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Department Of Computer Engineering

A BI PROJECT REPORT

ON

CASE STUDIES FOR BI

SUBMITTED TO THE DEPARTMENT OF COMPUTER
ENGINEERING AISSMS IOIT

BE Computer Engineering

SUBMITTED BY

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AISSMS IOIT, Department of Computer Engineering 2022-23



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CERTIFICATE

This is to certify that the project report.
“CASE STUDIES FOR BI”

Submitted by

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is a bonafide student at this institute and the work has been carried out by them under the supervision of **Prof. P.D.Bormane** and it is approved for the partial fulfillment of the Department of Computer Engineering AISSMS IOIT.

(Prof. P.D.Bormane)

Mini-Project Guide

(Dr. S.N. Zaware)

Head of Computer Department

Place: Pune

Date:

Abstract

The BI mini project report focuses on improving the operational processes, specifically the HR recruitment process, for a group of dental hospitals. The objective is to streamline and enhance the recruitment workflow to attract and hire qualified candidates more efficiently. By leveraging data mining techniques and analysing a standard dataset consisting of historical recruitment data, patterns and insights are derived to identify areas of improvement. The report provides recommendations such as automation of manual tasks, implementing applicant tracking systems, and refining screening and interview processes. These enhancements aim to improve operational efficiency, candidate quality, and reduce time-to-fill positions, ultimately contributing to the overall success of the dental hospitals.

This BI mini project report aims to optimize the HR recruitment process for a group of dental hospitals. By analysing historical recruitment data and applying data mining techniques, actionable insights are generated to enhance operational efficiency. Recommendations include automating manual tasks, implementing applicant tracking systems, and refining screening and interview processes. These improvements are expected to improve candidate quality, reduce time-to-fill positions, and contribute to the overall success of the dental hospitals.

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Introduction

The BI mini project report focuses on operational process improvement for a group of dental hospitals, specifically targeting the enhancement of the HR recruitment process. The efficient and effective recruitment of qualified professionals is vital for dental hospitals to maintain high-quality patient care and ensure smooth operations. By leveraging business intelligence techniques, data analysis, and data mining, this project aims to identify areas of improvement within the recruitment process and provide actionable insights to streamline and optimize HR operations.

The primary objective of this mini project is to assist the HR department of the dental hospitals in improving their recruitment process. The current recruitment process may face challenges such as lengthy time-to-fill positions, a high volume of unqualified applicants, manual and time-consuming administrative tasks, or inadequate candidate tracking systems. By utilizing business intelligence tools and techniques, this project aims to identify pain points and bottlenecks within the recruitment process, analyze historical recruitment data, and provide data-driven recommendations for process optimization.

By effectively leveraging business intelligence and data mining techniques, this project aims to provide valuable insights to the dental hospitals, enabling them to make data-driven decisions and optimize their recruitment processes. The resulting operational process improvements will contribute to the success and growth of the dental hospitals while ensuring the delivery of quality care to their patients.

Software Requirement Specification

Software Used:

- Power BI –

Power BI is a powerful business intelligence (BI) tool developed by Microsoft. It allows users to visualize and analyse data from various sources, create interactive reports, and share insights across an organization.

- Excel -

Excel is a widely used spreadsheet software developed by Microsoft. It provides a range of features and functionalities that make it a powerful tool for data analysis, calculation, visualization, and reporting.

Hardware Requirement

The detailed hardware requirements for the project are:

Item	Description
System	HP OMEN 15 series
Processor	AMD Ryzen 5 4600H
RAM	8 GB
System Type	64-bit operating system, x64-based processor
SSD	256 GB Solid State Drive
HDD	1 TB Hard Disk Drive
Graphics	NVIDIA 4 GB Graphic Card
Operating System	Windows 10 Operating System

Theory

Business Intelligence (BI) is a concept and set of strategies that involve the collection, analysis, and presentation of business information to support decision-making processes. It encompasses a range of technologies, tools, and methodologies that enable organizations to gather and transform data into valuable insights.

The core objective of BI is to provide timely, accurate, and relevant information to decision-makers, empowering them to make informed choices that drive business performance and competitiveness. BI enables organizations to analyse historical and current data, identify trends and patterns, and gain insights into their operations, customers, and market dynamics.

