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CIS4930

Individual\_Project\_II Report

**Titanic Dataset (Apriori)**

***All Rules***

Produces a set of 186 rules

***Support = 0.01 & Confidence = 0.9***

lhs rhs support confidence lift

1 {Class=2nd,Age=Child} => {Survived=Yes} 0.01090413 1.0000000 3.095640

2 {Class=1st,Sex=Female} => {Survived=Yes} 0.06406179 0.9724138 3.010243

3 {Class=2nd,Sex=Male,Age=Adult} => {Survived=No} 0.06996820 0.9166667 1.354083

4 {Class=1st,Sex=Female,Age=Adult} => {Survived=Yes} 0.06360745 0.9722222 3.009650

***Removing Redundancies***

1 {Class=2nd,Age=Child} => {Survived=Yes} 0.01090413 1.0000000 3.095640

2 {Class=1st,Sex=Female} => {Survived=Yes} 0.06406179 0.9724138 3.010243

3 {Class=2nd,Sex=Male,Age=Adult} => {Survived=No} 0.06996820 0.9166667 1.354083

***Sorted***

1 {Class=2nd,Age=Child} => {Survived=Yes} 0.01090413 1.0000000 3.095640

2 {Class=1st,Sex=Female} => {Survived=Yes} 0.06406179 0.9724138 3.010243

3 {Class=2nd,Sex=Male,Age=Adult} => {Survived=No} 0.06996820 0.9166667 1.354083

**Summary:** With the Titanic data set it is clear that after filtering for high confidence (and low support) as well as pruning for redundancies that those most likely to have survived the downfall of Titanic were 2nd class children as well as 2nd class male adults and female (adults and children) with a sizeable lift to support it.

**Retail Dataset (Apriori)**

***All Rules***

Set of 6108 rules

***Support = 0.01 & Confidence = 0.9***

Set of 520 rules

\*\*1 - 500 omitted to save space \*\*

501 {Bread,CannedGoods,Dairy,Drink,Fruit,PaperGoods,Vegetable} => {PersonalCare} 0.0158 0.9518072 1.644165

502 {Bread,CannedGoods,Dairy,Drink,FrozenFood,Fruit,Vegetable} => {PersonalCare} 0.0314 0.9486405 1.638695

503 {Bread,Dairy,Drink,FrozenFood,Fruit,PaperGoods,Tobacco} => {PersonalCare} 0.0211 0.9590909 1.656747

504 {Bread,Dairy,Drink,FrozenFood,PaperGoods,Tobacco,Vegetable} => {PersonalCare} 0.0216 0.9642857 1.665721

505 {Dairy,Drink,FrozenFood,Fruit,PaperGoods,Tobacco,Vegetable} => {PersonalCare} 0.0232 0.9666667 1.669834

506 {Bread,Drink,FrozenFood,Fruit,PaperGoods,Tobacco,Vegetable} => {PersonalCare} 0.0303 0.9711538 1.677585

507 {Bread,Dairy,Drink,Fruit,PaperGoods,Tobacco,Vegetable} => {PersonalCare} 0.0408 0.9691211 1.674073

508 {Bread,Dairy,Drink,FrozenFood,Fruit,Tobacco,Vegetable} => {PersonalCare} 0.0459 0.9562500 1.651840

509 {Bread,Dairy,Drink,FrozenFood,Fruit,PaperGoods,Vegetable} => {PersonalCare} 0.0232 0.9626556 1.662905

510 {Bread,Cleaner,Drink,FrozenFood,Fruit,PaperGoods,Tobacco,Vegetable} => {PersonalCare} 0.0114 0.9579832 1.654834

511 {Bread,Cleaner,Dairy,Drink,Fruit,PaperGoods,Tobacco,Vegetable} => {PersonalCare} 0.0168 0.9655172 1.667848

512 {Bread,CannedGoods,Dairy,Drink,FrozenFood,Fruit,PaperGoods,Tobacco} => {PersonalCare} 0.0120 0.9448819 1.632202

513 {Bread,CannedGoods,Dairy,Drink,FrozenFood,PaperGoods,Tobacco,Vegetable} => {PersonalCare} 0.0124 0.9465649 1.635109

