Letter of Intent and Previous Work

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My interests include mathematical modeling via
convex and combinatorial optimization, graph theory and dynamic programming algorithms. Interested in using probabilistic methods for creating suitable estimators and root cause analysis. Currently working on the following things
 a) redesigning the online Fulfillment algorithm using ε constrain method which will replace the weighted objectives method for scalarization
 b) looking into various reinforcement learning Policy Gradient algorithms such as PPO, applying those to Deployment Optimization and Fulfillment Optimization problems. For the purpose is using the `gymnasium` environment and `stable-baselines3` library.
 c) researching various algorithms for Root Cause Analysis using Bayesian inference and Probabilistic Temporal Logic. For the purpose exploring the usability of causal inference algorithms included in the packages `causal-learn`, `causalml` and `dowhy`.

Here are few repos representing my interests in those topics. All these repos are work in progress and will be updated periodically.
https://github.com/dimitarpg13/root_cause_analysis_and_model_checking

https://github.com/dimitarpg13/reinforcement_learning_and_game_theory

https://github.com/dimitarpg13/graphs_and_dynamic_programming

https://github.com/dimitarpg13/probabilistic_machine_learning

https://github.com/dimitarpg13/optimization_classification_regression

https://github.com/dimitarpg13/learning_bayesian_networks

https://github.com/dimitarpg13/transformers_intro

Additionally, in my free time I am looking into an implementation of *semantic simulation* for semantic search and semantic inference using reinforcement learning. Short description on Semantic Simulation can be found here:

https://github.com/dimitarpg13/aiconcepts/blob/master/docs/SemanticStructures/SemanticSimulation.docx

My coding experience involve python, C++, C, Java.
Here are samples of my C++ code from past endeavors:
https://github.com/google/or-tools/compare/stable...dimitarpg13:ortools:dpg/PWL_solver_stable_py2.7_gtest_scipV6
https://github.com/dimitarpg13/testcode/blob/master/fraction.cpp
https://github.com/dimitarpg13/testcode/blob/master/fraction_mt.cpp
https://github.com/dimitarpg13/testcode/blob/master/fraction_bigint.cpp
https://github.com/dimitarpg13/cpp_testcode/tree/master/SudokuQlik/src

And here are relevant documents to software design, architecture, coding techniques and design patterns:
https://github.com/dimitarpg13/BigIndex/blob/main/PresentationDGueorguiev2018.pdf
https://github.com/dimitarpg13/InsideTensorflow2Source/blob/master/Understanding%20Tensorflow%202%20source%20code.pdf

https://github.com/dimitarpg13/UnderstandingPythonEcosystem
https://github.com/dimitarpg13/inside_cpp_object_model

And here are few repos about C++ language details and features:
https://github.com/dimitarpg13/cpp_effective_modern
https://github.com/dimitarpg13/cpp_move_semantics
https://github.com/dimitarpg13/cpp_templates_complete_guide
https://github.com/dimitarpg13/cpp_random_pieces