Agent Astro

Predicate Graph Learning and Regulatory Text Alignment for FDA 510(k) Submissions

summary (in points):

- **Project Focus:** Developing AI methods to automate the analysis of FDA 510(k) submissions by linking unstructured regulatory text to structured data.
- **Methodology:** Utilizing Natural Language Processing (transformer-based models like BERT/GPT) combined with graph-based learning (Graph Neural Networks) to create a heterogeneous graph of devices, predicates, and regulatory clauses.
- **Goal:** Build a framework that extracts, normalizes, and connects information across FDA summaries and ISO standards to improve predicate identification and reduce manual research hours.
- **Environment:** This is an early-stage startup (approx. 12 contributors) with a remote-first environment. The intern will be supervised directly by the Founder and CEO.

questions to ask recruiter:

- Since this is the company's first collaboration with the MScAC program, what specific support systems or mentorship structures are in place for the intern?
- The proposal mentions "heterogeneous graphs" and "text-based inference." Is the primary focus of the internship more on the NLP pre-processing side or the graph neural network architecture?
- What represents the "ground truth" for training and benchmarking these models? Do you already have a dataset of domain-expert annotations available?

Heartwise AI Labs

Predicting Obstructive Coronary Artery Disease from Stress and Rest 12-Lead ECGs Using Deep Learning

summary (in points):

- **Problem:** Current stress tests and ECG interpretations rely on subjective judgment and have variable accuracy. The project aims to improve non-invasive CAD screening.
- **Methodology:** The project will leverage a pre-trained self-supervised foundation model called "DeepECG" (trained on 1M+ ECGs). The intern will fine-tune this encoder and a custom "ECGTokenizer" on paired stress/rest ECG data.
- **Data:** Access to approximately 6,262 stress-test ECGs, with about 3,000 matched to angiographic confirmed CAD status from the EPIC Centre.
- **Objectives:** Train deep learning models (1D CNNs, transformers) to classify ≥70% coronary stenosis and visualize attention maps for explainability.

questions to ask recruiter:

- The proposal mentions utilizing a custom "ECGTokenizer" and the "DeepECG" foundation model. How much of the work will involve refining these existing architectures versus developing new ones?
- Regarding the "stress vs. rest" aspect, does the current DeepECG model already account for temporal dynamics between these two states, or is that a primary research challenge for this internship?
- How does the collaboration work between the remote intern and the clinical team at the Montreal Heart Institute to validate the "clinical interpretability" of the outputs?

CPP Investments

Application of Financial Machine Learning in Forecasting Company Fundamentals

summary (in points):

- **Objective:** Apply Financial Machine Learning (FML) to forecast company fundamentals by integrating traditional financial data (financial statements) with alternative data (consumer transactions, app usage, web traffic).
- **Methodology:** The project involves feature engineering for "panel-to-population" prediction and testing ML models like Gradient Boosting and Transformer-based architectures.
- **Key Task:** The intern will perform "additivity analysis" to quantify the incremental predictive value of alternative data sources over standard fundamental data.
- **Outcome:** A working prototype of a forecasting model and a quantitative analysis of its effectiveness to support investment decisions.

questions to ask recruiter:

- Can you elaborate on the "alternative data sources" currently available for this project? Is the data cleaning and alignment phase expected to be a significant portion of the workload?
- The proposal mentions "panel-to-population prediction." Could you clarify the specific forecasting horizon (short vs. medium-term) that is most critical for the investment team?
- Will the "working prototype" need to be integrated into a live production trading pipeline, or is it primarily a research tool for the forecasting framework?

AXL

Inventing the Future of AI Applications: Applied Research in Machine Learning at AXL

summary (in points):

- **Core Challenge:** Moving beyond simple chat-based AI interfaces to support complex, multi-step workflows in operational settings.
- **Focus Area:** Intersection of AI and Human-Computer Interaction (HCI). Designing "intelligent user interfaces" and "mixed initiative strategies" where human judgment works alongside automated models.
- **Methodology:** An applied research approach involving identifying target workflows, rapid prototyping of interface concepts, and empirical evaluation using user-centered measures (task performance, trust).
- **Environment:** A venture studio environment. Work aims to support early-stage ventures by generating design foundations before full teams are assembled.

questions to ask recruiter:

- As a venture studio, will the specific "target workflow" and problem space be assigned, or will I be involved in selecting the venture context for the internship?
- The project emphasizes "empirical evaluation" and "user-centered studies." Will I have access to actual end-users or subject matter experts for these studies?
- What is the expected balance between front-end interface prototyping (HCI) and backend ML model integration/optimization?

CAMH

1. (Peter) Natural language processing prediction of treatment outcomes in mood disorders

summary (in points):

- **Objective:** Use LLMs to identify features in transcribed clinical interviews that predict treatment outcomes in mood disorders.
- **Methodology:** Implementing local language models (e.g., GPT-4o, DeepSeek R1) and semantic embeddings (word2vec, SIF) to analyze transcripts. Comparing LLM performance against trained qualitative researchers.
- **Data:** Using CANBIND data, which includes cleaned transcriptions of interviews regarding life events and childhood maltreatment.
- **Infrastructure:** Access to CAMH's high-performance compute clusters and SciNet, including local Nvidia A100 cards for LLM building.

questions to ask recruiter:

- The proposal mentions comparing LLMs to "trained qualitative researchers." Will I be working directly with these researchers to establish the ground truth for the "clustering of patients"?
- Regarding the "local" implementation of models like GPT-4o or DeepSeek, are there specific

privacy/security constraints I should be aware of when handling the clinical interview data?