514 {CannedGoods,Dairy,Drink,FrozenFood,Fruit,PaperGoods,Tobacco,Vegetable} => {PersonalCare} 0.0130 0.9489051 1.639152

515 {Bread,CannedGoods,Drink,FrozenFood,Fruit,PaperGoods,Tobacco,Vegetable} => {PersonalCare} 0.0169 0.9602273 1.658710

516 {Bread,CannedGoods,Dairy,Drink,Fruit,PaperGoods,Tobacco,Vegetable} => {PersonalCare} 0.0123 0.9461538 1.634399

517 {Bread,CannedGoods,Dairy,Drink,FrozenFood,Fruit,Tobacco,Vegetable} => {PersonalCare} 0.0252 0.9473684 1.636498

518 {Bread,CannedGoods,Dairy,Drink,FrozenFood,Fruit,PaperGoods,Vegetable} => {PersonalCare} 0.0136 0.9444444 1.631447

519 {Bread,Dairy,Drink,FrozenFood,Fruit,PaperGoods,Tobacco,Vegetable} => {PersonalCare} 0.0191 0.9597990 1.657970

520 {Bread,CannedGoods,Dairy,Drink,FrozenFood,Fruit,PaperGoods,Tobacco,Vegetable} => {PersonalCare} 0.0108 0.9391304 1.622267

***Removing Redundancies***

lhs rhs support confidence lift

1 {Drink} => {PersonalCare} 0.2921 0.9675389 1.67134

***Sorted***

lhs rhs support confidence lift

1 {Drink} => {PersonalCare} 0.2921 0.9675389 1.67134

**Summary:** A substantial amount of rules were generated when creating the entire rule set for the retail database. After filtering, PersonalCare seems to be the only product that gets chosen out of the three categories of Meat, Beverages and PersonalCare. Removing redundant rules led to one rule that was buying a “Drink” led to buying “PersonalCare” items with a decent amount of lift to support it.

**Game of Thrones Dataset (Apriori)**

***All Rules***

Set of 475 rules

***Support = 0.01 & Confidence = 0.9***

Set of 83 rules

lhs rhs support confidence lift

1 {House=House Martell} => {Survives=1} 0.01199564 0.9166667 1.373502

2 {House=House Tyrell} => {Survives=1} 0.01090513 0.9090909 1.362151

3 {House=Tyrell} => {Survives=1} 0.01526718 0.9333333 1.398475

4 {House=Martell} => {Survives=1} 0.02508179 0.9200000 1.378497

5 {House=House Martell,Book4} => {Survives=1} 0.01199564 1.0000000 1.498366

6 {House=Targaryen,Book5} => {Survives=1} 0.01308615 0.9230769 1.383107

7 {House=Tyrell,Book4} => {Survives=1} 0.01308615 0.9230769 1.383107

8 {House=Tyrell,Nobility} => {Survives=1} 0.01526718 0.9333333 1.398475

9 {House=Arryn,Book4} => {Survives=1} 0.01635769 0.9375000 1.404718

10 {House=Arryn,Nobility} => {Survives=1} 0.01853871 0.9444444 1.415123

11 {House=Martell,Book3} => {Survives=1} 0.01526718 1.0000000 1.498366

12 {House=Martell,Nobility} => {Survives=1} 0.02071974 0.9500000 1.423448

13 {House=Greyjoy,Book4} => {Survives=1} 0.03925845 0.9230769 1.383107

14 {House=Stark,Gender=F} => {Survives=1} 0.02071974 0.9047619 1.355664

15 {House=Stark,Book5} => {Survives=1} 0.02944384 1.0000000 1.498366

16 {House=Lannister,Book4} => {Survives=1} 0.04252999 0.9285714 1.391340

17 {House=Lannister,Book5} => {Survives=1} 0.01199564 1.0000000 1.498366

18 {Gender=F,Book4} => {Survives=1} 0.05125409 0.9591837 1.437208

19 {Nobility,Book4} => {Survives=1} 0.14721919 0.9183673 1.376050

20 {House=Targaryen,Gender=M,Book5} => {Survives=1} 0.01199564 0.9166667 1.373502

