



# ESTIMATION OF PASSENGERS TRAFFIC AT AN AIRPORT

BUSINESS STRATEGY AND DATA SCIENCE

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# ADOLFO SUÁREZ MADRID BARAJAS AIRPORT



Dirección de Operaciones, Seguridad y Servicios

Departamento de Estadísticas

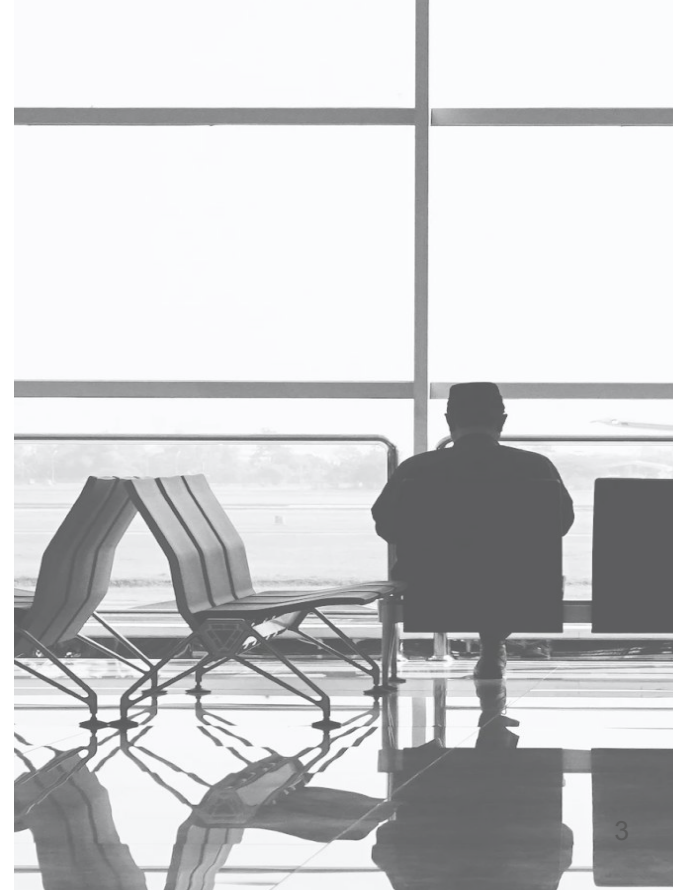
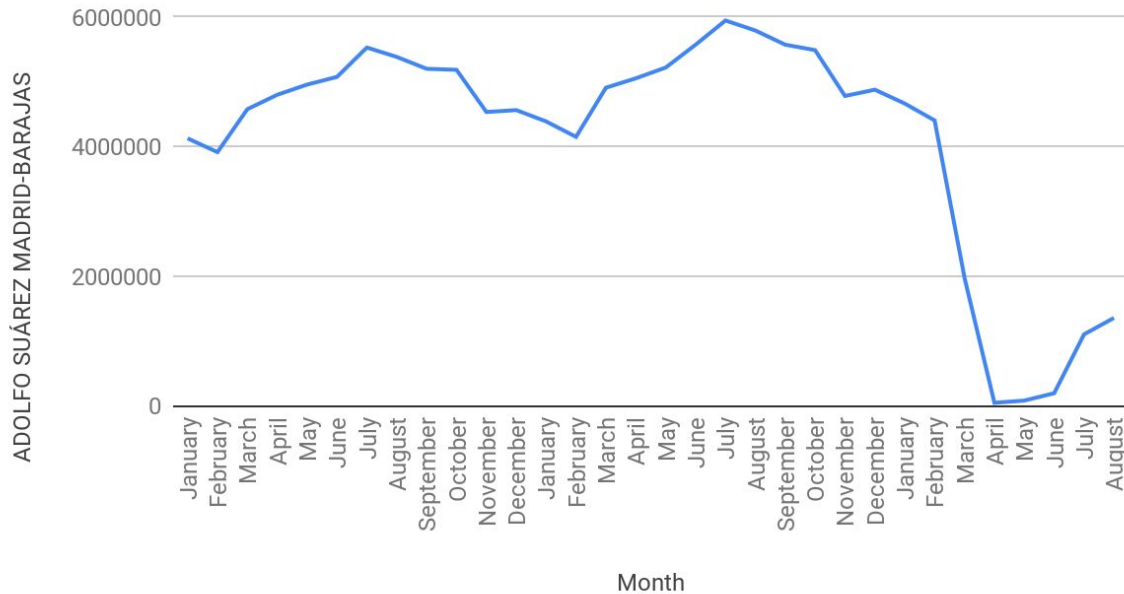
AEROPUERTOS	PASAJEROS	
	Total	% Inc 2020 /s 2019
ADOLFO SUÁREZ MADRID-BARAJAS	1.356.383	-76,6%
PALMA DE MALLORCA	1.240.113	-71,0%
BARCELONA-EL PRAT J.T.	1.110.578	-79,5%
MÁLAGA-COSTA DEL SOL	677.874	-69,3%
IBIZA	574.974	-58,2%
ALICANTE-ELCHE	480.710	-71,6%
GRAN CANARIA	469.560	-56,6%
TENERIFE NORTE C. LA LAGUNA	275.023	-39,8%

We will focus on a single airport in Spain.

