

CSC 466 Lab 2 Report:

Association Rules Mining

Date: 10/4/2019

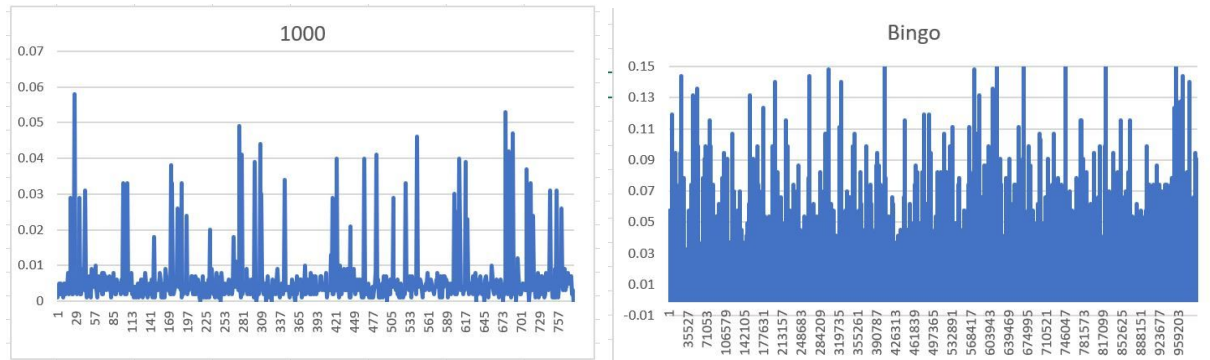
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Description of Procedures

In order to find the range of best minimum support values, we calculated the support of every combination and plotted those values in Excel. Using a visualization, we were able to find patterns the spikes in support that made for quality frequent datasets.



After the minimum support is calculated, we set the minimum confidence to 50%. This way we can analyse the rules that are generated and find any cliffs that may exist. Usually, the highly confident rules will be greater than 80% confident and the rest of the rules that make it will be much closer to the 50% minimum.

Table of Minimum Values

| | Min Support | Min Confidence | # of Rules |
|--------------|-------------|----------------|------------|
| bakery_1000 | .01 - .03 | .8 | 22 |
| bakery_5000 | .01 - .02 | .85 | 20 |
| bakery_20000 | .01 - .02 | .89 | 20 |
| bakery_75000 | .01 - .02 | .9 | 19 |

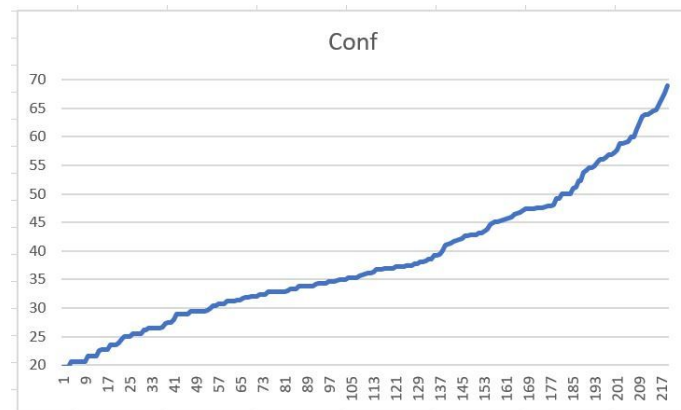
List of Skyline Rules for bakery_75000

| | |
|--|--------------------------------|
| Blueberry Tart Hot Coffee ---> Apricot Croissant | [sup=0.024 conf=91.3165266106] |
| Apricot Croissant Hot Coffee ---> Blueberry Tart | [sup=0.021 conf=92.8774928775] |
| Cherry Soda Apple Tart Apple Croissant ---> Apple Danish | [sup=0.027 conf=99.2907801418] |
| Cherry Soda Apple Danish Apple Croissant ---> Apple Tart | [sup=0.025 conf=98.8235294118] |
| Cherry Soda Apple Tart Apple Danish ---> Apple Croissant | [sup=0.023 conf=99.5260663507] |
| Casino Cake Chocolate Coffee ---> Chocolate Cake | [sup=0.024 conf=94.9579831933] |
| Chocolate Cake Casino Cake ---> Chocolate Coffee | [sup=0.027 conf=94.5606694561] |
| Apple Pie Hot Coffee Coffee Eclair ---> Almond Twist | [sup=0.023 conf=99.6453900709] |

