

Data Science

Artificial Intelligence

Machine Learning

Blockchain

Task 3 (Power BI solution): Data Analysis dashboard solution

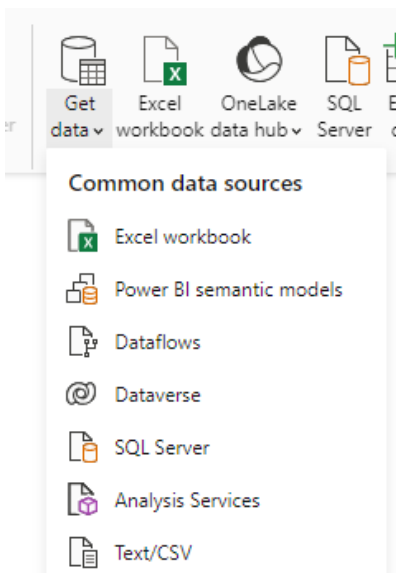
You will be assigned a dataset and required to create a suitable dashboard representing the main elements of its data. Please make sure that you follow the instructions below:

- i. You need to generate four different reports and integrate them into one dashboard.
- ii. Please use suitable titles, images, and links.

Data source: <https://www.kaggle.com/datasets/usdot/flight-delays/data>

Data files: flights.csv, airlines.csv and airports.csv

Importing source data using Text/CSV option in Power BI.



Once imported, it is possible to transform data and view general statistics, remove unwanted rows and columns from tables, creating new columns based on various scenarios and so on.

Removing the top row (row no 1) from the airports table because it is not required.

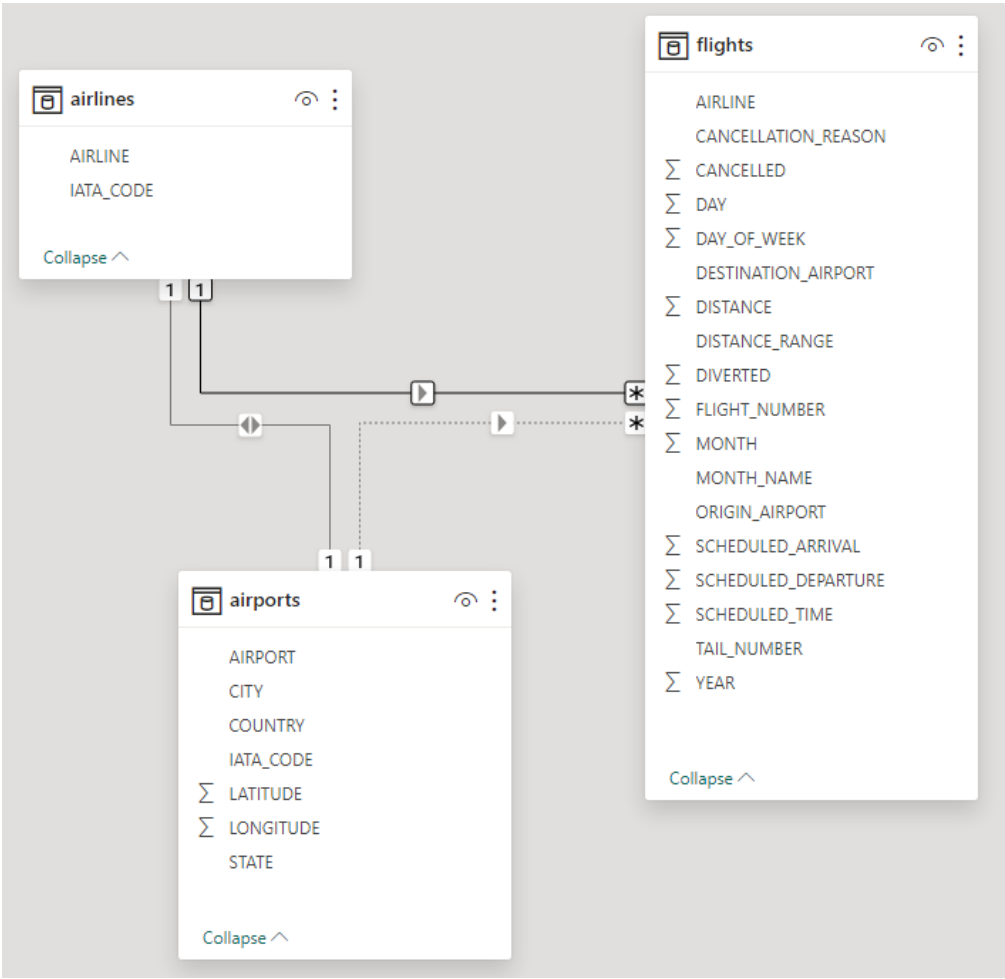
The screenshot shows a data tool interface with a table containing 15 rows. The first row is highlighted, and a context menu is open over it. The menu options include 'Remove Top Rows', 'Remove Bottom Rows', 'Remove the top N rows of table.', 'Remove Duplicates', 'Remove Blank Rows', and 'Remove Errors'. The 'Remove the top N rows of table.' option is selected.

	IATA_CODE	AIRLINE
1	IATA_CODE	AIRLINE
2	UA	United Air Lines Inc.
3	AA	American Airlines Inc.
4	US	US Airways Inc.
5	F9	Frontier Airlines Inc.
6	B6	JetBlue Airways
7	OO	Skywest Airlines Inc.
8	AS	Alaska Airlines Inc.
9	NK	Spirit Air Lines
10	WN	Southwest Airlines Co.
11	DL	Delta Air Lines Inc.
12	EV	Atlantic Southeast Airlines
13	HA	Hawaiian Airlines Inc.
14	MQ	American Eagle Airlines Inc.
15	VX	Virgin America

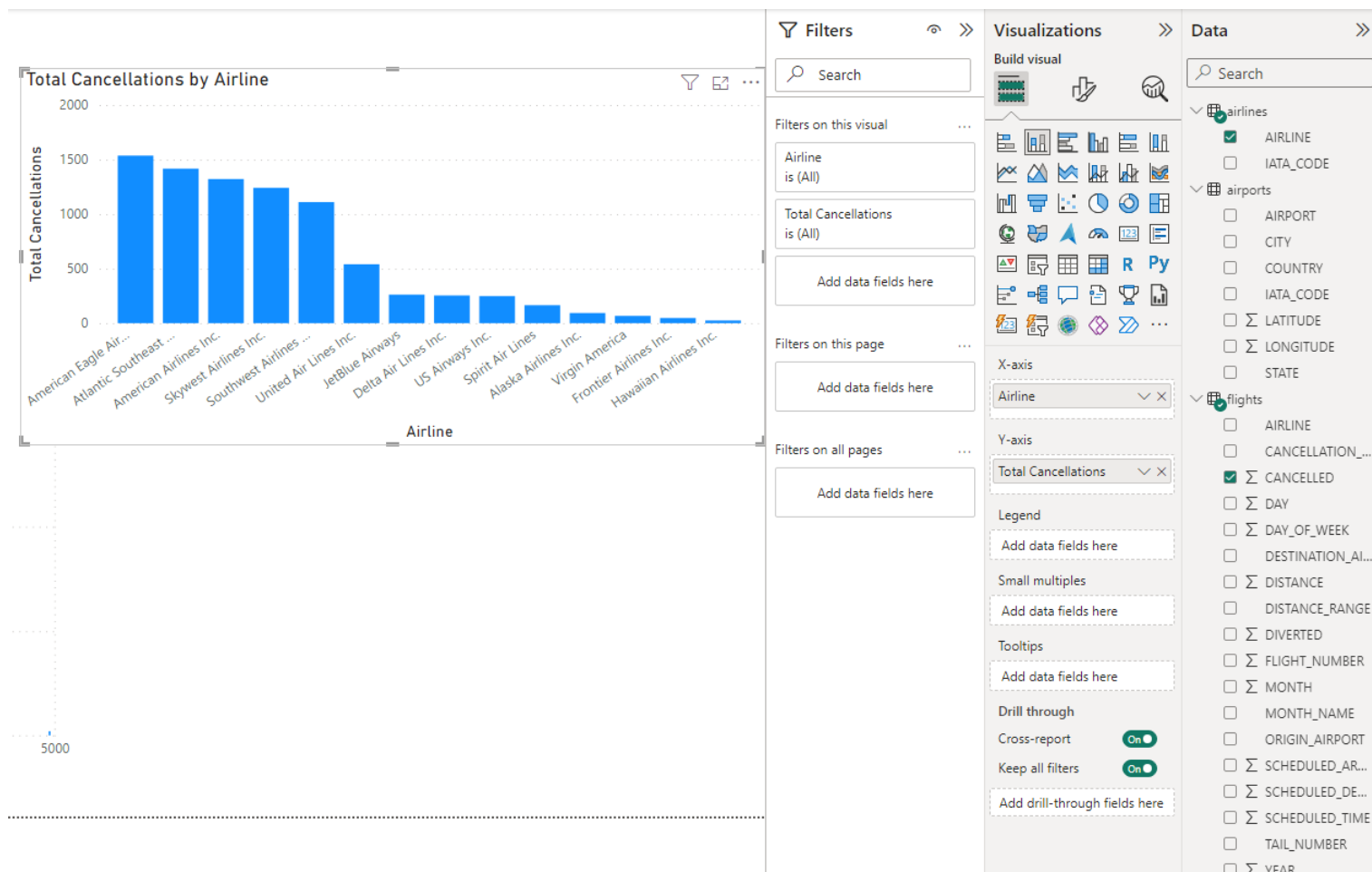
By using Column Quality and Column Profile options, general statistics and each columns distribution can be observed.

Viewing basic statistics on the airports table.

The below image shows the relationship between the 3 tables and the final tables after removing all unnecessary columns.

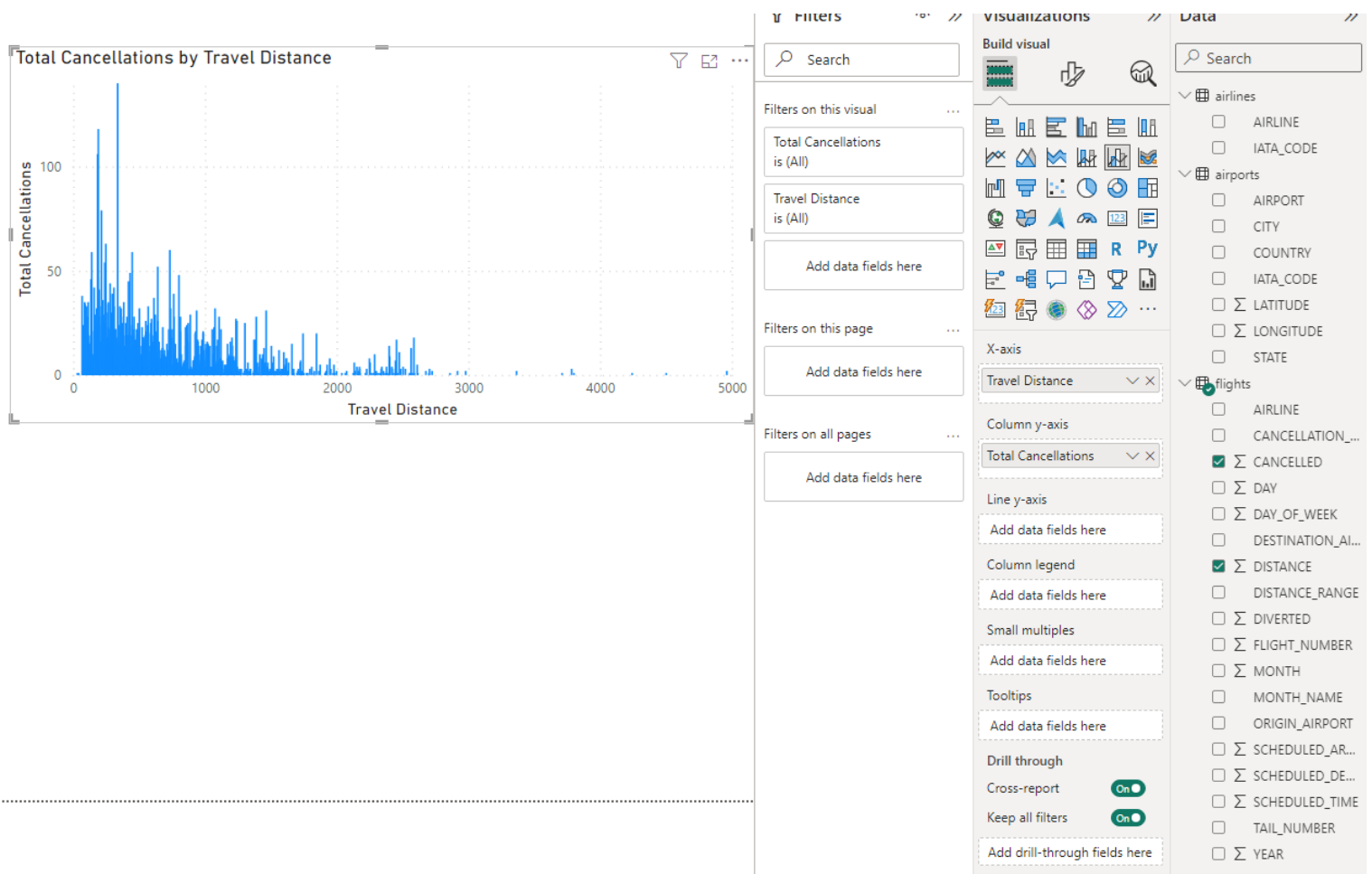


Generating a Stacked column chart to display the Total Cancellations by Airline.



