Supplement of conditional probability

1. Probability space

Consider a partitioned set

and

1. The intersection( or joint) probability as

Probability table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | sunny | rainy | foggy |  |
|  | happy | 0.5 | 0.05 | 0.05 | 0.6 |
|  | sad | 0.2 | 0.15 | 0.05 | 0.4 |
|  |  | 0.7 | 0.2 | 0.1 |  |

1. Check the legitimacy
2. Conditional probability

* You measure the weather condition to infer your mind
* You are confined in the room not to see outside. If you are happy. Predict the weather
* Check the legitimacy on the marginal probability

%% Kim’s comment :

Bayesian rule is very important nowadays. It is indispensable in ML. We should be familiar to this rule.

The interpretation may be

* Given B , the prob of A == the prob of A measured B == after measured B estimate A

== posterior probability

* P(A) : the original event of A == prior probabilaity
* Since

It is a marginal prob. It is constant w.r.t. event A i.e., the sunny prob.

* may be called the conditional marginal prob. i.e., it is a marginal regarding “B” conditioning

Home Assignment

1. See a video about Monty Hall problem and explain what is the rule.
2. In the Monty Hall problem, there are three doors for you to select to win the game.
   1. What is the “win” probability at each case such that after Monty open one of remained two door

-if you do not switch the door.

-if you switch the door. you switch the door.

* 1. Consider a Monty Hall problem in which there are four doors. Calculate the “win” probability at each case. After selection one door, three closed doors are remained.

1. if Monty open one door
2. if Monty open two doors simultaneously