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**Subject: Review of the doctoral thesis submitted by Pavel Jancik**

I have examined the results presented in the doctoral thesis with title “*Efficient Representation of Program States*” by Pavel Jancik. In the thesis, the doctoral student has presented two main contributions of his research work with the common goal of improving software verification algorithms: a technique to eliminate dead variables on the heap (Chapter 4) and a technique for reducing Craig interpolants based on (partial) variable assignments (Chapter 5).

The topic of efficient state representation (and matching, searching, etc.) is crucial in the area of software verification. During verification, several optimizations can be applied (partial order reduction, decomposition, state compression, etc.) and discovering information that can be discarded (like dead variables) promise to reduce the state space and mitigate the state explosion problem. As pointed out in the thesis, there is no silver bullet that can make sw verification by model checking always successful, but a group of techniques (like those presented in the thesis) can significantly improve performance and applicability of model checking algorithms.

I have found the thesis well written and the background (Chapter 2) sufficiently covered. The goals are clearly presented and discussed. I have appreciated the identification of a common topic between the two aspects of the thesis (one more oriented to explicit state representation and the other to the symbolic one).

Although the whole work is clearly the result of group effort, I am sure that the contribution of Pavel as main author of the papers published and discussed in the thesis (1.3) has been relevant. Moreover, the original parts of the thesis prove the author ability for creative scientific work.

For all these reasons, I propose to grant the doctoral degree to Mgr. Pavel Jancik.

Yours sincerely

Dalmine, 6/9/2017

Angelo Gargantini

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