This study investigates the decentralized task allocation of simple non-communicating agents in dynamic environments of multiple tasks. Multi-area patrolling is used as the sample domain: specific number of agents is required to successfully patrol each area on each timestep, indefinitely, until the system's security needs. Agents must individually decide whether to patrol and where (i.e., task availability is not limited by task demand nor by other agents' actions). Insufficient patrolling decreases security, while excess patrolling is wasteful and can lead to interference. Additionally, patrolling efforts cannot be accumulated: patrolling more now does not reduce patrolling needs later. Patrolling is also never completed, requiring ongoing agent action from a subset of the agents. Consequently, we term such tasks as "ongoing". Other examples include exploration, perishable resource gathering, diagnostics, and maintenance.

The presented research compares several Learning Automata amenable to the decentralized task allocation of ongoing tasks with dynamically changing demands. The approaches are compared based on how quickly and accurately agents adapt to new demands, as well as by the resulting level of agent specialization, since specialized action is generally considered beneficial to performance. Testing also addresses: whether agents can readapt after an initial adaptation; whether agents can learn to become active or to idle, as needed; and whether agents spread their work proportionately across tasks when there are too few to fulfill all task demands, or whether some tasks are continuously neglected in favor of others. Additionally, as all system tasks are always available to each agent, three task selection strategies are considered for each approach. Results showcase what adaptation behavior can be expected from each tested automata and selection strategy combination under the different domain conditions.

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The public is welcome to attend.