We will be analyzing and predicting the passenger traffic in the airport Adolfo Suárez Madrid in the short term (the rest of the year), and in the medium-term (next year).

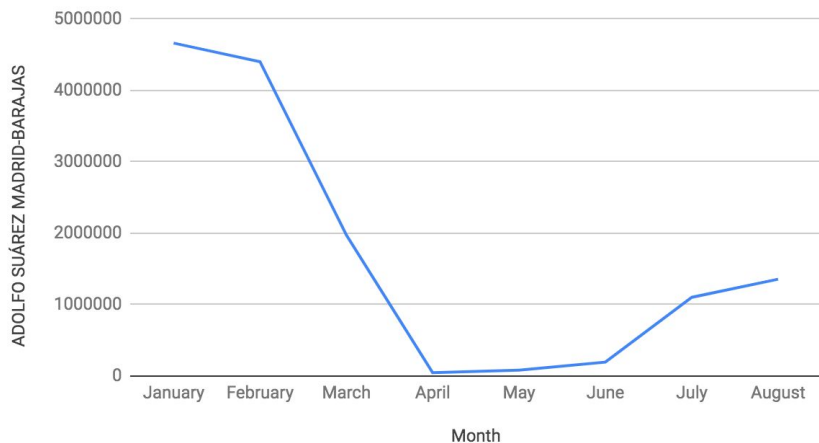
# PASSENGER TRAFFIC FROM YEARS 2018, 2019 AND 2020

ADOLFO SUÁREZ MADRID-BARAJAS vs Month



# CORRELATION BETWEEN COVID CASES AND PASSENGERS

Short-Term

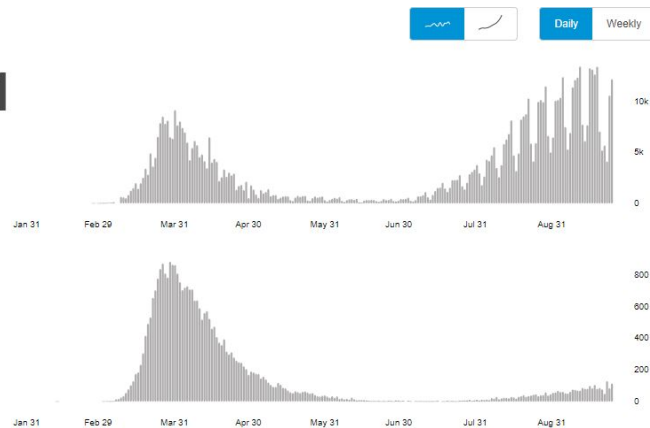


Spain Situation

**716,481**  
confirmed cases

**31,232**  
deaths

Source: World Health Organization



# PREDICTION METHODS

For this assignment we have decided to use regression analysis to predict the number of passengers.

- We have chosen to do our predictions with another regression technique called **SVR** (Support Vector Regression) and the results were surprisingly promising.
- We fed the data of 31 past months (X) with the amount of Passengers (Y) and trained the model. Then we used the same model to predict the following 4 months (short-term) and 16 months (medium-term).

We believe that many KPI's could be included in this assignment in order to make a Multiple linear regression model that could take more information into account whilst predicting the next months. Many of this information is not so easily gathered so we decided to stick to the known variables.

We have come up with some other key pieces of information that could help us create a more thorough model:

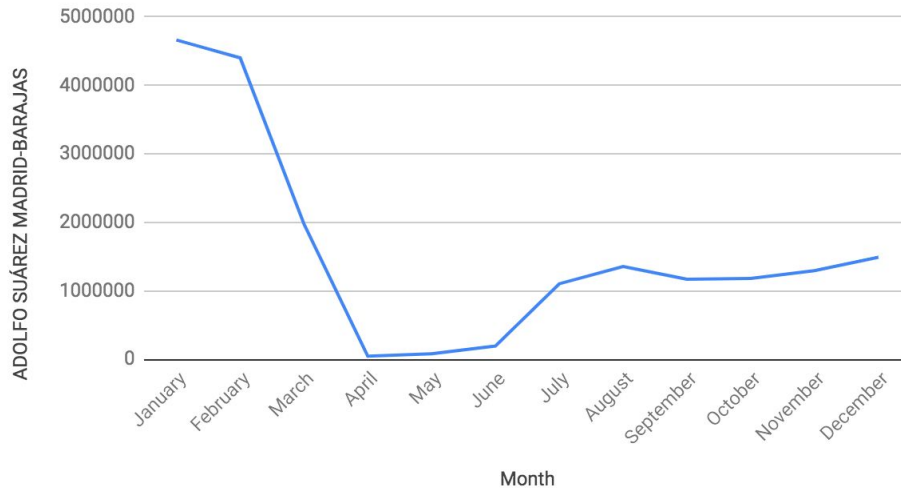
- Taxis in the airport.
- Uber rides to the airport
- Covid Cases in Madrid
- Airlines discontinuing flights
- Flights canceled
- Number of people deported

