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431 Python Project

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**DESCRIPTION OF ALGORITHMS**

Individual Flight Score

Most evaluation criteria the program provides for is based on individual flight scores. Every flight in the database is given a score so flights can be compared against each other, the higher the score the more likely the user is to have a successful flight. Score is determined by multiplying the number of seats on a flight by the success rate of the flight. The success rate of a flight is determined by the dividing the number of departures performed over the number of departures scheduled.

Best Carrier

First a table is made with each unique carrier name in a column called “NAME”. Next a column called” SCORE” is made which will hold the aggregate score for each carrier. Then the database is read and, for every flight, its score is added to the appropriate place in the score column for the carrier it had. This table is sorted for score and the top result with the highest score is the best carrier.

Best Aircraft

First a table is made with each unique aircraft type in a column called “NAME”. Next a column called” SCORE” is made which will hold the aggregate score for each aircraft. Then the database is read and, for every flight, its score is added to the appropriate place in the score column for the aircraft type number it had. This table is sorted for score and the top result with the highest score is the best aircraft.

Best State

First a table is made with each unique state abbreviation in a column called “NAME”. Next a column called” SCORE” is made which will hold the aggregate score for each destination state. Then the database is read and, for every flight, its score is added to the appropriate place in the score column for the state destination it had. This table is sorted for score and the top result with the highest score is the best state.

Best Destination

First a table is made with each unique destination city in a column called “NAME”. Next a column called” SCORE” is made which will hold the aggregate score for each destination. Then the database is read and, for every flight, its score is added to the appropriate place in the score column for the destination it had. This table is sorted for score and the top result with the highest score is the best destination city.

Best Origin

First a table is made with each unique origin city in a column called “NAME”. Next a column called” SCORE” is made which will hold the aggregate score for each origin city. Then the database is read and, for every flight, its score is added to the appropriate place in the score column for the origin city it had. This table is sorted for score and the top result with the highest score is the best origin city.

Best Month

First the best flights for each month is determined (flights with the best score) and stored in a table. Then each month is given a score by finding the mean of the best flight scores for the month and that is added to the table. The table is read and the highest month score determines the best month. Each month’s name and average score is also displayed.

Combination 1: Best Destination & Month

First the best month is determined using the algorithm for best month above. Then the best destination city is determined using the best destination algorithm above. These results are displayed onscreen along with flights that belong to the two categories.

Combination 2: Best Carrier & Month

First the best month is determined using the algorithm for best month above. Then the best carrier is determined using the best destination algorithm above. These results are displayed onscreen along with flights that belong to the two categories.

Combination 3: Best Aircraft & Month

First the best month is determined using the algorithm for best month above. Then the best aircraft is determined using the best destination algorithm above. These results are displayed onscreen along with flights that belong to the two categories.

**DEVELOPMENT ENVIRONMENT**

OS: Windows 8.1

Python version: 3.6.4.final.0 32bits

GUI: Tkinter

Tkinter version: 8.6

Required external librarys: Pandas

Pandas version: 0.22.0

RESULTS OF AUTOMATIC MODE (MODE 1)

Below are the results of automatic mode. Automatic mode displays the best aircraft type, carrier, destination city, and month to fly to the user. Each result is determined by the appropriate algorithm from the DESCRIPTION OF ALGORITHMS section.

BEST AIRCRAFT IS TYPE : 638

This aircraft type had the higher total score of all flight data.

BEST CARRIER IS TYPE : American Airlines Inc.

This carrier type had the higher total score of all flight data.

BEST DESTINATION IS TYPE : Charlotte, NC

This destination had the higher total score of all flight data.

BEST MONTH IS : July

Best Month average score : 5438.375321961423 is higher that every other month.

The flights with the best score are listed below.

SCORE SUCCESS\_RATE DISTANCE\_RANGE AIRCRAFT\_TYPE MONTH UNIQUE\_CARRIER\_NAME

0 57035.609121 0.996743 500-999 699 11 American Airlines Inc. 57222

1 57035.609121 0.996743 500-999 699 11 American Airlines Inc. 57222

2 54619.480132 0.983444 500-999 699 1 American Airlines Inc. 55539

3 54235.685811 0.989865 500-999 699 6 American Airlines Inc. 54791

4 53871.687919 0.983221 500-999 699 1 American Airlines Inc. 54791

5 53866.108108 0.986486 500-999 699 6 American Airlines Inc. 54604

RESULTS OF BEST AIRCRAFT

BEST AIRCRAFT IS TYPE : 0 638

This aircraft type had the higher total score of all flight data.

All aircraft type numbers and there scores are shown below.

