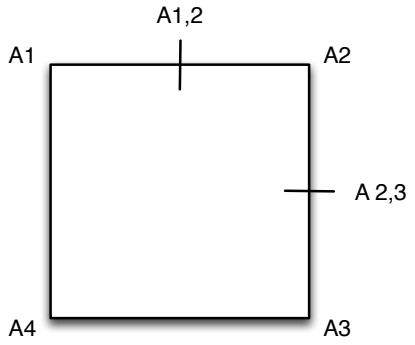
1 Decomposable Learning/Training

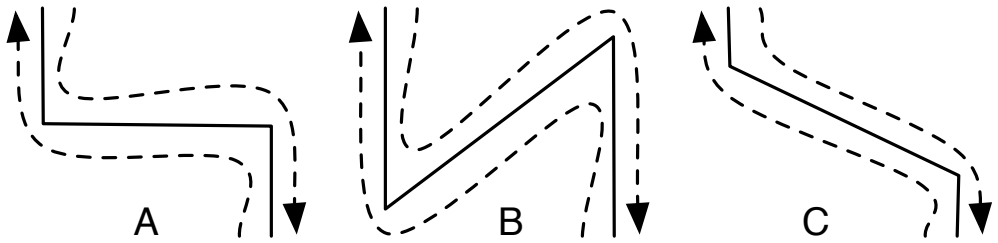
When I was doing a wall follow, I have noticed one interesting thing. To do a successful wall-follow you do not need to train the agent to wall-follow around the whole object. Let's consider the image below —



Previously I was training the agent by starting from A_1 to A_2 and to A_3; again from A_3 to A_4 and to A_1, i.e. full clock-wise rotation. However, this learning process does not need to be a full rotation. If I train the agent to move around A_1 to A_3 the agent can successfully follow almost any simple geometrical object. Moreover, it can also do the wall-follow if we train the agent to move from just $A_{1,2}$ to $A_{2,3}$. Which suggests that the learning may not need to be exhaustive always. In this case, what the agent is doing is to utilize the "perceptually aliased states", since the corner $A_1 - A_2 - A_3$ and $A_3 - A_4 - A_1$ are "perceptually aliased" in terms of *directio-to* and *distance-from* the object.

In other way, we can also say that the two features (i.e. *direction-to* and *distance-from*) are "aliased-state-invariant" when we are doing a "wall-follow" behavior.

So a I was wondering if a whole wall-follow could be made more general from training on a set of primitive objects like these –



Here the object A is has a turn of 90°, and the objects B and C has varying corner angles. Moreover, we will also train the agent for inside and outside corner. In this way we will train the agent with N numbers of different primitive objects and test if it can do the wall-follow on complicated objects like the "chinese character" or around the "vittorio" objects in the HiTAB.

A possible topic for investigation may be the minimum limit of decomposability of a large/complicated task, i.e. the minimum number of sub tasks that must be required to train the agent to achieve a very complicated maneuver, or what features are exactly need to be necessarily "alised-state-invariant" to successfully decompose a large complete maneuver to a set of independent small tasks – so that we can only concentrate only on those to train the agent.

I am not sure if this problem is worth-pursuing or how to do the investigation/analysis if this seems really useful.