

Course: IBM Data Analyst From Coursera

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Lista de Códigos

CAPÍTULO 1

INTRODUCTION TO DATA ANALYTICS

1.1. DATA

So, data is important for an enterprise whose main concern is keep up with technological development. Interpreting the correct data can give us valuable information that's able to change the development of an enterprise.

In summary, data is relevant.

1.2. ROLES IN DATA

There are several roles which are important in the process of analyzing data. These roles are the following:

- Data Engineer.
- Data Analyst.
- Data Scientist.
- Business Analyst.
- Business Intelligence Analyst.

Let's look into each one of them.

1.2.1. DATA ENGINEER

It's the first one of the process line to work with data. He develop and maintains data arquitectures in order to make data available for business operations and analysis.

They work in the data ecosystem to work with data to:

- Extract, integrate and organize data from dispase sources (or different sources).
- Clean, transform and prepare data.
- Desing, store and manage data in data repositories (such as a database, etc...).

So, the role of a Data Engineer is one of the most fundamental roles in the Data Analysis. Without him, it would be much more complicated to work with data.

Observación 1.2.1

They make data available in several formats for different systems and processes that involve data.

His work serves Business Applications and Data Analysts and Data Scientists.

Observación 1.2.2 (Skills)

A data engineer needs the following skills in order to perform his job:

- (1) Knowledge in programming.
- (2) Sound knowledge of systems and technology architectures.
- (3) In-depth understanding of databases (relational and no relational).

1.2.2. DATA ANALYST

In a few words, a Data Analyst translates information (such as tables, numbers and graphs) into plain language, so that organization can make decisions.

Observación 1.2.3 (Responsibilities of a Data Analyst)

A Data Analyst has the following responsibilities:

- Inspect and clean data for deriving insights, that is, for a specific purpose.
- Identify correlations, find patterns and apply statistical methods to analyze and mine data.
- Visualize data to interpret and present the findings of data analysis.

Basically, a Data Analyst answer questions that are made by the company.

What's the information we can infer from this data?

Observación 1.2.4 (Skills)

The skills a Data Analyst needs in order to perform his job are the following:

- Knowledge of spreadsheets, writing queries, using statistical tools to create charts and dashboards.
- Programming skills.
- Strong analytical and storytelling skills.

1.2.3. DATA SCIENTIST

Data scientist analyze data for:

- Actionable insights.
- Create predictive models using machine learning and deep learning.

They answer more complex questions, such as:

- How many new social media followers will we gain next month?
- Is this financial transaction fraudulent?

A data scientist needs the following skills:

- Knowledge of Mathematics and Statistics.
- Understanding of programming languages, databases and building data models.
- Domain knowledge.

1.2.4. BUSINESS ANALYST AND BI ANALYST

They leverage the work of data analyst and data scientist to make strategic and tactical business decisions.

BI analyst focus on market forces and external influences that shape their business, organize and monitor data on different business functions.

They explore data to extract insights and actionables that improve business performance.

1.2.5. SUMMARY

All the data roles are described in the following table:

| Role | Function |
|--|---|
| Data Engineer | Converts raw data into usable data. |
| Data Analytics | Use data to generate insights. |
| Data Scientists | Use Data Analytics and Data Engineering to predict the future using data from the past. |
| Business Analysts and Business Intelligence Analysts | Use insights and predictions to drive decisions that benefit and grow their business. |

Cuadro 1.1: Summary of Data Roles

1.3. WHAT IS DATA ANALYSIS?

Definición 1.3.1 (Data Analysis)

Data Analysis is a process that consists of the following:

- (1) *Gather, clean, analyze and mine data.*
- (2) *Interpret results.*
- (3) *Report findings.*

The objective of Data Analysis is to find patterns in data that can help to make better decisions.

With this signs and correlations we can make decisions. A Data Analyst helps a business to make better decisions using data:

- Understand past performance.
- Take informed decisions.
- Validate course action - saving time and resources, ensuring success.

1.3.1. TYPES OF DATA ANALYSTS

There are four types of primary Data Analysts:

| Descriptive Analytics | Diagnostic Analytics | Predictive Analytics | Prescriptive Analytics |
|------------------------------------|--|---|--|
| What happened? | Why did it happen? | What will happen next? | What should be done about it? |
| Provides insights into past events | Takes the insights from descriptive analytics to dig deeper to find the cause of the outcome | Leverages historical data and trends to predict future outcomes | Analyzes past decisions and events to estimate the likelihood of different outcomes. |

Cuadro 1.2: Primary Types of Data Analytics

Observación 1.3.1 (Predictive Analytics)

Predictive Analytics forecast what *may* happen in the future.

