I want to discuss the section V for Extended and Communicating finite state machines further in the pass 3 reading.

Normally, the difference between the extended finite state machines (EFSM) and the finite state machines (FSM) is that the transition of FSM is associated with a set of input and a set of output functions, while the transition of FSM is expressed by a set of trigger functions. In the paper, it defines the EFSM as $M = (I, O, S, \dot{x}, T)$ (where they denotes input symbols, output symbols, states, variables and transitions respectively). If a set of variables is valid, then the predicate on these variable values $P(\dot{x}) = true$. For the reason that the sets of valid variable values of transitions are disjoint, we can reduce the EFSM to the ordinary FSM. A configuration is a combination of a state and variable values. However, it is possible that equivalent ordinary FSM may have too many states (state explosion problem), which will make it impossible to construct it. Thus, the paper puts emphasis on discussing the procedure for minimization and reachability of deterministic EFSM and assumes the state explosion problem does not exist.

The paper then states that the first procedure is to construct the equivalent FSM. The method is to merge the equivalent states into a single one and then compute the reduced machine. The paper quotes a well-known example of token ring protocol to explain this. It gives the EFSM of the protocol, which consists of three control states, three variables and seven transitions. The three variables include a Boolean variable $M$ for the monitor bit, an integer variable consisting of three priority bits and an integer variable consisting of three bits for the reservation requests. For the outgoing transitions from the same state, we can partition them into blocks, with each block containing same predicate on the valid variable values.
Sometimes the ordinary FSM is too large to compute, so we can directly construct the minimized FSM. Well to mention is that minimization can largely reduce the system complexity.

For the transition system derived from the EFSM, the paper proposes to minimize the system by splitting the blocks until all transitions are stable. But can we make the machine smaller? The answer is that we can construct the reachable part of the reduced machine from the initial configuration without constructing the unreachable ones. The method is similar to that of minimization, of which we split the blocks once there are unstable transitions and mark newly reachable blocks.

The paper extends the FSM modeling to those EFSM with parameters associated with inputs and also have influence on the predicates and actions of transitions. And the paper demonstrates that such EFSM also has the state explosion problem, thus requiring more general procedure to simplify.

In real applications, machine with protocols among several different processes is common. It is different from the machine we have mentioned above in that it involved the interaction between different component machines. In order to solve the problem of state explosion, the paper proposes a more general procedure such as the guided random walk. The benefits of guided random walk include the bigger fault coverage. In the guided random walk, it gives the unvisited transitions higher priority and makes some random selection.