| | |
|--|--------------------------------|
| Apple Pie Almond Twist Hot Coffee ---> Coffee Eclair | [sup=0.029 conf=99.4690265487] |
| Hot Coffee Almond Twist Coffee Eclair ---> Apple Pie | [sup=0.034 conf=99.8223801066] |
| Single Espresso Coffee Eclair ---> Blackberry Tart | [sup=0.022 conf=91.9795221843] |
| Walnut Cookie Vanilla Frappuccino ---> Chocolate Tart | [sup=0.021 conf=91.2762520194] |
| Chocolate Tart Walnut Cookie ---> Vanilla Frappuccino | [sup=0.026 conf=92.4713584288] |
| Apricot Danish Opera Cake ---> Cherry Tart | [sup=0.024 conf=94.5790080738] |
| Cherry Tart Opera Cake ---> Apricot Danish | [sup=0.031 conf=93.9289805269] |
| Lemon Cookie Raspberry Lemonade Green Tea Raspberry Cookie ---> Lemon Lemonade | [sup=0.021 conf=100.0] |
| Lemon Lemonade Lemon Cookie Green Tea Raspberry Cookie ---> Raspberry Lemonade | [sup=0.02 conf=100.0] |
| Lemon Lemonade Raspberry Lemonade Green Tea Lemon Cookie ---> Raspberry Cookie | [sup=0.021 conf=99.7555012225] |
| Lemon Lemonade Raspberry Lemonade Green Tea Raspberry Cookie ---> Lemon Cookie | [sup=0.02 conf=99.7555012225] |

Minimum Support & Confidence for Fantasy Bingo

We went with 8% for our Minimum Support. This could fall under a range of 7-9% and only takes the sets whose support rise way above the majority of other support values.



We weren't as sure for the minimum confidence value. We tracked the confidence of all of our frequent sets and didn't see a major dropoff but decided to go with a 60% minimum confidence value. This left us with 14 skyline rules.

Fantasy Bingo Skyline Itemsets

Skyline Frequent Set #1: { Jones, Diana Wynne }
 Skyline Frequent Set #2: { Wurts, Janny }
 Skyline Frequent Set #3: { Aaronovitch, Ben }
 Skyline Frequent Set #4: { Bardugo, Leigh }
 Skyline Frequent Set #5: { Bujold, Lois McMaster }
 Skyline Frequent Set #6: { Drake, Darrell }

Skyline Frequent Set #7: { Martin, George R. R. }
Skyline Frequent Set #8: { Villosio, K. S. }
Skyline Frequent Set #9: { Anders, Charlie Jane }
Skyline Frequent Set #10: { Beaulieu, Bradley P. }
Skyline Frequent Set #11: { Bennett, Robert Jackson }
Skyline Frequent Set #12: { Liu, Marjorie }
Skyline Frequent Set #13: { Willis, Connie }
Skyline Frequent Set #14: { Schafer, Courtney }
Skyline Frequent Set #15: { Smith, Sherwood }
Skyline Frequent Set #16: { Wecker, Helene }
Skyline Frequent Set #17: { Wells, Martha }
Skyline Frequent Set #18: { Wolfe, Gene }
Skyline Frequent Set #19: { Stiefvater, Maggie }
Skyline Frequent Set #20: { Brown, Pierce }
Skyline Frequent Set #21: { Carriger, Gail }
Skyline Frequent Set #22: { McGuire, Seanan / Grant, Mira }
Skyline Frequent Set #23: { Schwab, V. E. / Schwab, Victoria }
Skyline Frequent Set #24: { Walton, Jo }
Skyline Frequent Set #25: { Hurley, Kameron }
Skyline Frequent Set #26: { Atwood, Margaret }
Skyline Frequent Set #27: { Bear, Elizabeth }
Skyline Frequent Set #28: { Kowal, Mary Robinette }
Skyline Frequent Set #29: { Vaughan, Brian K. }
Skyline Frequent Set #30: { Zelazny, Roger }
Skyline Frequent Set #31: { Elliott, Kate / Rasmussen, Alis A. }
Skyline Frequent Set #32: { Patrick, Benedict }
Skyline Frequent Set #33: { Erikson, Steven }
Skyline Frequent Set #34: { Butler, Octavia E. }
Skyline Frequent Set #35: { Okorafor, Nnedi }
Skyline Frequent Set #36: { Liu, Ken }
Skyline Frequent Set #37: { Huff, Tanya }
Skyline Frequent Set #38: { Lee, Yoon Ha }
Skyline Frequent Set #39: { Bancroft, Josiah. Abercrombie, Joe }
Skyline Frequent Set #40: { Eames, Nicholas. Abercrombie, Joe }
Skyline Frequent Set #41: { Gaiman, Neil. Abercrombie, Joe }
Skyline Frequent Set #42: { Abercrombie, Joe. Lawrence, Mark }
Skyline Frequent Set #43: { Sanderson, Brandon. Abercrombie, Joe }
Skyline Frequent Set #44: { Addison, Katherine / Monette, Sarah. Gaiman, Neil }
Skyline Frequent Set #45: { Hobb, Robin / Lindholm, Megan. Addison, Katherine / Monette, Sarah }
Skyline Frequent Set #46: { Jemisin, N. K.. Addison, Katherine / Monette, Sarah }
Skyline Frequent Set #47: { Addison, Katherine / Monette, Sarah. Lawrence, Mark }
Skyline Frequent Set #48: { Pratchett, Terry. Addison, Katherine / Monette, Sarah }

