Building Game Theoretical Software in a Research Environment

More info here

James Campbell & Dr Vince(nt) Knight

Department of Mathematics

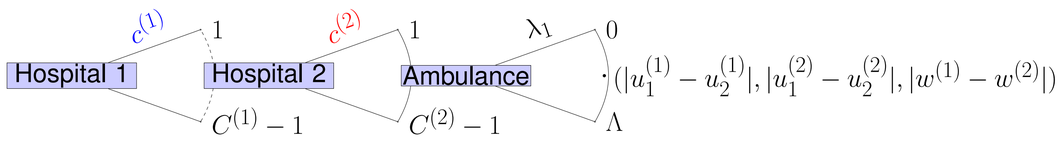

Figure 1: Underlying Stackelberg Game

Stackelberg game, MC, NFG

The issue of waiting times for ambulances at at two hospitals can be modelled as a simple Stackelberg game where each hospital has its own AE and Ward. Patients arrive at the AE at rate λ and if there is space in the queue they join it. If there is no space in the queue that patient is lost. Each patient has an AE service time, μ, which represents how long their treatment in AE will last. A proportion, p, of patients are then dismissed immediately. Those who are not dismissed are admitted to the ward if there is space, otherwise they will wait in AE, continuing to occupy a bed. Once admitted, they are treated in the ward with a service time $\hat{\mu}$ and then dismissed without delay.

Sage OSS, Matching/Co-operative games

Sage: "Creating a viable free open source alternative to Magma, Maple, Mathematica and Matlab". Ref? The areas of Game Theory that we decided to implement in Sage were Matching Games, Co-operative Games and Normal Form Games.

Limitations of MC

Fusce magna risus, molestie ut porttitor in, consectetur sed mi. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Pellentesque consectetur blandit pellentesque. Sed odio justo, viverra nec porttitor vel, lacinia a nunc. Suspendisse pulvinar euismod arcu, sit amet accumsan enim fermentum quis. In id mauris ut dui feugiat egestas. Vestibulum ac turpis lacinia nisl commodo sagittis eget sit amet sapien. Phasellus imperdiet, tortor vitae congue bibendum, felis enim sagittis lorem, et volutpat ante orci sagittis mi. Morbi rutrum laoreet semper. Morbi accumsan enim nec tortor consectetur non commodo nisi sollicitudin. Proin sollicitudin. Pellentesque eget orci eros. Fusce ultricies, tellus et pellentesque fringilla, ante massa luctus libero, quis tristique purus urna nec nibh. Proin sollicitudin. Pellentesque eget orci eros. Fusce ultricies, tellus et pellentesque fringilla, ante massa luctus libero, quis tristique purus urna nec nibh.

Q-Learning

Q-learning is the process of assigning a state-action value or Q-value to the combination of being in a state, taking an action and observing a reward. The Q-value is then updated by assessing the maximum value of being in the new state. The higher the Q-value the more likely a player is to choose action a when in state s.

Nulla sed arcu arcu. Duis et ante gravida orci venenatis tincidunt. Fusce vitae lacinia metus. Pellentesque habitant morbi. $\mathbf{A}\underline{\xi} = \underline{\beta}$ Vim $\underline{\xi}$ enum nidi $3(P+2)^2$ lacina. Id feugain $\mathbf{A}$ nun quis; magno. Fusce convallis rutrum turpis, quis aliquet enim accumsan id. Vestibulum ullamcorper porttitor convallis. Integer sagittis interdum malesuada. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Sed adipiscing tristique orci at ullamcorper. Morbi accumsan, urna et porttitor pulvinar, lacus risus dignissim massa. Proin sollicitudin. Pellentesque eget orci eros. Fusce ultricies, tellus et pellentesque fringilla, ante massa luctus libero, quis tristique purus urna nec nibh.

Results

Donec faucibus purus at tortor egestas eu fermentum dolor facilisis. Maecenas tempor dui eu neque fringilla rutrum. Mauris *lobortis* nisl accumsan. Aenean vitae risus ante. Pellentesque condimentum dui. Etiam sagittis purus non tellus tempor volutpat. Donec et dui non massa tristique adipiscing.

Treatments	Response 1	Response 2
Treatment 1	0.0003262	0.562
Treatment 2	0.0015681	0.910
Treatment 3	0.0009271	0.296

Table 1: Table caption