PROFESSIONAL TRAINING REPORT

Sathyabama Institute of Science and Technology

(Deemed to be University)

Submitted in partial fulfillment of the requirements for the award of

Bachelor of Technology Degree in Information Technology

By

Kishore Kumar.K

(40120049)

DEPARTMENT OF INFORMATION TECHNOLOGY

SCHOOL OF COMPUTING

SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY(DEEMED TO BE UNIVERSITY)

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APRIL 2023

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY
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DEPARTMENT OF INFORMATION TECHNOLOGY

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **KISHORE KUMAR (Reg. No: 40120049)** who carried out the project entitled "**MEDICAL APPOINTMENT PREDICTION**" under my supervision from January 2023 to April 2023.

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Submitted for Viva voce Examination held on 28/04/2023

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DECLARATION

I **Kishore Kumar.K (Reg. No.40120049)** hereby declare that the Project Report entitled "**Medical Appointment Prediction**" done by me under the guidance of **Dr.J.Jabez,M.E.,Ph.D.,** at Sathyabama Institute of Science and Technology (Deemed to be University) Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai – 600119 is submitted in partial fulfillment of the requirements for the award of Bachelorof Technology degree in Information Technology.

DATE: 28/4/23

PLACE: Chennai

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SIGNATURE OF THE CANDIDATE

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to **Board of Management** of **SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. T. Sasikala M.E., Ph.D.**, **Dean**, **School of Computing** and **Dr. R. Subhashini M.E., Ph.D., Head of the Department** of **Information Technology** for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Project Guide **Dr. J. Jabez, M.E., Ph.D.,** for his valuable guidance, suggestions and constant encouragement paved way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the **Department of Information Technology** who were helpful in many ways for the completion of the project.

TRAINING CERTIFICATE

No. : 34346

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NSIC - TECHNICAL SERVICES CENTRE

Sector B-24, Guindy Industrial Estate, Ekkaduthangal, Chennai - 600 032.

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This is to certify that Mr. **KISHORE KUMAR K.** S/o. Shri. **KARUPPASAMY M.** student of III year B.Tech. (IT), Sathyabama Institute of Science and Technology has undergone **"SKILL DEVELOPMENT PROGRAM ON DATA ANALYTICS"** conducted by us for a period of one week (30 Hours) from 09.03.2023 to 14.03.2023.

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ABSTRACT

Medical appointment is a scheduled time for a patient to visit a doctor or other medical professional for a specific health concern. The purpose of the appointment is to receive medical care or advice from the healthcare provider. This can include things like receiving a diagnosis, getting prescription, or having a procedure performed. In some cases, a medical appointment may be made in advance, while in other cases it may be scheduled on the same day as per visit. Every medical diagnosis starts with a medical history and background research. It's important to have a well thought out medical summary report so you can have the entire important patient details documented. This is a great option for hospitals and staff to ensure that the medical treatment a patient is undergoing or is about to undergo at the healthcare center is done while aligning with the existent medical summary. This sample medical report summary in pdf has demo content for physical description, personal, occupational, substance use history, which makes it a pretty comprehensive document.

CHAPTER 1

INTRODUCTION

Data analytics is the process of examining raw datasets to find trends, draw conclusions and identify the potential for improvement. Health care analytics uses current and historical data to gain insights, macro and micro, and support decision-making at both the patient and business level.

The use of health data analytics allows for improvements to patient care, faster and more accurate diagnoses, preventive measures, more personalized treatment and more informed decision-making. At the business level, it can lower costs, simplify internal operations and more.

In order to discuss health data analytics and the role it plays in the health care sector, we must first understand the data that is being collected and analyzed. There is data being collected on the processes and procedures of the business side of health care, but there is also an enormous amount of health data being gathered, stored and analyzed.

Health data is any data relating to the health of an individual patient or collective population. This information is gathered from a series of health information systems (HIS) and other technological tools utilized by health care professionals, insurance companies and government organizations.

We are able to see a holistic view of each individual patient as well as trends tied to location, socioeconomic status, race and predisposition. The information being collected can be broken down into specific datasets that can then be analyzed.

This part is purely for estimating the occupational hazards that could have an impact on the patient or the kind of financial situation the patient is in. This forms an essential part of the medical summary report, and hence must be duly captured in it.

1.1 Research Motivation

The main objective of the Project on Medical Appointment System is to manage the details of Doctor, Appointment, Patient, Booking, Doctor Schedule. It manages all the information about Doctor, Doctor Fees, Doctor Schedule, Doctor. The project is totally built at administrative end and thus only the administrator is guaranteed the access. The purpose of the project is to build an application program to reduce the manual work for managing the Doctor, Appointment, Doctor Fees, Patient. It tracks all the details about the Patient, Booking, Doctor Schedule.

1.2 Problem Statement

Outpatients who fail to attend their appointments have a negative impact on the healthcare outcome. Thus, healthcare organizations facing new opportunities, one of them is to improve the quality of healthcare. The main challenges is predictive analysis using techniques capable of handle the huge data generated. It may help collecting perfect management in details. In a very short time, the collection will be obvious, simple and sensible. It will help a person to know the management of passed year perfectly and vividly. It also helps in current all works relative to Doctor Appointment System. It will be also reduced the cost of collecting the management & collection procedure will go on smoothly. Our project aims at Business process automation, i.e. . we have tried to computerize various processes of Medical Appointment System.

1.3 Related Work

With the implementation of computerized system, the task of keeping records in an organized manner will be solved. The greatest of all is the retrieval of information, which will be at the click of the mouse. So the proposed system helps in saving the time in different operations and making information flow easy giving valuable reports. We have used Power BI to build their models by selecting different classifiers and choosing the one with the best results.

1.4 Report Structure

This master project report is organized into 15 chapters. The preface of the project, research motivation, and problem statement from chapter 1. Chapter 2 describes the Aim and scope of the project. Chapter 3 focuses on system requirements of the project. Chapter 4 and 5 explain the basic concepts and project development, while the chapter 6 focuses on data collection of the medical appointment. Chapter 7 focuses on data analysis. Chapter 8 starts with the types of data analysis. Chapter 9 concludesthe Microsoft bi .Chapter 10 talks about the project implementation and Chapter 11 concludes the data exploration and chapter 12 elaborates the types of prediction and final chapter consists of chapter 13,14,15 speaks about the conclusion, futurescope of the project and references.

CHAPTER 2
AIM AND SCOPE

Aim:

The main objective of the Project on Medical Appointment System is to manage the details of Doctor, Appointment, Patient, Booking, Doctor Schedule. It manages all the information about Doctor, Doctor Fees, Doctor Schedule, Doctor. The project is totally built at administrative end and thus only the administrator is guaranteed the access. The purpose of the project is to build an application program to reduce the manual work for managing the Doctor, Appointment, Doctor Fees, Patient. It tracks all the details about the Patient, Booking, Doctor Schedule.

Scope

Provides the searching facilities based on various factors. Such as Doctor, Patient, Booking, Doctor Schedule

- Doctor Appointment System also manage the Doctor Fees details online for Booking details, Doctor Schedule details, Doctor.
- It tracks all the information of Appointment, Doctor Fees, Booking ect
- Manage the information of Appointment
- Shows the information and description of the Doctor, Patient
- To increase efficiency of managing the Doctor, Appointment
- It deals with monitoring the information and transactions of Booking.

