COMPANION goals (Kirby thesis pp. 4-5)

• Minimizing the distance traveled to a goal, to conserve energy;

• Avoiding obstacles;

• Keeping a safety buffer around obstacles;

• Avoiding people, including keeping out of their personal space;

• Protecting the robot’s own “personal” space;

• Tending to the right when passing people;

• Keeping a default velocity, so as not to expend extra energy;

• Facing the direction of travel, but allowing for sidestepping obstacles as people do; and

• Maintaining forward inertia, rather than zig-zagging repeatedly, which is both inefficient and socially awkward.

US : we use first 4 (*maybe* we can use motion instructions that consider the last one? But not yet)

the robot should prefer to keep a constant velocity. Changes to the default velocity should result in a cost to the robot, such that the robot would have a cost trade-off between slowing down versus traveling a greater distance around an obstacle or person. We model this objective as proportional to the absolute difference between the chosen velocity and the default velocity; that is, both increases and decreases in speed incur a cost, and greater changes cause greater costs. This cost is computed according to the following equation: cvelocity(s1, s2, a) = a.t v 0 x − a.vx (4.12) where v 0 x is the desired forward velocity. The cost is scaled by the time to execute the action, so that if actions can have variable execution times (as they do when a variable grid is used; see Section 4.4), the cost will also differ. Because of the time scaling, this cost is typically small, and thus may require a higher weighting in the overall objective function to cause a significant change in the planner’s behavior.