Skyline Frequent Set #49: { McClellan, Brian. Addison, Katherine / Monette, Sarah }
Skyline Frequent Set #50: { Novik, Naomi. Addison, Katherine / Monette, Sarah }
Skyline Frequent Set #51: { Hawkins, Scott. Bancroft, Josiah }
Skyline Frequent Set #52: { Hobb, Robin / Lindholm, Megan. Bancroft, Josiah }
Skyline Frequent Set #53: { Bancroft, Josiah. Kay, Guy Gavriel }
Skyline Frequent Set #54: { Bancroft, Josiah. King, Stephen }
Skyline Frequent Set #55: { Lynch, Scott. Bancroft, Josiah }
Skyline Frequent Set #56: { Bancroft, Josiah. Rowe, Andrew }
Skyline Frequent Set #57: { Bancroft, Josiah. Valente, Catherynne M. }
Skyline Frequent Set #58: { Ball, Krista D. / Ball, K.. Bancroft, Josiah }
Skyline Frequent Set #59: { Bancroft, Josiah. Brennan, Marie }
Skyline Frequent Set #60: { Bancroft, Josiah. Le Guin, Ursula K. }
Skyline Frequent Set #61: { Sullivan, Michael J.. Bancroft, Josiah }
Skyline Frequent Set #62: { Chambers, Becky. Bancroft, Josiah }
Skyline Frequent Set #63: { Mieville, China. Bancroft, Josiah }
Skyline Frequent Set #64: { McClellan, Brian. Bancroft, Josiah }
Skyline Frequent Set #65: { Bancroft, Josiah. Herbert, Frank }
Skyline Frequent Set #66: { VanderMeer, Jeff. Bancroft, Josiah }
Skyline Frequent Set #67: { Aaron, Rachel / Bach, Rachel. Bancroft, Josiah }
Skyline Frequent Set #68: { Bancroft, Josiah. Gladstone, Max }
Skyline Frequent Set #69: { Eames, Nicholas. Gaiman, Neil }
Skyline Frequent Set #70: { Eames, Nicholas. Jemisin, N. K. }
Skyline Frequent Set #71: { Eames, Nicholas. Lawrence, Mark }
Skyline Frequent Set #72: { Eames, Nicholas. Lynch, Scott }
Skyline Frequent Set #73: { Eames, Nicholas. Sullivan, Michael J. }
Skyline Frequent Set #74: { Eames, Nicholas. Mieville, China }
Skyline Frequent Set #75: { Hobb, Robin / Lindholm, Megan. Gaiman, Neil }
Skyline Frequent Set #76: { Jemisin, N. K.. Gaiman, Neil }
Skyline Frequent Set #77: { Lynch, Scott. Gaiman, Neil }
Skyline Frequent Set #78: { Rowe, Andrew. Gaiman, Neil }
Skyline Frequent Set #79: { Pratchett, Terry. Gaiman, Neil }
Skyline Frequent Set #80: { Sullivan, Michael J.. Gaiman, Neil }
Skyline Frequent Set #81: { Mieville, China. Gaiman, Neil }
Skyline Frequent Set #82: { Novik, Naomi. Gaiman, Neil }
Skyline Frequent Set #83: { Sanderson, Brandon. Gaiman, Neil }
Skyline Frequent Set #84: { VanderMeer, Jeff. Gaiman, Neil }
Skyline Frequent Set #85: { Hobb, Robin / Lindholm, Megan. Jemisin, N. K. }
Skyline Frequent Set #86: { Hobb, Robin / Lindholm, Megan. King, Stephen }
Skyline Frequent Set #87: { Hobb, Robin / Lindholm, Megan. Lawrence, Mark }
Skyline Frequent Set #88: { Hobb, Robin / Lindholm, Megan. Lynch, Scott }
Skyline Frequent Set #89: { Hobb, Robin / Lindholm, Megan. Rowe, Andrew }
Skyline Frequent Set #90: { Hobb, Robin / Lindholm, Megan. Brennan, Marie }
Skyline Frequent Set #91: { Hobb, Robin / Lindholm, Megan. Pratchett, Terry }