CHAPTER 3

SYSTEM REQUIREMENTS

3.1 Windows

• Microsoft® Windows® 7/8/10 64-bit

• 4 GB RAM minimum, 8 GB RAM recommended

• 2 GB of available disk space minimum,

• 4 GB Recommended 500 MB for IDE + 1.5 GB for Android SDK and emulator system image

• 1280 x 800 minimum screen resolution

3.2 Mac

• Mac® OS X® 10.10 Yosemite or higher, up to 10.14 macOS Mojave

• 4 GB RAM minimum, 8 GB RAM recommended

• 2 GB of available disk space minimum,

• 4 GB Recommended 500 MB for IDE + 1.5 GB for Android SDK and emulator system image

3.3 Linux

• GNOME or KDE desktop - Tested on gLinux based on Debian.

• 64-bit distribution capable of running 32-bit applications

• GNU C Library glibc 2.19 or later 17

• 4 GB RAM minimum, 8 GB RAM recommended

• 2 GB of available disk space minimum,

CHAPTER 4

BASIC CONCEPTS

We will be looking into some of the variables that play a vital role in determining the no show rate. Each variable has a different weight that is used while training the model .Prior knowledge of these variables should be present to understand the dataset.

4.1 Medical Appointment Data

The medical appointment data is from the year2016, which is taken from Bureau of Medical Statics. Every schedule has many variables, which give detailed information about thespecific flight.

- Year, date, and month
- Scheduled Appointment time
- Actual Appointment Time
- Scheduled IN-Patient appointment
- Scheduled OUT-Patient appointment
- No. of NO Show

4.2 NO-SHOW

Next one is the main objective of the project that is the cause of NO Show. NO Show occurs for the varies of reason, in this project we explained about the NO Show's namely:

- Cost of care
- Patients don't deem it necessary to show up.
- Patients dread lengthy wait times.
- Patients forgot about appointments.
- Patients can't get through to your practice.
- Lack of Transportation

Now collect the dataset for these issues for particular over an year and import it to the excel shown in Figure (i).

PROVIDER MEDICAL APPOINTMENT

Date	Appoin	Cancell	No-Sho	Waiting	Patient	Averag	Reven	Referra	Patient	Staff Utili
01-01-2016	15	5	2	3	9	10min	200	2%	20%	5%
02-01-2016	7	9	1	4	8	15min	500	1%	22%	2%
03-01-2016	5	4	3	4	7	20min	700	2%	25%	4%
04-01-2016	4	8	5	5	9	17min	1000	3%	36%	2%
05-01-2016	14	6	2	6	8	24min	1500	1%	32%	10%
06-01-2016	16	5	1	4	6	16min	700	1%	38%	6%
07-01-2016	13	9	3	7	5	20min	400	2%	35%	9%
08-01-2016	14	10	4	5	6	17min	550	2%	45%	5%
09-01-2016	20	4	6	6	8	30min	600	3%	40%	4%
10-01-2016	16	5	2	5	7	25min	900	1%	46%	6%
11-01-2016	19	7	1	8	6	14min	700	4%	20%	7%
12-01-2016	22	5	0	6	6	13min	800	2%	55%	4%
13-01-2016	15	9	0	3	8	20min	400	2%	66%	4%
14-01-2016	18	6	5	2	5	26min	600	3%	70%	4%
15-01-2016	23	3	3	6	8	15min	400	3%	68%	3%
16-01-2016	24	4	3	7	7	19min	500	1%	69%	2%
17-01-2016	27	7	2	10	8	20min	600	1%	64%	1%
18-01-2016	20	6	1	7	9	18min	1000	4%	77%	5%
19-01-2016	10	4	1	7	6	19min	1700	5%	75%	4%
20-01-2016	20	7	2	5	7	20min	1200	4%	72%	6%
21-01-2016	22	2	2	4	7	19min	1100	6%	80%	8%
22-01-2016	23	4	3	5	6	17min	700	2%	52%	5%
23-01-2016	25	6	3	3	9	16min	500	1%	55%	3%
24-01-2016	28	8	0	7	8	19min	600	2%	70%	5%
25-01-2016	29	2	0	4	7	20min	400	2%	90%	6%
26-01-2016	21	4	1	8	8	15min	700	3%	88%	5%
27-01-2016	22	6	2	4	9	18min	800	1%	55%	6%
28-01-2016	30	5	2	7	6	17min	900	1%	54%	3%
29-01-2016	24	11	1	4	7	15min	700	2.50%	66%	2%
30-01-2016	28	12	3	8	5	19min	800	2.30%	68%	5%
31-01-2016	25	10	1	9	9	17min	600	1.20%	45%	6%

APPOINTM	IN DATA P	SCHEDUL	NO SHOV	GENDER	DEPARTM	DEPART	LOCATI
01-01-2016	A100	100	6	M	Cardiology	C10	OMR
02-01-2016	A101	59	7	F	Medicine	M11	Sholinganalur
03-01-2016	A102	60	8	M	Hematholog	H12	Semencheri
04-01-2016	A103	61	9	M	Gyneacology	G13	Adayar
05-01-2016	A104	62	10	F	Nephrology	N14	ECR
06-01-2016	A105	63	11	M	Cardiology	C10	Madhavaram
07-01-2016	A106	64	12	M	Cardiology	C10	Guindy
08-01-2016	A107	65	13	F	Medicine	M11	Tambaram
09-01-2016	A108	66	14	F	Medicine	M11	Thiruvotiyur
10-01-2016	A109	67	15	M	Oncology	O11	Amjikarai
11-01-2016	A110	68	16	M	Pharmacy	PH11	Egmore
12-01-2016	A111	69	17	F	Radiology	R12	Perambur
13-01-2016	A112	70	18	M	Radiology	R12	Ayanavaram
14-01-2016	A113	71	19	F	Oncology	O11	Adayar
15-01-2016	A114	72	20	M	Radiology	R12	ECR
16-01-2016	A115	73	21	F	Cardiology	C10	Madhavaram
17-01-2016	A116	74	22	F	Medicine	M11	Guindy
18-01-2016	A117	75	23	M	Radiology	R12	Adayar
19-01-2016	A118	53	24	F	Cardiology	C10	ECR
20-01-2016	A119	54	15	F	Cardiology	C10	Madhavaram
21-01-2016	A120	55	16	M	Accident & E	A12E13	Guindy
22-01-2016	A121	56	17	F	Accident & E	A12E13	Tambaram
23-01-2016	A122	57	18	F	Discharge Lo	D00	Thiruvotiyur
24-01-2016	A123	58	19	M	ENT	ENT123	Amjikarai
25-01-2016	A124	70	20	M	Cardiology	C10	Egmore
26-01-2016	A125	71	21	M	Radiology	R12	Perambur
27-01-2016	A126	72	22	F	Medicine	M11	Ayanavaram
28-01-2016	A127	73	23	F	Medicine	M11	OMR
29-01-2016	A128	74	5	F	Medicine	M11	Sholinganalur
30-01-2016	A129	75	6	M	Medicine	M11	Semencheri
31-01-2016	A130	76	7	F	Radiology	R12	Adayar

Fig4.1. Data

CHAPTER 5

PROJECT DEVELOPMENT

In this section, there is an overview of the process of data mining and data modeling, from collecting the data, through the data preparation and finally the datamodeling. Data cleaning and formatting can be considered as the most critical partof the whole project according to several data scientists.

Fig.2 shows how the process of data mining works to extract knowledge usingalgorithms.