There are several key components and concepts associated with BI:

1. **Data Warehousing:** BI often involves the creation of a centralized data repository called a data warehouse. This is where data from various sources is collected, integrated, and organized for analysis.
2. **ETL (Extract, Transform, Load):** ETL processes are used to extract data from different sources, transform it into a consistent format, and load it into the data warehouse.
3. **Data Modeling:** BI relies on effective data modeling to structure data in a way that facilitates analysis and reporting. This involves defining relationships, hierarchies, and dimensions to enable multidimensional analysis.
4. **Reporting and Dashboards:** BI reports and dashboards present summarized and visualized data to users in a meaningful way. Reports provide detailed information on specific aspects, while dashboards provide an overview of key performance indicators (KPIs) and metrics.
5. **Data Visualization:** BI utilizes data visualization techniques such as charts, graphs, and maps to present data in a visually appealing and understandable format. Visualizations aid in the interpretation of complex data and facilitate decision-making.

6. **Analytics:** BI incorporates various analytical techniques, such as descriptive, diagnostic, predictive, and prescriptive analytics, to uncover insights, discover patterns, and make data-driven decisions.

A BI report is a document that presents the findings, analysis, and insights derived from a BI initiative or project. It typically includes sections such as an executive summary, introduction, methodology, data analysis, key findings, recommendations, and conclusion. The structure and content of a BI report may vary depending on the specific project and its objectives. However, a well-designed BI report should clearly communicate the purpose of the analysis, provide relevant contextual information, present the data analysis and visualizations in a clear and concise manner, and offer actionable recommendations based on the insights gained.

BI reports are vital tools for communicating information to stakeholders, facilitating data-driven decision-making, and driving business performance and competitiveness. They play a crucial role in disseminating insights derived from BI initiatives and supporting organizational growth and success.

BI report:

A BI report is a comprehensive document that presents the findings, analysis, and insights derived from a business intelligence project. It aims to communicate key information, analysis, and recommendations to stakeholders in a clear and concise manner. Here are the key components and steps involved in creating a BI report:

1. Introduction:

- a. Provide an overview of the project's objectives and context.
- b. Define the problem statement or business question that the report aims to address.
- c. Outline the scope and methodology of the analysis.

2. Data Collection and Preparation:

- a. Identify the relevant data sources for the analysis.
- b. Gather and extract the necessary data, ensuring data quality and integrity.
- c. Clean, transform, and prepare the data for analysis, addressing missing values, outliers, and inconsistencies.

3. Data Analysis:

- a. Apply appropriate analytical techniques to derive insights from the data.
- b. Use descriptive analytics to summarize and explore the data.
- c. Apply advanced analytics, such as predictive or prescriptive analytics, if relevant.
- d. Identify trends, patterns, correlations, or anomalies in the data.

4. Data Visualization:

- a. Select appropriate visualizations, such as charts, graphs, or maps, to represent the data.
- b. Create clear and visually appealing visualizations to communicate the findings effectively.
- c. Use interactive features to allow stakeholders to explore the data and gain insights.

5. Key Findings:

- a. Summarize the most important insights and findings from the analysis.
- b. Present key performance indicators (KPIs) and metrics relevant to the problem statement.
- c. Highlight significant trends, patterns, or correlations observed in the data.

6. Recommendations:

- a. Based on the insights gained, provide actionable recommendations to address the problem or improve performance.
- b. Clearly outline the steps or strategies to implement the recommendations.
- c. Consider the feasibility and potential impact of each recommendation.

7. Conclusion:

- a. Summarize the main findings and recommendations of the report.
- b. Emphasize the value and implications of the analysis for the organization.
- c. Consider any limitations or constraints encountered during the analysis.

8. Appendices:

- a. Include any supporting information, calculations, or additional data that may be relevant to the analysis.
- b. Provide references to data sources, analytical techniques, or methodologies used.

It's important to tailor the structure and content of the BI report to the specific project and audience. The report should be well-organized, visually appealing, and provide clear and actionable insights to drive decision-making within the organization.

Case Studies for BI

1. Operational Process Improvement for a group of dental hospitals

The Challenge

The client wanted to improve their operational processes to make use of Power BI reports to identify the pitfalls of the processes, take steps to overcome the pitfalls identified in order to maximize their revenue. They also wanted to capture certain traits related to patients, such as which topographical region showed most patients.

