dr. Srinivasan Murali]

May 2018 – Nov 2018    Chennai, India (Remote)

- Developed *gradient-boosted ensembles* and *LSTM models* for regression, classification tasks to provide unique insights into patients’ health.
- Engineered features from imbalanced time-series clinical data with *biomarkers* like sleep apnea, troponin, haemoglobin, blood pressure.

## RESEARCH INTERESTS

- Efficient Deep Learning
- Data-Centric AI
- Limited Supervision
- Continual Learning
- Active Learning
- Sparse Learning
- Federated Learning
- LLMs/VLMs
- Bayesian/Robust Deep Learning
- Ubiquitous Computing
- Human-Centric ML
- Mobile/Audio Sensing
- Activity Recognition

## EDUCATION

Ph.D. in Electrical and Computer Engineering

University of Texas at Austin

Aug 2023-2028    Austin, TX

### Coursework

- Advanced Computer Vision
- Applied Machine Learning
- Generative Models in Machine Learning
- Human Signals: Sensing/Analytics

B.Tech in Information Technology

Anna University [SSN College of Engineering]

Grad. Apr 2017    Chennai, India

Thesis: Intelligent Bus Stop Recognition

## SUMMER SCHOOLS

5th Summer School on Artificial Intelligence (2021)

Aug 2021    IIIT Hyderabad (Virtual)

Computer Vision and Machine Learning.

Eastern European Machine Learning Summer School (EEML 2020 & 2021)

Jul 2020 & 2021    Eastern Europe (Virtual)

Deep Learning and Reinforcement Learning.

- Presented *ActiveHARNet* at EEML ’20, *Zero-shot Federated Learning* at EEML ’21.
- Presented task-independent continual learning at unconference sessions.

Oxford Machine Learning Summer School (OxML 2020)

Aug 2020    Oxford, UK (Virtual)

Deep Learning and Healthcare.

## Research & Teaching Assistant

**SOLARILLION FOUNDATION** [Mentor: Vineeth Vijayaraghavan]

📅 Feb 2016 – May 2018

📍 Chennai, India

- Led a team of four to develop **HARNet** – a set of *deep learning ensemble models* for HAR on edge devices capable of incremental model updation.
- Led a team of five to design user-independent ML approaches for *dynamic gesture recognition* on a low-cost Raspberry Pi Zero (\$5).
- Deployed a **Movie Occupancy Prediction** engine by engineering adaptive behavioral features of the crowd using tree-based ensemble models and branched LSTMs for a *top 3 Indian movie multiplex chain*.
- *Mentored over 11 students* in embedded machine learning, and in their assignments and research project.

## Undergraduate Student Researcher

**SSN COLLEGE OF ENGINEERING** [Advisors: Dr. Bhalaji N and Dr. Srinivasan R]

📅 Feb 2015 – Mar 2017

📍 Chennai, India

- Developed a vision-based **Intelligent Bus Stop Recognition System** using CNNs. Used data augmentation and active learning strategies to handle scalability and adaptability to dynamic Indian environments.
- Led a team to work 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 test bed*.

## PUBLICATIONS

### 🌸 Conference/Journal/Workshop [Citations: 178]

- Tata Ganesh\*, **Gautham Krishna Gudur\***, Gopinath Chennupati, Mohammad Emtiyaz Khan, *Can Calibration Improve Sample Prioritization?*, **NeurIPS 2022** - Human in the Loop Learning (HILL '22) & Has It Trained Yet? (HITY '22) workshops.
- **Gautham Krishna Gudur**, Raaghul R, Adithya K, Shrihari Vasudevan, *Data-Efficient Automatic Model Selection in Unsupervised Anomaly Detection*, **IEEE ICMLA 2022** [Oral Presentation].
- **Gautham Krishna Gudur**, Satheesh Kumar Perepu, *Zero-Shot Federated Learning with New Classes for Audio Classification*, **Interspeech 2021**.  
*Abridged versions: ICLR 2021* - Distributed and Private Machine Learning (DPML '21) & Hardware Aware Efficient Training (HAET '21) workshops. Also presented at **EEML 2021**.
- **Gautham Krishna Gudur**, Satheesh Kumar Perepu, *Resource- Constrained Federated Learning with Heterogeneous Labels and Models for Human Activity Recognition*, **IJCAI-PRICAI 2020** - Workshop on Deep Learning for Human Activity Recognition (DL-HAR '20) [Oral Presentation].  
*Abridged version: NeurIPS 2020* - Machine Learning for Mobile Health Workshop (MLMH '20).
- Abhijith Ragav\*, **Gautham Krishna Gudur\***, *Bayesian Active Learning for Wearable Stress and Affect Detection*, **NeurIPS 2020** - Machine Learning for Mobile Health Workshop (MLMH '20).
- **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 Venkataramani, 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) [Oral Presentation].