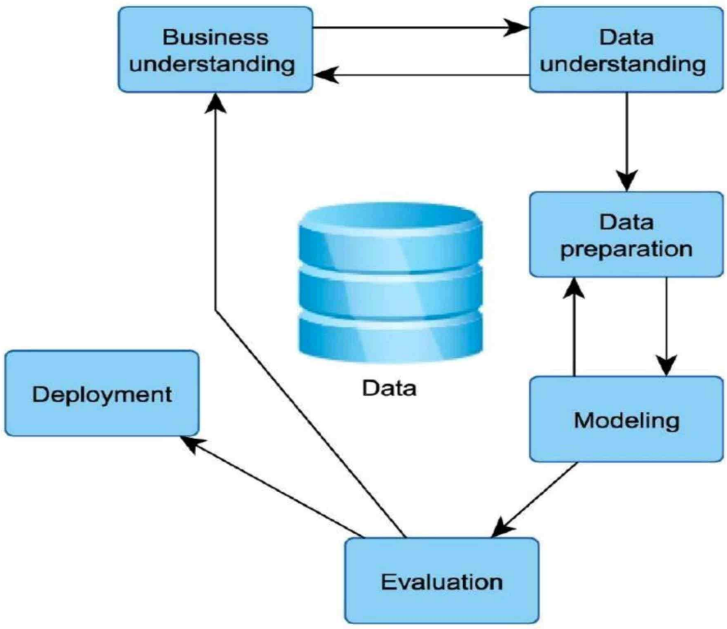

Fig.5.1 Project Development

CHAPTER 6

DATA COLLECTION

Once the project undertaking is completely comprehended, our subsequent stage is to gather the information that is required for future model building. The information accumulation was an issue as data was not situated at a single source. The data was kept in unique information design. To achieve the end goal, it requires a clear understanding of the correct location of the data.

As we can see in Figure (iii) the US Bureau of Transportation Statistics gives detailed information on every single household flight, which incorporates their booking and take off circumstances and real takeoff, origin, destination, date, and carrier. We consolidated a portion of the information properties with Local Climatological Data from National Oceanic and Atmospheric Administration (NOAA) to shape a join data set.

Since the datasets for every year are very massive, we decrease our concentration to one-year, i.e., 2018, which as of now contains 1 million records for the most significant airplane terminals. In this venture, we have taken 2018 as our preparation set and 2019 as our test set.

Handling speed is a noteworthy thought since the machine learning methodology that functions admirably on smaller datasets cause issues with the Jupyter Notebook establishments on our PCs.

Date	Appoir	Cancel	No-Sho	Waitin	Patient	Averag	Reven	Referr	Patient	Staff Uitil
01-01-2016	15	5	2	3	9	10min	200	2%	20%	5%
02-01-2016	7	9	1	4	8	15min	500	1%	22%	2%
03-01-2016	5	4	3	4	7	20min	700	2%	25%	4%
04-01-2016	4	8	5	5	9	17min	1000	3%	36%	2%
05-01-2016	14	6	2	6	8	24min	1500	1%	32%	10%
06-01-2016	16	5	1	4	6	16min	700	1%	38%	6%
07-01-2016	13	9	3	7	5	20min	400	2%	35%	9%
08-01-2016	14	10	4	5	6	17min	550	2%	45%	5%
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11-01-2016	19	7	1	8	6	14min	700	4%	20%	7%
12-01-2016	22	5	0	6	6	13min	800	2%	55%	4%
13-01-2016	15	9	0	3	8	20min	400	2%	66%	4%
14-01-2016	18	6	5	2	5	26min	600	3%	70%	4%
15-01-2016	23	3	3	6	8	15min	400	3%	68%	3%
16-01-2016	24	4	3	7	7	19min	500	1%	69%	2%
17-01-2016	27	7	2	10	8	20min	600	1%	64%	1%
18-01-2016	20	6	1	7	9	18min	1000	4%	77%	5%
19-01-2016	10	4	1	7	6	19min	1700	5%	75%	4%
20-01-2016	20	7	2	5	7	20min	1200	4%	72%	6%
21-01-2016	22	2	2	4	7	19min	1100	6%	80%	8%
22-01-2016	23	4	3	5	6	17min	700	2%	52%	5%
23-01-2016	25	6	3	3	9	16min	500	1%	55%	3%
24-01-2016	28	8	0	7	8	19min	600	2%	70%	5%
25-01-2016	29	2	0	4	7	20min	400	2%	90%	6%
26-01-2016	21	4	1	8	8	15min	700	3%	88%	5%
27-01-2016	22	6	2	4	9	18min	800	1%	55%	6%
28-01-2016	30	5	2	7	6	17min	900	1%	54%	3%
29-01-2016	24	11	1	4	7	15min	700	2.50%	66%	2%
30-01-2016	28	12	3	8	5	19min	800	2.30%	68%	5%
31-01-2016	25	10	1	9	9	17min	600	1.20%	45%	6%

Fig.6.1 Data Collection

CHAPTER 7

DATA ANALYSIS

The process of data analysis, or alternately, data analysis steps, involves gathering all the information, processing it, exploring the data, and using it to find patterns and other insights. The process of data analysis consists of: Data Requirement Gathering: Ask yourself why you're doing this analysis, what type of data you want to use, and what data you plan to analyze.

7.1 Data Collection: Guided by your identified requirements, it's time to collect the data from your sources. Sources include case studies, surveys, interviews, questionnaires, direct observation, and focus groups. Make sure to organize the collected data for analysis.

7.2 Data Cleaning: Not all the data you collect will be useful, so it's time to clean it up. This process is where you remove white spaces, duplicate records, and basic errors. Data cleaning is mandatory before sending the information on for analysis.

7.3 Data Analysis: Here is where you use data analysis software and other tools to help you interpret and understand the data and arrive at conclusions. Data analysis tools include Excel, Python, R, Looker, Rapid Miner, Charito, Meta base, Rehash, and Microsoft Power BI.

7.4 Data Interpretation: Now that you have your results, you need to interpret them and come up with the best courses of action based on your findings.

7.5 Data Visualization: Data visualization is a fancy way of saying, "graphically show your information in a way that people can read and understand it." You can use charts, graphs, maps, bullet points, or a host of other methods. Visualization helps you derive valuable insights by helping you compare datasets and observe relationships.

If you want to make informed decisions, you need data, but there's more to it. The data in question must be accurate. Data analysis helps businesses acquire relevant, accurate information, suitable for developing future marketing strategies, business plans, and realigning the company's vision or mission. A simple example of data analysis can be seen whenever we make a decision in our daily lives by evaluating what has happened in the past or what will happen if we make that decision. Basically, this is the process of analyzing the past or future and making a decision based on that analysis.

CHAPTER 8

TYPES OF DATA ANALYSIS

The four types of data analysis are:

1. Descriptive Analysis
2. Diagnostic Analysis
3. Predictive Analysis
4. Prescriptive Analysis

8.1 DESCRIPTIVE ANALYSIS

Descriptive analytics answer the question, “What happened?”. This type of analytics is by far the most commonly used by customers, providing reporting and analysis centered on past events. It helps companies understand things such as:

- How much did we sell as a company?
- What was our overall productivity?
- How many customers churned in the last quarter?

Descriptive analytics is used to understand the overall performance at an aggregate level and is by far the easiest place for a company to start as data tends to be readily available to build reports and applications. It’s extremely important to build core competencies first in descriptive analytics before attempting to advance upward in the data analytics maturity model.

Core competencies include things such as data modeling fundamentals, communicating data with right visualization and basic dashboard skills.

It's likely you've adopted some form of descriptive analytics internally, whether that be static P&L statements, PDF reports, or reporting within an analytics tool. For a true descriptive analytics program to be implemented, the concepts of repeatability and automation of tasks must be top of mind. Repeatability in that a data process is standardized and can be regularly applied with minimal effort (think a weekly sales report), and automation in that complex tasks (VLOOKUPS, merging of excel spreadsheets, etc.) are automated—requiring little to no manual intervention.