Based on the above visual, American Eagle airliner has more than 1500 air travel cancellations for the year 2015, and Huwaiian Airline has become the best airliner among others (based only on booking cancellations) due to its minimum cancellations.

Generating a Line chart to display Total Cancellations by Travel Distance.



The accompanying graphic, which takes into account all of the airlines included in the source data, shows that when the trip distance is less than 1000 km, there are more cancellations of air travel; however, when the distance is somewhat more than 2800 km, there are fewer cancellations. In other words, it is reasonable to infer that airlines have worked harder to avoid having to cancel flights, particularly for longer ones.

Creating a new `DISTANCE_RANGE` column based on the `DISTANCE` column.

	A ^B _C DISTANCE_RANGE	1 ² ₃
1727	1000-2000	
1487	1000-2000	
429	0-1000	
295	0-1000	
158	0-1000	
1482	1000-2000	
957	0-1000	
680	0-1000	
441	0-1000	
309	0-1000	
431	0-1000	

Adding a conditional column to generate name of the month using the MONTH column.

Add Conditional Column

Add a conditional column that is computed from the other columns or values.

New column name

MONTH_NAME

	Column Name	Operator	Value ①		Output ①
If	MONTH	equals	ABC 123 1	Then	ABC 123 Jan
Else If	MONTH	equals	ABC 123 2	Then	ABC 123 Feb
Else If	MONTH	equals	ABC 123 3	Then	ABC 123 Mar
Else If	MONTH	equals	ABC 123 4	Then	ABC 123 Apr
Else If	MONTH	equals	ABC 123 5	Then	ABC 123 May
Else If	MONTH	equals	ABC 123 6	Then	ABC 123 Jun

Add Clause

Else ①

ABC 123 Dec

OK

Cancel

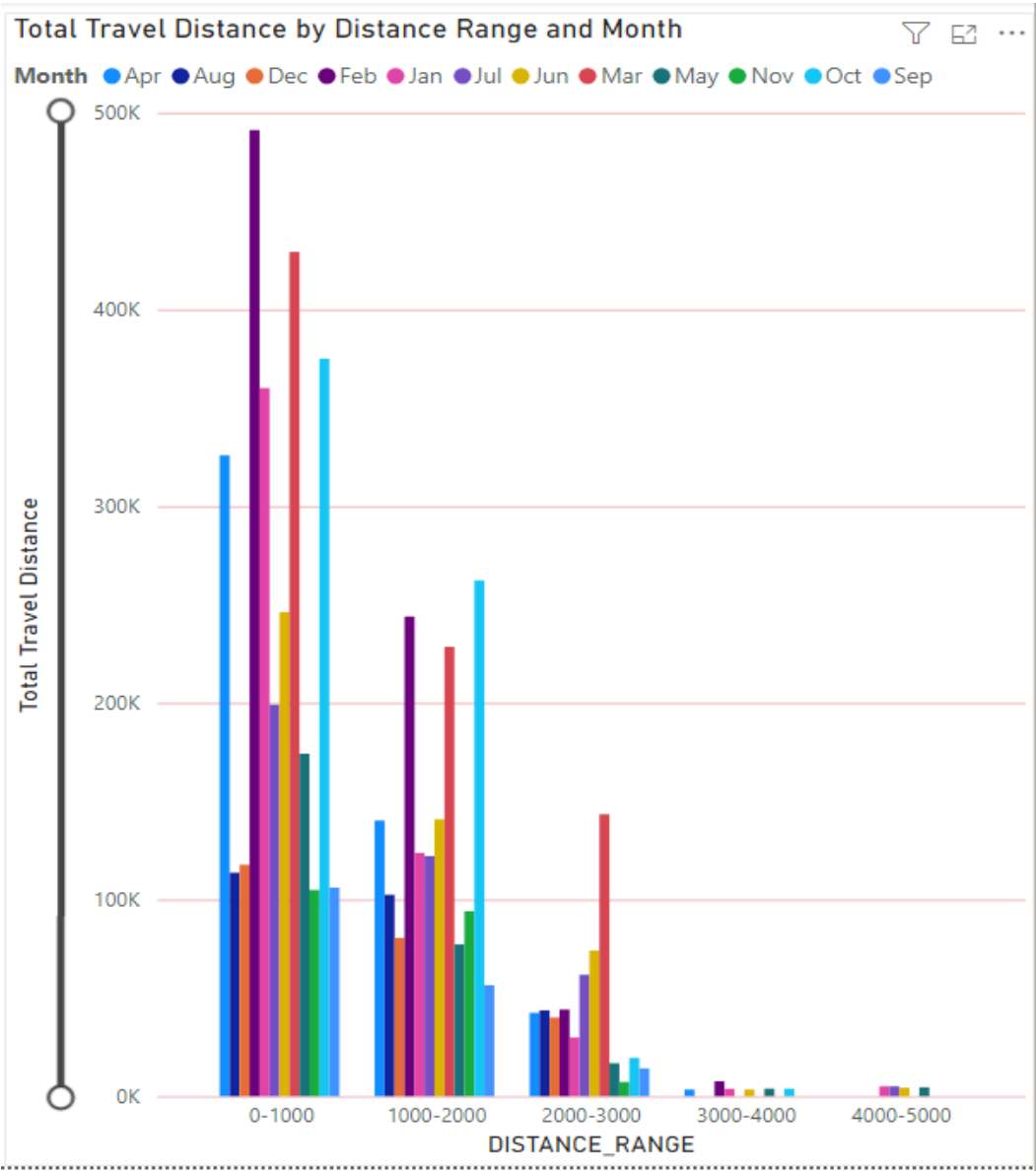
Generating a new Total Travel Distance by Distance Range and Month

Enabling Cross-report option under Drill though, it is possible to open another window to display the selection's data in more detail.

Drill through

Cross-report

On

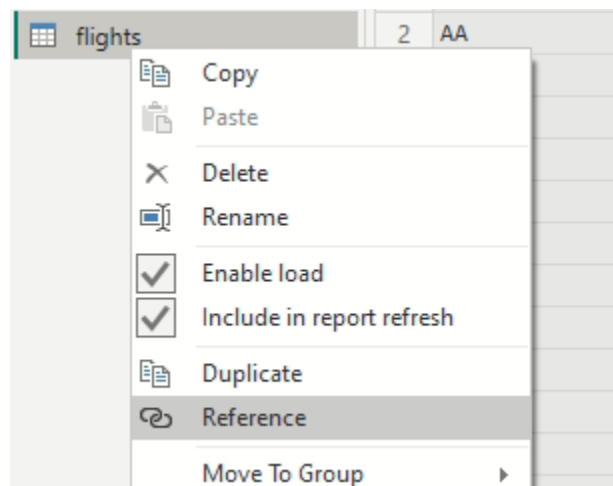


Drill Through is enabled so that when a user selects any bar, another window will open for a particular selection's data to display the same in more detail.

[Back to report](#)

DISTANCE_RANGE	Total Travel Distance	Month	AIRLINE	TAIL_NUMBER	ORIGIN_AIRPORT	DESTINATION_AIRPORT	CANCELLATION_REASON
0-1000	67	Apr	OO	N905SW	MKE	ORD	B
0-1000	73	Apr	OO	N768SK	COS	DEN	B
0-1000	74	Apr	EV	N12921	CLL	IAH	C
0-1000	77	Apr	OO	N976SW	SFO	MRY	C
0-1000	83	Apr	EV	N839AS	ATL	CSG	C
0-1000	84	Apr	OO	N930EV	SBN	ORD	B
0-1000	89	Apr	MQ	N635MQ	DFW	ACT	B
0-1000	89	Apr	MQ	N656MQ	ACT	DFW	B
0-1000	89	Apr	MQ	N657MQ	DFW	ACT	B
0-1000	89	Apr	MQ	N824MQ	ACT	DFW	B
0-1000	89	Apr	MQ	N824MQ	DFW	ACT	B
0-1000	102	Apr	EV	N685AE	TYR	DFW	A

Creating a reference table and generating a group by field based on ORIGIN_AIRPORT field.



Grouping via ORIGIN_AIRPORT and calculating the sum of DISTANCE (total distance).

✕

Group By

Specify the column to group by and the desired output.

☒ Basic ☐ Advanced

ORIGIN_AIRPORT

New column name

Count

Operation

Sum

Column

DISTANCE

OK

Cancel

Creating a new table to select top 10 origin airports based on the highest air travelled distance.

Clipboard

Data

Queries

Relationships

Calculations

Security

Sensitivity

Share

✕ ✓

1 Top 10 Ori Airports = TOPN(10, flights_GrpByOriAPDestAP, flights_GrpByOriAPDestAP[GrpBy_OriAP_DesAP], DESC)

ORIGIN_AIRPORT	GrpBy_OriAP_DesAP
IAH	110852
DEN	124940
JFK	122604
EWB	169069
SFO	236390
11298	173985
ORD	292323
DFW	423910
LAX	200939
LGA	257111

Quick measure

Data

Search

airlines

AIRLINE

IATA_CODE

airports

flights

flights_GrpByOriAPDestAP

Σ GrpBy_OriAP_DesAP

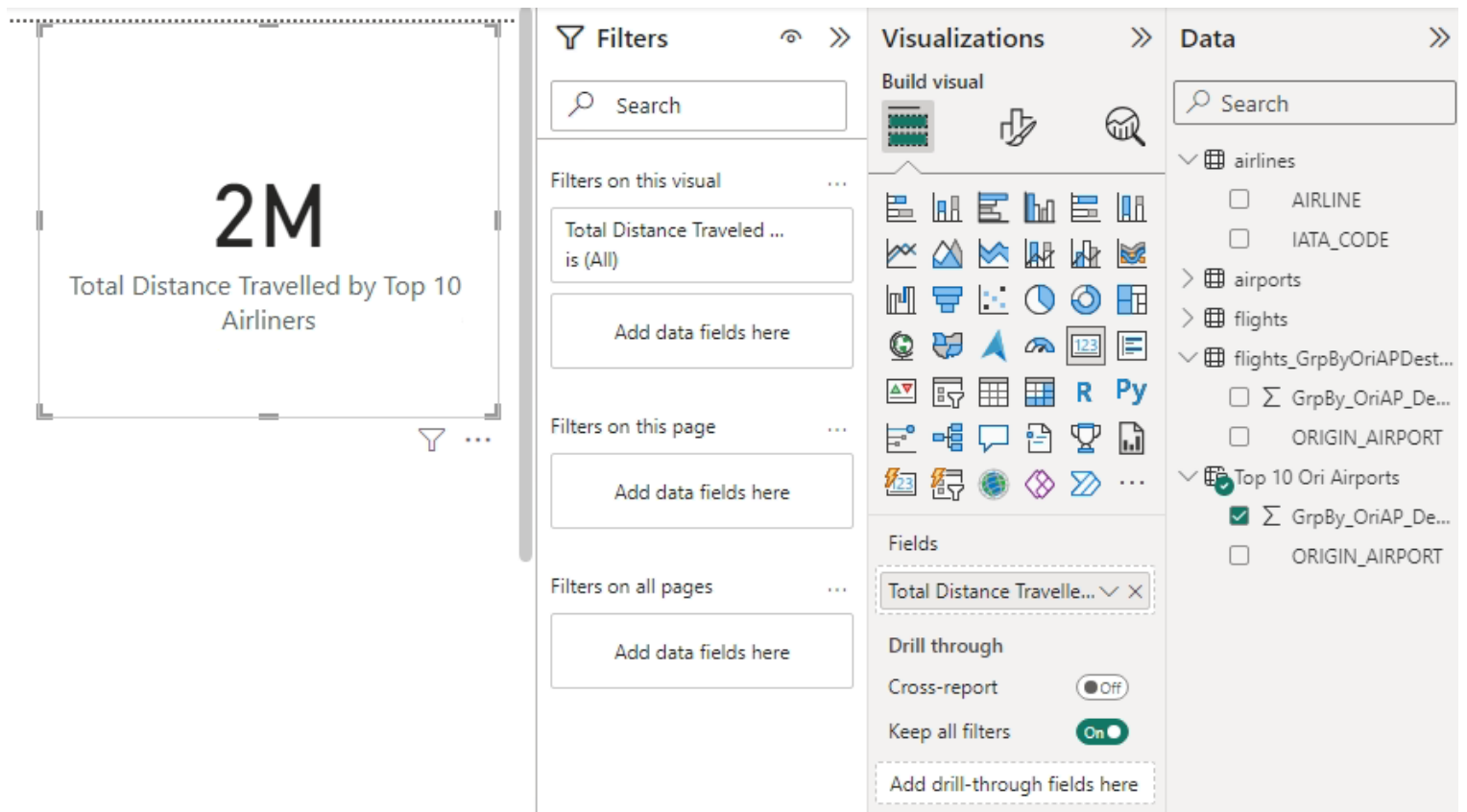
ORIGIN_AIRPORT

Top 10 Ori Airports

Σ GrpBy_OriAP_DesAP

ORIGIN_AIRPORT

Adding a card to showcase the total distance travelled by the top 10 airlines (filtered based on the total distance).



