KESHAV BHARADWAJ VAIDYANATHAN

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EDUCATION

Northeastern University, Boston, MA **Dec 23**
Master of Science in Computer Engineering, Specialization in Computer Vision, Machine Learning and Algorithms **GPA: 3.88**
Courses: Machine Learning, Deep Learning, Natural Language Processing, DBMS, Advanced Computer Vision, Assistive Robotics.

Visvesvaraya Technological University, Bangalore, India **Aug 22**
Bachelor of Engineering in Electronics and Communication Engineering **GPA: 8.43**
Head of Falcon's technical team, organized project expos, technical seminars, national conferences, and workshops.

TECHNICAL SKILLS

- **Programming Languages** - Python, C/C++, R, SQL, Shell scripting, HTML
- **Software & Tools** - AWS, Postgres, MongoDB, Docker, Elastic Search, SQLite, Postman, Git, OpenVINO, TensorRT, Vivado
- **Packages** - NumPy, Pandas, Flask, Tkinter, PyTorch, PyTorch-lightning, OpenCV, Keras, SciKit, NLTK, Dash, OpenGL

WORK EXPERIENCE

Silicon Synapse Lab, Northeastern University, MA, USA **Sep 23 – Present**
Computer Vision Research Assistant | YOLO, AutoEncoder, Transformer, OpenVINO, TensorRT, YOSO, mask2former
- Integrated real-time scene segmentation and object detection into the robot's perception domain. Conducted thorough data analysis, and preprocessed RGB data, achieving a 0.78 IoU for the ground class. Currently implementing instance segmentation models.
- Working to deploy by utilizing network quantization and optimization using OpenVINO/ TensorRT for NVIDIA Jetson Orin.

Abiomed Inc (Johnson & Johnson), MA, USA **Feb 23 – Sept 23**
Data Science Co-op | Time-Series, LSTM, RNN, Transformer, Signal Processing, Data Visualization, Data Analysis, Regression, SQL
- Developed machine learning models to predict cardiac output in patients receiving mechanical circulatory support, utilizing in vivo high-frequency time-series device data, achieving a **5.2%** reduction in percentage error.
- Conducted research and implemented a Domain-Adversarial Neural Network (**DANN**) to forecast aortic pressure in different patient cohorts, leveraging computer simulations to generate high-volume data.

Northeastern University, MA, USA **May 22 – Dec 22**
Graduate Teaching Assistant | Digital Logic Design
- Designed a specialized computer architecture for RISC-V (ALU, Instruction Decoder, and Memory) and provided guidance.

Mad Street Den, Chennai, India **Dec 20 – Jul 21**
Machine Learning Engineer | Recommendation System, Docker, SQL, CNN, SVM, Classification, AWS, SVM, Elastic-search, NLP
- Developed ML models to generate tags for an Elastic search-driven recommendation system. Constructed indexing and search scripts, and fine-tuned the scoring function for optimization. Designed a CNN for vision-based tasks of identifying handwritten text and tables and a language-based SVM classifier to categorize questions into various question types.
- Designed and implemented data processing pipelines and tag storage across Redshift, S3, Dynamo, and Redis databases and optimized by eliminating redundant operations, resulting in a **15%** reduction in response time.

PATENTS

Q-CerGen (Quick Certificate Generator) | *Flask, OpenCV, Tkinter, WebGL, Brython, HTML, Python* **Mar 21**
- Devised a novel application for swift generation of over **3000**+ E-certificates/ E-trophies with a user-friendly interface, and a website.

ADAM *(Automatic Disassemble and Assemble Machine)* | *Python, OpenGL, OpenCV, SIFT algorithm, scikit-learn* **Jun 21**
- Led the brainstorming, design, and development of a robotic pick-and-place arm prototype adept at disassembling and reassembling patterns made from basic units for object recognition and pattern mapping, while also designing a 3D GUI for pattern customization.

ACADEMIC PROJECTS

Advanced Computer Vision, Northeastern University, MA **Sept 22 - Dec 22**
SegMask for 3D Object Detection | 3D Object detection, LiDAR data,Multimodal, Autonomous driving, PSPNet Segmentation mask
- Developed a novel approach on Frustum-PointPillars to enhance accuracy by integrating RGB and LiDAR data on pre-trained PSPNet segmentation masks, resulting in a **3%** improvement in car AP scores on the KITTI-hard dataset for 3D object detection.
- Employed Frustum PointPillars with YOLO, achieving a notable **78 mAP** with a multi-sensor approach

Natural Language Processing, Northeastern University, MA **Jan 22 - Apr 22**
Question Answering System | Large Language Model - BERT, LSTM, RNN
- Obtained a **63.5%** accuracy and **66.7** F1-score with the baseline Bi-Directional LSTM model on SQuAD2.0, and a **77.3%** accuracy with Distilled BERT, achieving an **85.4** F1-score for question-answering tasks.

Deep Learning, Northeastern University **Jan 22 - Apr 22**
Visual Question Answering | Transformers, LxMERT, VGG, LSTM, CNN, Multimodal
- Achieved **57%** accuracy with the baseline LSTM Question + norm image model with VGG image embedding and **70.68%** accuracy with the transformer-based LXMERT model for visual question answering on the VQA dataset.