Skyline Frequent Set #92: { Hobb, Robin / Lindholm, Megan. Mieville, China }
Skyline Frequent Set #93: { Hobb, Robin / Lindholm, Megan. Novik, Naomi }
Skyline Frequent Set #94: { Hobb, Robin / Lindholm, Megan. Sanderson, Brandon }
Skyline Frequent Set #95: { Jemisin, N. K.. Lawrence, Mark }
Skyline Frequent Set #96: { Jemisin, N. K.. Valente, Catherynne M. }
Skyline Frequent Set #97: { Ball, Krista D. / Ball, K.. Jemisin, N. K. }
Skyline Frequent Set #98: { Jemisin, N. K.. Brennan, Marie }
Skyline Frequent Set #99: { Le Guin, Ursula K.. Jemisin, N. K. }
Skyline Frequent Set #100: { Jemisin, N. K.. Pratchett, Terry }
Skyline Frequent Set #101: { Sullivan, Michael J.. Jemisin, N. K. }
Skyline Frequent Set #102: { Chambers, Becky. Jemisin, N. K. }
Skyline Frequent Set #103: { Mieville, China. Jemisin, N. K. }
Skyline Frequent Set #104: { Arden, Katherine. Jemisin, N. K. }
Skyline Frequent Set #105: { Novik, Naomi. Jemisin, N. K. }
Skyline Frequent Set #106: { VanderMeer, Jeff. Jemisin, N. K. }
Skyline Frequent Set #107: { Sanderson, Brandon. King, Stephen }
Skyline Frequent Set #108: { Lynch, Scott. Lawrence, Mark }
Skyline Frequent Set #109: { Rowe, Andrew. Lawrence, Mark }
Skyline Frequent Set #110: { Pratchett, Terry. Lawrence, Mark }
Skyline Frequent Set #111: { Sullivan, Michael J.. Lawrence, Mark }
Skyline Frequent Set #112: { Butcher, Jim. Lawrence, Mark }
Skyline Frequent Set #113: { Novik, Naomi. Lawrence, Mark }
Skyline Frequent Set #114: { VanderMeer, Jeff. Lawrence, Mark }
Skyline Frequent Set #115: { Lynch, Scott. Pratchett, Terry }
Skyline Frequent Set #116: { Lynch, Scott. Sanderson, Brandon }
Skyline Frequent Set #117: { Pratchett, Terry. Rowe, Andrew }
Skyline Frequent Set #118: { Novik, Naomi. Rowe, Andrew }
Skyline Frequent Set #119: { Sanderson, Brandon. Rowe, Andrew }
Skyline Frequent Set #120: { Brennan, Marie. Valente, Catherynne M. }
Skyline Frequent Set #121: { Mieville, China. Brennan, Marie }
Skyline Frequent Set #122: { Sanderson, Brandon. Brennan, Marie }
Skyline Frequent Set #123: { Le Guin, Ursula K.. Sanderson, Brandon }
Skyline Frequent Set #124: { Sullivan, Michael J.. Pratchett, Terry }
Skyline Frequent Set #125: { Mieville, China. Pratchett, Terry }
Skyline Frequent Set #126: { Novik, Naomi. Pratchett, Terry }
Skyline Frequent Set #127: { VanderMeer, Jeff. Pratchett, Terry }
Skyline Frequent Set #128: { Sullivan, Michael J.. Sanderson, Brandon }
Skyline Frequent Set #129: { Chambers, Becky. Sanderson, Brandon }
Skyline Frequent Set #130: { Mieville, China. Sanderson, Brandon }
Skyline Frequent Set #131: { North, Claire / Webb, Catherine / Griffin, Kate. Sanderson, Brandon }
Skyline Frequent Set #132: { Sanderson, Brandon. Butcher, Jim }
Skyline Frequent Set #133: { *N/A. Sanderson, Brandon }