The Solution

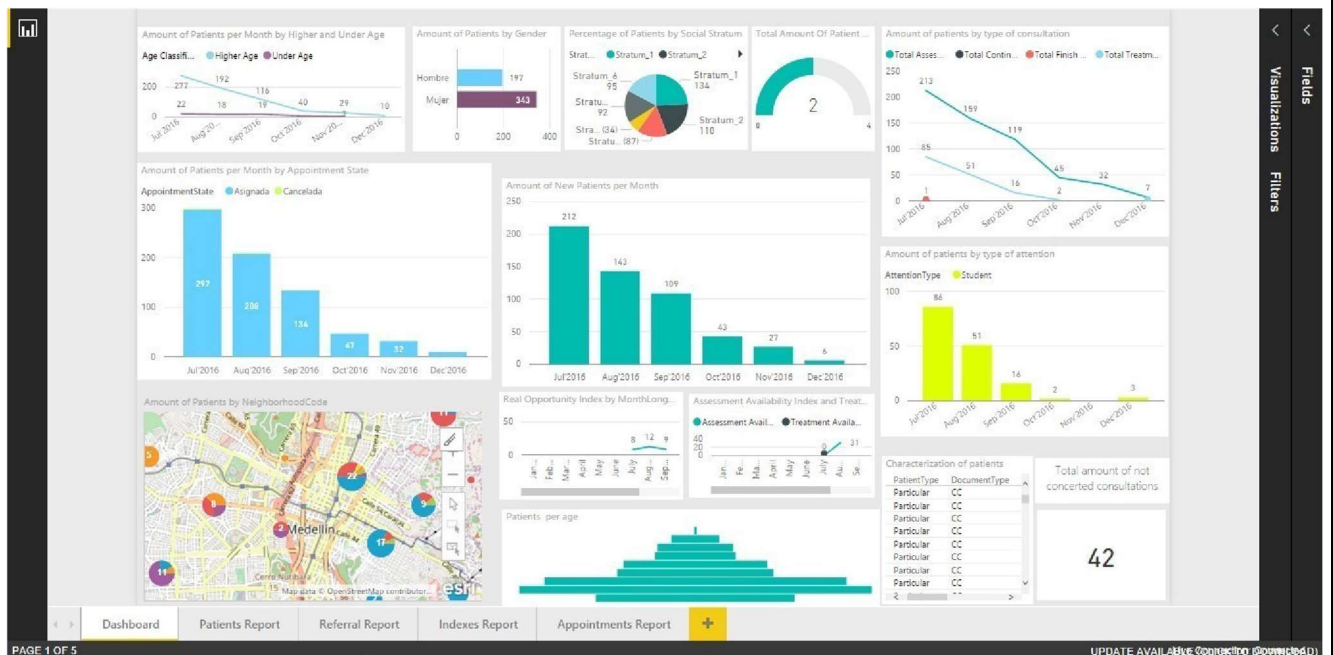
We developed a bunch of reports related to their assessment process. Questions like, Who did the initial assessment, intern, doctor or specialist? Was there a necessity to refer patient to a specialist? How many more assessments were required for a patient? We helped them infer an assessment index based on the above information. This traits of this index helped them identify where they were lacking in their assessment process and they improved it to a considerable level. Also, they could now predict when and how many interns to hire.

Other most import factor was treatment. We developed the reports that helped them study the treatment process. This included analysing the following parameters,

- What was the diagnosis made?
- What treatments were incorporated?
- What medications were involved?
- What were the instruments required for the treatment?
- How many patients were allergic to the treatments?
- What number of patients were in what stage of medical condition?

We helped them infer several treatment indexes by converting the information we captured into various quick-to-infer charts and graphs. These indexes led them to improve their diagnosis capabilities, identify what training to provide to interns and doctors, what medicines to use and keep an appropriate number of instruments in the hospital. Several other reports, such as a map showing topography of the patients, regularity of employees, year-year and quarter-quarter revenue, branch wise revenue etc. were also developed.

A glimpse of reporting



Total Of Registers

735

Division	PatientType	DocumentType	Document	FirstName	SecondName	FirstLastName	SecondLastName	BirthDate	Age	Gender	Address
Medellin	Particular	CC	0	Marta	Cecilia	Tobon	Taborda	07/04/1961	56	Mujer	carrera 58 32a
Medellin	Particular	CC	326096	Muara	Mercedes	Acosta	Pita	04/29/1970	47	Mujer	N/A
Medellin	Particular	CC	523578	Raul	Vicente	Marañon	Paredes	01/04/1961	56	Hombre	Carrera 32 #79-
Medellin	Particular	CC	736434	Enoel	De Jesus	Quintero	Quintero	12/14/1995	22	Hombre	carrera 80c 30
Medellin	Particular	CC	1526218	Humberto		Vasquez	Gallego	10/21/1964	53	Hombre	Carrera 45 # 88
Medellin	Particular	CC	2138646	Ana	Elisa	Lopez	Mona	03/14/1930	87	Mujer	Calle 55 # 49-8!
Medellin	Particular	CC	2138646	Ana	Elisa	Lopez	Mona	03/14/1930	87	Mujer	Calle 55 # 49-8!
Pereira	Particular	CC	2632334	Ramiro	Emilio	Ramirez	Botero	02/02/1936	81	Hombre	Calle 55 # 49-85 Interior 608 Centro
Medellin	Particular	CC	2632334	Ramiro	Emilio	Ramirez	Botero	02/02/1936	81	Hombre	Calle 55 # 49-85 Interior 608 Centro
Medellin	Particular	CC	3316089	Jose	Luis	Isaza	Zuleta	08/08/1937	80	Hombre	calle 45 bb # 15v