Visualizing the above same in detail by using a Table.

Departure Airport	Total Air Distance
DFW	423910
ORD	292323
LGA	257111
SFO	236390
LAX	200939
11298	173985
EWR	169069
DEN	124940
JFK	122604
IAH	110852
Total	2112123

Filters

Filters on this page ...

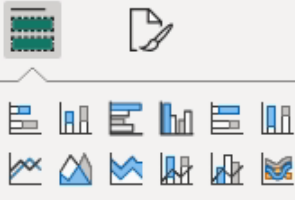
Add data fields here

Filters on all pages ...

Add data fields here

Visualizations

Build visual



Values

Add data fields here

Drill through

Cross-report ☒

Keep all filters ☒

Add drill-through fields here

Data

- ✓ ☒ airlines
 - ☐ AIRLINE
 - ☐ IATA_CODE
- > ☒ airports
- > ☒ flights
- ✓ ☒ flights_GrpByOriAPDest...
 - ☐ Σ GrpBy_OriAP_De...
 - ☐ ORIGIN_AIRPORT
- ✓ ☒ Top 10 Ori Airports
 - ☐ Σ GrpBy_OriAP_De...
 - ☐ ORIGIN_AIRPORT

Creating a group by column to find the total delayed departure hours.

Group By

Specify the columns to group by and one or more outputs.

☐ Basic ☒ Advanced

DESTINATION_AIRPORT ▾

MONTH ▾

Add grouping

New column name

Depart_Delay_Sum

Operation

Sum ▾

Column

DEPARTURE_DELAY ▾

Add aggregation

OK

Cancel

Generating a table to find the top 10 airliners based on delayed departure hours to travel destinations.

✕ ✓ 1 Top 10 Departers Delays = TOPN(10, flights1_GrpByDesApMonth, flights1_GrpByDesApMonth[Depart_Delay_Sum], DESC)		
DESTINATION_AIRPORT ▾	MONTH ▾	Depart_Delay_Sum ▾
ORD	6	488292
ATL	6	396243
ATL	12	394094
ORD	2	336594
ORD	7	334546
SFO	12	331474
DFW	6	313927
DEN	6	309236
LAX	7	309211
ORD	1	307152

Adding a new column to calculate the number of hours on the column Depart_Delay_Sum.

Name

MONTH

Format

Whole number

Summarization

Don't summarize

Sort by column

Sort

Data groups

Groups

Manage relationships

Relationships

New column

Calculations

Data type

Whole number

Format

\$ % , .00 0

Data category

Uncategorized

Structure

Formatting

Properties

1 Top 10 Departers Delays = TOPN(10, flights1_GrpByDesApMonth, flights1_GrpByDesApMonth[Depart_Delay_Sum], DESC)

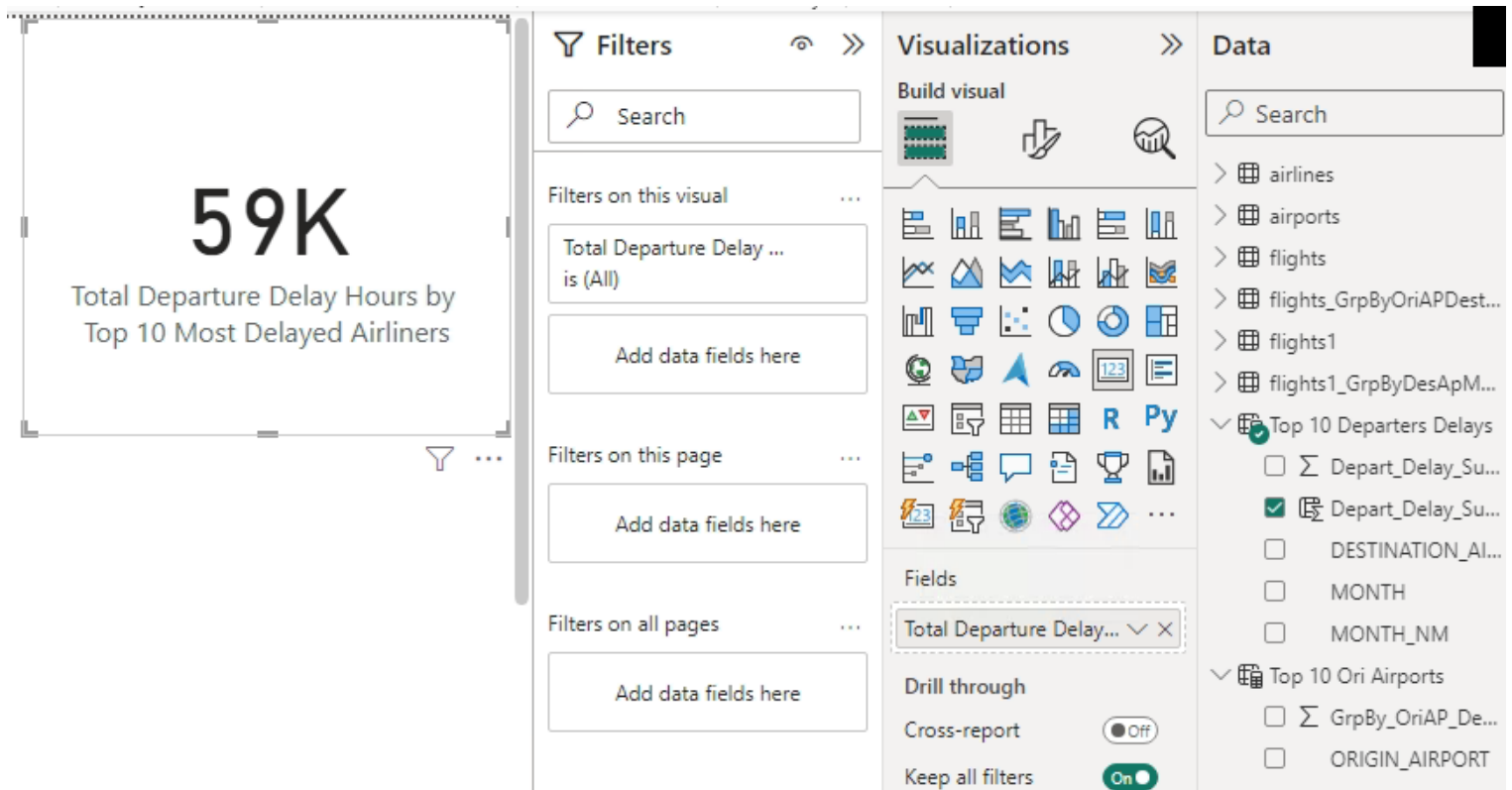
DESTINATION_AIRPORT	MONTH	Depart_Delay_Sum	Depart_Delay_Sum_Hours
ORD	6	488292	8138
ATL	6	396243	6604
ATL	12	394094	6568
ORD	2	336594	5610
ORD	7	334546	5576
SFO	12	331474	5525
DFW	6	313927	5232
DEN	6	309236	5154
LAX	7	309211	5154
ORD	1	307152	5119

Data

Search

- airlines
- airports
- flights
- flights1_GrpByOriAPDestAP
- flights1
- flights1_GrpByDesApMonth
- Top 10 Departers Delays
 - Depart_Delay_Sum
 - Depart_Delay_Sum_Hours
 - DESTINATION_AIRPORT
 - MONTH
- Top 10 Ori Airports

Adding a card to display the total number of hours delayed to departure.



Adding a table to display the above same in detail.

Month	Destination Airport	Total Hours Delayed to Departure
Jun	ORD	8138
Jun	ATL	6604
Dec	ATL	6568
Feb	ORD	5610
Jul	ORD	5576
Dec	SFO	5525
Jun	DFW	5232
Jun	DEN	5154
Jul	LAX	5154
Total		58679

Filters

Search

Filters on this visual

Destination Airport is (All)

Month is (All)

Total Hours Delayed to ... is (All)

Add data fields here

Filters on this page

Add data fields here

Filters on all pages

Visualizations

Build visual

Columns

Month

Destination Airport

Total Hours Delayed t...

Drill through

Cross-report

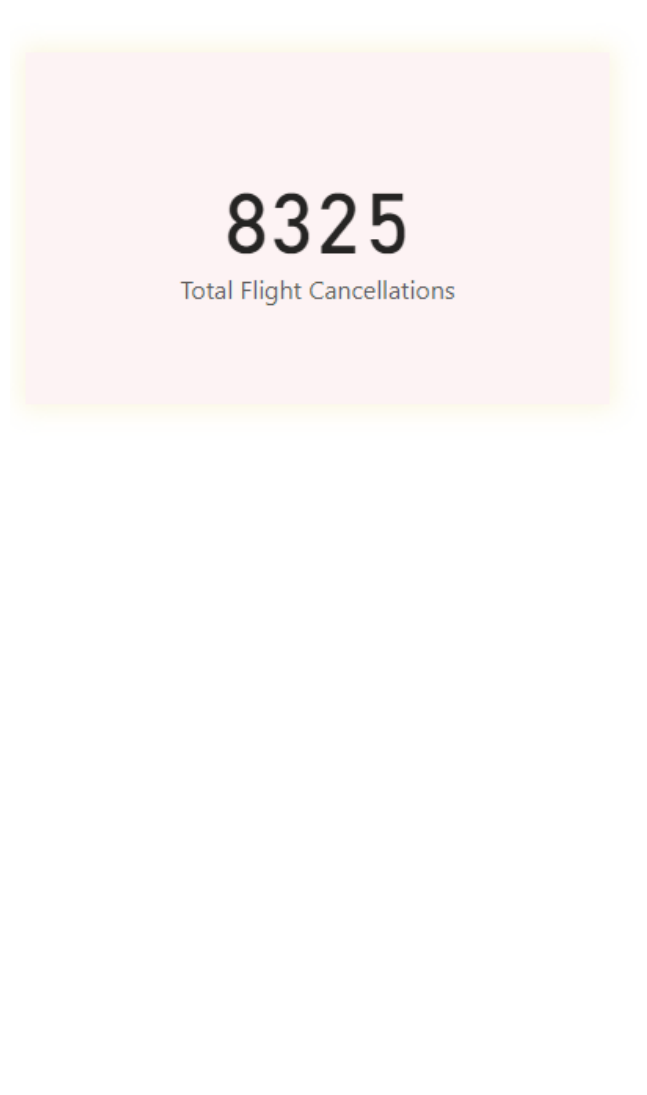
Data

Search

- airlines
- airports
- flights
- flights_GrpByOriAPDest...
- flights1
- flights1_GrpByDesApM...
- Top 10 Departers Delays
 - Depart_Delay_Su...
 - Depart_Delay_Su...
 - DESTINATION_AI...
 - MONTH
 - MONTH_NM
- Top 10 Ori Airports
 - GrpBy_OriAP_De...
 - ORIGIN_AIRPORT

Creating a new measure to calculate the total number of cancellations for the year 2015 and displaying it in a card.

```
1 Total Cancellations = sum(flights[CANCELLED])
```