8.2 DIAGNOSTIC ANALYSIS

Diagnostic analytics, just like descriptive analytics, uses historical data to answer a question. But instead of focusing on "what", diagnostic analytics addresses the critical question of why an occurrence or anomaly occurred within your data. Diagnostic analytics also happens to be the most overlooked and skipped step within the analytics maturity model. Anecdotally, I see most customers attempting to go from "what happened" to "what will happen" without ever taking the time to address the "why did it happen" step. This type of analytics helps companies answer questions such as:

8.2.1 Why did our company sales decrease in the previous quarter?

8.2.2 Why are we seeing an increase in customer churn?

8.2.3 Why is a specific basket of products vastly outperforming their prior year salesfigures?

Diagnostic analytics tends to be more accessible and fit a wider range of use cases than machine learning/predictive analytics. You might even find that it solves some business problems you earmarked for predictive analytics use cases. Being at the diagnostic analytics phase likely means you've adopted a modern analytics tool. Most modern analytics tools contain a variety of search-based, or lightweight artificial intelligence capabilities.

These features allow for detailed insights a layer deeper (for example: the Key Drivers visualization in Power BI, or Qlik's search-based insight functionality). To be clear, these are an effective lightweight means to address diagnostic analytics use cases butare not a means to a full-scale implementation. Software vendors like Sisu have built their core business around addressing diagnostic analytics use cases (what they call "augmented analytics") and are a great bet. Diagnostic analytics is an important step inthe maturity model that unfortunately tends to get skipped or obscured. If you cannot infer why your sales decreased 20% in 2020, then jumping to predictive analytics and trying to answer "what will happen to sales in 2021" is a stretch in advancing upward inthe analytics maturity model.

8.3 PREDICTIVE ANALYSIS

Predictive analytics is a form of advanced analytics that determines what is likely to happen based on historical data using machine learning. Historical data that comprises the bulk of descriptive and diagnostic analytics is used as the basis of building predictive analytics models. Predictive analytics helps companies address use cases such as:

- Predicting maintenance issues and part breakdown in machines.
- Determining credit risk and identifying potential fraud.
- Predict and avoid customer churn by identifying signs of customer dissatisfaction.

At the outset of any predictive analytics build, three core elements need to be established:

- Identify a problem to solve,
- Define what is you want to predict, and
- State what you will achieve by doing so.

To start you should collect existing data, organize data in a useful way to allow for data modeling, cleanse your data and review overall quality, and finally determine your modeling objective.

While modeling takes up the spotlight in predictive analytics, data prep is a crucial step that needs to happen first. This is why organizations with a rock-solid foundation in descriptive and diagnostic analytics are better equipped to handle predictive analytics. Simply put, the time and effort to prep, transform, and ensure data quality for retrospective reporting has already taken place. The groundwork should be relatively well laid to quickly identify and leverage data for the modeling phase. I always encourage customers with well-defined KPIs and business logic in a specific business reporting area (think sales reporting for example) to use that as the first predictive analytics use case. The goal is to derive value quickly, and there is no better place to start than an area where you know data is well defined and of high quality.

8.4 PRESCRIPTIVE ANALYSIS

Prescriptive analytics is the fourth and final pillar of modern analytics. Prescriptive analytics pertains to true guided analytics where your analytics is prescribing or guiding you toward a specific action to take. It is effectively the merging of descriptive, diagnostic, and predictive analytics to drive decision making. Existing scenarios or conditions (think your current fleet of freight trains) and the ramifications of a decision or occurrence (parts breakdown on the freight trains) are applied to create a guided decision or action for the user to take (proactively buy more parts for preventative maintenance).

Prescriptive analytics requires strong competencies in descriptive, diagnostic, and predictive analytics which is why it tends to be found in highly specialized industries (oil and gas, clinical healthcare, finance, and insurance to name a few) where use cases are well defined. Prescriptive analytics help to address use cases such as:

- Automatic adjustment of product pricing based on anticipated customer demandand external factors.
- Flagging select employees for additional training based on incident reports in thefield.

Prescriptive analytics' primary aim is to take the educated guess or assessment out of data analytics and streamline the decision-making process. Prescriptive analytics is commonly considered the merging of descriptive, diagnostic, and predictive analytics. Getting started isn't so much a step-by-step list but rather the time and effort up front to build your competencies within the analytics maturity curve.

Simply put, there is no starting point in prescriptive analytics without the requisite first three pillars of modern analytics being established first. If you're ready for prescriptive analytics, then quantifying your call to action and the underlying criteria will be the first requirement. For example: if the use case is to call corrective action for an employee (i.e. – additional training based on poor performance) then the factors that necessitate this action must be firmly established and the action itself must be clearly defined. Knowing how each kind of analytics helps you better understand your data and how to use it.

CHAPTER 9

MICROSOFT POWERBI

Power BI is an interactive data visualization software product developed by Microsoft with a primary focus on business intelligence. It is part of the Microsoft Power Platform.

Power BI is a collection of software services, apps, and connectors that work together to turn unrelated sources of data into coherent, visually immersive, and interactive insights.

Data may be input by reading directly from a database, webpage, or structured files such as spreadsheets, CSV, XML, and JSON.

Microsoft Power BI is a business intelligence (BI) platform that provides nontechnical business users with tools for aggregating, analyzing, visualizing and sharing data.

Power BI's user interface is fairly intuitive for users familiar with Excel, and its deep integration with other Microsoft products makes it a versatile self-service tool that requires little upfront training.

Users can download an application for Windows 10, called Power BI Desktop, and native mobile apps for Windows, Android and iOS devices. There is also Power BI Report Server for companies that must maintain their data and reports on premises. That version of Power BI requires a special version of the desktop app -- aptly called Power BI Desktop for Power BI Report Server.

9.1 USES OF POWER BI

Microsoft Power BI is used to find insights within an organization's data. Power BI can help connect disparate data sets, transform and clean the data into a data model and create charts or graphs to provide visuals of the data. All of this can be shared with other Power BI users within the organization.

The data models created from Power BI can be used in several ways for organizations, including the following:

- telling stories through charts and data visualizations;
- examining "what if" scenarios within the data; and
- creating reports that can answer questions in real time and help with forecasting to make sure departments meet business metrics.

Power BI can also provide executive dashboards for administrators or managers, giving management more insight into how departments are doing.

9.2 Features OF POWER BI

Microsoft has added a number of data analytics features to Power BI since its inception and continues to do so. Some of the most important features are the following:

Artificial intelligence. Users can access image recognition and text analytics in Power BI, create machine learning models using automated ML capabilities and integrate with Azure Machine Learning.

Hybrid deployment support. This feature provides built-in connectors that allow Power BI tools to connect with a number of different data sources from Microsoft, Salesforce and other vendors.

Quick Insights. This feature allows users to create subsets of data and automatically apply analytics to that information.

Common data model support. Power BI's support for the common data model allows the use of a standardized and extensible collection of data schemas (entities, attributes and relationships).

Cortana integration. This feature, which is especially popular on mobile devices, allows users to verbally query data using natural language and access results using Cortana, Microsoft's digital assistant.

Customization. This feature allows developers to change the appearance of default visualization and reporting tools and import new tools into the platform.

APIs for integration. This feature provides developers with sample code and application program interfaces (APIs) for embedding the Power BI dashboard in other software products.

Self-service data prep. Using Power Query, business analysts can ingest, transform, integrate and enrich big data into the Power BI web service. Ingested data can be shared across multiple Power BI models, reports and dashboards .

Modeling view: This allows users to divide complex data models by subject area into separate diagrams, multiselect objects and set common properties, view and m

CHAPTER 10

PROJECT IMPLEMENTATION

The project is implemented in Microsoft excel and Microsoft power Bi.

