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Submission for Data Visualisation and the Web

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What U.K. airport is the busiest in terms of charter passengers in 2019?

Research Topic:

My research question is what U.K. airport is the busiest in terms of charter passengers in 2019? As, I want to find out the distribution of passengers travelling in charter flights among UK airports. The general population of the country are keen travellers, I want to discover which airports mostly caters to scheduled and charter flights. The reason being most airports in the U.K. don't get their passengers data widely published as popular airports like Heathrow¹ and Gatwick do.

But first, I would like to explain what scheduled and charter flights are:

Scheduled flights: Scheduled flights are flights that are operational on a scheduled basis and are in demand throughout the year. These routes are highly competitive and many airlines fly these routes throughout the year with Wide Body aircrafts such as Boeing(777, 787, 747) and Airbus(A350, A340) all of which has a 300+ passenger capacity. Example route: London Heathrow (LHR) - John F. Kennedy Airport, New York (JFK)

Charter flights: Charter flights are flights that are operational on a non- scheduled basis and are in demand only during a certain time of the year; For instance during summer for holidaymakers. One such example of Charter flights is when Thomas Cook declared for Bankruptcy in September, CAA chartered Malaysian Airlines(MH)² to airlift U.K. passengers from their holidays. Even though Malaysian airlines have scheduled flights to London from Malaysia. Example route: London Gatwick(LHR) - Chania Airport (CHQ)

As British passengers travel a lot throughout the year, especially during summer; airports in the U.K. get a surge of passengers. So, I want to find out which airports experience this surge and which airports don't. As everyone knows, Heathrow is the

¹ (2019, February 7). Heathrow remains busiest airport in Europe, according to ACI Retrieved December 12, 2019, from

<https://www.internationalairportreview.com/news/80966/heathrow-busiest-airport-europe-aci/>

² (2019, October 2). Onboard a Thomas Cook rescue flight using the world's Retrieved December 12, 2019, from

<https://www.independent.co.uk/travel/news-and-advice/thomas-cook-collapse-latest-rescue-flight-airbus-a380-plane-civil-aviation-authority-a9128836.html>

busiest airport in the country and there are multiple factors that aids it. But, my prediction is that it isn't the busiest airport in terms of charter flights. So, I seek to find which U.K. airport receives the most charter passengers.

Concepts:

Flight type: The type of flight either a scheduled or a charter flight

Airport name: An airports name

Passenger type: Passenger types which are UK and EU passenger. In the .csv file passengers are denoted as **PAX**. The following are the passenger types in this research:

- **UK Scheduled passengers:** Passengers with U.K. citizenship travelling on a scheduled flight
- **UK charter passengers:** Passengers with U.K. citizenship travelling on a charter flight
- **EU scheduled passengers:** Passengers with EU citizenship travelling on a scheduled flight
- **EU charter passengers:** Passengers with EU citizenship travelling on a charter flight
- **Non- EU scheduled passengers:** Passengers with Non_EU citizenship travelling on a scheduled flight
- **Non-EU charter passengers:** Passengers with Non-EU citizenship travelling on a charter flight

Airport type: Airport types which has airports that are categorised based on their locations. We have 3 categories.

They are:

- **London area airports:** Airports located in London and within the suburban area of London
- **Other UK airports:** Airports located in the United Kingdom, excluding London
- **Overseas UK airports:** Airports that are not geographically located in the United Kingdom

Overseas UK airports were excluded from the analysis as these airports weren't in the top 10 list.

Data source:

Data was sourced from the Civil Aviation authority's website and is the 2019³ iteration. It was in Comma Separated values (.csv) format and is very well presented but still needed some cleaning as there were some columns that were irrelevant to my research. To eliminate that data I utilised Google Sheets. Before data cleaning, there was data about every major U.K. airport registered with CAA.

There were rows of data that weren't important to the analysis such as figures of passengers transiting through U.K. airports based on their nationality and their flight type(I deleted them as it would've made the analysis and visualisation complex), so I deleted those rows and retained the ones that were to be used for the analysis. A bias in data can be due to the exclusion of these rows and also as the reporting_date column indicates that it was released in April 2019; although it is confirmed due to lack of information. Additionally, these rows had null values which would later result in complexity. I had to remove some columns of data using **Pandas' data.drop()** method and then rename some columns using **data.rename()** method which was taught during the labs.