Filters

Build visual

airlines

airports

flights

☐ AIRPORT

☐ CITY

☐ COUNTRY

☐ IATA_CODE

☐ LATITUDE

☐ LONGITUDE

☐ STATE

☐ AIRLINE

☐ CANCELLATION_REASON

☐ CANCELLED

☐ DAY

☐ DAY_OF_WEEK

☐ DESTINATION_AIRPORT

☐ DISTANCE

☐ DISTANCE_RANGE

☐ DIVERTED

☐ FLIGHT_NUMBER

☐ MONTH

☐ MONTH_NAME

☐ ORIGIN_AIRPORT

☐ SCHEDULED_ARRIVAL

☐ SCHEDULED_DEPARTURE

☐ SCHEDULED_TIME

☐ TAIL_NUMBER

☒ Total Cancellations

Values

Add data fields here

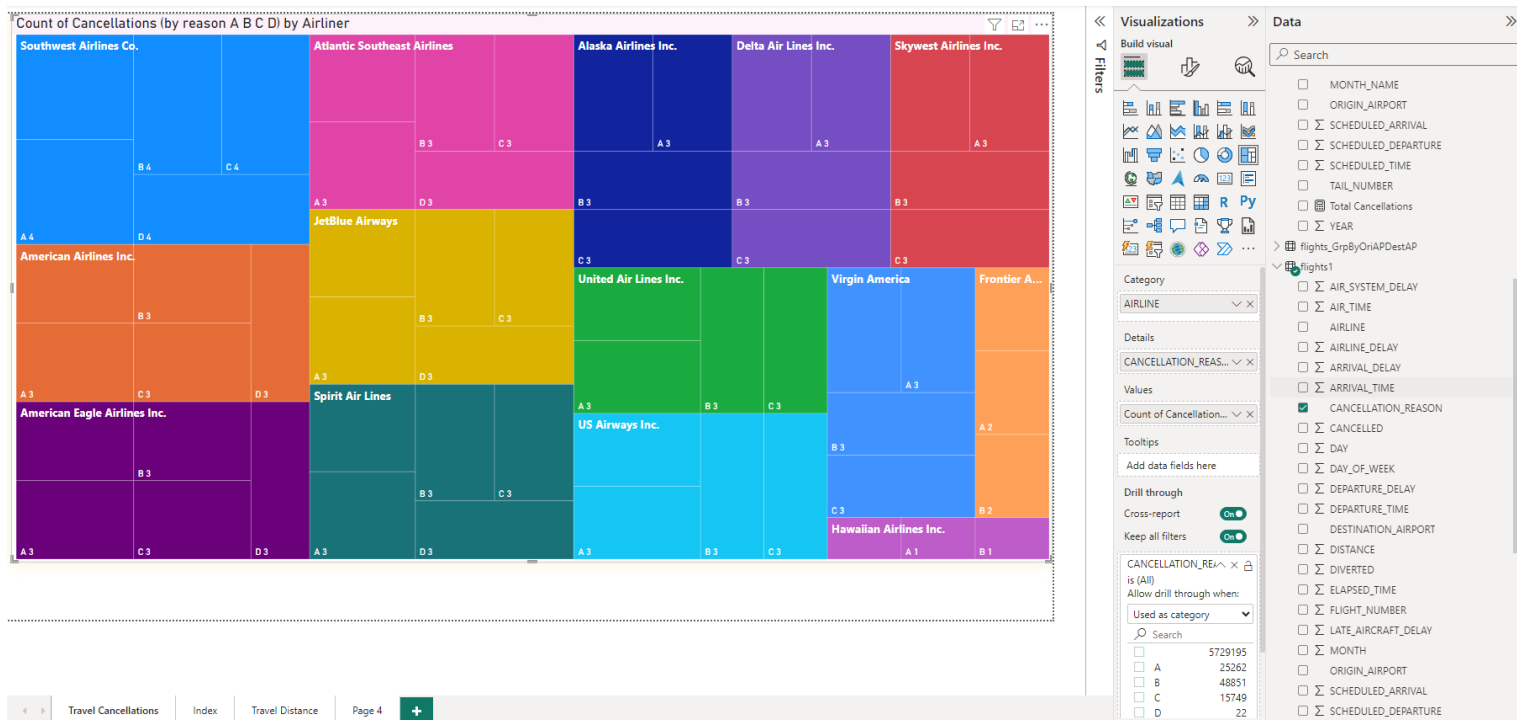
Drill through

Cross-report ☒

Keep all filters ☒

Add drill-through fields here

Adding a Treemap to visualize flight cancellations by reason of cancellation category (A, B, C, and D) for each Airliner.



Adding a new conditional column to categorize reason of cancellations and visualizing it against the total number of cancellations in a Donut chart.

Query Settings

PROPERTIES

Name

flights

APPLIED STEPS

Source

Promoted Headers

Changed Type

Filtered Rows

Removed Columns

Inserted Range

Inserted Merged Column

Filtered Rows1

Reordered Columns

Renamed Columns

Reordered Columns1

Removed Columns1

Added Custom

Changed Type1

Removed Columns2

Added Conditional Column

Added Conditional Column1

Table.AddColumn("#Added Conditional Column", "CANCELLATION_CATEGORY", each if [CANCELLATION_REASON] = "A" then "Bad Weather" else if [CANCELLATION_REASON] = "B" then "Mechanical issue" else if [CANCELLATION_REASON] = "C" then "Air Traffic Control Issue" else "Security Issue")

Add Conditional Column

Add a conditional column that is computed from the other columns or values.

New column name

CANCELLATION_CATEGORY

Column Name

Operator

Value

Output

If

CANCELLATION_...

equals

ABC 123

A

Then

ABC 123

Bad Weather

Else If

CANCELLATION_...

equals

ABC 123

B

Then

ABC 123

Mechanical issue

Else If

CANCELLATION_...

equals

ABC 123

C

Then

ABC 123

Air Traffic Control Issue

Add Clause

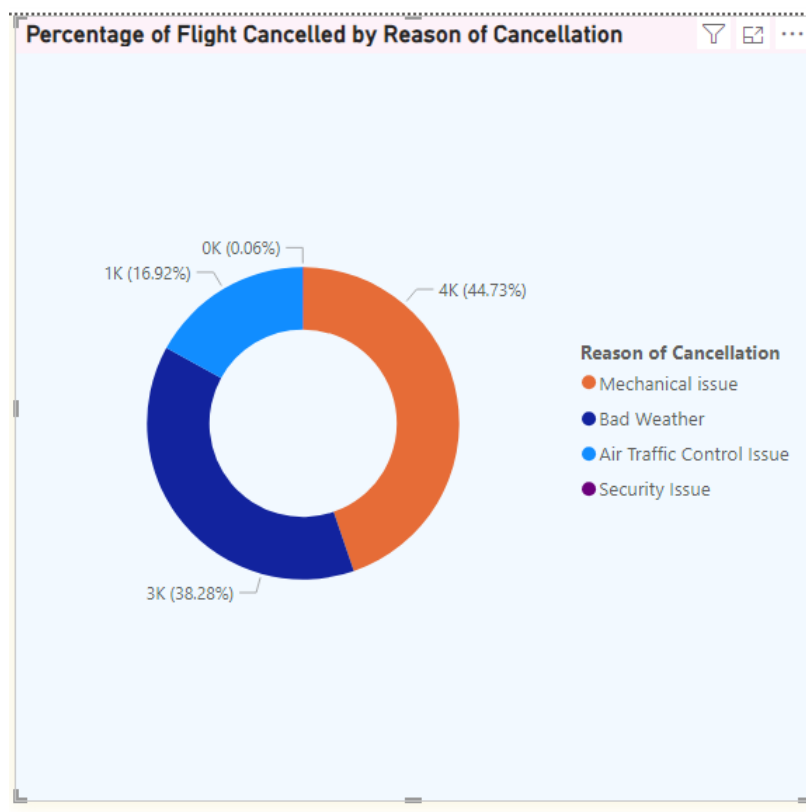
Else

ABC 123

Security Issue

OK

Cancel



Visualizations

Build visual

Reason of Cancellation

Percentage of Flight C...