21 {House=Tyrell,Nobility,Book4} => {Survives=1} 0.01308615 0.9230769 1.383107

22 {House=Arryn,Nobility,Book4} => {Survives=1} 0.01308615 1.0000000 1.498366

23 {House=Arryn,Gender=M,Book4} => {Survives=1} 0.01308615 0.9230769 1.383107

24 {House=Arryn,Gender=M,Nobility} => {Survives=1} 0.01635769 0.9375000 1.404718

25 {House=Martell,Nobility,Book3} => {Survives=1} 0.01308615 1.0000000 1.498366

26 {House=Martell,Gender=M,Book3} => {Survives=1} 0.01090513 1.0000000 1.498366

27 {House=Martell,Gender=M,Nobility} => {Survives=1} 0.01526718 0.9333333 1.398475

28 {House=Greyjoy,Nobility,Book4} => {Survives=1} 0.02944384 0.9310345 1.395030

29 {House=Greyjoy,Gender=M,Book4} => {Survives=1} 0.03489640 0.9142857 1.369935

30 {House=Stark,Gender=F,Book5} => {Survives=1} 0.01090513 1.0000000 1.498366

31 {House=Stark,Gender=F,Book3} => {Survives=1} 0.01090513 0.9090909 1.362151

32 {House=Stark,Nobility,Book5} => {Survives=1} 0.02835333 1.0000000 1.498366

33 {House=Stark,Gender=M,Book5} => {Survives=1} 0.01853871 1.0000000 1.498366

34 {House=Lannister,Book3,Book4} => {Survives=1} 0.02181025 0.9523810 1.427015

35 {House=Lannister,Nobility,Book4} => {Survives=1} 0.03707743 0.9189189 1.376877

36 {House=Lannister,Gender=M,Book4} => {Survives=1} 0.03707743 0.9444444 1.415123

37 {House=Lannister,Gender=M,Book5} => {Survives=1} 0.01090513 1.0000000 1.498366

38 {House=Night's Watch,Book1,Book5} => {Survives=1} 0.01308615 1.0000000 1.498366

39 {House=None,Gender=F,Nobility} => {Survives=1} 0.02181025 0.9523810 1.427015

40 {Gender=F,Book4,Book5} => {Survives=1} 0.01199564 1.0000000 1.498366

41 {Gender=F,Book2,Book4} => {Survives=1} 0.01090513 0.9090909 1.362151

42 {Gender=F,Book3,Book4} => {Survives=1} 0.02071974 1.0000000 1.498366

43 {Gender=F,Nobility,Book4} => {Survives=1} 0.03707743 0.9714286 1.455556

44 {Gender=F,Book3,Book5} => {Survives=1} 0.02071974 0.9500000 1.423448

45 {Gender=F,Nobility,Book5} => {Survives=1} 0.03162486 0.9666667 1.448420

46 {Book2,Book4,Book5} => {Survives=1} 0.02399128 0.9166667 1.373502

47 {Nobility,Book4,Book5} => {Survives=1} 0.02726281 0.9615385 1.440737

48 {Gender=M,Nobility,Book4} => {Survives=1} 0.11014177 0.9017857 1.351205

49 {Book1,Book3,Book5} => {Survives=1} 0.04034896 0.9024390 1.352184

50 {House=Arryn,Gender=M,Nobility,Book4} => {Survives=1} 0.01090513 1.0000000 1.498366

51 {House=Greyjoy,Gender=M,Nobility,Book4} => {Survives=1} 0.02726281 0.9259259 1.387376

52 {House=Stark,Gender=F,Nobility,Book5} => {Survives=1} 0.01090513 1.0000000 1.498366

53 {House=Stark,Gender=M,Nobility,Book5} => {Survives=1} 0.01744820 1.0000000 1.498366

54 {House=Lannister,Book2,Book3,Book4} => {Survives=1} 0.01635769 0.9375000 1.404718

55 {House=Lannister,Gender=M,Book2,Book4} => {Survives=1} 0.01962923 0.9000000 1.348529

56 {House=Lannister,Nobility,Book3,Book4} => {Survives=1} 0.01853871 0.9444444 1.415123

57 {House=Lannister,Gender=M,Book3,Book4} => {Survives=1} 0.01962923 0.9473684 1.419505

58 {House=Lannister,Gender=M,Nobility,Book4} => {Survives=1} 0.03162486 0.9354839 1.401697

