**Introduction**

The purpose of this assignment is to inform a marketing plan that will target future visitors to one of the Wisconsin Dells seven attractions referenced in the Harrington (2007) case study. This study will outline management recommendations to drive more visitors to “The Ducks” tour using an unsupervised learning model based on associative rule mining. The input data is a 1,698 in-person survey conducted at various locations and attractions across the Wisconsin Dells area.

**Results**

The model uses the “Apriori” algorithm developed by Peter Harrington as outlined in the book Machine Learning in Action (2012). This algorithm reduces the computation cost of candidate itemsets and calculates inference probabilities between an itemset X that correlates with an itemset Y. The first part of the study analyzed correlations between the 33 activities to identify potential marketing strategies to target visitors at activity X with a propensity to also visit activity Y. Two critical algorithm variables were manipulated to increase the likelihood that the management recommendations would deliver the expected business results. The support algorithm variable (alpha) was set high (0.50) to identify frequent data sets and the confidence was also set higher than chance (0.60) to only identify rules with a strong correlation that visitor attending activity X is also highly likely to attend activity Y. The model produced a strong market basket correlation between riding the Duck Tour and shopping. A shopping visitor was 62.1% likely to ride the Duck Tour. Conversely, a visitor to the Duck Tour was 87% likely to shop. The model did not identify rules between other activities beyond shopping. Using this insight, recommendations to the Ducks marketing plan include:

* Print ads in shopping center guide books
* Ad pamphlets placed next shopping center advertisements in locations such as hotel lobbies
* Discount coupons left on cars outside shopping center establishments
* Co-marketing between shopping centers or specific retailers to offer slight Duck Tour discounts on point-of-sale receipts. Given the strong correlation (86%) that Duck Tour visitors also shop, there could also be advertisements on the boat, pamphlets or brochures that also offer discounts at those specific retailers. This strategy would be mutually beneficial.
* Online ads placed on shopping center websites and paid search ads for users searching for shopping information.
* Geo-based mobile ads that target users who are in shopping locations.

The second part of the analysis evaluated visitor demographics to determine if there were any strong correlations to the Duck Tour. The categorical demographic data was binarized and the model calculated associations between the following variables:

* There is a 59.94% probability taking the Duck Tour when there are 2 adult visitors
* There is 61.5% probability taking the Duck Tour when visitors plan more than one in advance.

**Conclusions**

**Code**

**References**

Harrington, J. C. (2007). *Wisconsin Dells.* Madison, Wisconsin: Research Publishers.

Harrington, P. (2012). Machine learning in action. Shelter Island, N.Y.: Manning.