10.1 Methodology

We need to collect the data set for particular Month, over an year or 365 days.That includes the Appointment's :

- Date wise appointment Volume
- Location wise patient count
- Total patient count
- Department wise patient count
- Gender wise patient count
- Age wise

Now enter the dataset in Microsoft excel sheet as per the date and month shown in figure(i).Next one is the main objective of the project that is cause of NO Show.NO Show occurs varies of reasons ,in this project we explained about theses delays namely:

- Cost of care
- Patients don't deem it necessary to show up
- Patients dread lengthy wait times
- Patients forgot about appointments
- Patients can't get through to your practice
- Lack of transportation

Now collect the dataset for these issues for particular hospital over an year.

Import to the excel sheet. Then import ot the MICROSOFT POWERBI.

CHAPTER 11

DATA EXPLORATION FOR MEDICAL APPOINTMENT DATA

As a first exploratory examination, we consider the watched likelihood of deferral in minutes on the whole dataset. The best path is through a histogram, taking a Scheduled appointment and NO Show independently.

11.1 No Show Rate

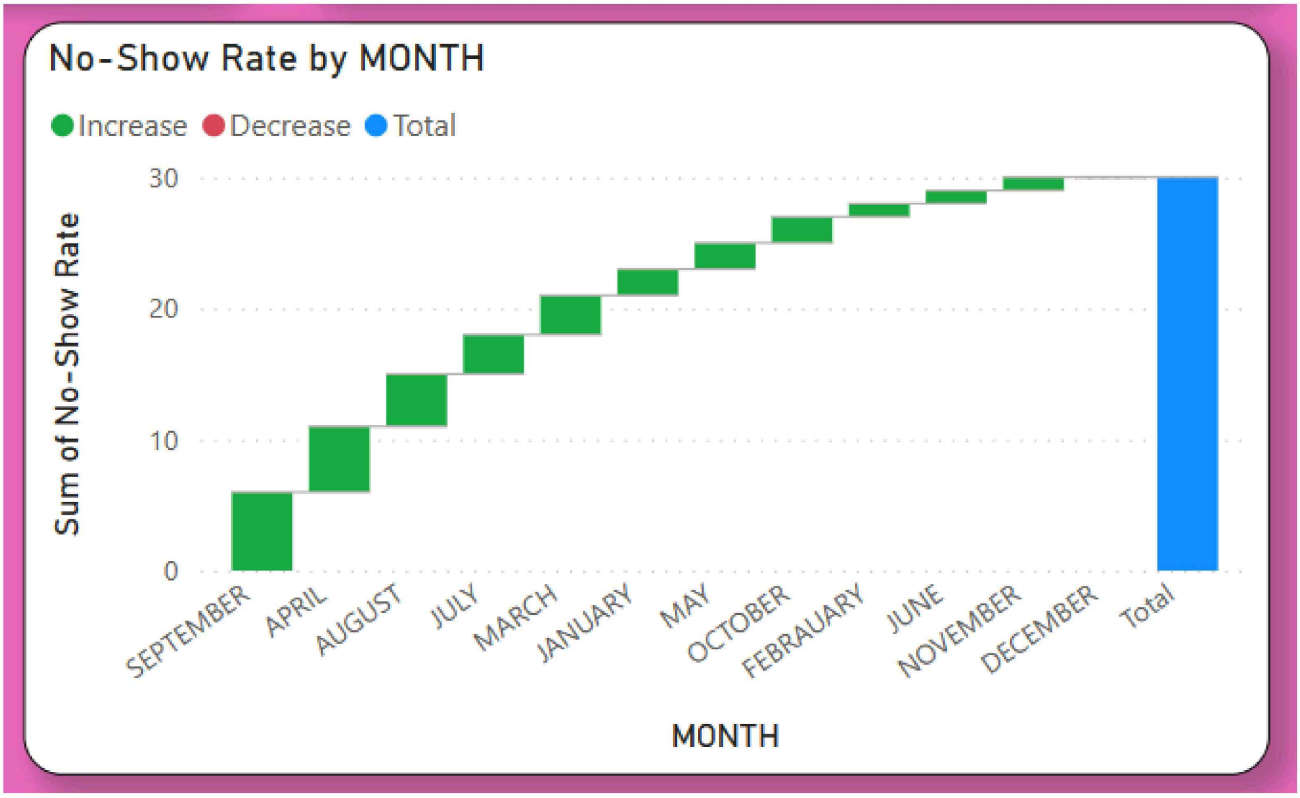

Fig.11.1. No Show rate

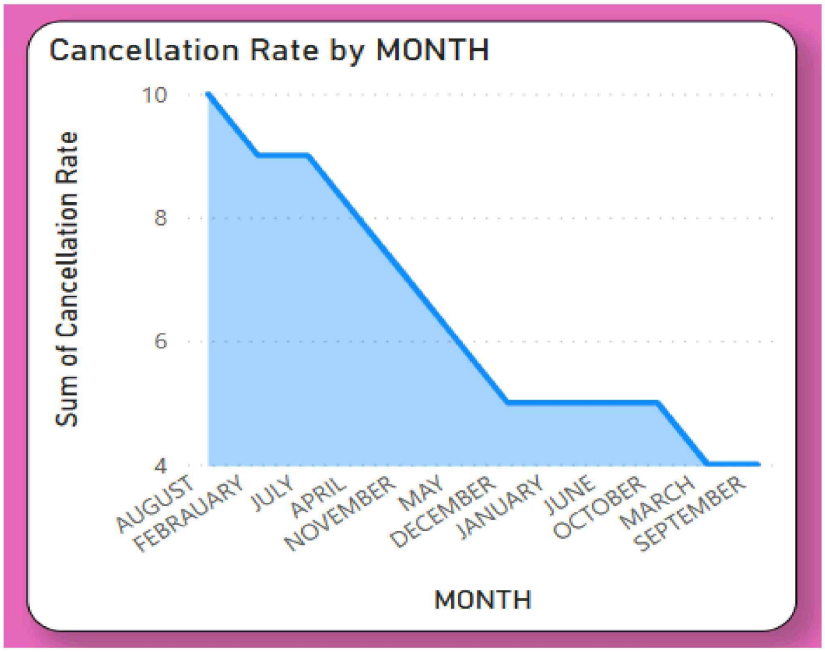

Fig.11.2. Cancellation Rate

In Figure (iv) and Figure (v), Patients that do not attend a scheduled clinic appointment (Termed: No-shows) cause administrative issues to the resident's practice, negatively impact the workflow, and affect the financial status of the facility, continuity of patient care, resident education, and clinic efficiency.

Previous studies that focused on the reasoning behind missed scheduled appointments suggest a variety of causes, such as forgetting about the appointment, means of transportation, interfering family or work commitment, long waiting time, and failure to understand the scheduling systems. Variable interventions were implemented to prevent or limit No- shows, including: reminders via mail, phone call, or physician reminders. However, even with the broadly detailed utilization of reminder systems, residency program.