59 {House=Lannister,Gender=M,Nobility,Book3} => {Survives=1} 0.02508179 0.9200000 1.378497

60 {House=Night's Watch,Book1,Book3,Book5} => {Survives=1} 0.01308615 1.0000000 1.498366

61 {House=Night's Watch,Gender=M,Book1,Book5} => {Survives=1} 0.01308615 1.0000000 1.498366

62 {House=None,Gender=F,Nobility,Book3} => {Survives=1} 0.01417666 0.9285714 1.391340

63 {Gender=F,Nobility,Book3,Book4} => {Survives=1} 0.01962923 1.0000000 1.498366

64 {Gender=F,Book2,Book3,Book5} => {Survives=1} 0.01308615 0.9230769 1.383107

65 {Gender=F,Nobility,Book3,Book5} => {Survives=1} 0.01199564 0.9166667 1.373502

66 {Nobility,Book1,Book4,Book5} => {Survives=1} 0.01090513 0.9090909 1.362151

67 {Nobility,Book2,Book4,Book5} => {Survives=1} 0.01744820 0.9411765 1.410227

68 {Nobility,Book3,Book4,Book5} => {Survives=1} 0.01417666 0.9285714 1.391340

69 {Gender=M,Nobility,Book4,Book5} => {Survives=1} 0.01744820 0.9411765 1.410227

70 {Nobility,Book2,Book3,Book4} => {Survives=1} 0.03598691 0.9166667 1.373502

71 {Gender=M,Book1,Book3,Book5} => {Survives=1} 0.03380589 0.9117647 1.366157

72 {House=Lannister,Nobility,Book2,Book3,Book4} => {Survives=1} 0.01308615 0.9230769 1.383107

73 {House=Lannister,Gender=M,Book2,Book3,Book4} => {Survives=1} 0.01635769 0.9375000 1.404718

74 {House=Lannister,Gender=M,Nobility,Book3,Book4} => {Survives=1} 0.01635769 0.9375000 1.404718

75 {House=Night's Watch,Gender=M,Book1,Book3,Book5} => {Survives=1} 0.01308615 1.0000000 1.498366

76 {Nobility,Book1,Book2,Book4,Book5} => {Survives=1} 0.01090513 0.9090909 1.362151

77 {Nobility,Book1,Book3,Book4,Book5} => {Survives=1} 0.01090513 0.9090909 1.362151

78 {Nobility,Book2,Book3,Book4,Book5} => {Survives=1} 0.01308615 0.9230769 1.383107

79 {Gender=M,Nobility,Book2,Book4,Book5} => {Survives=1} 0.01308615 0.9230769 1.383107

80 {Gender=M,Nobility,Book3,Book4,Book5} => {Survives=1} 0.01090513 0.9090909 1.362151

81 {Gender=M,Nobility,Book2,Book3,Book4} => {Survives=1} 0.02944384 0.9000000 1.348529

82 {House=Lannister,Gender=M,Nobility,Book2,Book3,Book4} => {Survives=1} 0.01308615 0.9230769 1.383107

83 {Nobility,Book1,Book2,Book3,Book4,Book5} => {Survives=1} 0.01090513 0.9090909 1.362151

***Removing Redundancies***

Set of 21 rules

lhs rhs support confidence lift

1 {House=House Martell} => {Survives=1} 0.01199564 0.9166667 1.373502

2 {House=House Tyrell} => {Survives=1} 0.01090513 0.9090909 1.362151

3 {House=Tyrell} => {Survives=1} 0.01526718 0.9333333 1.398475

4 {House=Martell} => {Survives=1} 0.02508179 0.9200000 1.378497

6 {House=Targaryen,Book5} => {Survives=1} 0.01308615 0.9230769 1.383107

9 {House=Arryn,Book4} => {Survives=1} 0.01635769 0.9375000 1.404718

10 {House=Arryn,Nobility} => {Survives=1} 0.01853871 0.9444444 1.415123

13 {House=Greyjoy,Book4} => {Survives=1} 0.03925845 0.9230769 1.383107

14 {House=Stark,Gender=F} => {Survives=1} 0.02071974 0.9047619 1.355664

15 {House=Stark,Book5} => {Survives=1} 0.02944384 1.0000000 1.498366

16 {House=Lannister,Book4} => {Survives=1} 0.04252999 0.9285714 1.391340

17 {House=Lannister,Book5} => {Survives=1} 0.01199564 1.0000000 1.498366

18 {Gender=F,Book4} => {Survives=1} 0.05125409 0.9591837 1.437208

19 {Nobility,Book4} => {Survives=1} 0.14721919 0.9183673 1.376050

38 {House=Night's Watch,Book1,Book5} => {Survives=1} 0.01308615 1.0000000 1.498366

