Progress Presentation

May 26th - June 6th

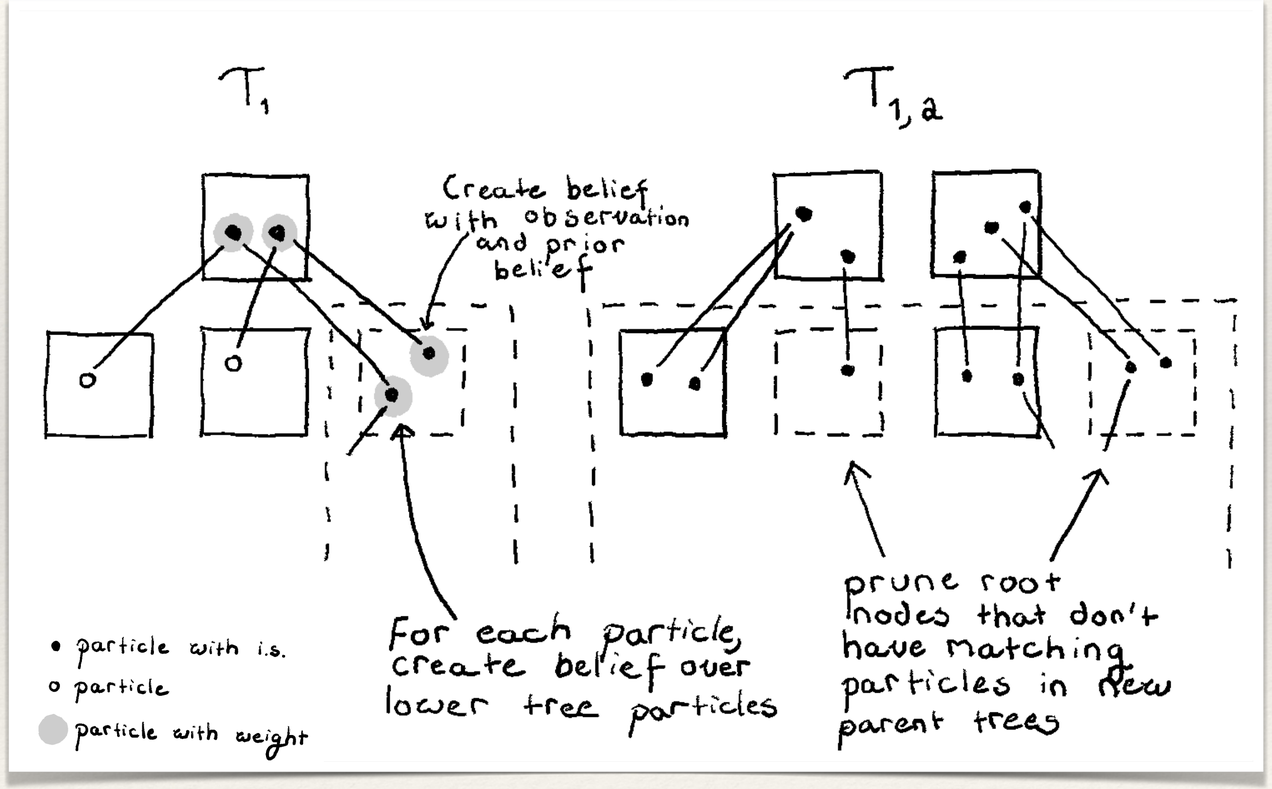
Agenda

- updates to the algorithm v2
  - clarification on belief update
  - big change to planning
- issue with particle filter (creating a valid belief reflecting the true state)

What kind of strategies do civilisations in the universe employ to ensure their survival, and how do these strategies change over time and space?

