# Decision Tree

## Non/pre/post-pruning Decision Tree

1. *Data Sets*

* Watermelon Data Set:
* The dataset has 9 features which are Color,Burgundy,slap,texture,umbilicus,touch,density,Sugar content and Good melon. And there are 17 items. The dataset come from the book of Machine Learning.
* In the experiment, I use this dataset to construct the my code
* Contraceptive Method Choice Data Set:
* The dataset has 10 features which are
* Wife's age ,Wife's education,Husband's education,Number of children ever born,Wife's religion ,Wife's now working,Husband's occupation,Standard-of-living index ,Media exposure and Contraceptive method used. And there are 1473items. The dataset come from the website of UCI
* In the experiment , I use this dataset to test the algorithm written by me.

1. *Experimental Setup*

* win10
* test size: 25%

1. Quantitative Results

* The result of algorithm on the watermelon dataset are here. Here is predict accuracy of three method.

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| * Algorithm typeP | * Predict accuracy |
| * Non-pruning decision tree | * 28% |
| * Pre-pruning decision tree | * 57% |
| * Post-pruning decision tree | * 57% |

1. *Qualitative Results*

* The result of algorithm on the Contraceptive Method Choice Data Set are here.Here is predict accuracy of three method.

|  |  |
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| * Algorithm typeP | * Predict accuracy |
| * Non-pruning decision tree | * 20% |
| * Pre-pruning decision tree | * 33% |
| * Post-pruning decision tree | * 33% |

1. *Further Discussion*
   * The Predict accurcy of my algorithm is a little low. Both watermelon data set and contraceptive method choice data set,the accuracy is no more than 60% .Even in the contraceptive method choice data set it is no more than 40%.
   * I think it is because in my algorithm the feature selection are based on Infomation Gain.
   * The accuracy of pre-pruning decision tree and the post\_pruning decision tree are same.
   * I think it is because pruning operation is performed on the same validation data set. So the accuracy of the decison tree is same after pruning.