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.

*Work in Progress, to be submitted at

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***).
- 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)***.
- 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, 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
- **97th percentile in HackerRank (Algorithms Domain)**
- Certification of Merit for Grade A1 in all subjects in AISSE
- Top 10 percentile in 42nd 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

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]*.

Movie Occupancy Prediction Engine [Solarillion Foundation]
Structured and extracted behavioral features from terabytes of transactional time-series data ($\sim$5 years) to forecast the movie occupancy (± 6 MAPE) using tree-based ensemble models and Recurrent neural nets. Deployed the beta application into production.

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 (± 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

Dr. Srinivasan Murali
CEO, SmartCardia, EPFL

Dr. Arjuna Sathiaseelan
CEO, Gaius Networks; Ex Director, N4D Lab, University of Cambridge

Vineeth Vijayaraghavan
Director, Solarillion Foundation

Dr. Srinivasan R
Professor, SSN College of Engineering

Dr. Bhalaji Natarajan
Assoc. Prof., SSN College of Engineering

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