³ (n.d.). Airport data 2019 01 | UK Civil Aviation Authority. Retrieved December 12, 2019, from <https://www.caa.co.uk/Data-and-analysis/UK-aviation-market/Airports/Datasets/UK-Airport-data/Airport-data-2019-01/>

Data before processing:

	rundate	reporting_period	reporting_airport_group_name	reporting_airport_name	total_pax	pax_terminal_scheduled_UK	pax_transit_scheduled_UK	pax_terr
0	12/03/2019 14:40	12/04/2019 14:40	Other UK Airports	BELFAST INTERNATIONAL	405935	317825	0	
1	12/03/2019 14:40	201901	Other UK Airports	BIRMINGHAM	781258	263931	0	
2	12/03/2019 14:40	201901	Other UK Airports	BRISTOL	520854	328895	427	
3	12/03/2019 14:40	201901	Other UK Airports	EDINBURGH	920098	509602	391	
4	12/03/2019 14:40	201901	London Area Airports	GATWICK	2953515	1982446	0	

After processing:

	rundate	reporting_period	reporting_airport_group_name	airport	total_pax	Scheduled UK pax	pax_transit_scheduled_UK	Scheduled EU pax	pax_transit_schedule
0	12/03/2019 14:40	12/04/2019 14:40	Other UK Airports	BELFAST INTERNATIONAL	405935	317825	0	78763	
1	12/03/2019 14:40	201901	Other UK Airports	BIRMINGHAM	781258	263931	0	336264	
2	12/03/2019 14:40	201901	Other UK Airports	BRISTOL	520854	328895	427	150611	
3	12/03/2019 14:40	201901	Other UK Airports	EDINBURGH	920098	509602	391	347991	

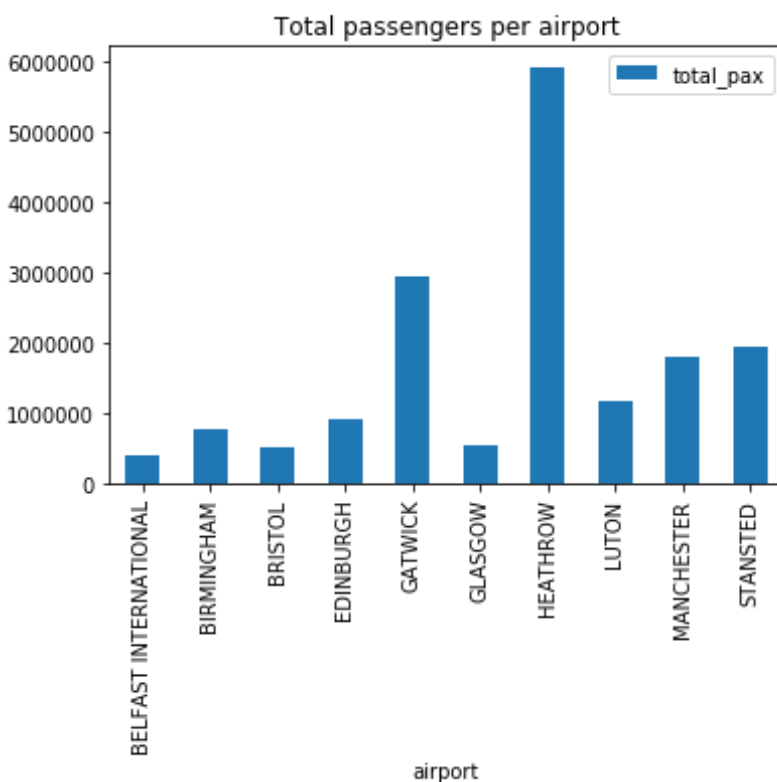
Data Analysis and Visualisation:

The main areas that I looked at to help explore the research question was the number of passengers at a specific airport and what category of passengers are travelling from that specific airport.

The visualisations are as follows:

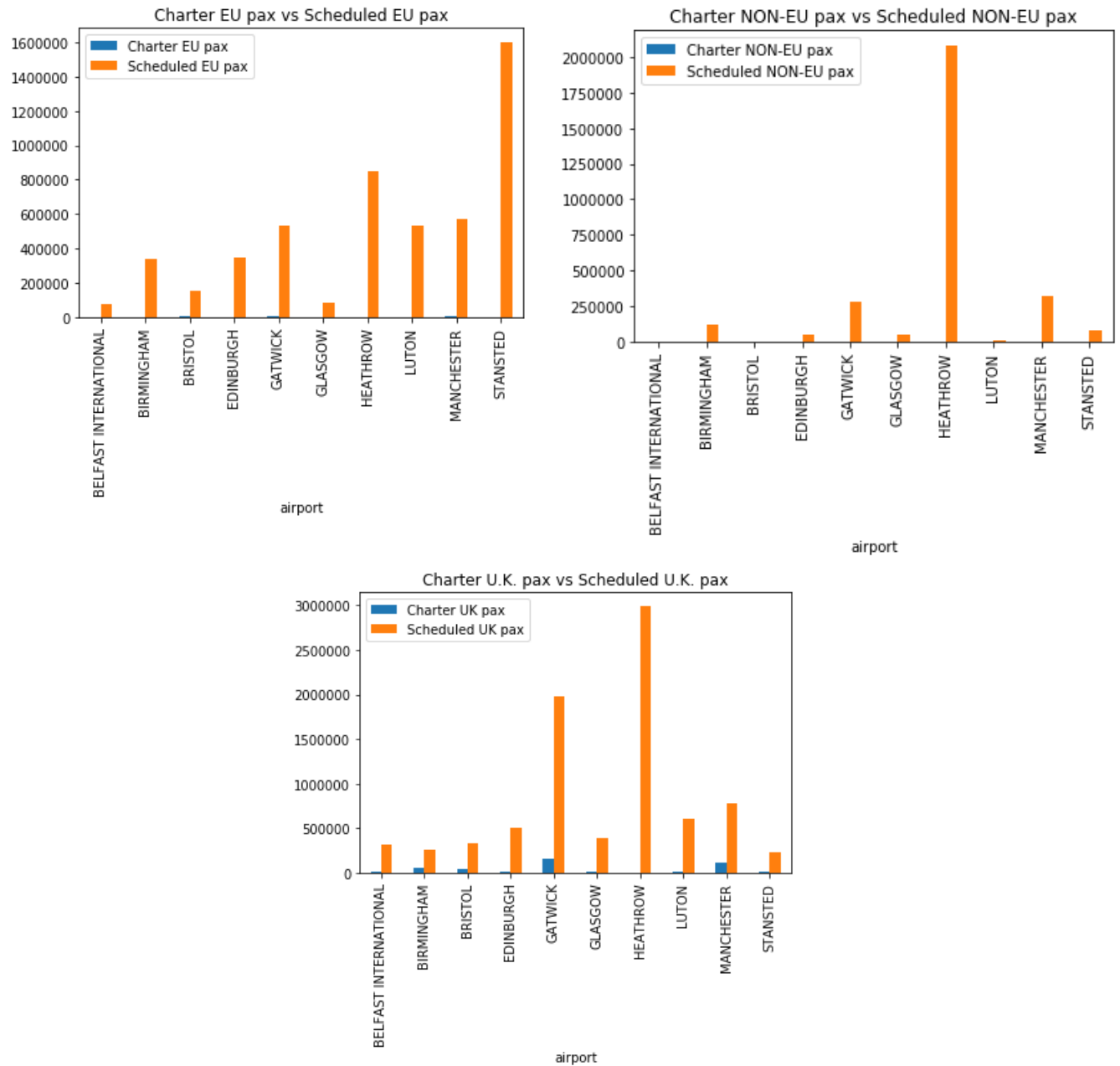
BAR CHART

Total passengers:



In the above visualisation you can see that Heathrow airport comes on top in terms of total passengers served for the year 2019. Due to it being a major hub for the country's national carrier and also as it is served by major airlines from all over the world providing seamless air connectivity to passengers all over the world. Gatwick comes on the second spot and Stansted on third respectively. It is interesting to notice that all top 3 airports are located in the London area.

Comparison of Scheduled passengers vs Charter Passengers:

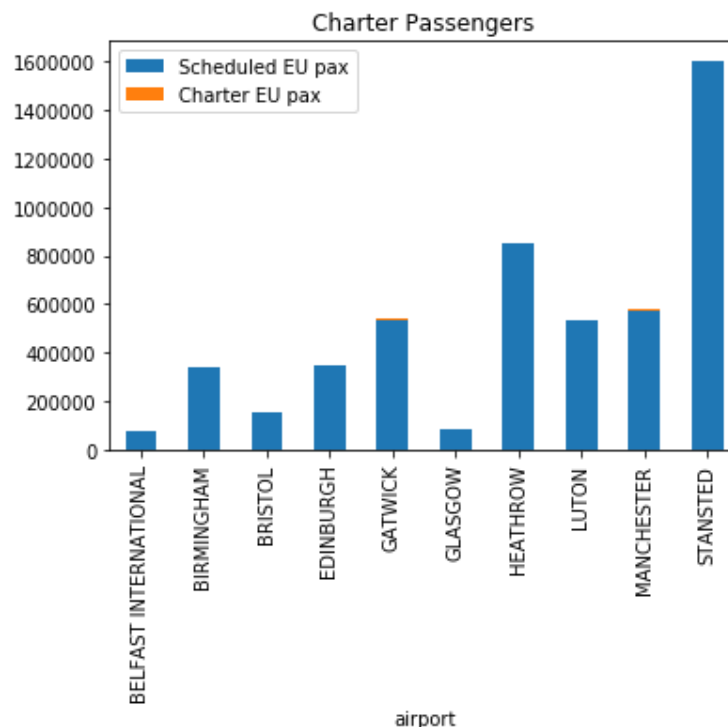


In the visualisations above you can see in every category of passengers (i.e. U.K., EU, NON-EU) scheduled passengers come on top as U.K. is a major aviation hub in the industry and has an efficient infrastructure that is lucrative for big airlines. For instance, Norwegian air which is a Norway based airline has transatlantic operations to major U.S. airports from the U.K. competing

with U.K. and U.S. based airlines. The route between LHR-JFK⁴ is the world's busiest air route and has helped British airways earn more than \$1 Billion during 2018-19.

