Karkala Shashank Hegde

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Education

- **University of Southern California - Master of Science** — Los Angeles, USA
  Electrical and Computer Engineering - Machine Learning & Data Science *GPA: 3.85/4* *2019 – 2021*

  Relevant Courses: Graduate Linear Algebra, Graduate Probability, Deep Learning, Applied Machine Learning and Reinforcement Learning for games

  Associated Organizations: Autonomous Vehicle Lab, Dynamic Robotics and Control Laboratory

- **National Institute of Technology Karnataka - Bachelor of Technology** — Surathkal, India
  Electrical and Electronics Engineering - Signal Processing *GPA: 8.17/10* *Thesis GPA: 9.5/10* *2013 – 2017*

  Relevant Courses: Calculus, Signal and Systems, Digital Signal Processing, Digital Processing of Speech and Audio, Advanced Digital Signal Processing, Control Theory, Numerical Methods, Pattern Recognition and Machine Learning

  Associated Organizations: ACM NITK Chapter, SPICMACAY Mangalore Chapter, NITK Music Club

Professional Experience

- **Dynamic Robotics and Control Laboratory, USC** — Los Angeles, USA
  Research assistant as Reinforcement Learning Engineer *November 2019 - present*
  - Simulate and control a quadruped mini cheetah robot on Pybullet, by using stochastic control with policy gradient based agents. Train and test the AI controller on the actual robot.
- **Fidelity Investments** — Bangalore, India
  Software Engineer at Asset Management technology *July 2017 - July 2019*
  - Develop applications based on Supervised Machine Learning for trade order selection and efficient execution.
  - Research on Reinforcement Learning and its application on portfolio construction in equity trading.
  - Working with the Equity Trading team to develop and support the java and python based trading engine.
- **Fidelity Investments** — Bangalore, India
  Summer intern as Software Developer *May 2016 - July 2016*
  - Worked with the fixed income research team to build a complete end to end application using .NET and Excel VBA.

Publications

- Hegde, S., Kumar, V., and Singh, A. (2018). *Risk aware portfolio construction using deep deterministic policy gradients.* IEEE Symposium Series on Computational Intelligence (SSCI) Bangalore, Nov. 2018. [pdf]
- Singh, A., Kumar, V., and Hegde, S. (2018). *Reinforcement Learning: AI that creates AI.* Proceedings of Data Science Congress, Mumbai, May 2018. [pdf]
- Severes, A., Hegde, S., D'Souza, L. and Hegde, S. (2017). *Use of LED for enhanced lipid production in micro-algae based bio-fuels and predicting growth patterns.* Journal of Photochemistry and Photobiology B: Biology, Elsevier, Volume 170, Pages 235-240. [link]

Achievements and Academic Projects

- **Anaemia Detection (Present):** Using deep learning to identify patients with anaemia using images of the eye.
- **Autonomous Vehicle Navigation (Present):** As a part of the Autonomous Vehicle lab, I work on navigation, path planning and simulation of an autonomous car to take part in IGVC 2020.
- **Torque Transfer (Present):** Use reinforcement learning and transfer learning to create robust AI agents. The AI agent should generalize to a variety of open world self driving simulations.
- **The Data Open:** Was a finalist in the SoCal round of the Data Open Hackathon organized by Citadel. Along with my team, we were able to quickly analyse and draw conclusions on data corresponding to Brexit.
- **Soda bottle classification contest[link]:** Winner of image classification contest by Deep Cognition (An AI company based out of Irving, Texas). I built a robust (100% test accuracy) Neural Network using a variant of the VGG architecture.
- **Prosthetic Voice (Thesis)[pdf]:** sEMG signal controlled speech aid for speech challenged individuals using Machine Learning. After building the sensors, muscle signals were collected, filtered and a SVM was trained on the data.
- **Emotion Detection[pdf]:** I was part of a three member team that built a Machine Learning driven emotion detector using variations in speech signals. Using MFCC feature extraction and PCA on many other features, we built a emotion classifier.
- **Algal growth prediction:** Predicting growth trend of algae after studying the effect of light on algal bio-fuel production.

Programming Skills

- **Languages**: **Python** (Tensorflow, PyBullet, Gym, PyTorch, Pandas, Numpy, Flask, Scikit-learn, Scipy, YOLO, GAN), **MATLAB** (Statistics and Machine Learning, Deep Learning, Signal Processing Toolboxes), **Java** (Spring, Springboot, Kafka, Camel, Jackson, SpringJDBC), and working knowledge of: SQL, Hadoop, Unity, Angular JS, C, C#, ROS, AWS