Add data fields here

Add data fields here

Data

Search

airlines

airports

flights

AIRLINE

CANCELLATION_CATEGORY

CANCELLATION_REASON

CANCELLED

DAY

DAY_OF_WEEK

DESTINATION_AIRPORT

DISTANCE

DISTANCE_RANGE

DIVERTED

FLIGHT_NUMBER

MONTH

MONTH_NAME

ORIGIN_AIRPORT

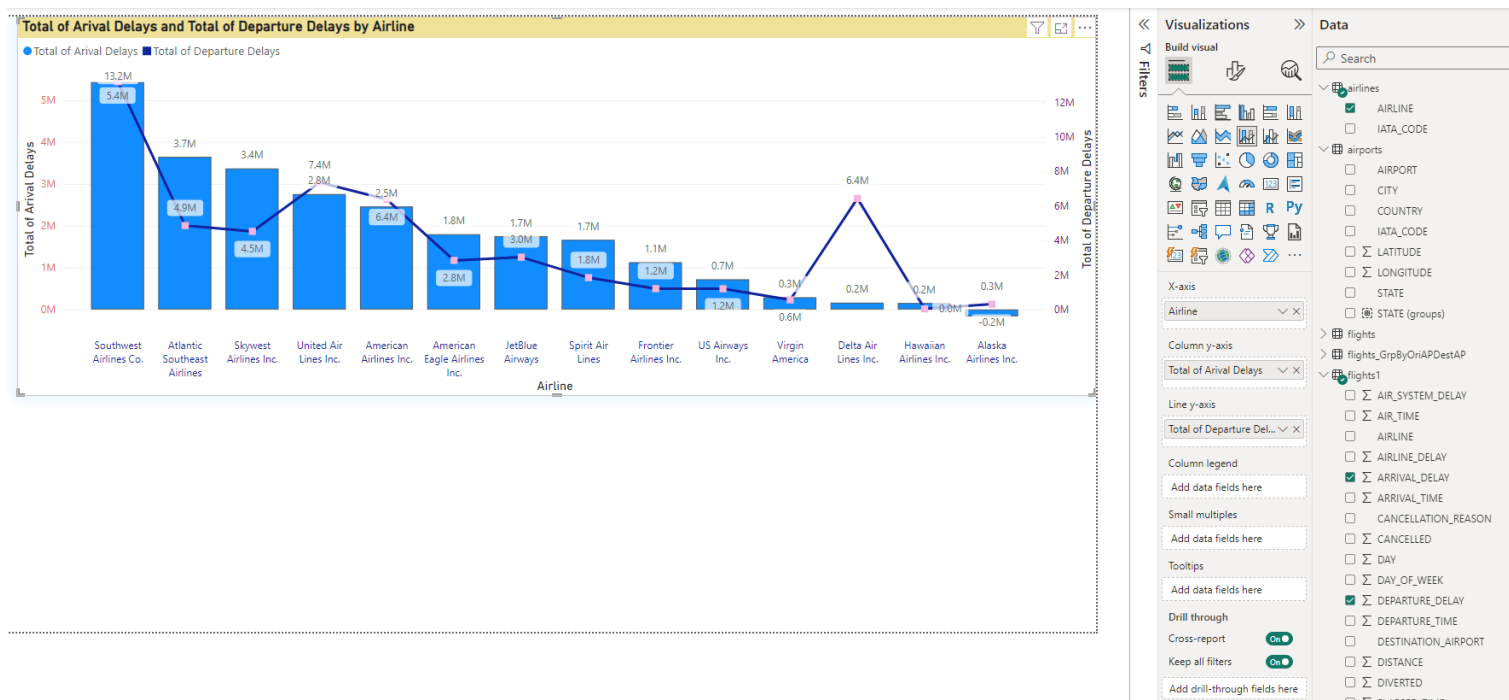
SCHEDULED_ARRIVAL

SCHEDULED_DEPARTURE

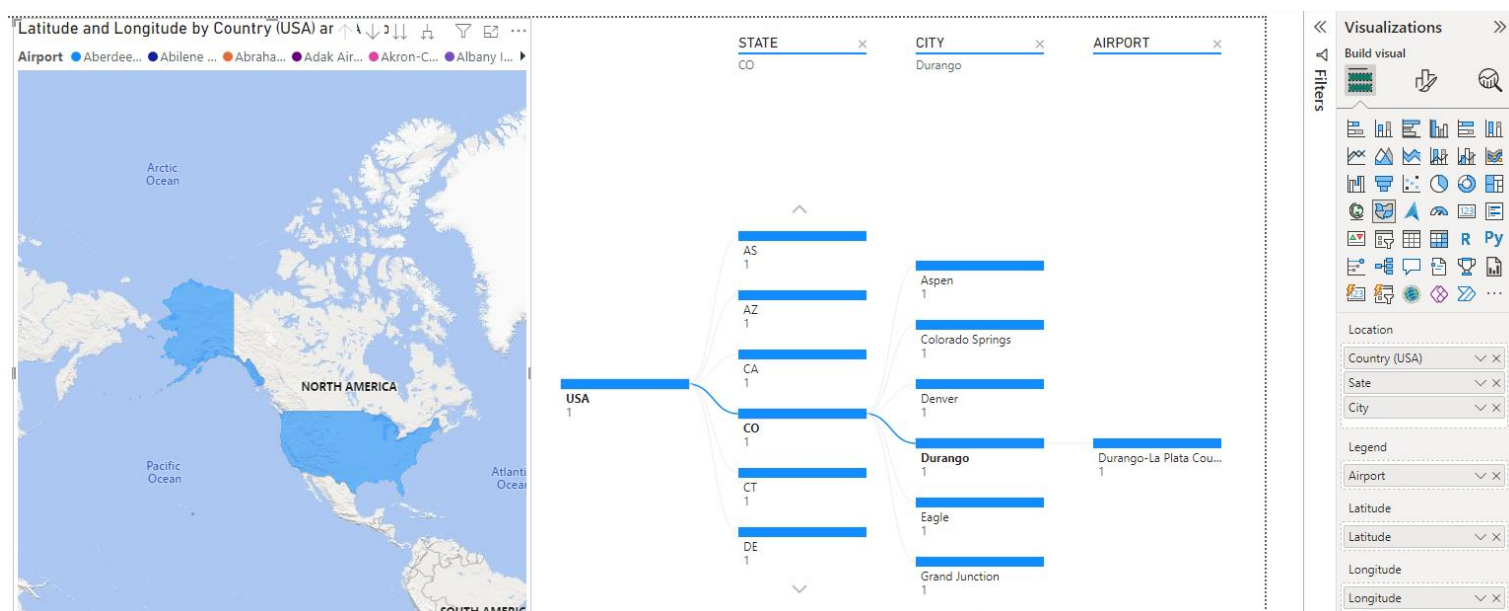
SCHEDULED_TIME

TAIL_NUMBER

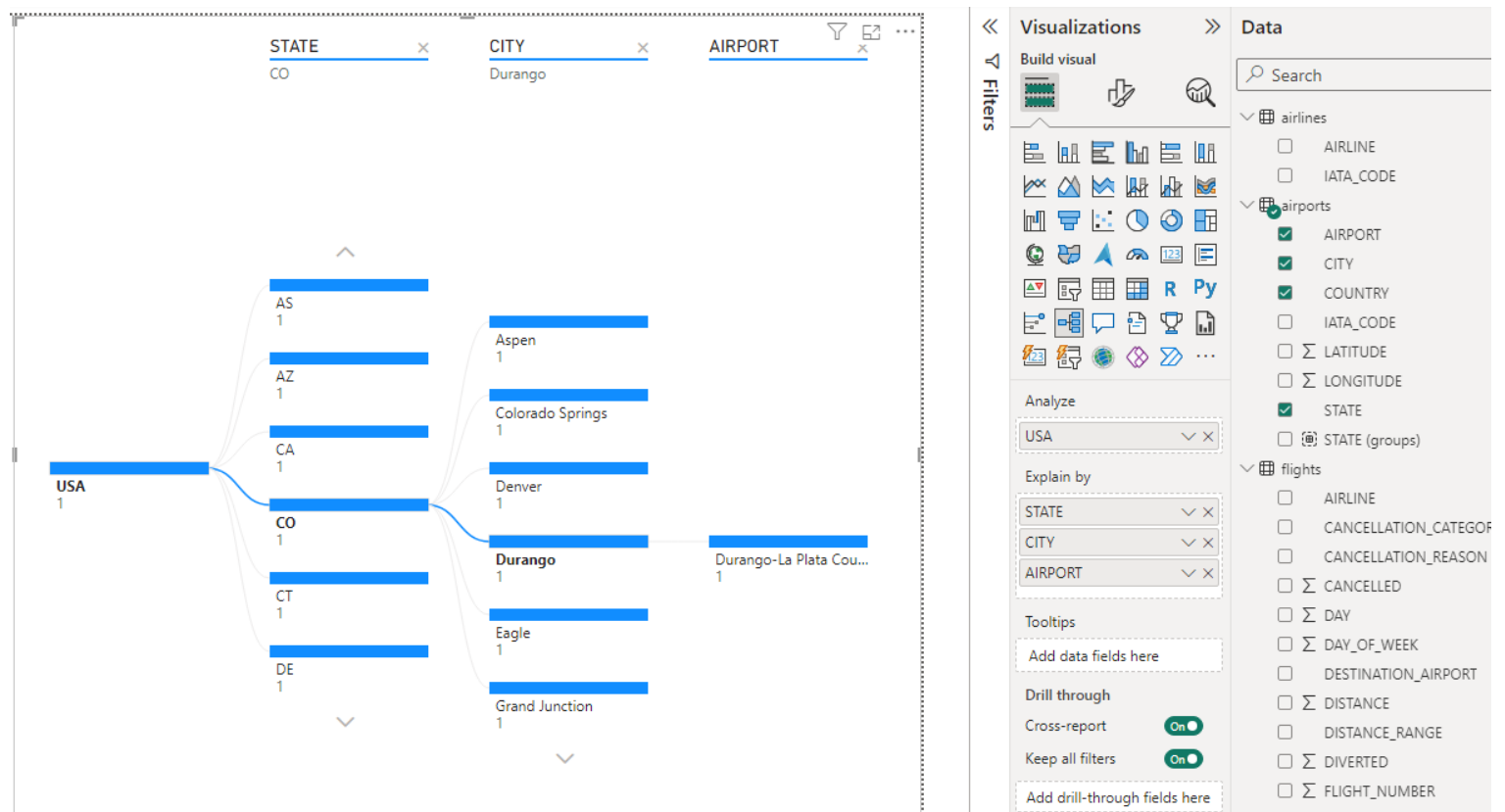
Plotting a Line and Stacked plot chart to display each airlines' total departure delays against total arrival delays.



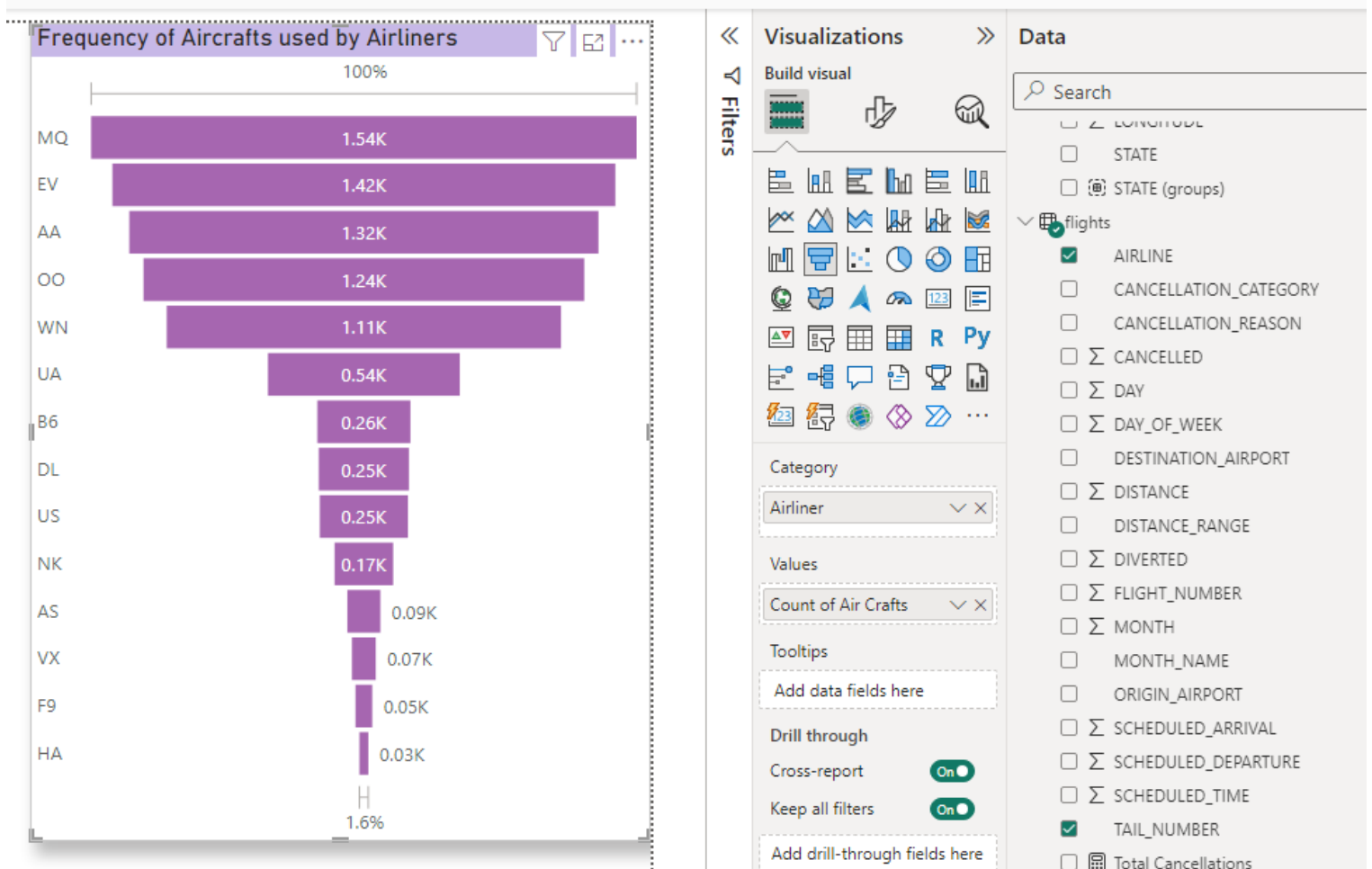
Adding a Filled Map and Decomposition Tree to display each state's, each city's airport location in a map on the United States of America.



Settings of the above Decomposition Tree.



Using a Funnel and visualizing the total number of aircrafts (by using their tail numbers) that have been used by airlines during the year 2015.



Placing a slicer to drill down from Airliner to their flights (based on the flights' tail numbers)

Airliner, Flight Tail Number

- ☐ Alaska Airlines Inc.
- ☐ American Airlines Inc.
- ☐ American Eagle Airlines Inc.
- ☐ Atlantic Southeast Airlines
- ☐ Delta Air Lines Inc.
- ☐ Frontier Airlines Inc.
- ☐ Hawaiian Airlines Inc.
- ☐ JetBlue Airways
- ☐ Skywest Airlines Inc.
- ☐ Southwest Airlines Co.
- ☐ Spirit Air Lines
- ☐ United Air Lines Inc.
- ☐ US Airways Inc.
- ☒ Virgin America
 - ☐ N281VA
 - ☐ N521VA
 - ☐ N522VA
 - ☐ N523VA
 - ☐ N524VA
 - ☐ N525VA
 - ☐ N527VA
 - ☐ N530VA
 - ☐ N621VA