11.2 COUNT DEPARTMENT BY MONTH

The participants were patients of the Internal Medicine clinic at a major academic medical center. We included participants that missed one or more of the scheduled primary care clinic appointment in the last year. The participants were required to answer a questionnaire regarding the reasons for missing a scheduled clinic appointment, which included questions concerning their suggestions for solutions. All the interviews were conducted in the facility's examination rooms. The Institutional Review Board provided human subjects approval

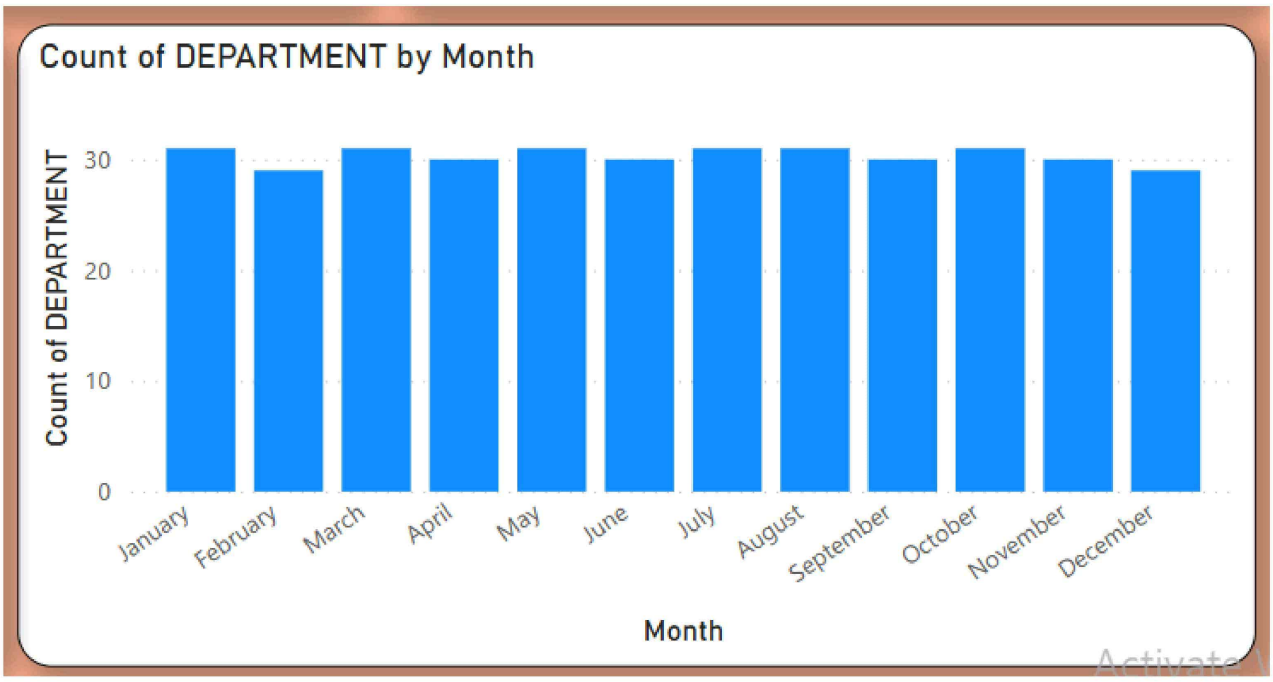

Fig.11.3. Count of Department by Month

Participants were selected sequentially from the patients attending the Internal Medicine clinic in January 2016.

11.4 Scheduled by Appointment Day

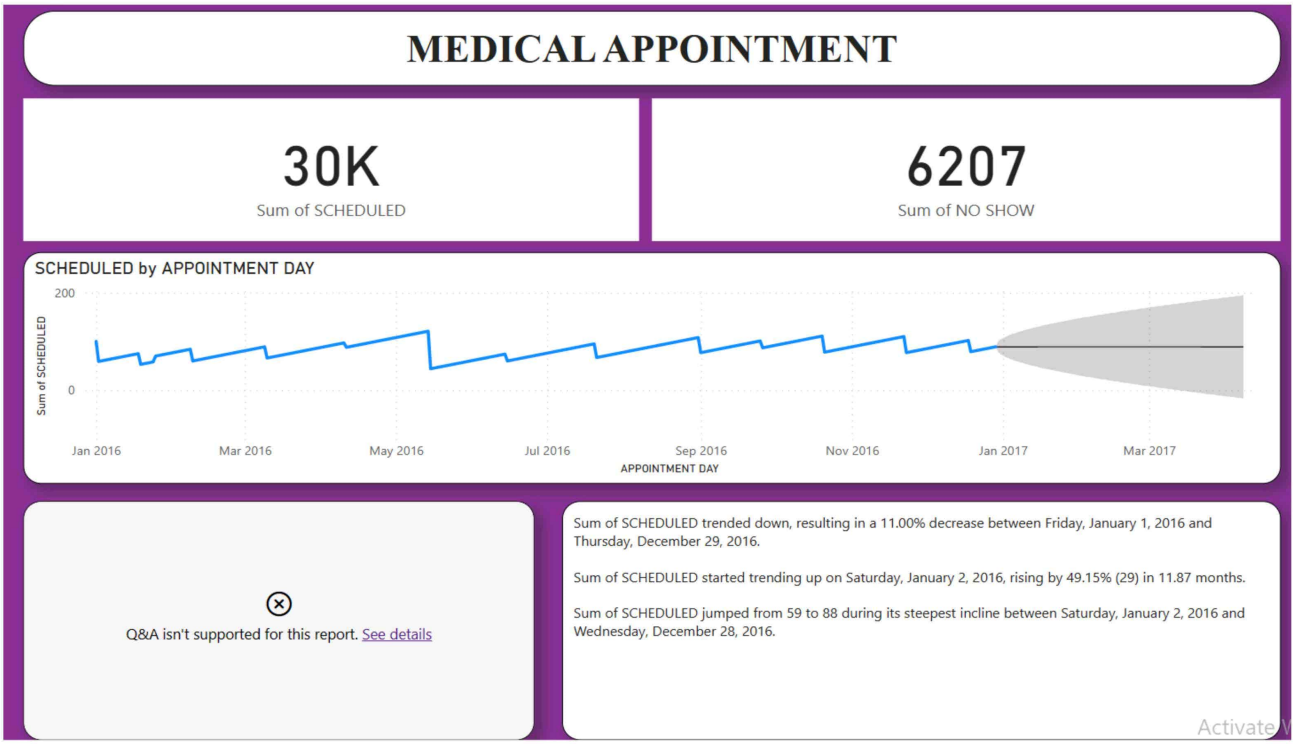

Fig.11.4 Medical Appointment

In this figure, we can notice that x-axis is year by month and y-axis is date and the blue color waves are representing the current year delayed minutes.And by using forecast method in power Bi, we can predict the future flight delays ofupcoming year, represents in black color waves.Question and answer model used in the figure(vii), is the easy way to convey the message, you can ask preferred questions to the model it will the appropriate answerto your question. For example you need the delayed mins of particular month ,you no need to see the graph you see in the q & a column itself.By this project the sum of delayed mins is 161.45 mins.

11.5 Sum of Staff Utilization Rate by Month

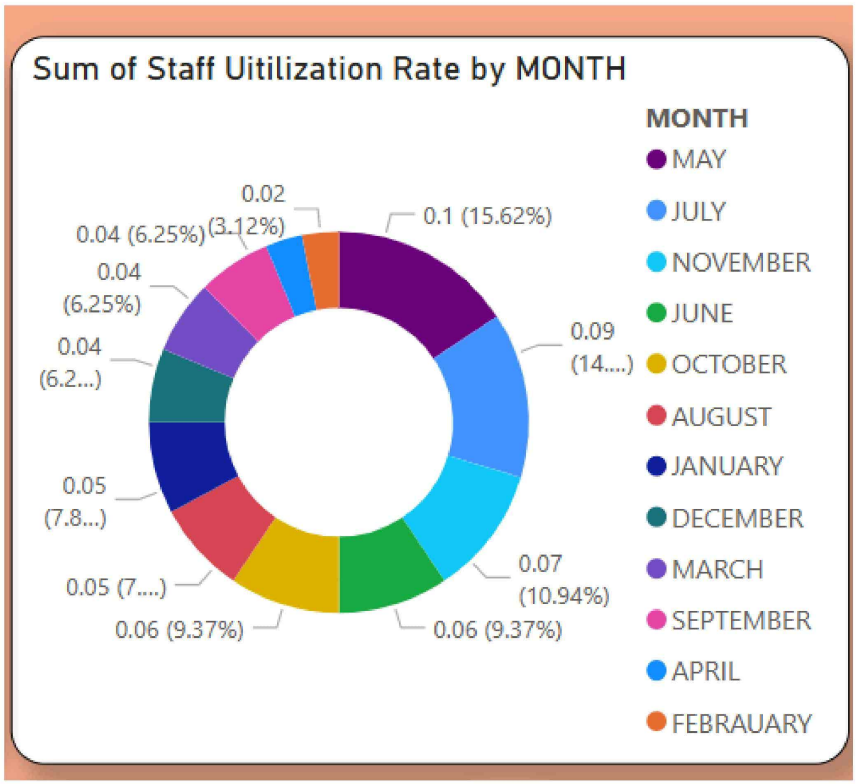

Fig.11.5 pie chart model for sum of staff utilization rate by month.

