

Inference of Development Activities from Interaction with Uninstrumented Applications

An Extended Abstract of a Paper Published in the Empirical Software Engineering Journal
(Communicated by Massimiliano Di Penta)

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ABSTRACT

Studying developers' behavior is crucial for designing effective techniques and tools to support developers' daily work. However, there are two challenges in collecting and analyzing developers' behavior data. First, instrumenting many software tools commonly used in real work settings (e.g., IDEs, web browsers) is difficult and requires significant resources. Second, the collected behavior data consist of low-level and fine-grained event sequences, which must be abstracted into high-level development activities for further analysis.

In this paper [1], to address these two challenges, we first use our ActivitySpace framework to improve the generalizability of the data collection. Then, we propose a Condition Random Field (CRF) based approach to segment and label the developers' low-level actions into a set of basic, yet meaningful development activities. To evaluate our proposed approach, we deploy the ActivitySpace framework in an industry partner's company and collect the real working data from ten professional developers' one-week work. We conduct an experiment with the collected data and a small number of initial human-labeled training data using the CRF model and the other three baselines (i.e., a heuristic-rules based method, a SVM classifier, and a random weighted classifier). The proposed CRF model achieves better performance (i.e., 0.728 accuracy and 0.672 macro-averaged F1-score) than the other three baselines.

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ICSE '18, May 27-June 3, 2018, Gothenburg, Sweden

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ACM ISBN 978-1-4503-5638-1/18/05.

<https://doi.org/10.1145/3180155.3182537>

The full paper is published in the Empirical Software Engineering journal, and can be found at:

<https://link.springer.com/article/10.1007/s10664-017-9547-8>

Please cite the following paper: Bao L, Xing Z, Xia X, Lo D, Hassan AE (2017). Inference of Development Activities from Interaction with Uninstrumented Applications. Empirical Software Engineering pp 1–39.

CCS CONCEPTS

• **Software and its engineering** → *Software libraries and repositories*;

KEYWORDS

Software development, Developers' interaction data, Conditional Random Field

REFERENCES

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