<<
Visualizations
>>

Build visual

Field

Airliner

Flight Tail Number

Drill through

Cross-report On

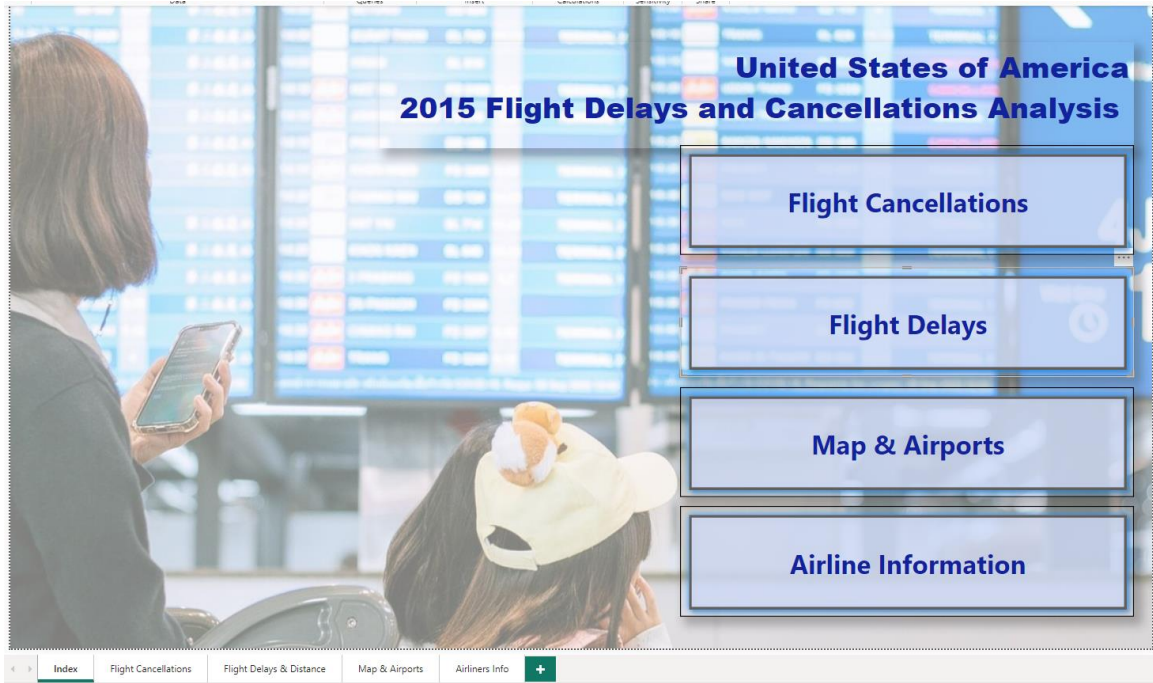
Keep all filters On

Add drill-through fields here

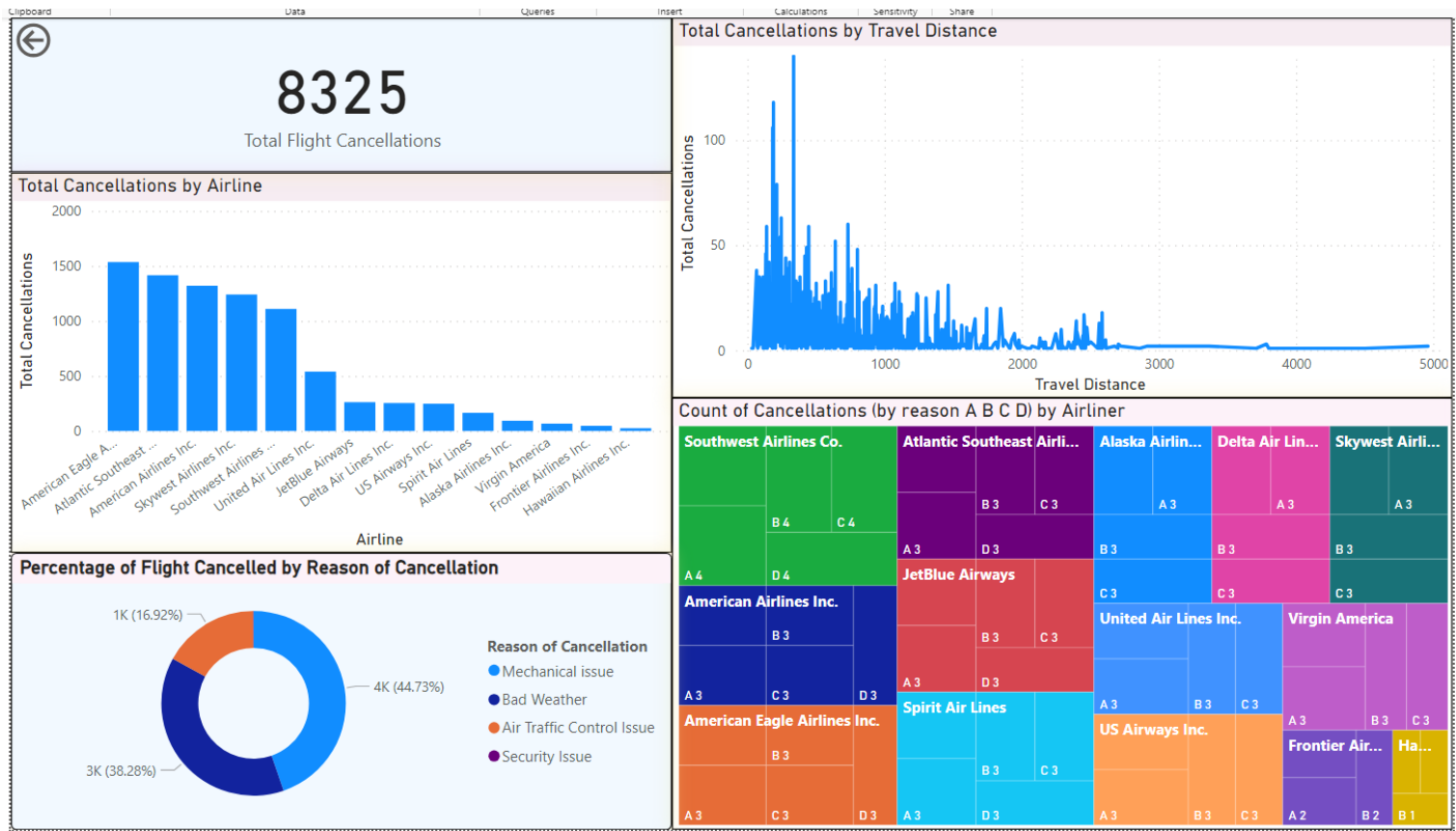
Data

- ☐ COUNTRY
- ☐ IATA_CODE
- ☐ Σ LATITUDE
- ☐ Σ LONGITUDE
- ☐ STATE
- ☐ STATE (groups)
- ☒ flights
 - ☐ AIRLINE
 - ☐ CANCELLATIO...
 - ☐ CANCELLATIO...
 - ☐ Σ CANCELLED
 - ☐ Σ DAY
 - ☐ Σ DAY_OF_WEEK
 - ☐ DESTINATION_...
 - ☐ Σ DISTANCE
 - ☐ DISTANCE_RA...
 - ☐ Σ DIVERTED
 - ☐ Σ FLIGHT_NUMBER
 - ☐ Σ MONTH
 - ☐ MONTH_NAME
 - ☐ ORIGIN_AIRPO...
 - ☐ Σ SCHEDULED_A...
 - ☐ Σ SCHEDULED_D...
 - ☐ Σ SCHEDULED_TI...
 - ☒ TAIL_NUMBER
 - ☐ Total Cancella...
 - ☐ Σ YEAR
- > ☒ flights_GrpByOriAPDe...
- > ☒ flights1

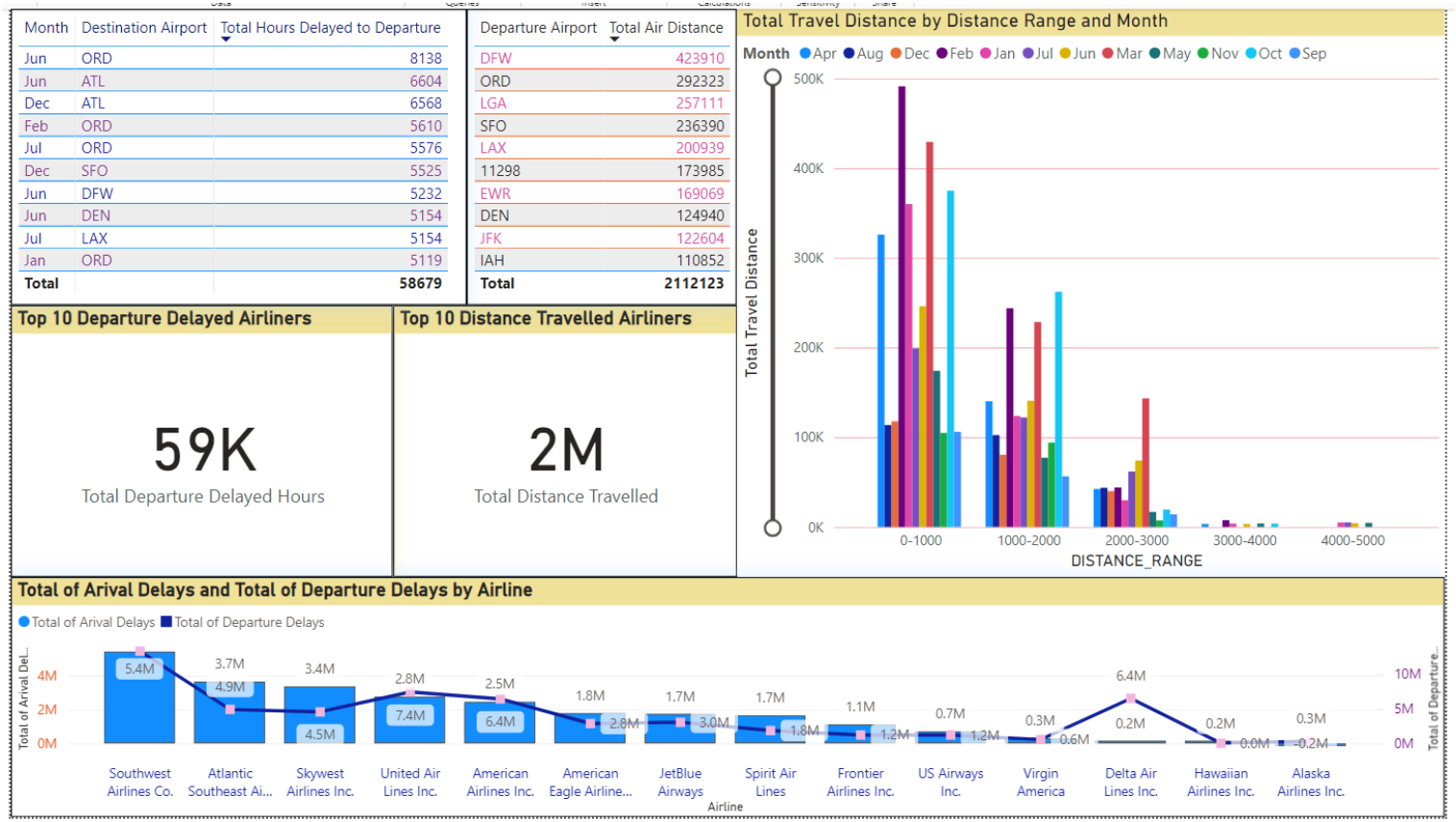
Creating an Index page with 4 page-navigation buttons.



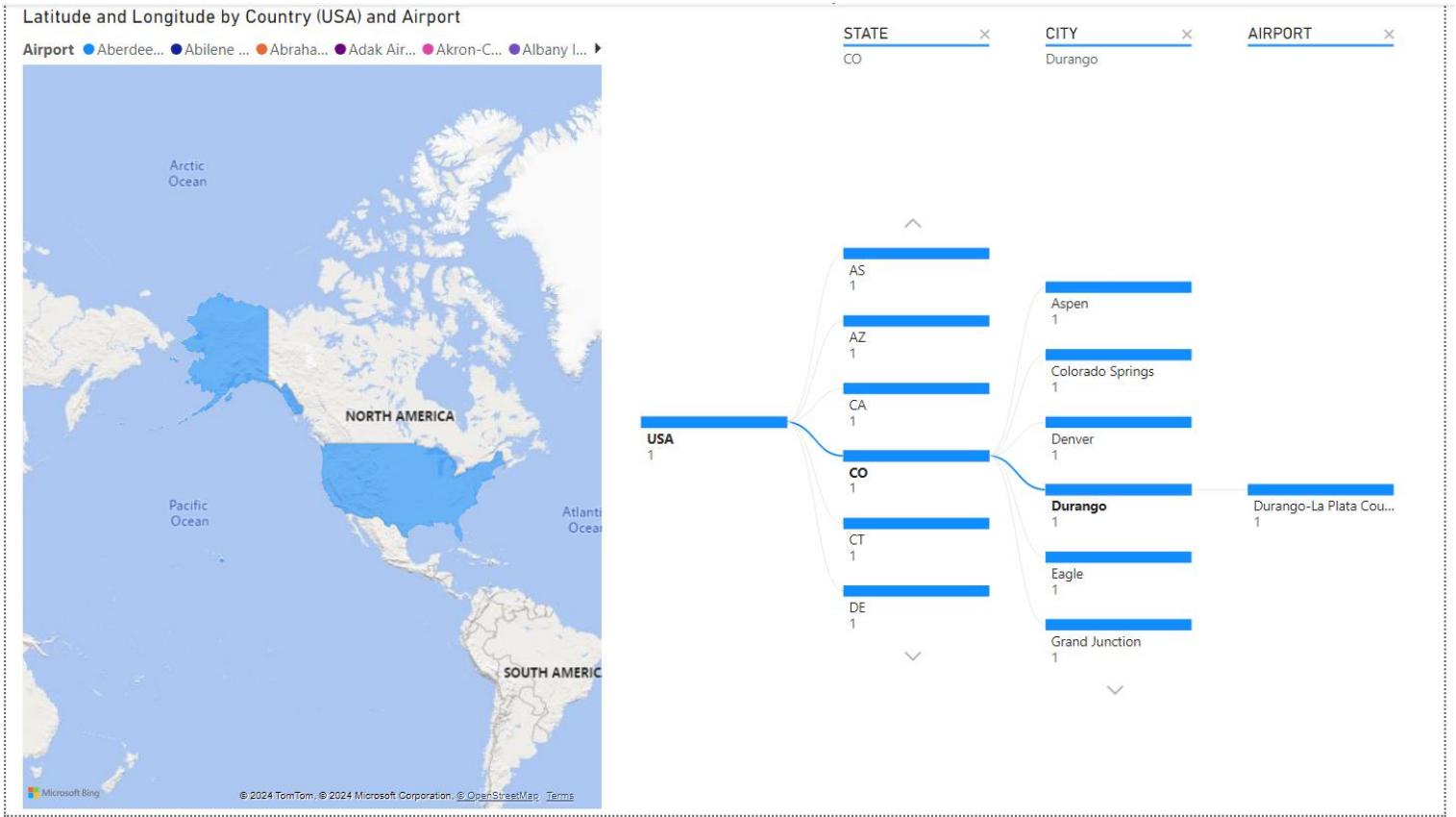
Flight Cancellations Dashboard.