amount of patients attended by a student

Month	Count
Jul-2016	84
Aug-2016	51
Sep-2016	16
Oct-2016	2
Dec-2016	3

amount of patients attended by a particular

Month	Count
Jan-2017	1

Amount of Patients attended by a Specialist

Month	Count
Jan-2017	1

Navigation: Dashboard | Patients Report | Referral Report | Indexes Report | Appointments Report

2. Helping HR in recruitment process

The Challenge

Our client used to follow a manual paper-work based recruitment process. He had to manage a lot of data in excel sheets. The process was tedious and error prone. On the top of that, they could not afford to spend time in manually analysing the valuable information they captured. As they assigned us the task move towards shifting to new technologies and automating the data capturing and analysing process, they also wanted us to develop useful reports which would help them predict future trends.

The Solution

To keep the automation process in line with other tools used by the client, we suggested them to go with Power BI for reporting purpose.

We developed a number of reports for them. The visuals used were eye catching. The reports were easy enough to understand and even a lay man could grasp useful information by just a glance at a report. The reports contained useful indicators like total recruitment over time and average CTC offered to & is expected by the candidates. All the reports contained default filters like period (Apr 2016 - Mar 2017). We also provided a separate report that allowed to compare candidates based on the aspects like salary, qualification and experience. Drill down reports were included whenever required.

The client could now easily get to know top 10 sources of recruitment and top 10 reasons that made the candidates leave their previous company. The same data helped them to modify their existing policies and reduce employee attrition rate. They could now forecast a lower limit of written test score for selecting candidates. Number of reports included trends built up from the information. Trends like the salary expectations a certain experience level with a specific technical expertise helped then a lot in deciding the annual salary hike of their existing employees. Now they also have numbers of candidates who were expert in a specific technology. And the list of benefits goes on.

The client is more than satisfied with the ease of use and value of information they can capture using Power BI.

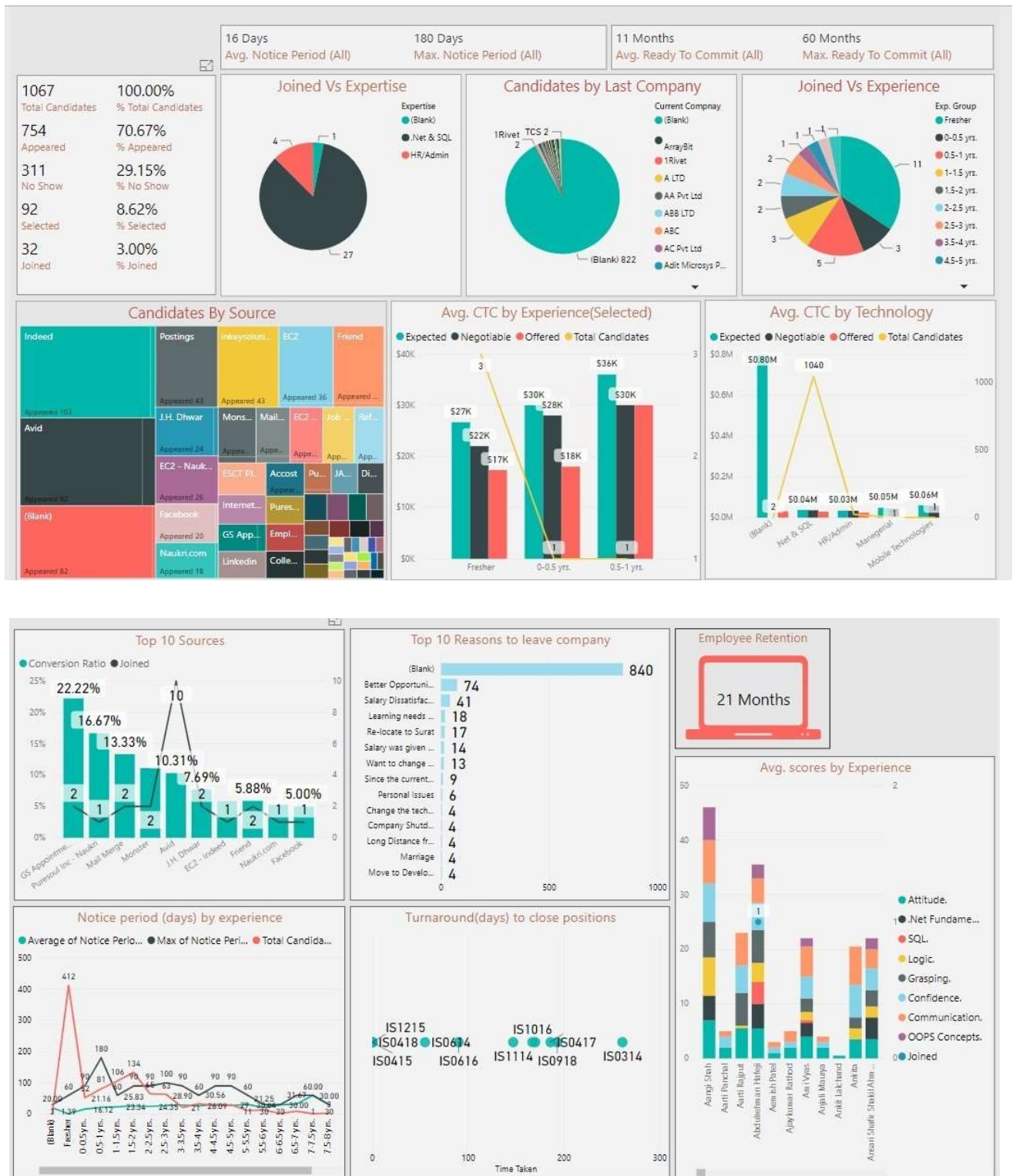
We tried to decipher the data and tried to come up with the ideas that will be helpful to the organization:

- Information of the candidates that are applying/appearing/not appearing/selected/joined for the interview.
- Information about the sources that has helped the candidates to apply for interview.
- Information about last companies that the applied candidates were working at.
- Details of the candidates by their expertise when appeared in an interview
- Which are the top 10 sources that candidates have found the organization?
- Which were the top 10 reasons for the candidates to leave their last company?
- Information about the hired candidates and their experience.
- Information about the scores by their quality and their experience.
- Information about the notice period by their experience.

The Extra Mile

- Information about the CTC by their experience and their expertise (technology).
- Trends of CTC by their Expertise and hike according to their experience.
- Forecast of CTC by their Expertise and hike according to their experience.
- Information about the time that the candidates are ready to commit.

A glimpse of reporting



Conclusion

In conclusion, the BI mini project on operational process improvement for a group of dental hospitals, specifically targeting the HR recruitment process, has yielded valuable insights and actionable recommendations. Through the analysis of historical recruitment data and the application of data mining techniques, the project has identified key areas for improvement.

The recommendations include automating manual tasks, implementing applicant tracking systems, refining candidate sourcing strategies, and improving screening and interview processes. These enhancements aim to streamline the recruitment workflow, reduce time-to-fill positions, and attract top-quality candidates. By adopting data-driven decision-making and implementing these recommendations, the dental hospitals can optimize their HR operations, improve operational efficiency, and provide high-quality dental care to their patients.

Overall, this BI mini project offers a roadmap for the dental hospitals to enhance their HR recruitment process. By leveraging the power of data analysis and incorporating the recommended improvements, the hospitals can effectively address recruitment challenges and position themselves for long-term success in attracting and retaining top talent.

References

Books:

1. Business Intelligence Guidebook: From Data Integration to Analytics" by Rick Sherman
2. "Business Intelligence: A Managerial Perspective on Analytics" by Ramesh Sharda, Dursun Delen, Efraim Turban
3. "Data Warehousing, Data Mining, and OLAP" by Alex Berson, Stephen J. Smith, and Kurt Thearling
4. "The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling" by Ralph Kimball and Margy Ross

Websites:

1. Microsoft Power BI: <https://powerbi.microsoft.com/>
2. Tableau: <https://www.tableau.com/>
3. IBM Analytics: <https://www.ibm.com/analytics>
4. TDWI (The Data Warehousing Institute): <https://tdwi.org/>
5. KDnuggets: <https://www.kdnuggets.com/>
6. Business Intelligence Insights by Gartner:
<https://www.gartner.com/en/business-intelligence>
7. Business Intelligence Summit: <https://businessintelligencesummit.com/>