NAME SCORE

0 638 6.256918e+06

1 699 6.135971e+06

2 698 3.592620e+06

3 629 2.618150e+06

4 655 2.221291e+06

5 694 1.914051e+06

RESULTS OF BEST CARRIER

BEST CARRIER IS : 0 American Airlines Inc.

This carrier had the higher total score of all flight data.

All carriers and there scores are shown below.

NAME SCORE

0 American Airlines Inc. 1.307603e+07

1 PSA Airlines Inc. 7.182152e+06

2 Delta Air Lines Inc. 3.433461e+06

3 Southwest Airlines Co. 1.442914e+06

4 Piedmont Airlines 1.307447e+06

5 Republic Airlines 1.197330e+06

RESULTS OF BEST MONTH

BEST MONTH IS : July

Best Month average score : 6383.91144490684 is higher that every other month.

January : 4832.467628747752

February : 4429.10755399997

March : 5453.916520713357

April : 5470.787452791895

May : 5572.926346229557

June : 6159.453268176186

July : 6383.91144490684

August : 5767.647846025704

September : 4854.268121175185

October : 6079.759318447531

November : 5532.805199237318

December : 4995.835095388776

Best month flights shown below.

SCORE SUCCESS\_RATE DISTANCE\_RANGE MONTH UNIQUE\_CARRIER\_NAME SEATS DISTANCE

0 53311.787879 0.979798 500-999 7 American Airlines Inc. 54411 936

1 52753.239865 0.976351 500-999 7 American Airlines Inc. 54031 936

2 48840.320000 0.974545 1500-1999 7 American Airlines Inc. 50116 1773

3 47897.119403 0.977612 400-499 7 American Airlines Inc. 48994 468

4 45085.625498 0.980080 1500-1999 7 American Airlines Inc. 46002 1773

5 41739.662447 0.970464 400-499 7 American Airlines Inc. 43010 468

RESULTS OF BEST DESTINATION CITY

BEST CITY TO FLY TO IS : 0 Charlotte, NC

This destination had the higher total score of all flight data.

All city destinations and there scores are shown below.

NAME SCORE

0 Charlotte, NC 1.265756e+07

1 Raleigh/Durham, NC 2.616525e+06

2 Atlanta, GA 1.774606e+06

3 New York, NY 1.674746e+06

4 Charleston, SC 1.102055e+06

5 Chicago, IL 7.795411e+05

RESULTS OF BEST ORIGIN CITY

BEST CITY TO DEPART FROM IS : 0 Charlotte, NC

This origin city had the higher total score of all flight data.

All origin cites and there scores are shown below.

NAME SCORE

0 Charlotte, NC 1.086042e+07

1 Raleigh/Durham, NC 2.791630e+06

2 Atlanta, GA 1.947770e+06

3 New York, NY 1.663903e+06

4 Charleston, SC 1.187529e+06

5 Washington, DC 8.162673e+05

RESULTS FOR DISTANCE

The flights below are sorted from shorted travel distance to longest.

SCORE SUCCESS\_RATE DISTANCE\_RANGE MONTH UNIQUE\_CARRIER\_NAME SEATS DISTANCE

0 10412.546763 0.992806 0-99 10 PSA Airlines Inc. 10488 75

1 2877.065217 0.978261 0-99 4 PSA Airlines Inc. 2941 75

2 2877.065217 0.978261 0-99 4 PSA Airlines Inc. 2941 75

3 543.333333 0.833333 0-99 7 PSA Airlines Inc. 652 75

4 478.636364 0.818182 0-99 7 PSA Airlines Inc. 585 75

5 6995.166667 0.979167 0-99 8 PSA Airlines Inc. 7144 75

RESULTS FOR BEST STATE

BEST STATE TO FLY TO IS : 0 NC

This state had the higher total score of all flight data.

All state destinations and there scores are shown below.

NAME SCORE

0 NC 1.661213e+07

1 SC 2.233011e+06

2 GA 1.978517e+06

3 NY 1.851848e+06

4 FL 1.471542e+06

5 VA 1.333234e+06

RESULTS FOR BEST AIRCRAFT AND MONTH

BEST AIRCRAFT IS TYPE : 638

This aircraft type had the higher total score of all flight data.

BEST MONTH IS : July

Best Month average score : 6014.643646263518 is higher that every other month.

The flights for this aircraft during the best month are listed below.

SCORE SUCCESS\_RATE DISTANCE\_RANGE AIRCRAFT\_TYPE MONTH UNIQUE\_CARRIER\_NAME SEATS

0 17947.032258 0.975806 100-199 638 7 PSA Airlines Inc. 18392

1 17799.016129 0.971774 100-199 638 7 PSA Airlines Inc. 18316

2 17102.961039 0.987013 300-399 638 7 PSA Airlines Inc. 17328

3 16804.225108 0.978355 300-399 638 7 PSA Airlines Inc. 17176

4 16280.333333 0.969298 200-299 638 7 PSA Airlines Inc. 16796

5 15975.656250 0.968750 300-399 638 7 PSA Airlines Inc. 16491

RESULTS FOR BEST CARRIER AND MONTH

BEST CARRIER IS TYPE : American Airlines Inc.