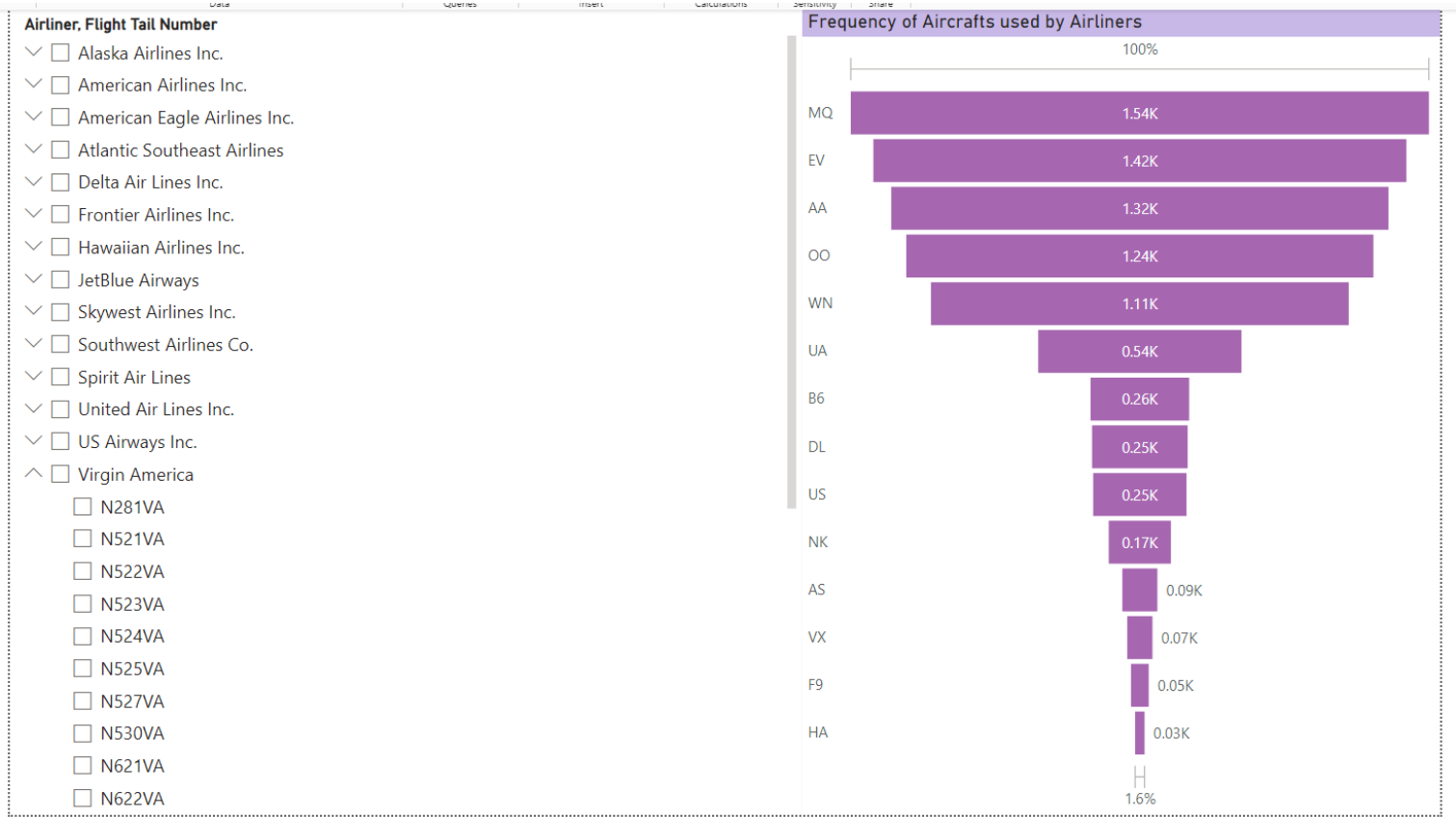
Flight Delays Dashboard.



Map & Airports Dashboard.



Airline Information Dashboard.



- Natural Language Processing
- Recurrent Neural Networks
- Machine Learning
- Business context of AI
- AI decision making in businesses.
- Blockchain
- DLT (Distributed Ledger Technology)
- Hyperledgers, Smart Contracts and IoT in business models.
- Assessing long-term impacts from these models to the business

Summary of above concepts.

AI: The phrase artificial intelligence is used to describe machines that replicate human cognitive abilities such as learning and problem-solving.

Three main categories of AI

1.Artificial Narrow Intelligence (ANI): weak AI: Examples of ANI include computer vision and natural language processing (NLP), which enable businesses to automate processes and serve as the foundation for chatbots and virtual assistants like Siri and Alexa.

2.Artificial General Intelligence (AGI): strong AI: this would perform on par with another human.

3.Artificial Super Intelligence (ASI): strong AI: while Artificial Super Intelligence (ASI)—also known as superintelligence—would surpass a human’s intelligence and ability.

AI features and variants in businesses.

Thinking of artificial intelligence, machine learning, deep learning, and neural networks as a sequence of AI systems that are encapsulating each other from largest to smallest is the simplest approach to conceptualize these concepts.

Neural Networks: A particular kind of machine learning known as "deep learning" makes use of networked nodes or neurons arranged in a layered pattern to mimic the structure of the human brain.

Natural Language Processing: A subfield of artificial intelligence (AI) called natural language processing (NLP) gives computers the ability to understand, produce, and modify human language.

Recurrent Neural Networks: Recurrent neural networks, or RNNs for short, are a family of neural networks that support hidden states and the use of prior outputs as inputs. A deep learning model trained to interpret and translate a sequential data input into a specific sequential data output is called a recurrent neural network (RNN).

Machine Learning (ML): this has 3 subsets, Supervised learning, Unsupervised learning, and Reinforcement learning.

Supervised Learning: Using labelled training data, algorithms can be trained to generate predictions or choices.

Unsupervised Learning: Without labeled outputs, algorithms find patterns and relationships in data.

Reinforcement Learning: Agents pick up new skills through interaction with their surroundings and feedback in the form of incentives or penalties.

Business context of AI:

Manufacturing:

- **Predictive Maintenance:** (AI) forecasts equipment breakdowns, cutting downtime and improving maintenance plans.
- **Quality Control:** On production lines, computer vision and artificial intelligence are used to inspect and guarantee product quality.

E-commerce:

- **Recommendation Systems:** AI makes product recommendations to users based on their past usage and preferences.
- **Dynamic Pricing:** Using data from the market, competition, and demand, artificial intelligence modifies pricing in real-time.

Education:

- **Personalized Learning:** AI enables individualized learning experiences by customizing instructional materials to meet the needs of each individual student.
- **Automated Grading:** AI helps teachers save time by automating the grading of assignments and tests.

Energy and Utilities:

- **Predictive Maintenance:** AI optimizes maintenance plans by forecasting equipment breakdowns in utilities and power plants.
- **Energy Consumption Optimization:** AI uses data analysis to optimize how much energy is used in buildings and other facilities.

Supply Chain and Logistics:

- **Predictive Maintenance:** AI foresees equipment faults, cutting downtime and increasing the effectiveness of maintenance.
- **Route Optimization:** AI systems maximize delivery routes while lowering expenses and improving the effectiveness of the supply chain as a whole.

Healthcare:

- **Medical Imaging:** Artificial Intelligence helps with medical picture processing for diagnosis and early disease identification.
- **Drug Discovery:** Drug development is expedited by AI through the analysis of chemical and biological data.

AI decision making in businesses:

Virtual assistants, virtual and augmented reality, process discovery, task mining, and various data analytics and business intelligence platforms are just a few of the many tools that fall under this broad category of technology.

Businesses use large-language models, also known as generative AI. These models are a class of algorithms that can ingest large amounts of data, including text, numbers, software code, images, videos, and then understand the probabilistic structure of the data and use it to create summaries, answers, simulations, and alternative scenarios.

Consumer transaction data is used by well-known businesses like Amazon. Businesses can gain more insight into the group of consumers that purchase specific products together by employing this strategy.

Components of blockchain

Nodes

Blockchain nodes are members of the network whose devices are allowed to keep up the distributed ledger and serve as central points of contact for various network operations.

Wallet

A digital tool or software program known as a wallet enables users to interact, manage, and store their digital assets, such as cryptocurrencies, in a secure manner.

Ledger

A distributed, decentralized database that maintains an immutable, chronological record of all transactions and data is referred to as a ledger in the context of blockchain technology.

Nonce

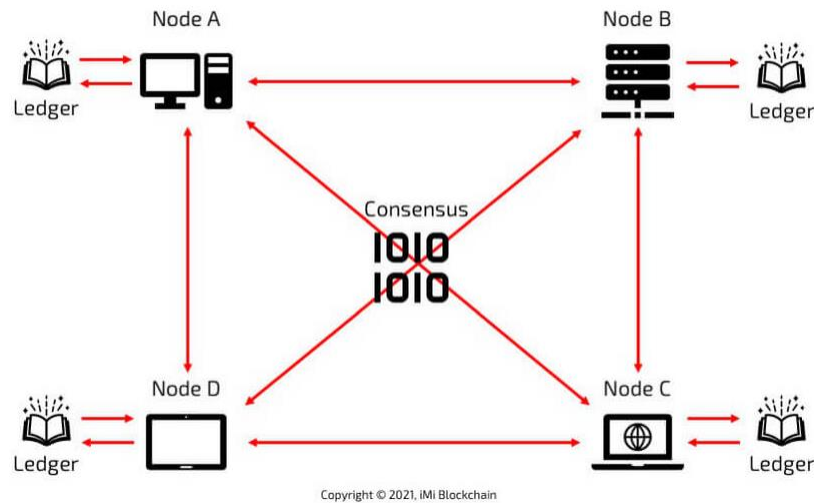
A nonce is a number appended to a hashed or encrypted block on a blockchain.

Hash

The result of a cryptographic hash function is referred to as a hash. A hash function creates a fixed-length character string, known as the hash value or hash code, from an input (data) of arbitrary size.

DLT (Distributed Ledger Technology) concepts, features, benefits, relevance in application.

DLT Simply Explained



Blockchain is a type of DLT.

Hyperledgers, Smart Contracts and IoT in business models.

Hyperledger:

Hyperledger Fabric is a specific type of DLT that makes use of data structures containing blocks of data to display information even more clearly.

Smart contract:

By storing contract information on a peer-to-peer network and acting upon it more quickly than with traditional techniques, smart contracts have the ability to grow equity and execute automatically.

IoT

The network of physical items, or "things," that are implanted with sensors, software, and other technologies in order to communicate and exchange data with other devices and systems over the internet, is known as the Internet of Things (IoT).

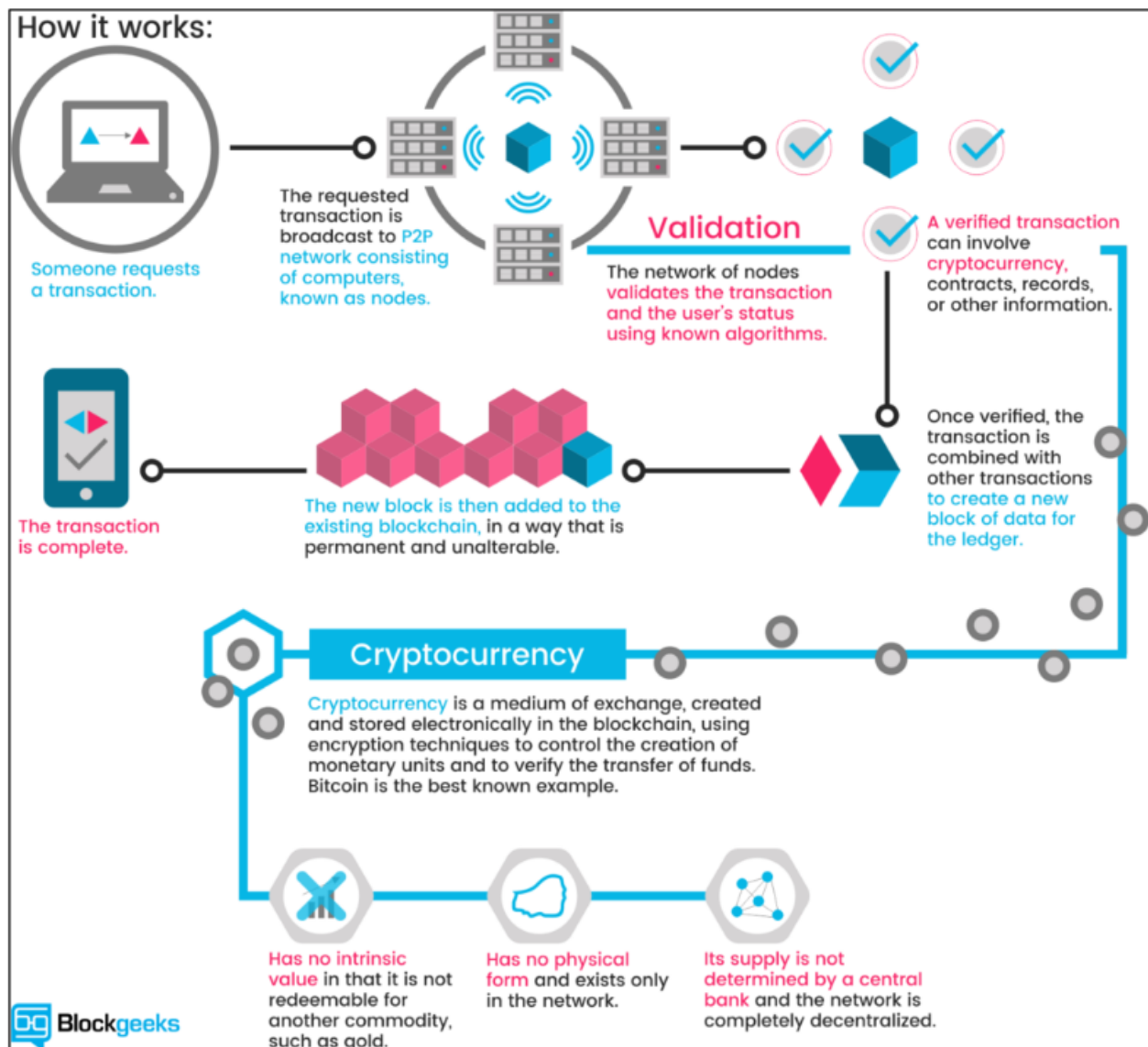


Figure 3 : Blockchain - how it works

Assessing long-term impacts from these models to the business.

1. Defining Objectives and KPIs:

- Clearly state the business goals that hope to accomplish by integrating blockchain technology and artificial intelligence.
- Create Key Performance Indicators (KPIs) that correspond with these goals so the company can track the progress over time.

