**Internal Job Description**

**Title:** Applied Scientist - Selection Monitoring Team  
**Location:** Amazon.com Services LLC  
**Job ID:** 2871327

**Overview**

The Selection Monitoring team at Amazon is responsible for leveraging cutting-edge AI technologies, including Large Language Models (LLMs) and Generative AI (GenAI), to enhance Amazon’s product catalog. Our mission is to build the most comprehensive, accurate, and up-to-date universal product catalog, leveraging multimodal AI and scalable data integration techniques.

This role requires both maintaining and optimizing existing AI pipelines while also designing and implementing next-generation AI solutions to improve product intelligence and data integration. The ideal candidate will work on modernizing legacy AI systems and contributing to innovative AI-driven initiatives that enhance product understanding, categorization, and matching at an unprecedented scale.

**Key Responsibilities**

**1. Maintenance & Optimization of Legacy Systems**

* Maintain and optimize existing AI pipelines in AWS that extract and validate product attributes from diverse data sources.
* These systems rely on **AWS Glue and Apache Kafka** for preprocessing, ensuring data consistency and reliability.
* Enhance the scalability and efficiency of **entity resolution models** for product matching and deduplication. These models are built mainly in **PyTorch and TensorFlow**.
* Refactor legacy code to improve system reliability, reduce technical debt, and enhance maintainability.
* Migrate legacy AI models to newer architectures, leveraging **AWS infrastructure** for improved scalability.
* Address technical issues and implement performance improvements in **distributed AI models handling billions of product records**.
* Ensure model interpretability and explainability by enhancing **feature extraction and monitoring mechanisms**.

**2. Next-Generation AI System Development**

* Design and implement **LLM-powered AI systems** for automated product description generation, feature extraction, and classification.
* Develop **multimodal AI models** that integrate **text, images, and structured data** for a holistic understanding of products.
* Utilize **Transformer-based architectures (BERT, GPT, T5, etc.)** to improve entity resolution and knowledge graph construction.
* Create **self-learning AI models** that continuously refine their understanding of product attributes through reinforcement learning.
* Deploy AI-driven solutions to enhance **semantic reasoning and knowledge graph completion**, utilizing **Amazon Neptune and AWS SageMaker**.
* Implement **automated model retraining and drift detection** using **MLflow and Amazon CloudWatch**.
* Scale AI solutions to efficiently process **billions of product records** in a **distributed AWS environment (EMR, Lambda, Step Functions)**.
* Develop real-time anomaly detection models leveraging **AWS Kinesis and Apache Flink**.
* Collaborate with engineering and product teams to integrate AI-driven insights into Amazon’s selection strategies.

**Technical Stack & Tools**

**Core AI & ML Technologies:**

* **Programming Languages:** Python, Java, C++
* **Deep Learning Frameworks:** PyTorch, TensorFlow, Hugging Face Transformers
* **NLP & Computer Vision Models:** BERT, GPT, T5, CLIP, DINO
* **Entity Resolution & Knowledge Graphs:** Amazon Neptune, NetworkX, DGL
* **Data Processing:** Apache Spark, AWS Glue, Dask
* **Model Deployment & Monitoring:** MLflow, TensorBoard, Amazon CloudWatch

**Infrastructure & Big Data Technologies:**

* **Cloud Platforms:** AWS (S3, Lambda, SageMaker, EMR, Step Functions, Kinesis, Neptune)
* **Streaming & Processing:** Apache Kafka, Apache Flink
* **Databases & Storage:** Amazon DynamoDB, S3, PostgreSQL
* **CI/CD & DevOps:** Docker, Kubernetes, Terraform, GitHub Actions

**Research & Innovation Contribution**

* Stay at the forefront of AI research by exploring and implementing **state-of-the-art techniques** in LLMs, GenAI, and multimodal learning.
* Publish findings and contribute to the **scientific community** through peer-reviewed papers, conference presentations, and industry collaborations.
* Prototype new AI-driven features in collaboration with academic and industry research teams.

**Qualifications**

**Basic Qualifications:**

* **PhD in Computer Science, Machine Learning, or related field**, OR **Master's degree with 4+ years of experience**.
* Proficiency in **Python, Java, or C++** for developing scalable AI solutions.
* Experience with **LLMs, GenAI, multimodal learning, and distributed AI models**.
* Strong knowledge of **data structures, algorithms, parsing, and high-performance computing**.
* Expertise in **parallel and distributed computing**.

**Preferred Qualifications:**

* Experience working with **large-scale AI models in production**.
* Strong background in **LLMs (GPT, T5, BERT) and multimodal AI**.
* Experience with **AWS services for AI/ML (SageMaker, Lambda, EMR, Step Functions, Kinesis, Neptune)**.
* Ability to lead research initiatives and contribute to cutting-edge AI advancements.

**Impact & Career Growth**

This role offers the opportunity to drive AI innovation at Amazon, working with **one of the largest product datasets in the world**. You will shape the future of product intelligence, contribute to AI research, and develop **scalable, production-grade AI solutions** that impact millions of customers globally.