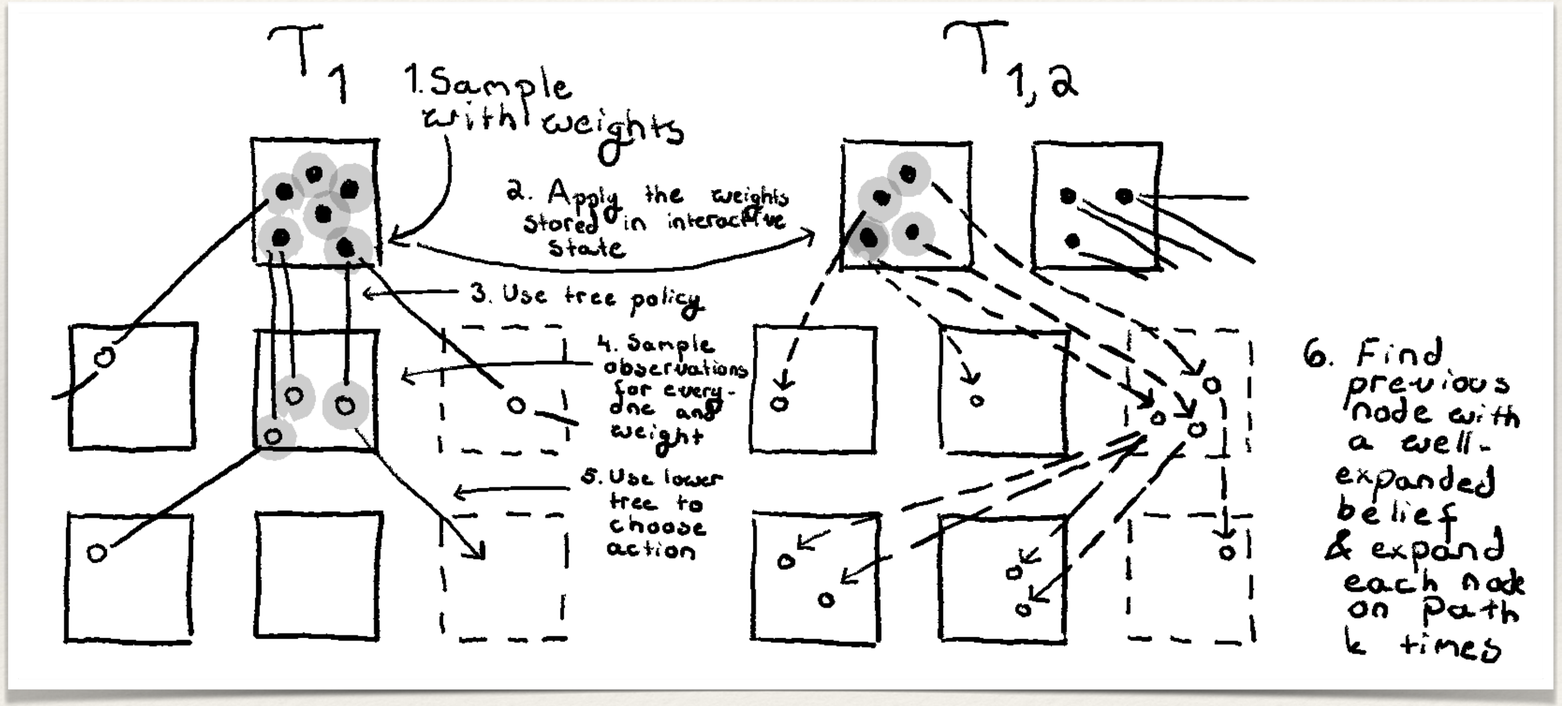
Belief Update

- interactive state (weights over particles in the corresponding node in the child tree of the other agent) only stored in particles in the root nodes
- other interactive states are created dynamically (by weighting during sampling)
  - new particles are added to non-root nodes, so no point in storing weights



Planning

- issue: with bottom-up planning, the trees on lower levels might not have planned adequately for what to do in a given belief
  - approximation of optimal moves becomes poor
  - stems from a difference between what the agent thinks the other agent will do and what they actually do
- new idea: plan top-down, first the top-level tree and the lower trees only when necessary
  - small issue remaining: propagating values upwards after simulating from a non-root node



Issues with Particle Filter

- particle filter always diverges (weights of all particles become 0)
- this happened even in v1 — it was just quietly ignored in the code
- usually fixed with
  - resampling
  - “roughening” (adding noise to transition function)
- possible solution: adding particles that are compatible with observation (“sampling from likelihood”) to node
  - but how to weight appropriately?