2. Assessing the impact on Operations:

- Assess the impact of blockchain models and AI on daily operations. This entails optimizing procedures, cutting expenses, raising productivity, and strengthening judgment.

3. Analysing the Cost-Benefit:

- To fully understand the financial effects of deploying blockchain and artificial intelligence technology, do an in-depth cost-benefit analysis.

4. Evaluating the Data Security and Privacy:

- Evaluate how blockchain and AI affect privacy and data security. Recognize the ways in which these technologies manage sensitive data and make sure that applicable laws (such as the GDPR) are followed.

ii. How do these new ideas relate to what you already know about the subject?

I can relate these above new ideas based on below grounds.

1. Educational Background:

- I am from the computer science background and am familiar with disciplines about the technical facets of blockchain and artificial intelligence.

2. Business Professionals:

- As a business professional in my workplace, I already aware of how artificial intelligence (AI) may improve decision-making, streamline processes, and improve consumer experiences. Hence, I can may

be able to provide light on blockchain's applications in safe data sharing, smart contracts, and supply chain management in my workplace.

3. **Continuous Learning:**

- Because technology is changing so quickly, as an IT person who value lifelong learning might actively look for updates on blockchain and artificial intelligence. Apparently, I might have a better understanding of recent developments and new uses with continuous learning.

iii. Can you imagine any real-life examples or applications of the concepts you learned?

IBM Food Trust

This is a cooperative network of manufacturers, retailers, wholesalers, distributors, growers, and processors improves transparency and accountability throughout the food supply chain.

Ripple

Ripple is a network for remittances, currency exchange, and real-time gross settlement. This approach depends largely on mutual trust amongst participants.

MedRec

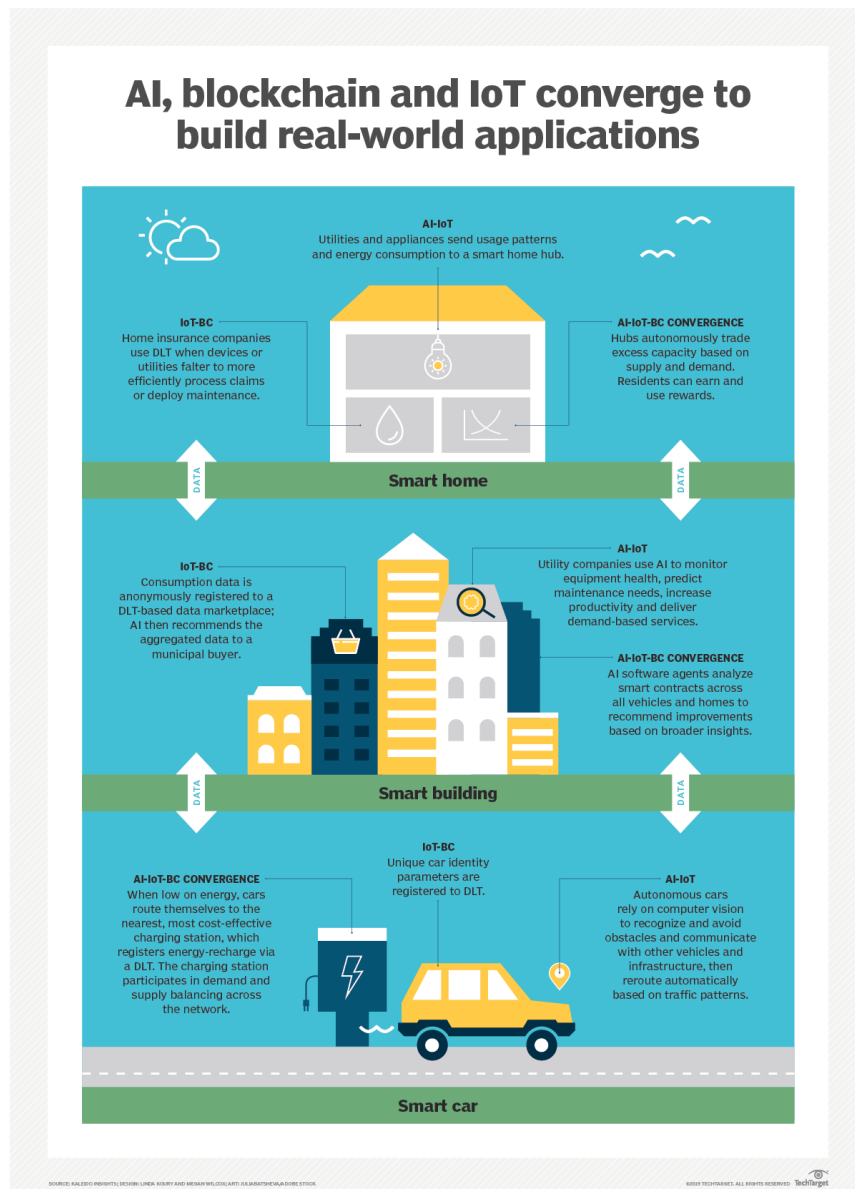
This is a brand-new blockchain-based decentralized record management solution for electronic medical records.

E-Residency of Estonia

This is issued by the Estonian government and provides access to the country's extremely sophisticated digital infrastructure to those who possess said digital identification (referred to as e-residents).

Moreover,

- Microsoft has released the Edge mobile web browser and the new Bing search engine, both of which are driven by AI.
- With the ability to choose how the answers are shown, users of the new Bing mobile app can ask straightforward or sophisticated inquiries and obtain citations and replies.
- Bing for Skype, which is powered by AI and allows users to add Bing to a group and ask queries that are visible to all members, is another innovation from Microsoft.



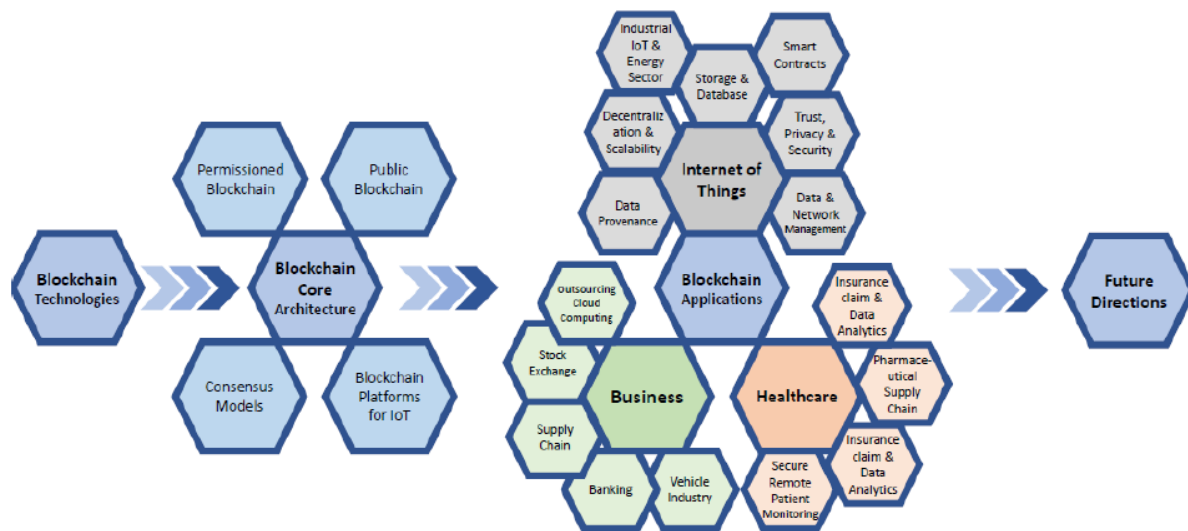


FIGURE 4. A comparative review of blockchain architecture and its applications including IoT – healthcare and business.

iv. What was most challenging about this lesson or topic, and why?

- Persuading employees or users who are resistant to change or who are afraid of losing their employment.
- How to trust these new since many experiments are still ongoing and they are still in their early stages.
- People have been using search engines for a long time, and when new technology like chatbots are implemented, there is resistance to change.
- Real-time data is typically required for training AI models; without it, the models are unable to produce precise predictions. However, it is illegal to mine data without the authors' authorization, and several have already brought copyright cases against some of the biggest internet companies, including open AI. For example, Paul Tremblay and Mona Awad claim that ChatGPT "used to train" their copyrighted novels because the chatbot produced "very accurate summaries" of the works. In an increasingly fierce legal struggle over the unlawful use of published work to train artificial intelligence algorithms, The New York Times sued Microsoft and OpenAI for copyright infringement.

Below are some additional challenging topic areas.

Artificial Intelligence (AI): Relevant and high-quality data are essential for AI models to function. It can be difficult to obtain diverse, clean, and labeled datasets.

Blockchain, IoT, and AI integration: Because of variations in protocols, standards, and data formats, it can be difficult to combine blockchain, IoT, and AI technologies together in a seamless manner. Reaching interoperability is essential to building robust and effective systems.

Integration of DLT, Hyperledger, and Smart Contracts: Putting DLT, Hyperledger, and smart contracts into practice frequently calls for a change in perspective and level of knowledge.

v. [How have the learning activities helped your understanding of the topics?](#)

Those learning activities helped me to understand of the topics under the below mentioned grounds.

Predictive Analytics: I can create, develop, and implement machine learning models thanks to machine learning algorithms and ML support platforms. I can learn about potential patterns, actions, or results by applying these models to forecast new information flows.

Automation: The entire machine learning lifecycle may be automated with the help of Azure Machine Learning. After a model has been trained and put into use, I may set up automatic pipelines to continuously take in fresh data and produce predictions free of human involvement. Making judgments in real time and remaining up to date updated with knowledge are aided by this.

Scalability: Azure, Python or MS Power BI platforms offer a scalable infrastructure that makes it possible for me to effectively manage massive data volumes. This is especially important when working with real-time data sources, as they might have substantial data volumes.

vi. What strategies did you use to overcome any difficulties or obstacles you encountered?

Below are some obstacles that I faced.

Lack of Understanding:

Employee resistance to using new technologies was occasionally caused by a lack of understanding on their part of the staff regarding the technology or the changes it brings to their workflow. Thus, in addition to offering hands-on workshops and thorough training sessions to acquaint staff members with the new technology, I also created documentation for future use.

Lack of Trust:

A few of our sales executives expressed doubt or uneasiness about AI/ML making choices that would affect them on achieving their sales and targets. I had to incorporate transparency into the system as a result. In addition, I made sure that privacy laws were followed, made sure that decision-making processes were transparent, and gave clients a way to challenge choices or request explanation.

Communication Gaps:

Some of our clients were unaware of the advantages or modifications that our AI/ML models brought about. I created a communication plan to inform clients about the benefits of implementing AI and ML in order to overcome this. Other than that, I addressed questions and issues through customer support and marketing channels.

Integration Issues:

Integrating AI/ML systems with our existing systems was challenging. Hence, I collaborated closely with database designers and administrators during the integration process. On the other hand, I provided technical support and documentation to ensure smooth integration.

vii. How did your understanding or attitude toward the topic change throughout the learning experience?

Mathematics and Statistics:

Since I am a full stack software developer, in order to fully comprehend the foundations of machine learning algorithms, I had to get a deeper understanding of mathematical principles like probability, calculus, linear algebra etc.

Machine Learning Concepts:

It is imperative that I become acquainted with different machine learning algorithms and their uses. These comprised reinforcement learning, supervised learning, and unsupervised learning.

Data Handling and Preprocessing:

Developing my abilities in feature engineering, data manipulation, cleaning, and preprocessing as well as comprehending the nuanced characteristics of the dataset and managing missing values was a really fascinating experience.

Programming Languages:

As a software developer, it was straightforward for me to build machine learning models using libraries like NumPy, pandas, and scikit-learn and programming languages like Python.

Model Evaluation and Hyperparameter Tuning:

I recognized that gaining expertise in assessing model performance, choosing relevant metrics, and fine-tuning hyperparameters is essential to creating reliable and successful machine learning models.

viii. What would you do differently (to learn from the experience) next time?

Firstly, gaining an in-depth awareness of the problem domain and the particular needs of the machine learning or artificial intelligence projects. To make sure that the built models meet the needs of the real world, this entails close collaboration with domain specialists.

Secondly, focusing on data quality is vital. Attempting to acknowledge the vital significance of high-quality data. Take the time to comprehend and cleanse the data, fill in any discrepancies with numbers, and make sure the dataset accurately reflects the issue being tackled.

Thirdly, learning and working on feature engineering is important. Acquiring the ability to identify significant features in the data. Enhancing model performance is mostly dependent on feature engineering, which requires for a thorough grasp of the underlying domain.

Most importantly, selecting a right model is mandatory. Recognize several machine learning algorithms and learn to select the best model for the given situation. Acquiring the ability to assess model performance using pertinent metrics and make modifications to the model in response to evaluation findings.

Lastly, stay informed on latest advances on AI and ML is valuable for career life because the domains of AI and ML are developing quickly. Reading research papers, taking part in online forums, and attending conferences can all help to stay up to date on the newest findings, instruments, and methods.

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