39 {House=None,Gender=F,Nobility} => {Survives=1} 0.02181025 0.9523810 1.427015

44 {Gender=F,Book3,Book5} => {Survives=1} 0.02071974 0.9500000 1.423448

45 {Gender=F,Nobility,Book5} => {Survives=1} 0.03162486 0.9666667 1.448420

46 {Book2,Book4,Book5} => {Survives=1} 0.02399128 0.9166667 1.373502

49 {Book1,Book3,Book5} => {Survives=1} 0.04034896 0.9024390 1.352184

59 {House=Lannister,Gender=M,Nobility,Book3} => {Survives=1} 0.02508179 0.9200000 1.378497

***Sorted***

Set of 21 rules

lhs rhs support confidence lift

15 {House=Stark,Book5} => {Survives=1} 0.02944384 1.0000000 1.498366

17 {House=Lannister,Book5} => {Survives=1} 0.01199564 1.0000000 1.498366

38 {House=Night's Watch,Book1,Book5} => {Survives=1} 0.01308615 1.0000000 1.498366

45 {Gender=F,Nobility,Book5} => {Survives=1} 0.03162486 0.9666667 1.448420

18 {Gender=F,Book4} => {Survives=1} 0.05125409 0.9591837 1.437208

39 {House=None,Gender=F,Nobility} => {Survives=1} 0.02181025 0.9523810 1.427015

44 {Gender=F,Book3,Book5} => {Survives=1} 0.02071974 0.9500000 1.423448

10 {House=Arryn,Nobility} => {Survives=1} 0.01853871 0.9444444 1.415123

9 {House=Arryn,Book4} => {Survives=1} 0.01635769 0.9375000 1.404718

3 {House=Tyrell} => {Survives=1} 0.01526718 0.9333333 1.398475

16 {House=Lannister,Book4} => {Survives=1} 0.04252999 0.9285714 1.391340

6 {House=Targaryen,Book5} => {Survives=1} 0.01308615 0.9230769 1.383107

13 {House=Greyjoy,Book4} => {Survives=1} 0.03925845 0.9230769 1.383107

4 {House=Martell} => {Survives=1} 0.02508179 0.9200000 1.378497

59 {House=Lannister,Gender=M,Nobility,Book3} => {Survives=1} 0.02508179 0.9200000 1.378497

19 {Nobility,Book4} => {Survives=1} 0.14721919 0.9183673 1.376050

1 {House=House Martell} => {Survives=1} 0.01199564 0.9166667 1.373502

46 {Book2,Book4,Book5} => {Survives=1} 0.02399128 0.9166667 1.373502

2 {House=House Tyrell} => {Survives=1} 0.01090513 0.9090909 1.362151

14 {House=Stark,Gender=F} => {Survives=1} 0.02071974 0.9047619 1.355664

49 {Book1,Book3,Book5} => {Survives=1} 0.04034896 0.9024390 1.352184

**Summary:**  Set of 475 rules were generated here to tell us the attributes needed for a character to survive in Game of Thrones. The entire rule set was generated under support and confidence values of 0.01 each. Values on the rhs were all possible values of whether the character survives or not in the series. After filtering and pruning, only rules of whether the character survives came back.

Nobility does not play a role in survival as there are only 5 rules (23.8% chance) that account for nobility leading to survival. Gender also does not play a rule in survival as there are only 6 (28.5% chance) rules that account for gender leading to survival. No rules state that Jon Snow should not live as he is part of the Night’s Watch and is in Books 1-5. The rule {House=Night’s Watch, Book1, Book5} states that he survives with a high enough lift value. Arya Stark is of House Stark, a Female, exists in all the Books (1-5); the rules {House Stark, Book 5} and {House Stark, Gender = F} both apply to her and signifies that she does survive.