PhD Thesis Proposal

Title:
Automated Code Generation for Real-Life Software Applications

Subject:
Search-Based Software Engineering, Evolutionary Algorithms, Data Mining, ChatBot

Context:
Search-Based Software Engineering and Testing (SBSE/T) aim to automate the generation and the testing of software applications. Automation of Software Engineering has attracted a lot of attention in the last decade from both industry and academia. The field splits into two different research areas:

    (i)   **Program Synthesis [1]** where programs are generated using some search-based techniques (e.g., genetic programming) with respect to some high-level specifications or abstract input/output scenarios.

    (ii)   **Program Sketching [2]** where technical documentation is mined using some text analytics tools to create a sketch/skeleton/Feature Model of the desired software application with the required functionalities and dependencies.

PhD Objective:
Artificial Intelligence (AI) is the central enabling technology for both Program Synthesis and Program Sketching. The goal of this PhD is to combine these two areas and exploit the abundant documentation to allow the synthesis of large real-life software applications.

Relevant Readings:

[1] Stefan Forstenlechner, David Fagan, Miguel Nicolau, and Michael O'Neill. Extending program synthesis grammars for grammar-guided genetic programming. In *Parallel Problem Solving from Nature – PPSN XV*, pages 197–208, Cham, 2018. Springer International Publishing.

[2] Yanxin Lu, Swarat Chaudhuri, Chris Jermaine, and David Melski. Program splicing. In *Proceedings of the 40th International Conference on Software Engineering*, ICSE '18, pages 338–349. ACM, 2018.

Supervisor:

Dr Takfarinas Saber

Dates:

The PhD thesis will commence between September 2020 and January 2021.

Location:

School of Computer Science, University College Dublin (UCD), Ireland
UCD is Ireland Largest University and one of Europe's leading research-intensive universities.

Conditions and Benefits:

The PhD position covers the payment of the PhD registration fees. The position also comes with a tax-free scholarship of €18,000 per year and an allowance for a PC. The candidate will gain access to UCD student facilities and services (such as, clubs, concerts, sports centre, campus pubs, etc.).

Informal Enquiries:

Get in touch with Dr Takfarinas Saber by email at takfarinas.saber@ucd.ie

Application:

Send CV and recent transcripts to: takfarinas.saber@ucd.ie