Advancing data mining algorithms in assertion-based verification process to make a trustworthy system

Summary

Short summary of the position

Research field:	Information and communication technology
Supervisors:	Tara Ghasempouri Prof. Dr. Sadok Ben Yahia
Availability:	This position is available.
Offered by:	School of Information Technologies Department of Computer Systems Department of Software Science
Application deadline:	Applications are accepted between June 01, 2020 00:00 and July 03, 2020 23:59 (Europe/Zurich)

Description

With ever increasing design sizes, verification becomes an important process in modern design flows. Up to 70% of the overall costs of a design flow are due to the verification task. Assertion-based verification has reduced dramatically the verification time and cost compared with the traditional methods. However, the current assertion mining approaches suffer from shortcomings, i.e., producing too many assertions causes overhead in the verification process and too few assertions lead to incomplete coverage.
Meanwhile, data mining has become a promising way for discovering patterns and complex relations between data in large data sets. Thus, an advanced data mining algorithm which is compatible with assertion mining can solve the above-mentioned shortcomings. This PhD program aims at proposing an innovative data mining algorithm to extract useful information from specifications and the designs, to generate high-quality assertions. These high-quality assertions will be used in the verification process to assure the system is trustworthy and totally aligned with the specifications and the designers' intents.

We are looking for motivated PhD students graduated in computer science or related area. The candidates are expected to have the following core skills:

- Ability to describe RTL designs (preferably in Verilog)
- Ability to write C++/python scripts for building small EDA tools
- Proof of strong writing skills (English) that are compatible with doctoral-level requirements, i.e., IELST 6.5 or TOEFL 70-93.

Other skills are considered a plus:

- Publication(s) in topics related to verification, design understanding, reliability and data mining
- Familiarity with concept of verification and assertions
- Hands-on experience with data mining

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