Abinav Ravi Venkatakrishnan

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Experience

- **Data Scientist** deepc gmbh — Oct 2020 - Present
  1. Development of end2end analysis pipeline integrated with product.
  2. Development and management of preprocessing pipeline for brain CT scans.
  3. Code testing and Refactoring, increased test code coverage by 5% by refactoring and adding tests to refactored modules.
- **Junior Data Scientist- Working Student,** deepc gmbh — June 2019-Oct 2020
  1. Developed novel methods for fracture detection of skull improving business usecase bringing in potential of new customers with access to multiple lab locations.
  2. Increased documentation and logging coverage in Back end API by 5% and 20% respectively
  3. Technical Evaluation of 3 new use-case was done by evaluating existing data sources, creating new model prototypes which can increase potential revenue by 100%
  4. Run frequent inference on updated production models and report the metrics. Proposed a new technique for calibrating deep models to new site.
- **Working Student Data Science, The Mobility House Gmbh** — Oct 2018 - Mar 2019
  1. Conducted Data Analysis of Charging Behaviour for vehicle to grid projects (Time series Data).
  2. Conducted Data analysis for pooling concept for frequency containment reserve.
  3. Pattern recognition and forecasting of Energy market data for trading strategies.

Open Source

- **Developer** PipelineDP(OpenMined) in collaboration with google — Feb 2021 - Present
- **Research Engineer** OpenMined research — Oct 2020 - Present
- **Writer contributor, OpenMined blog** OpenMined Blog — Oct 2020 - Present
  1. Published the post in OpenMined blog as a part of summarizing the Privacy conference.

Technical Skills

Programming Languages - Python(Advanced), C(Intermediate), bash scripting(Intermediate), C++(Basic) ,Javascript(basic),Rust(Basic),
Data Science tools -Numpy, Scipy,matplotlib, scikit learn, scikit image, Pytorch, Pandas, OpenCV ,Flask, Gitlab Runner,PySyft
Database MySQL, MongoDB
DevOps Tool Docker, Kubernetes (Knative and Kind), Gitlab runner, Jenkins.
Cloud Platforms - AWS, Google Cloud

Projects

- **Differential Privacy and Language Models (Openmined Research Project)** Objective is to check the effect of differential privacy on size of language models and how unintended memorization of data can be reduced. Dec 2020 - Present
  TOOLS PyTorch, Numpy, Huggig face datasets, Scikit-learn, Opacus, AWS
- **Self Supervised OOD-Detection for medical applications (Master thesis)** Developed novel algorithm that proposes new anomaly score that detects Anomaly in Brain CT scans. State of the art results were achieved for in-house dataset by improvement of over 7% previous methods Sept 2019 - July 2020
  TOOLS PyTorch, Numpy, Nibabel, Scikit-learn, Scikit-image, GCP
- **How to train small and reliable Cancer detectors?** Developed a novel reliable classifier for skin cancer detection using ISIC 2018 dataset. The reliable classification accuracy is 71% after incorporating Out of Distribution detection. Dec2019 - Feb2020
  TOOLS: PyTorch, Numpy, Scikit-image, GCP
- **Inverse Problems in PDE driven process using Deep learning** Developed a deep learning model that learns on simulated heat equation data based on fenics. It has been shown with theoretical guarantees that the error propagation of neural solver is less and time taken for neural solver to arrive at converged solution is 300 times less when compared with Finite element solver. Apr2019-Oct2019
  TOOLS PyTorch, Numpy, Fenics

- **Stroke Detection** Built a deep learning model for stroke detection on BRATS dataset using a Fully Convolutional Autoencoder based network. Achieved a dice score 0.68 with limited training. May 2019
  TOOLS Colab, PyTorch, Numpy, Nibabel, Scikit-image
- **A Network Analytical take on European parliament**: Built topic model from European parliament speeches and then built a network model and did community detection on the network model to find Hidden agenda Oct 2018-Feb 2019
  TOOLS Numpy, NLTK, SpaCy,Networkx
- **Physics Aware Generative Adversarial Network**: Application of Generative Adversarial Network on Velocity simulation of a smoke flow.The inference of the simulation was done on higher resolution while training on a lower resolution. Apr-July 2018
  TOOLS PyTorch, Numpy, MantaFlow, Scikit-image

Education

M.Sc, Computational Science and Engineering
Department of Informatics, Technical University Munich 2017 - 2020
B.Tech, Mechanical Engineering Amrita School Of Engineering,Bengaluru, India (First Class with Distinction) 2012 - 2016

Publications

- **Abinav Ravi Venkatakrishnan**, Seong Tae Kim, Rami Eisawy, Franz Pfister, Nassir Navab, "Self supervised Out of distribution detection in Brain CT scans", **Med Neurips 2020**, view here
- Suprosanna.S,**Abinav Ravi Venkatakrishnan**,Ivan Ezhov, Jana Lipkova,Marie Piraud,Bjoern Menze ,"Implicit Neural Solver for Time-dependent Linear PDEs with Convergence Guarantee", **NeurIPS workshop on Machine learning with convergence Guarantees**,view here
- **Abinav R** ,Nandu .R.Nair,P.Shravan,Pradeesh Kumar and S.R.Nagaraja ,"CFD Analysis of Co-Flow Jet Airfoil", Indian Journal of Science and technology, vol.9 Issue.45 view here
- **Abinav R**, Nambiar G.K, Sahu D, "A case study on low power vapour compression refrigeration system", IOP Conference Series,Material science and Engineering, vol 149, July 2015. view here

Review

- Reviewer for Distributed and Private Machine learning workshop at ICLR 2021 Mar 2021

Presentations

- **Meetup talk on Out of Distribution detection** Presentation on how to include out of distribution detection for deployed classifiers to make them more reliable. Sept 2020
- **Thesis defense** Master Thesis defense on self supervised Out of Distribution detection for Medical applications in CAMP chair Aug 2020
- **Seminar on 3D computer vision and deep learning** Presentation of the paper MapNet and report prepared for the seminar course on 3D computer vision and Deep learning November 2018
- **Introduction to Scientific Computing with Python** Basic Introduction to scientific computing using Numpy at Amrita School of Engineering Bangalore March 2018

Achievements

- Published extended Abstract in med-neurips 2020 workshop at NeurIPS 2020 conference
- Selected in OpenMined Research Engineers program among 28 people
- Won first place in HackaTUM hackathon 2019 among 12 teams in Allianz challenge
- Published extended Abstract in Machine learning with Guarantees workshop at NeurIPS conference 2019.
- Selected for *NASSMA* summer school in Ben Guerir, Morocco, 2019 with complete scholarship.
- Graduated Bachelors in Technology in Mechanical Engineering with First Class and distinction . Awarded to people with CGPA more than 8/10 and a publication in international Conference or Journal