Skyline Frequent Set #134: { McClellan, Brian. Sanderson, Brandon }
 Skyline Frequent Set #135: { VanderMeer, Jeff. Sanderson, Brandon }
 Skyline Frequent Set #136: { Gladstone, Max. Sanderson, Brandon }
 Skyline Frequent Set #137: { Aaron, Rachel / Bach, Rachel. VanderMeer, Jeff }
 Skyline Frequent Set #138: { Bancroft, Josiah. Sanderson, Brandon. Addison, Katherine / Monette, Sarah }
 Skyline Frequent Set #139: { Eames, Nicholas. Bancroft, Josiah. Sanderson, Brandon }
 Skyline Frequent Set #140: { Bancroft, Josiah. Gaiman, Neil. Lawrence, Mark }
 Skyline Frequent Set #141: { Bancroft, Josiah. Jemisin, N. K.. Sanderson, Brandon }
 Skyline Frequent Set #142: { Bancroft, Josiah. Sanderson, Brandon. Lawrence, Mark }
 Skyline Frequent Set #143: { Bancroft, Josiah. Sanderson, Brandon. Pratchett, Terry }
 Skyline Frequent Set #144: { Novik, Naomi. Bancroft, Josiah. Sanderson, Brandon }

Fantasy Bingo Skyline Rules

Hawkins, Scott ---> Bancroft, Josiah [sup=9.05349794239 conf=64.7058823529]
 Addison, Katherine / Monette, Sarah | Sanderson, Brandon ---> Bancroft, Josiah [sup=8.6419753 conf=60.0]
 Bancroft, Josiah | Addison, Katherine / Monette, Sarah ---> Sanderson, Brandon [sup=8.6419753 conf=60.0]
 Herbert, Frank ---> Bancroft, Josiah [sup=8.64197530864 conf=67.7419354839]
 McClellan, Brian ---> Sanderson, Brandon [sup=11.1111111111 conf=64.2857142857]
 Butcher, Jim ---> Sanderson, Brandon [sup=10.6995884774 conf=66.6666666667]
 Gaiman, Neil | Lawrence, Mark ---> Bancroft, Josiah [sup=8.2304526749 conf=68.9655172414]
 Bancroft, Josiah | Gaiman, Neil ---> Lawrence, Mark [sup=8.2304526749 conf=62.5]
 Kay, Guy Gavriel ---> Bancroft, Josiah [sup=8.64197530864 conf=63.6363636364]
 Bancroft, Josiah | Jemisin, N. K. ---> Sanderson, Brandon [sup=9.46502057613 conf=63.8888888889]
 Abercrombie, Joe ---> Sanderson, Brandon [sup=11.1111111111 conf=61.3636363636]
 Novik, Naomi | Sanderson, Brandon ---> Bancroft, Josiah [sup=9.46502057613 conf=63.8888888889]
 Novik, Naomi | Bancroft, Josiah ---> Sanderson, Brandon [sup=9.46502057613 conf=65.7142857143]
 Eames, Nicholas | Sanderson, Brandon ---> Bancroft, Josiah [sup=8.2304526749 conf=64.5161290323]