Games and Information

Problems Sets

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Problem Set 1

Exercise 1

Imagine, the MEPS alumni association EAAS is planning a day hike in the Siegerland in July. You know that according to long-term statistics the probability for a sunny day (s) is 20%, the probability for a cloudy but dry day (c) is 50% and otherwise it will rain(r).

Farmers have their professional forecasting system. They receive private information about s, c or r a day ahead and all react in the same way. Early in the morning they choose between the option to harvest or not to harvest.

(1) What are the EAAS' priors π_s, π_c, and π_r?

(2) Draw a game tree (without pay-offs, as we are going to investigate beliefs only)!

(3) On the day before the trip is scheduled the weather is fine. You watch the farmers' weather channel on TV and either see the farmers harvest or not. (Remember, they all act the same way!)

   (a) You know that they harvest only if it is going to rain the next day. Formalize the farmers' strategy and compute the Bayesian beliefs of player EAAS?

   (b) You know that farmers are precautious and harvest the hay even if a cloudy but dry day is predicted. Formalize their strategy and derive player EAAS' beliefs!

please turn the page

Exercise 2

Consider the following almost true story: You see your neighbor over the road of your house every morning when he walks to work. Sometimes he carries an umbrella, sometimes not. You have to leave right after him and each time you ask yourself whether you should take your umbrella or not.

Take a look at the game tree below and make sure that you understand how this game tree matches the story. (In the game tree we list only your pay-offs because we focus on your behavior as a reaction

The weekly long-term forecast is represented by π. The daily forecast is exact and reliable, say $\psi = (\psi_A, \psi_B)$, and $\psi = (1, 0)$ or $\psi = (0, 1)$. Try to form reasonable, i.e. possibly Bayesian beliefs about the real weather.
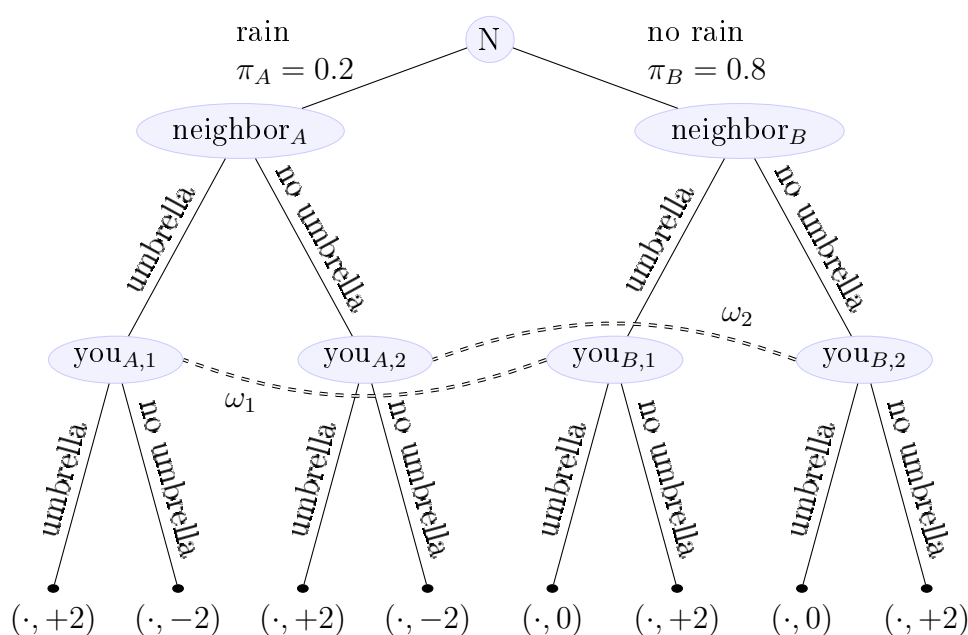
(1) What are your neighbor's strategies? Some of the strategies give you the chance to improve your information, some don't? Identify them and explain!

(2) What are your strategies?

(3) Consider your neighbor's strategies which improve your information. What are your beliefs based on these strategies, and what are your best responses to these strategies?