

# GAUTHAM KRISHNA GUDUR

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## EXPERIENCE

### Data Scientist

#### ERICSSON R&D - GLOBAL AI ACCELERATOR (GAIA)

📅 Feb 2019 – Ongoing    📍 Chennai, India

- Incorporating Machine Learning for Network Intelligence broadly in the space of telecom and IoT.
- Currently working on **iSite (Intelligent Site Acceptance)** – **on-mobile object localization/segmentation** to automate close out package for fault tolerance at cell sites, time-series anomaly detection, failure prediction of Mean Time to Connect (MTTC) for service providers.
- Developing an **open-source anomaly detection framework - qudditch**, with a focus existing/novel Machine Learning unsupervised algorithms, metrics, explainability, visualization, etc.

### Independent Researcher

📅 Dec 2018 – Ongoing    📍 Chennai, India

- Currently working on **Bayesian Incremental/Continual Learning** on the edge to handle *catastrophic forgetting*, by leveraging *data distillation* for audio and HAR tasks. (Collaborating remotely with Bell Labs/Oxford and Cambridge)) [**\*IMWUT/UbiComp**].
- Working on **Federated Learning** across devices using *Knowledge Distillation* to handle multiple *heterogeneous architectures*, and *Active Learning* for real-time ground truthing for audio tasks. [**\*ICASSP 2020**].
- Worked on incremental updation of incoming unlabeled data on-device using **Bayesian Active Learning** for Human Activity Recognition and Fall detection tasks.

### Machine Learning Engineer

#### SMARTCARDIA (EPFL)

📅 May 2018 – Nov 2018    📍 Chennai, India

- 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 – June 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.
- Developed a **Movie Occupancy Prediction** engine for a top 3 Indian movie multiplex chain, using tree-based ensemble models and Recurrent neural nets. Deployed the beta application into production.
- Led a team of five and designed a user-independent on-device **Dynamic Gesture Recognition** system using accelerometers with Machine Learning approaches on Raspberry Pi Zero (\$5).
- Mentored over 7 students by helping them develop their problem solving approaches in programming and embedded systems.

## RESEARCH INTERESTS

Applied Machine Learning/Deep Learning  
Ubiquitous/Wearable Computing  
Activity Recognition    On-Device ML  
Healthcare    Bayesian ML    IoT  
Continual Learning    Active Learning  
Computer Vision    NLP    HCI

## 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.*

#### Courses

Programming & Data Structures: I & II  
Design & Analysis of Algorithms  
Artificial Intelligence    Signal Processing  
Operating Systems    Data Analytics  
Data Warehousing & Data Mining

### 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    Octave

### Hardware & Software

LaTeX    Git    Arduino    Raspberry Pi

### Tools & Frameworks

NumPy    Pandas    TensorFlow    Keras  
Scikit-learn    PyTorch    OpenCV    NLTK  
PySpark    Flask    Weka    AWS

## 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 ConvNets, utilized data augmentation, Incremental Bayesian Active Learning strategies for bus stop scalability and adaptability to dynamic Indian bus stop environments.
- Worked on a funded HCI research project of **Neurocinematics**, where real-time cognitive responses of film viewers are captured using EEG.
- Worked on choosing the best-suited mote for two IoT scenarios, by analyzing their RPL performance metrics on a Contiki testbed.

## PUBLICATIONS

### Conference/Workshop

- 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 2019*.
- 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)*.
- Pralathathan 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)*.
- 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, ICRTCS 2016*.

### Poster/Extended Abstract

- 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 [Poster].

## HONORS & SERVICES

### Honors and Awards

- Undergraduate **Financial Research Grant of INR 24,000** from SSN College of Engineering
- Winner** of GermEval Shared Task 1 Challenge (Subtask (a)), KONVENS 2019 in Post-Evaluation Phase
- 97<sup>th</sup> percentile in HackerRank (Algorithms Domain)**
- Certification of Merit for Grade A1 in all subjects in AISSE
- Top 10 percentile in 42<sup>nd</sup> National Mathematics Talent Competitions
- Completed all 10 levels of UCMAS Mental Arithmetic (Abacus)
- Division/State Badminton Player (U-19)

### 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

## 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
- 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
- fastai** - Deep Learning for Coders

## NOTABLE PROJECTS

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### 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 deep embeddings with attention and data programming. An illustrated heat map of the closely-knit social media topics and their summary is showcased to the user [*\*ICWSM 2020*].

### 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 [*\*TBD*].

### Gest-Face

Developed a Gesture & Facial recognition application using OpenCV and PyQt5, that can accurately recognize simple hand gestures, as well as detect faces of users using in real-time.

### Speed Control of DC Motor using Arduino

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

### Competitions/Challenges

- Winner of *Subtask (a) – GermEval 2019* - Shared task on hierarchical classification of German blurbs [*KONVENS '19*].
- Emteq Human Activity Recognition [*UbiComp '19*].

Kindly visit my website/GitHub for an exhaustive list of projects

## REFEREES

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Dr. Arjuna Sathiseelan

📍 CEO, Gaius Networks; Ex Director, N4D Lab, University of Cambridge

Dr. Srinivasan Murali

📍 CEO, SmartCardia, EPFL

Vineeth Vijayaraghavan

📍 Director, Solarillion Foundation

Dr. Srinivasan R

📍 Professor, SSN College of Engineering

Dr. Bhalaji Natarajan

📍 Assoc. Prof., SSN College of Engineering