Towards a RTC agent algorithm – some initial rules of thumb

It’s complex and evolving but here is my take on some heuristics:

• Observe the environment carefully
• Suppress desire to act spontaneously (not to act is also to act)
• Consider at least 4 actions you can take and consider each in relation to the existing environment
• Your action may:
  – reinforce (copy / add to / continue) an existing pattern in the environment (evidenced from at least two previous actions)
  – Begin a pattern suggested by a first action (make a second action)
  – Start a new action
• Try to make actions clear to observers of the environment
• Try to avoid starting a new action unless the environment suggests it: such as looping or a physical constraint
• Be creative in continuing a pattern with the materials available and the environmental constraints
• Limit your communication to actions within the environment
An outline algorithm

• Given environment \( E = \{f_1, f_2, f_3, \ldots\} \) where \( f \) are observable features (or patterns in) \( E \)
• A set of agents \( P = \{p_1, p_2, p_3, \ldots\} \) have access to \( E \)
• For each time step \( t \)
  – each agent observes \( E \) and forms a set \( S = \{\text{null}, a_1, a_2, a_3, \ldots\} \) of potential actions, where \( \text{null} = \) no action, up to some maximum
  – Each action may extended an existing feature (or pattern) or create a new one with a bias toward extending [tricky bit]
  – By some maximum time \( t + \delta \) each agent selects an action from \( S \) and performs it on \( E \) changing the feature set of \( E \)
• Repeat next time step

[note: each agent may / should have several different / overlapping feature (pattern) recognition modules and action repertoires]
Trivial example

- $E$ = a network of nodes undirected links (graph), $f$ = each node and it’s links
- $P$ = population of agents all the same
- Potential actions = copy a random $f$ or add a new node and link to one randomly chosen existing node (create a new $f$)
- Repeat

[from ANY initial $E$ – including nothing - we get something like....]