Here the different colors denote the months January to December. From this figure(viii) we can say May month has most staff utilization and most average of 15.62% and second most average contains 14.06 % by July month and 10.94% by November month and 9.37% by June month.By this way you can calculate the staff utilization rate by month.

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CHAPTER 12

TYPES OF COUNT

12.1 Count of Gender and Department by month

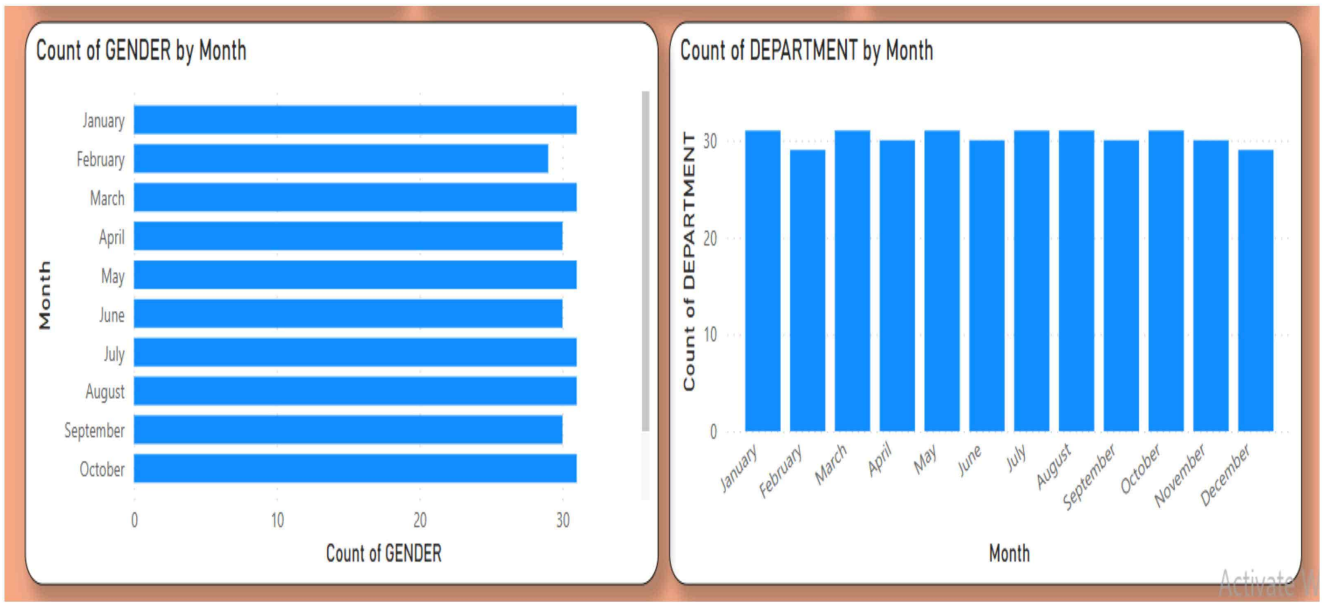

Fig.12.1 the bar graph model of Count of Gender and Department by Month

The x axis in first graph denotes the month and y axis denotes the count of Gender.The x axis in first graph denotes the Count of department and y axis denotes the Month. From diagram 1, January,March,May,July,August,October month has the largest Count of Gender From diagram 2 January,March,May,July,August,October achieves the largest Count of Department by Month.

12.2 Appointment Volume and Revenue per Appointment by month

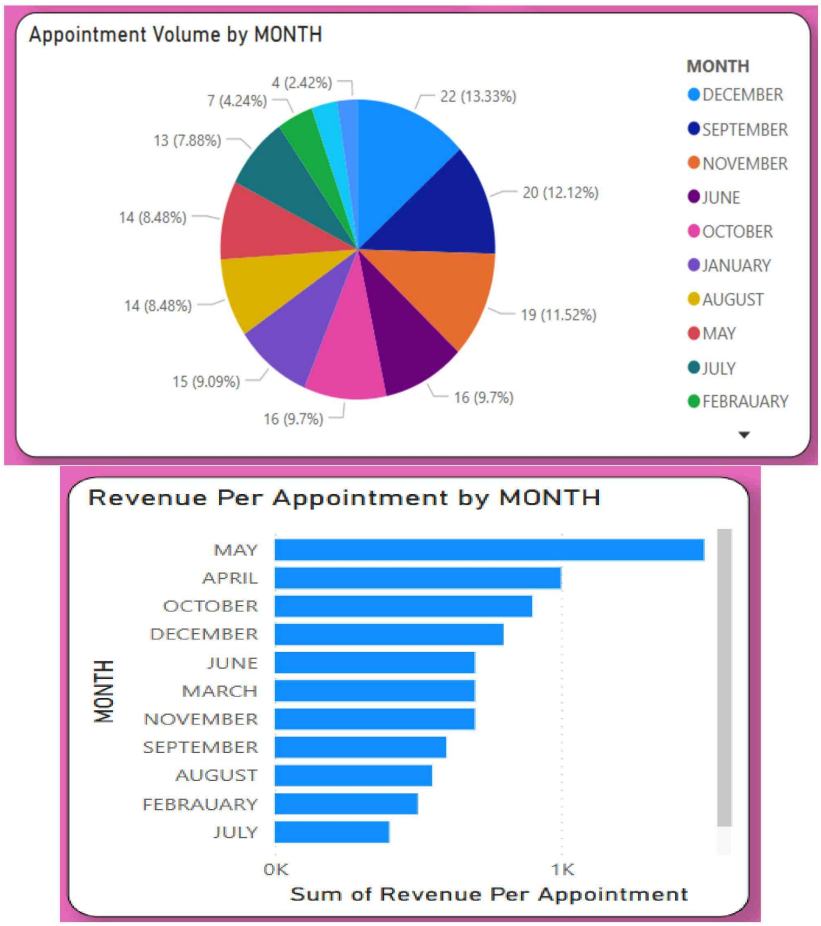

Fig.12.2. the pie chart model and Bar Chart model

It denote the Appointment Volume and revenue per Appointment by month.In pie chart diagram, the major delay is happened in December month of percentage 13.33. the different colors denote the month of a year over a year And the bar chart represents the Sum of Revenue Per Appointment here the scale is varying from 0K to 1K by month.