KPIs



# SHORT - TERM PREDICTION

Short-Term Prediction



We trained the SVR model that allowed us to make a rough estimate of the number of passengers that will be travelling in the last four months of 2020, right before the year finishes.

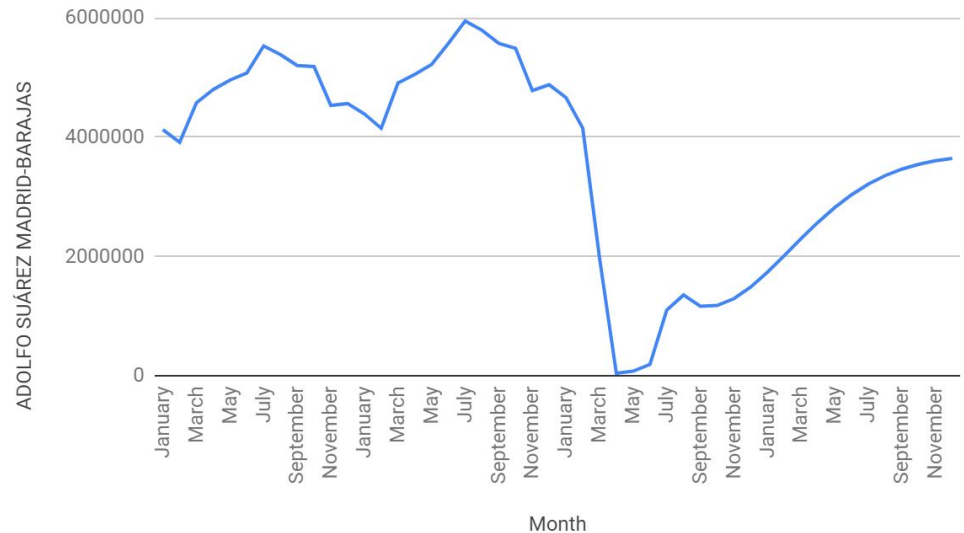
We can interpret that it has predicted a subtle decrease for the month September that remains constant for the month of October and then for it to perform a slow continuous increase in the months of November and December.

# MEDIUM - TERM PREDICTION

The medium term prediction was created by using data that goes from early 2018 up till the current date.

As you can see the expected behaviour would be a slow but steady return to the average values seen during 2018 and 2019.

Medium-Term Prediction



# CONCLUSION

Having analysed the model, we identified several factors that could influence the state of global affairs in such a way as to disrupt the model. The model would be consistent with the idea that the increase in infection rate around September would result in minor disruption, which is certainly within realistic expectations.

However, it would be equally reasonable to assume that restrictions would be more severe should the pandemic worsen significantly, which would not only decrease the expected flights, but would likely decrease them to near 0, allowing only certain exceptions.



A photograph of a Delta Airlines aircraft (N609SK) at an airport gate. The aircraft is white with a red and blue tail. It is parked on a wet tarmac. In the background, there are other Delta aircraft and a large, snow-covered mountain under a cloudy sky. The text "THANK YOU ANY QUESTIONS?" is overlaid in large, bold, green letters on a light green rectangular background.

**THANK YOU  
ANY QUESTIONS?**

# REFERENCES

(2020). Retrieved from EU Open Data Portal:

<https://data.europa.eu/euodp/en/data/dataset/covid-19-coronavirus-data>

AENA. (2020). Retrieved from Estadísticas de tráfico aéreo:

<http://www.aena.es/csee/Satellite?pagename=Estadisticas/Home>

<https://colab.research.google.com/drive/1eaqXfnCRH5N5YcuMUjY6rX55EazLulkw?usp=sharing>  
(Code)

[https://docs.google.com/spreadsheets/d/1ppGW65hMMtwyPVMmVDcZzwnQmYHB1Tv\\_jAQC13VFYow/edit?usp=sharing](https://docs.google.com/spreadsheets/d/1ppGW65hMMtwyPVMmVDcZzwnQmYHB1Tv_jAQC13VFYow/edit?usp=sharing) (Data)