Classification Learning Activity – Due: January 25 2016

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Problem:

Using “Golf Decision Table” from class, while holding Outlook = “rainy”, analyze the Entropy of the system and decide which predictor is the best one to analyze.

Analysis:

The reduced decision table with Outlook = “rainy” is as follows:

Temperature	**Humidity**	**Windy**	**Play Golf?**
Hot	High	False	No
Hot	High	True	No
Mild	High	False	No
Cool	Normal	False	Yes
Mild	Normal	True	Yes

Evaluating the predictors gives the following outcome:

Predictor	**Condition**	**Yes Count**	**No Count**	**Probability**
Temperature	Hot	0	2	2/5
Temperature	Mild	1	1	2/5
Temperature	Cool	1	0	1/5
Humidity	High	0	3	3/5
Humidity	Normal	2	0	2/5
Windy	True	1	1	2/5
Windy	False	1	2	3/5

Evaluating the Entropy gives:

$H(\text{Temperature}) = 2/5\ (0) + 2/5\ (1) = 0.4$

$H(\text{Humidity}) = 3/5(0) + 2/5(0) = 0$

$H(\text{Windy}) = 2/5(1) + 3/5(0.92) = 0.4 + 0.55 = 0.95$

Conclusions:

We only need to look at humidity to determine the outcome. This is indicated by the fact that the entropy of the Humidity predictor is 0 as this implies that if we know Humidity, then we must know the outcome. Analyzing the Humidity predictor table above, we see that if Humidity if Normal, Play Golf is always yes. Likewise, when Humidity is High, Play Golf is always no. Thus, we do not need to look at Temperature or Windy in order to determine the outcome of this situation, if we know Outlook = “rainy” and we know the value of Humidity.