2. (Andrew) Development of the first Female-Specific Alzheimer's Disease risk calculator

summary (in points):

- **Problem:** Current Alzheimer's risk models often exclude female-specific factors (e.g., menopause type, hormone therapy), despite women making up two-thirds of cases.
- **Objectives:** Harmonize data from 8+ large databases (350,000+ women) and develop a female-specific risk prediction model.
- **Methodology:** Uses a pipeline of data harmonization (Item Response Theory), hierarchical clustering/dimensionality reduction (PCA, UMAP), and ensemble ML models (XGBoost, Neural Networks).
- **Impact:** Aims to create a risk calculator to reduce women's lifetime AD risk, funded by the Wellcome Leap CARE initiative.

questions to ask recruiter:

- The project involves harmonizing data from 8+ large databases. Has the initial data acquisition and permissioning been completed, or will that be part of the internship timeline?
- You mention "neuroendocrine contributions" as a critical gap. Will I need specific domain knowledge in neuroendocrinology, or will the lab team provide that expertise?

CIBC

1. Benchmarking and Standardization for LLMs and Agentic AI Systems

summary (in points):

- **Problem:** Lack of standardized evaluation frameworks for LLMs and agentic AI in enterprise settings, leading to reliability and compliance risks.
- **Objective:** Develop a comprehensive benchmarking framework for accuracy, reliability, safety, and security of AI systems.
- **Methodology:** Literature review, framework design tailored to enterprise tasks, and developing automated tools for rapid testing and experimentation.
- **Outcome:** A benchmarking framework and documented best practices to enable confident scaling of AI solutions across the bank.

questions to ask recruiter:

- Will this benchmarking framework focus primarily on open-source models, or will I also be evaluating proprietary internal models and agents?

- How do you define "Agentic AI systems" within the context of CIBC's current infrastructure?

2. Reliable Multi-LLM Systems: Input and Context Optimization

summary (in points):

- **Problem:** Traditional "chunking" for RAG (Retrieval-Augmented Generation) often fails with large, complex enterprise documents, losing global context.
- **Solution:** Explore "context optimization" using graph-based document representations and dynamic context selection algorithms.
- **Methodology:** Constructing graph/tree structures of documents enriched with metadata, and designing algorithms for dynamic pruning/compression of context based on queries.
- **Metric:** Success is measured by improvements in context relevance, conciseness, and retrieval quality compared to standard baselines.

questions to ask recruiter:

- Regarding "graph-based document representations," are you currently using specific graph databases or libraries (like Neo4j or NetworkX) that I should be familiar with?
- Will the "Multi-LLM" aspect involve orchestrating different models for different parts of the retrieval/generation pipeline?

Geotab

Automated, scalable load weight detection in heavy duty vehicles

summary (in points):

- **Goal:** Detect loaded weight of electric and internal combustion heavy-duty vehicles to better estimate EV range and suitability.
- **Challenge:** Existing POC works on flat terrain but struggles with elevation changes. The new solution must account for "road pitch" and scale to production.
- **Methodology:** Log additional gyroscope data to infer road pitch. Combine this with acceleration and engine torque data to estimate weight using machine learning.
- **Scale:** The solution must be scalable to process data from Geotab's environment (4 billion records/day).

questions to ask recruiter:

- The proposal mentions an existing POC using an MCMC model. Is the goal to optimize this model or replace it with a different architecture (e.g., Deep Learning) to handle the scale?
- Since "road pitch" is a key new variable, is the gyroscope data currently being collected at scale, or is this a new data stream I will help instrument?
- Will the work focus more on the physics-based modeling of the vehicle or the "big data" engineering required to scale the pipeline?

Layer 6

Research, Applications, and Engineering (Multiple Streams)

summary (in points):

- **Scope:** The lab focuses on Generative AI and predictive AI for finance. Internships are available in Fundamental Research, Applied Science, or Engineering streams.
- **Project Options:**

  1. **LLM Agents:** Automating and optimizing workflows.
  2. **Enterprise RAG:** Using multimodal models to process information at scale.
  3. **Tabular Foundation Models:** Representation learning for tabular data (a key bank asset).
  4. **Trustworthy AI:** Fairness, privacy, robustness, and explainability of generative models.

- **Environment:** Collaborative research lab (MaRS district) with access to a GPU cluster and internal reading groups.

questions to ask recruiter:

- The proposal lists several distinct project directions (Agents vs. Tabular vs. Trustworthy AI). How and when is the specific project assignment determined for an intern?
- For the "Tabular data representation" project, are there specific internal datasets or public benchmarks (like those used in your NeurIPS papers) that will be the primary focus?
- What is the typical balance between publishing research papers and deploying models into TD Bank's operational systems for an intern?

RBC Capital

Agentic AI-driven Insight and Productivity for Financial Institutions

summary (in points):

- **Focus:** Developing autonomous AI agents for productivity-critical tasks, specifically validating and generating model documentation.
- **Key Innovation:** "Autonomous Memory Management." Improving the agent's ability to store/

retrieve context over long periods and "memory compression" to consolidate redundant information.
- **Methodology:** Moving beyond standard RAG to use memory compression, relevance filtering, and feedback-driven adaptation (Reinforcement Learning techniques).
- **Tools:** Python, PyTorch/TensorFlow, Vector Databases (FAISS, Milvus), and agent orchestration tools like LangGraph.

questions to ask recruiter:

- The proposal mentions "memory compression techniques." Are you envisioning this as a summarization task via LLMs or a vector-space operation?
- You mention "Reinforcement Learning" for feedback-driven adaptation. Is there an existing simulation environment or user-feedback loop established to train these policies?
- Is the "model documentation" use case strictly for internal risk models, and will I need to understand the financial models themselves to build the agent effectively?