\*Equal Contribution

## PATENTS

- *Federated Learning using Heterogeneous Labels*, WO2022013879A1.
- *Distributed Machine Learning with New Labels using Heterogeneous Label Distribution*, WO2022162677A1.
- *Method and Apparatus for Approach Recommendation with Threshold Optimization in Unsupervised Anomaly Detection*, WO2023166515A1.

## SERVICES

- **Program Committee Member/Reviewer**
  - **ICLR 2021** - Distributed and Private Machine Learning Workshop (DPML)
  - **NeurIPS** - Machine Learning for Health Workshop (ML4H 2020, ML4H 2019)
  - **KONVENS 2019** - GermEval '19
- Technical Reviewer of the book titled "Hands-On Meta Learning With Python"
- Event Organizer of "Data Nuggets" – a Data Science event, Invente 2016
- Mentor at IEEE B. Tech. Student Branch – *Python Programming for Underrepresented*
- Member at National Service Scheme (NSS)

## HONORS AND AWARDS

- **Graduate Ph.D. Fellowship** from Cockrell School of Engineering at UT Austin
- AIB (Automated Intelligent knowledge Base) won **Ericsson's Top Performance Competition 2020** in Operational Excellence category
- **Top 1 percentile in HackerRank** (Algorithms Domain/Problem Solving - Advanced)
- *Full financial registration grants* to attend ICLR 2021, NeurIPS 2020, OxML 2020
- Undergraduate *research grant* of **INR 25,000** from SSN College of Engineering
- **Winner of GermEval Shared Task 1 Challenge** (Subtask (a)), KONVENS 2019 in post-evaluation phase
- Top 10 percentile in 42<sup>nd</sup> National Mathematics Talent Competitions
- **Certification of Merit for Grade A1 in all subjects** in AISSE (CBSE 10th boards)
- Completed all 10 levels of UCMAS Mental Arithmetic (Abacus)

- Raghavan A K, Venkatesh Umaashankar, **Gautham Krishna Gudur**, *Label Frequency Transformation for Multi-Label Multi-Class Text Classification*, **KONVENS 2019** (GermEval '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**) [Oral Presentation].
- **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**) [Oral Presentation]. Also presented at **EEML 2020**.
- 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**) [Oral Presentation].
- **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**) [Oral Presentation].
- **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**.

## Poster/Extended Abstract

- **Gautham Krishna Gudur**, Satheesh Kumar Perepu, *Heterogeneous Zero-Shot Federated Learning with New Classes for On-Device Audio Classification*, **MobiUK 2021**.
- **Gautham Krishna Gudur**, Abhijith Ragav, Prahalathan Sundaramoorthy, Venkatesh Umaashankar, *Bayesian Active Learning for Wearable and Mobile Health*, **NeurIPS Europe** meetup on Bayesian Deep Learning (**BDL 2020**).
- **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.

## TALKS

- *Machine Learning and Ubiquitous Computing* [June 2022, SSN College of Engineering]
- *Heterogeneous Zero-Shot Federated Learning with New Classes for On-Device Audio Classification* [July 2021, MobiUK 2021]
- *Telecom-Specific Language Translation using GCP* [May 2021, Ericsson/Google Cloud Day]
- *Resource-Constrained Machine Learning for Ubiquitous Computing Applications* [Sept 2020, Flipped by GAIUS]

## 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 PyTorch  
 TensorFlow Keras OpenCV  
 Docker MATLAB PySpark GCP

## MOOCS

- **HackerRank | Problem Solving**  
 Advanced Intermediate Basic
- **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
- **Stanford University | Coursera**  
 Machine Learning
- **UC San Diego | Coursera**  
 Algorithmic Toolbox Data Structures
- **John Hopkins University | Coursera**  
 R Programming
- **Stanford University - CS231n**