An extension of Mazukiewicz Traces and their applications in specification of real-time systems

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Abstract: This paper proposes a method for specification of concurrency and timing constraints of real-time systems. The key idea of the proposed method is to extend the Mazurkiewicz Traces with time in order to capture the concurrency and timing constraints among the services of systems. The method is formal, effective for abstracting and supporting automated checking. © 2010 IEEE.

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References:

• Keller, R.M., Parallel program schemata and maximal parallelism i. fundamental results (1973) J. ACM, 20 (3), pp. 514-537

- Mazurkiewicz, A., Trace theory (1987) Advances in Petri Nets 1986, Part II on Petri Nets: Applications and Relationships to Other Models of Concurrency, pp. 279-324., New York, NY, USA: Springer-Verlag New York, Inc
- Liu, Z., Jifeng, H., Li, X., Rcos: A refinement calculus for object systems (2006) Theoretical Computer Science, Tech. Rep.
- Alur, R., Dill, D.L., A theory of timed automata (1994) Theor. Comput. Sci., 126 (2), pp. 183-235
- Larsen, K.G., Pettersson, P., Yi, W., (1995) Model-checking for Real-time Systems, pp. 62-88
- Hung, L.D., Hung, D.V., Timing and concurrency specification in component-based real-time embedded systems development (2007) TASE '07: Proceedings of the First Joint IEEE/IFIP Symposium on Theoretical Aspects of Software Engineering, pp. 293-304. Washington, DC, USA: IEEE Computer Society
- Diekert, V., Gastin, P., From local to global temporal logics over Mazurkiewicz traces (2006) Theoretical Computer Science, 356 (1-2), pp. 126-135., DOI 10.1016/j.tcs.2006.01.035, PII S0304397506001095
- D'souza, D., (2000) A Logical Study of Timed Distributed Automata, , phd thesis
- Bollig, B., (2006) Formal Models of Communicating Systems: Languages, Automata, and Monadic Second-Order Logic (Texts in Theoretical Computer Science. An Eatcs Series), , Secaucus, NJ, USA: Springer-Verlag New York, Inc
- Mathematik, V.D.F.F., Und, I., Rheinischwestflischen, N.D., Hochschule, T., Erlangung, A., Leucker, M., Leucker, M., Prfung, T.D.M., (2002) Logics for Mazurkiewicz Traces
- Gastin, P., Petit, A., Asynchronous cellular automata for infinite traces (1992) ICALP '92: Proceedings of the 19th International Colloquium on Automata, Languages and Programming, pp. 583-594., London, UK: Springer-Verlag
- Zielonka, W., Notes on finite asynchronous automata (1987) ITA, 21 (2), pp. 99-135
- Van Hung, D., Anh, B.V., Model checking real-time component based systems with blackbox testing (2005) Proceedings 11th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications, pp. 76-79. , DOI 10.1109/RTCSA.2005.59, 1541060, Proceedings - 11th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications
- Thiagarajan, P.S., Walukiewicz, I., An expressively complete linear time temporal logic for mazurkiewicz traces (2002) Inf. Comput., 179 (2), pp. 230-249
- Bengtsson, J., Yi, W., Timed automata: Semantics, algorithms and tools (2003) Lectures on Concurrency and Petri Nets, pp. 87-124
- Jifeng, H., Liu, Z., Xiaoshan, L., (2003) Contract-oriented Component Software Development, , UNU/IIST, P.O. Box 3058, Macao SAR, Tech. Rep