Indrajeet Aditya Roy

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Education

Northeastern University | **M.S. Computer Engineering (AI & ML)** | **GPA: 3.89** | *September 2023 - May 2025* | Boston, MA

- *Coursework: Machine Learning, Deep Learning, Reinforcement Learning, Natural Language Processing, Unsupervised Data Mining, LLM-based Dialogue Agents, Data Visualization, Parallel Data Processing, Applied Probability and Stochastic Processes*

Iowa State University | **B.S. Software Engineering** | *August 2018 - May 2022* | Ames, IA

- *Coursework: Data Structures and Algorithms, Distributed Systems, DBMS, Object Oriented Design, Large Scale Data Analysis, Software Architecture*

Technical Skills

- **Languages:** *Java, Python, GraphQL, R, Ruby, Elixir, Javascript, Typescript, HTML, HTML.ERB, CSS, C, C++*
- **Python Libraries:** *Pandas, Numpy, PySpark, Matplotlib, Seaborn, Altair, Plotly, Pydantic, Psycopg2, Statsmodels, Scrapy, Requests*
- **Machine Learning Libraries:** *Keras, Tensorflow, PyTorch, Skorch, Scikit-learn, Imbalanced-learn, SpaCy, NLTK, Scipy, Transformers*
- **LLM Application Tools***: LangChain, LangGraph, LlamaIndex, Faiss*
- **Web Development:** *Ruby Rails, Elixir Phoenix, Django, Flask, FastAPI, React, Axios, Apollo, Redux, Redux-toolkit, Next.js, Node.js, Tailwind CSS*
- **DBMS:** *MySQL, PostgreSQL, DynamoDB, Cassandra, Neo4j, Redis*
- **Development Tools***: Git, Docker, Postman, Github, Gitlab, Swagger, Jira, Miro, Kaggle*
- **Observability Tools***: Datadog, Bugsnag, Prometheus, Grafana, New Relic*
- **Cloud Tools:** *Algolia, AWS (DynamoDB, RDS, S3, Lambda, Kinesis, EC2, MSK, CloudWatch), Terraform*

Work Experience

Software Engineering Intern | Amwell | *June 2024 - August 2024* | Boston, MA

- Integrated Validic and Amwell Conversa Health platforms, syncing health monitoring device data with healthcare programs for enhanced user healthcare data analytics and engagement.
- Developed API services implementing CRUD operations interfacing with the Validic REST API for user profile and device management features.
- Developed API services to integrate Validic Inform Streaming API data events steam.
- Utilized AWS Kinesis, Lambda, and DynamoDB for data ingestion, processing, and persistent storage.
- Implemented Ruby Rails REST API services for user devices data integration, improving user device data synchronization with automated healthcare programs.
- Optimized database efficiency by refining Validic account provisioning in API services, effectively eliminating redundant record creation.

Software Engineer | The RealReal | *June 2022 – May 2023* | San Francisco, CA

- Implemented backend for Customer 360, an analytics and machine learning data aggregation platform, enhancing data integration and accessibility.
- Developed ETL pipelines in Ruby and Elixir, utilizing AWS MSK and MSK Connect for data streaming and AWS DynamoDB for data storage.
- Migrated The RealReal web platform from Elixir Phoenix to a React ecosystem using Redux, Axios, Apollo, Next.js, Jest, and Webpack,
- Improved usability and increased Lighthouse performance score by 41%.
- Transitioned feature flag management platform from LaunchDarkly to Harness, reducing vendor costs.
- Developed ETL scripts for feature flag migration, automating data extraction, transformation, and validation workflows utilizing GitHub Actions.

Software Engineering Intern | The RealReal | *June 2021 – August 2021* | San Francisco, CA

- Developed Ruby Rails admin platform for the Get Paid Now program, enhancing admin control over feature responses to user interactions.
- Implemented REST Ruby Rails API and GraphQL Elixir API services utilizing AWS Postgres RDS for CRUD operations for program rules.
- Implemented Redis caching and Pub/Sub model based Kafka messaging for efficient data access and event-driven updates across backend systems.
- API services streamlined and optimized data accessibility, improved data integrity, and supported efficient concurrent DB operations.
- Redis caching reduced database load, optimized CRUD operations, and decreased latency and database row lock error rates by 11%.

Software Engineering Intern | Carlin Fit | *May 2020 – August 2020* | West Chester, PA

- Developed Android companion app to interface with the UV light hardware device component of the Purple-Bug UV ride-share cleaning product, utilizing Java/Kotlin, Retrofit, Glide, Room, RxJava, and Coroutines.

Projects & Research (www.indrajeetroyportfolio.com)

- **Mitigation techniques against deanonymization and DOS Attacks in Decentralized Networks**

Analysis of attack vectors and Tor network architecture vulnerabilities focusing on deanonymization and Denial-of-Service (DoS) attacks in decentralized networks and mitigating strategies to safeguard anonymity and maintain network integrity.

- **Enhancing Research Paper Summarization Through Language Abstractive Methods, LLM Fine-tuning and RAG**

Enhancement of academic journal summarization precision and comprehension by integrating language model fine-tuning methodologies such as Parameter-Efficient Fine-Tuning (PEFT) and Low-Rank Adaptation (LoRA) with Retrieval-Augmented Generation (RAG).

- **Reinforcement Learning Approach for Complex Maze Navigation and Spatial Decision Making**

Implemented Q-Learning, SARSA, and Actor-Critic Reinforcement Learning algorithm based agents using PyTorch for complex environment navigation, evaluating algorithm performance in achieving optimal outcomes under specific environment conditions and different reward functions.

- **Stock Behavior and Volatility Prediction**

Implemented K-Means Clustering on S&P 500 stocks dataset to segment weekly returns and utilized GARCH and SVM-GARCH models to forecast stock volatility, enhancing predictive accuracy and market trend analysis.

- **Network behavior anomaly detection**

Developed a FNN model using the BETH dataset on simulated network traffic logs, achieving a validation accuracy of 85%. Implemented StandardScaler for data normalization, optimized with Adam, and utilized sequential binary classification to effectively identify malicious activities.