RUDRAMANI SINGHA

605 W 141st ST
NEW YORK, NY 10031

linkedin.com/in/rudramanisingha/
github.com/rgs2151

+1 (646) 785-6865
rgs2151@columbia.edu

EXPERIENCE

Columbia University - School of Engineering and Applied Science — *New York City, NY*
Research Associate @ Computational Neuroscience lab — *Mar 2023 - Present*

- **Leading representational content extraction from neural activities:** Characterizing *latent features* of perceptual decision-making from single-channel recordings, EEGs, and fMRIs in *lower dimensions* to understand computations performed in brain
- **Designing state space models:** Mathematically modelling 9+ *Hidden Markov models* (HMMs) in multiple state and emission conditions to identify patterns and strategies in decision-making through explainable machine learning
- **RSA benchmarking:** Quantifying efficacy of 10+ metrics of *Representational Similarity Analysis* (RSA) techniques on biophysically realistic RNNs trained on working memory retention; identifying strengths, limitations, and sensitivity to noise

NEUROVISION LLP — *Mumbai, IN*
Co-Founder & CTO — *Jul 2021 - Aug 2022*

- **Team Formation & Leadership:** Led a team of 15 engineers to incorporate an *engineering and consulting firm* offering *Agile* AI/ML solutions that addressed specialized business needs
- **B2B Customer Success:** Delivered 10+ impactful solutions ranging from site optimizations with Google Analytics post-processing to automation using seq2seq chatbots for clients including Null-IoT, Cart Geek, and Axis Technical Group

AZYO — *New Delhi, IN*
Machine Learning Engineer II — *Feb 2021 - Dec 2021*

- **Engineered NLP solution for explainable HTS lookup:** Developed decision graph frameworks for *hierarchical classification* of 500+ classes in *Harmonized Tariff Schedule* (HTS) with *Q&A trace justifications* and *parallel traversals*, achieving 94% validation accuracy on supported product chapters
- **Standardized R&D:** Devised companywide standard MLOps platform for automated unit testing, model logging, and data caching, resulting in *cross-departmental model sharing* and enabling 2x speedup in rapid development of working prototypes

CSKA Automation Services Pvt Ltd — *New Delhi, IN*
Software Engineer — *Jan 2020 - Feb 2021*

- **Designed liveness detection system:** Developed *anti-spoofing* countermeasures and authenticated 3000+ users against *presentation attacks* using a combination of *facial recognition*, *hand gestures*, and *eye movements* from live feed
- **Refactored complete ID extraction pipeline:** Integrated *OCR API* with *Google Vision* for up to 60% faster performance and 30% improved accuracy; created *cleanup and validation engine* to support 11+ government Identity Document (ID) formats with *Named Entity Recognition* (NER) and *REGEX* in AWS

EDUCATION

Columbia University — *New York City, NY*
Master of Science in Biomedical Engineering — *Expected Feb 2024*

- Won Shardashish Interschool Fellowship, worth $50,000, nominated by Dean of Columbia Engineering
- Won Data Science Institute Scholar award for Developing AI Model Share MLOps platform
- High Performance Machine Learning, Deep Learning for Computer Vision, Competitive Programming

University of Mumbai — *Mumbai, IN*
Bachelor of Engineering in Information Technology — *Jun 2018 - Jul 2022*

- Distributed Systems, Computer Networks, Operating Systems, Data Science, System Administration

SKILLS

- **Tools:** PyTorch, TensorFlow, Scikit-learn, Keras, Spark, JAX, Elasticsearch, Pandas, Git, FastAPI, Flask, Django, Docker, AWS, GCP
- **Languages:** Python, R, C/C++, Java, MATLAB, CUDA, SQL, Linux, JavaScript, LaTeX, Markdown, HTML, CSS, Bootstrap, Jenkins
- **Pipelines:** Retriever-Reader, Abstractive Summarization, Object Detection, Image Segmentation, Question Answering (IRQA)
- **Certifications:** AWS Fundamentals Specialization, TensorFlow in Practice Specialization, Reinforcement Learning Specialization

PROJECTS

- Artificial Fourier Transformer to reconstruct accelerated MRI across multiple weighted sequences and species [*patent pending*]
- NeuralDecoder: Parallelized toolkit to measure and visualize representational similarities and latent features efficiently
- NeuralJAXwork: GPU Accelerated Lightweight ML Framework from Scratch with JAX and JIT compilation
- GraphWelder: High-Performance MLOps Framework for Flexible Computation Graphs in Research and Production Pipelines
- ChatGPT but it cites its sources: Retriever Augmented Abstractive Summarization in the Wild for Question Answering
- LiveCAPTCHA: In-Browser Live Challenge-Response Authentication with Face and Hand Landmarks

PUBLICATIONS & PATENTS

- **DOI: 10.1109/ICSSIT53264.2022.9716509 -** *BlazePose and LSTM for Spinal Dysfunction Risk Estimation*
- **DOI: 10.1109/ICSSIT53264.2022.9716386 -** *Speed Detection Using Multi-Branch Networks From Temporal Image Pairs*
- **Poster: https://rb.gy/fuowt -** *Extracting representational content in deep learning models*
- **Patent: IN 202111058826 -** *Realtime Proctoring and Analysis System Using Facial, Gesture and Behavior Analysis*