This carrier type had the higher total score of all flight data.

BEST MONTH IS : July

Best Month average score : 12837.370943467284 is higher that every other month.

The flights for this carrier during the best month are listed below.

SCORE SUCCESS\_RATE DISTANCE\_RANGE AIRCRAFT\_TYPE MONTH UNIQUE\_CARRIER\_NAME SEATS

0 53311.787879 0.979798 500-999 699 7 American Airlines Inc. 54411

1 52753.239865 0.976351 500-999 699 7 American Airlines Inc. 54031

2 48840.320000 0.974545 1500-1999 699 7 American Airlines Inc. 50116

3 47897.119403 0.977612 400-499 699 7 American Airlines Inc. 48994

4 45085.625498 0.980080 1500-1999 699 7 American Airlines Inc. 46002

5 41739.662447 0.970464 400-499 699 7 American Airlines Inc. 43010

RESULTS FOR BEST DESTINATION AND MONTH

BEST DESTINATION IS TYPE : Charlotte, NC

This destination had the higher total score of all flight data.

BEST MONTH IS : July

Best Month average score : 7313.977991887215 is higher that every other month.

The flights to this city during the best month are listed below.

SCORE SUCCESS\_RATE DISTANCE\_RANGE DEST\_CITY\_NAME MONTH UNIQUE\_CARRIER\_NAME SEATS

0 53311.787879 0.979798 500-999 Charlotte, NC 7 American Airlines Inc. 54411

1 48840.320000 0.974545 1500-1999 Charlotte, NC 7 American Airlines Inc. 50116

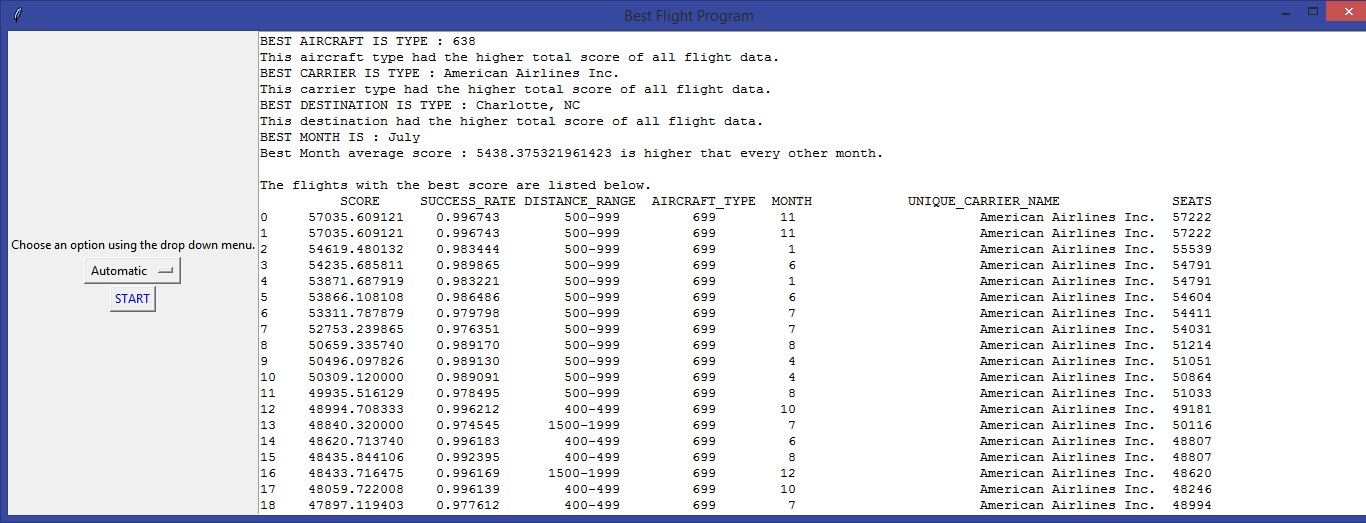
2 41739.662447 0.970464 400-499 Charlotte, NC 7 American Airlines Inc. 43010

3 33477.087432 0.989071 1000-1499 Charlotte, NC 7 American Airlines Inc. 33847

4 33310.867021 0.973404 2000-2499 Charlotte, NC 7 American Airlines Inc. 34221

5 32916.155556 0.988889 2000-2499 Charlotte, NC 7 American Airlines Inc. 33286

TEST OF MODE 1



TESTS OF MODE 2

