Letter of Intent and Previous Work

D.Gueorguiev, 10/13/2023

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 Fulfillment Optimization core algorithms redesign at Nike.

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/graphs_and_dynamic_programming)

<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/SemanticSimulation.pdf

Some preliminary notes on the semantic simulation process can be found here:

[https://github.com/dimitarpg13/aiconcepts/blob/master/docs/OnTheNeedofDynamicSimulationWhen](https://github.com/dimitarpg13/aiconcepts/blob/master/docs/OnTheNeedofDynamicSimulationWhen%20%20ModelingInteractionsOfSemanticStructures.pdf)

[ModelingInteractionsOfSemanticStructures.pdf](https://github.com/dimitarpg13/aiconcepts/blob/master/docs/OnTheNeedofDynamicSimulationWhen%20%20ModelingInteractionsOfSemanticStructures.pdf)

<https://github.com/dimitarpg13/aiconcepts/blob/master/docs/ModelingAttractiveRepulsiveForcesInSemanticProperties.pdf>

<https://github.com/dimitarpg13/aiconcepts/blob/master/docs/ReinforcementMechanismInSemanticStructureModels.pdf>

<https://github.com/dimitarpg13/aiconcepts/blob/master/docs/SemanticTemplates.pdf>

<https://github.com/dimitarpg13/aiconcepts/blob/master/docs/PracticalExamplesUsingSemanticSimulationWithRL.pdf>

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](https://github.com/dimitarpg13/InsideTensorflow2Source/blob/master/Understanding%20Tensorflow%20%20%202%20source%20code.pdf)

[%202%20source%20code.pdf](https://github.com/dimitarpg13/InsideTensorflow2Source/blob/master/Understanding%20Tensorflow%20%20%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>