Heathrow comes on top in terms of Non-EU and U.K scheduled passengers due to it being served by major airlines from countries all over the world, even though it is operating on its maximum capacity and the numbers of passengers travelling from this airport has been growing gradually over the past few years.

Scheduled EU passengers:

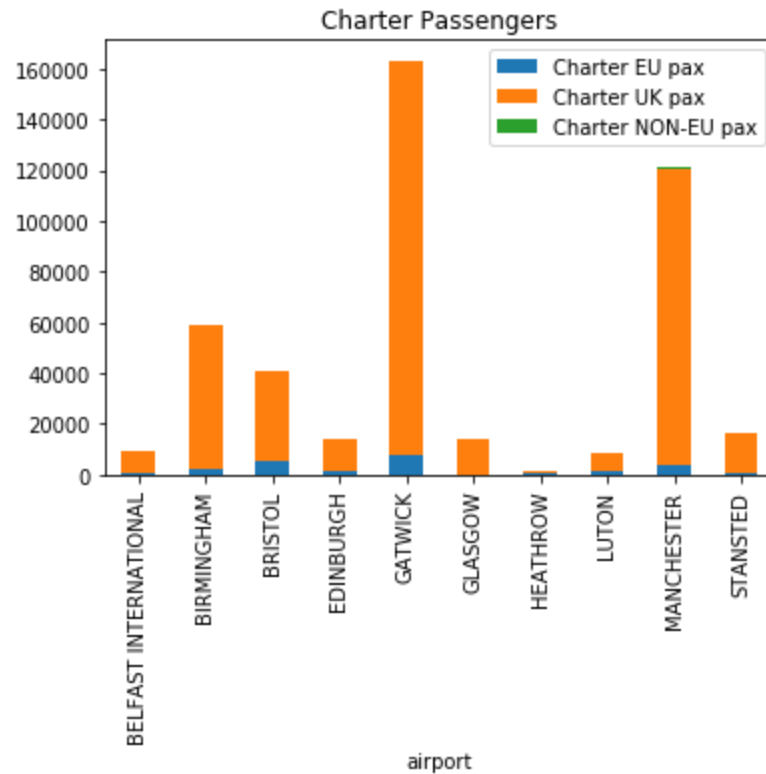


Also, this wasn't part of the initial research I stumbled upon this visualisation when I was experimenting with various variables. It was very interesting to find that Stansted airport ranks on top in terms of Scheduled passengers in the U.K.; This is due to the airport allowing airlines to operate on a low cost thus resulting in low fares, attracting reams of passengers.

⁴ (2018, July 9). New York-London Is The World's First Billion-Dollar ... - Forbes. Retrieved December 12, 2019, from <https://www.forbes.com/sites/danielreed/2018/07/09/for-real-new-york-london-is-the-worlds-first-billion-dollar-route-for-british-airways/>

Stacked bar chart

Comparison of Charter passengers:



Above you can see that Gatwick comes on top spot in terms of every charter passengers travelling from the U.K. . This is mainly due to a large number of charter flights available during holiday seasons which opens up lots of new unexplored routes for passengers to travel. Another reason can be due to its proximity to London compared to other airports in the visualisation above excluding Heathrow; which allows passengers arriving in the country easy access to the capital. Also, It is worth noting Heathrow comes at the lowest level in terms of Charter passengers. **Thus, it is concluded that Gatwick airport is the busiest airport in terms of Charters passengers.**

Pie chart



In the figure above you can see the distribution of top 10 airports in the U.K.

Conclusion and Evaluation of process:

Key findings:

To conclude I would say that some of the findings surprised me a bit. For instance, I didn't expect Stansted airport to have the highest number of EU scheduled passengers; but to my amusement it did.

It was astonishing to see the difference between scheduled and charter passengers as I did not know the figures of charter passengers compared to scheduled passengers, which is quite low.

Factors that affect this surge of passengers is due to the pricing of airport slots based on which an airline operates from an airport. Overall, It is now safe to say that Gatwick is the busiest airport in terms of Charter passengers.

Evaluation of process:

The decision of only including the top 10 airports is justified as the inclusion of all 50+ airports would have arisen in complexities during analysis and visualisation. Also, I decided to use 2019s data as it is the latest and merging data from past would have added to the complexity. I believe that the analysis done was satisfactory.

The process of creating the visualisations were learnt in the lab as well as from practising them alongside using documentation as a reference. I decided to keep the visualisations simple without using any extra styles as I believe that visualisations with simple colours are easier to understand and absorb for any audience.