ter Beek, Maurice H.; **Kleijn, Jetty**
Vector team automata. (English) Zbl 1252.68205
Theor. Comput. Sci. 429, 21-29 (2012).

Team automata are composed out of sequential automata interacting through synchronizations on common actions, with a synchronous execution of a global action changing the local states of the automata that take part in the synchronization. The paper explores the relationship between team automata and Petri nets which are a model of concurrent systems, where the execution of an action is local in the sense that it only depends and affects local states in the immediate neighborhood of the action. Synchronization in a team automaton, on the other hand, in general depends on the global state which is referred to as state-sharing, and sometimes it is impossible to determine which automata take part in a given synchronization.

Vector team automata are a class of team automata with an explicit representation of synchronizations in the form of vectors of component actions from which one can deduce automata involved in synchronizations. The paper shows how one can capture the behavior of non-state-sharing vector team automata by individual token net controllers. The latter are a class of state machine decomposable labeled Petri nets with a synchronization mechanism based on vector labels. It becomes therefore possible to transfer and apply the concurrency semantics developed for Petri nets to the vector team automata model.

Reviewer: Maciej Koutny (Newcastle upon Tyne)

MSC:

68Q85	Models and methods for concurrent and distributed computing (process algebras, bisimulation, transition nets, etc.)
68Q10	Modes of computation (nondeterministic, parallel, interactive, probabilistic, etc.)
68Q45	Formal languages and automata
68Q55	Semantics in the theory of computing

Keywords:

team automaton; Petri net; vector team automaton; vector controlled concurrent system; synchronization; individual token net controller; model translation

Full Text: DOI

References:

[1] M.H. ter Beek, Team automata: a formal approach to the modeling of collaboration between system components, Ph.D. Thesis, Leiden University, 2003.

[2] ter Beek, M.H.; Ellis, C.A.; Kleijn, J.; Rozenberg, G., Team automata for spatial access control, (), 59-77

[3] ter Beek, M.H.; Ellis, C.A.; Kleijn, J.; Rozenberg, G., Synchronizations in team automata for groupware systems, Computer supported cooperative work, 12, 1, 21-69, (2003)

[4] Carmona, J.; Kleijn, J., Interactive behaviour of multi-component systems, (), 27-31

[5] Diekert, V.; Rozenberg, G., ()

[6] Engels, G.; Groenewegen, L.P.J., Towards team-automata-driven object-oriented collaborative work, (), 257-276 · Zbl 1060.68607

[7] N.W. Keesmaat, Vector controlled concurrent systems, Ph.D. Thesis, Leiden University, 1996.

[8] Keesmaat, N.W.; Kleijn, H.C.M.; Rozenberg, G., Vector controlled concurrent systems, part I: basic classes, Fundamenta informaticae, 13, 275-316, (1990) · Zbl 0713.68024

[9] Keesmaat, N.W.; Kleijn, H.C.M.; Rozenberg, G., Vector controlled concurrent systems, part II: comparisons, Fundamenta informaticae, 14, 1-38, (1991) · Zbl 0718.68036

[10] Kleijn, J., Team automata for CSCW: a survey, (), 295-320 · Zbl 1283.68247

[11] ()

paper as accurately as possible without claiming the completeness or perfect precision of the matching.