1.3.2. DATA ANALYSIS PROCESS

As always, the process of a data analysts starts with **understanding the problem that needs to be solved and the desired result to be achieved** (where are we? and where do we want to be?).

Then decide **how we can measure our goal** (such as KPIs, etc...). Deciding what will be measured and how it will be measured is crucial for the success of the data analysis.

Finally, **gathering the data necessary to perform the analysis**. Identify the data needed, the sources from which the data will be obtained, and the best tools and techniques to perform the analysis.

Finally, **cleaning the data** (fix quality issues that may affect the outcome of the analysis). Standardizing the data format coming from different sources.

Analyzing and mine data. Extracting, analyzing, manipulating data from different perspectives, understand trends, identify correlations, and find patterns and variations.

Interpret results. Evaluate the defensibility of analysis and circumstances under which analysis may not hold true.

And, finally, **present results** in clear and impactful ways using data visualization tools and techniques.

In summary:

- (1) Understand the problem and define the goal.
- (2) Decide how to measure the goal.
- (3) Gather the data.
- (4) Clean the data.
- (5) Analyze and mine the data.
- (6) Interpret results.

(7) **Present results.**

Observación 1.3.2

Something important is to confirm a hypothesis and use data to make a story. Sometimes it is useful to break down information into subsets or smaller parts.

Observación 1.3.3 (Data Analysis vs Data Analytics)

During this course, the terms data analysis and data analytics mean the same thing. There is a subtle difference between them, but for the purpose of this course, they are used interchangeably.

The difference is the following:

- The **dictionary meanings** are:
 - **Analysis** - detailed examination of the elements or structure of something
 - **Analytics** - the systematic computational analysis of data or statistics

Analysis can be done without numbers or data, such as business analysis psycho analysis, etc. Whereas Analytics, even when used without the prefix "Data", almost invariably implies use of data for performing numerical manipulation and inference.

1.4. RESPONSABILITIES OF A DATA ANALYST

The role of a data analyst may differ from one organization to another, but in general, a data analyst is responsible for the following tasks:

- Acquire data (from primary and secondary data sources).
- Creating queries to extract required data.
- Filtering, cleaning, standarizing and reotrganizing data.
- Using statistical tools to interpret data stes.
- Using statistical techniques.
- Analyze patterns.
- Preparing reports and charts.
- Cerating appropriate documentation

1.4.1. SKILLS OF A DATA ANALYST

The data analysis processs requieres a set of thecnical, functional and soft skills. Such as:

- **Technical:**
 - (1) Expertise in using spreadsheets.
 - (2) Proficensy in statistic analysis and visualization and software tools, such as: IBM; Power BI; Tableau; Excel.
 - (3) Proeficiency in prograaming languages, such as: R, Python, C++, Java, and MATLAB.

- (4) Good knowledge of SQL and ability to work with data in relational and non-relational databases.
- (5) Ability to access and extract data from repositories, such as Data Marts, Data Warehouses, Data Lakes and Data Pipelines.
- (6) Familiarity with big data processing tools like Hadoop, Hive, and Spark.

■ **Functional:**

- (1) **Proefficiency in statistics:** Analyze data, validate the analysis, identify fallacies and logical errors.
- (2) **Analytical skills:** Research and interpret data, theorize and make forecasts.
- (3) **Problem-solving skills:** Identify issues, think critically and make data-driven decisions.
- (4) **Probin skills:** Identify and define the problem statement and desired outcome.
- (5) **Data visualization skills:** Create clear and compelling viisualizatoins to present the analysis.
- (6) **Project management skills:** manage the process, people, dependencies and timelines.

■ **Soft skills:**

- (1) Work colaboratively in a team environment.
- (2) Communicate effectively with both technical and non-technical stakeholders.
- (3) Tell a compeling and convincing story.
- (4) Gather support and buy-in for your work.
- (5) Curiosity and eagerness to learn new tools and techniques.
- (6) Intiution to identify trends and patterns in data.

Some of the Technical, Functional and Soft skills will be reviewed during this course.