12.3 NO SHOW and SCHEDULED by month

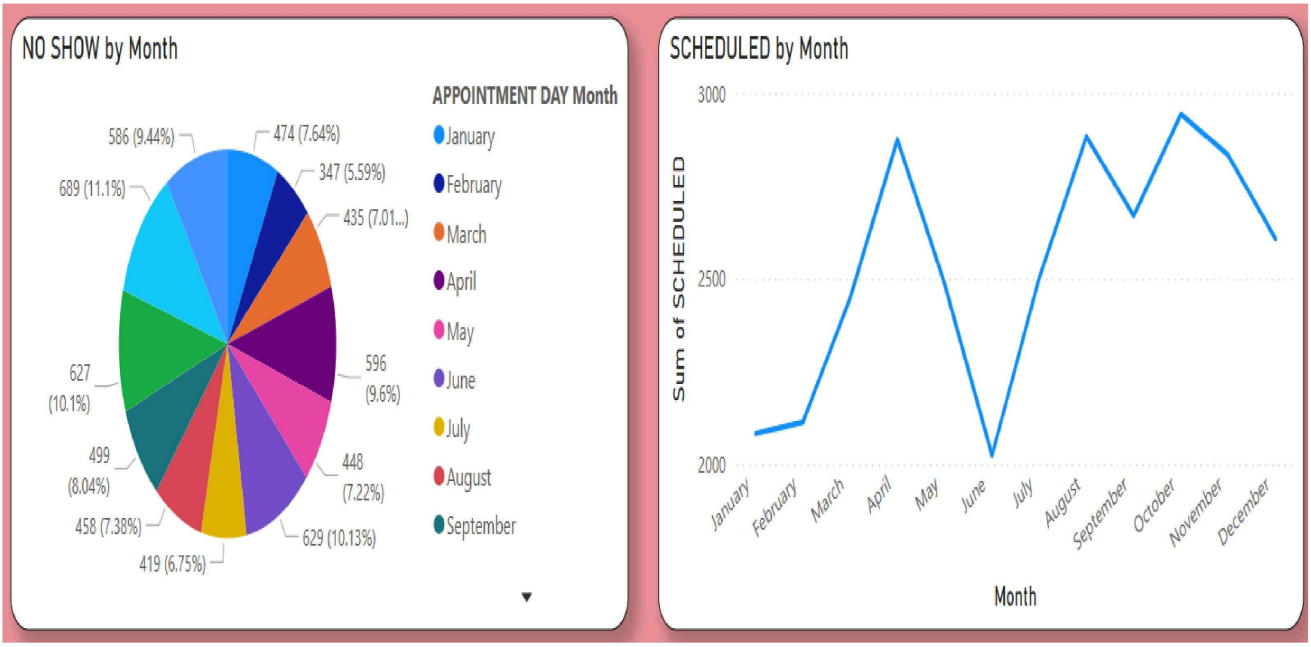

Fig.12.3.

Figure(xi) represents two diagrams top one is the No SHOW by Month and bottom denotes the SCHEDULED by Month.In first diagram January has the highest Appoinment and September has the Lowest, so from the diagram we can concludethat January highest NO SHOW by Month. In second diagram the October has the higest Schedule with 2943,and January has the Lowest Schedule with 2083.

12.4 Average of number of delays by month

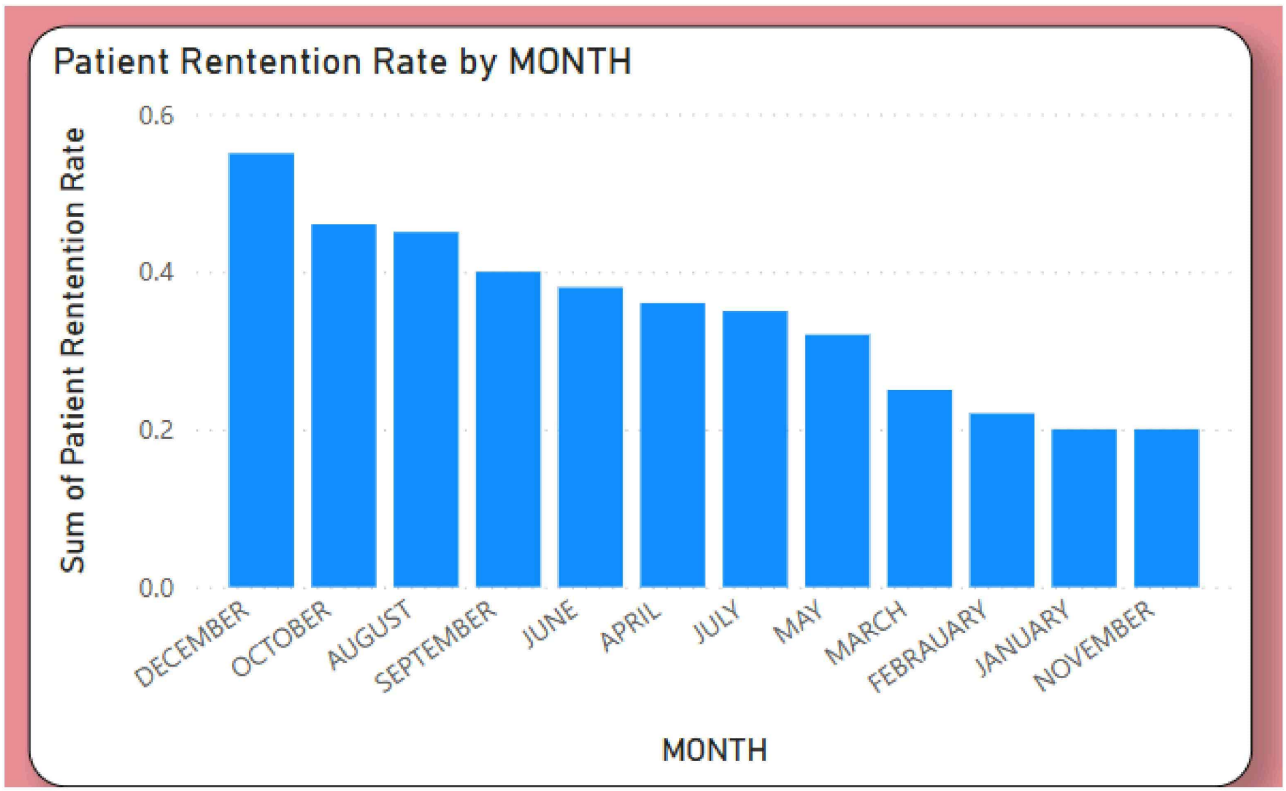

Fig.12.4 visualizing Patient Retention by Month

From the above diagram we can say that December as the highest number Patient Retention with 0.55.

13 CONCLUSION

In this study, we sought evidence from the literature to discuss the benefits and challenges of implementing Web-based medical appointment systems. Compared with traditional appointment methods, Web-based appointment scheduling is more patient-centered and has many advantages due to improved access. After implementing Web-based appointment systems, many practices have shown positive changes such as reduced no-show rate, decreased staff labor, decreased waiting time, and improved patient satisfaction.

Although these changes suggest Web-based appointment systems could produce positive outcomes, this assertion should be further reinforced by more sophisticated study designs. As in some studies, the Web-based appointment services are components of portals and it is hard to measure their impacts statistically. Some studies reported results without controlling for other factors. It is possible that the positive outcomes are produced by the other factors or by the combination of the Web-based appointment systems and the other factors.

Providers and patients both have reasons for the slow adoption of Web-based appointment scheduling. Cost, flexibility, safety, and integrity are major reasons discouraging providers from using Web-based scheduling. Patients' reluctance to adopt Web-based appointment scheduling is mainly influenced by their past experiences using computers and the Internet, as well as their communication preferences.

Overall, the literature suggests a growing trend for the adoption of Web-based appointment systems. The findings of this review suggest that there are benefits to a variety of patient outcomes from Web-based scheduling interventions with the need for further studies.

14 Future work

This project is based on data analysis from year 2016. A large dataset is availablefrom 1987-2008 but handling a bigger dataset requires a great amount of preprocessing andcleaning of the data.

Therefore, the future work of this project includes incorporatinga larger dataset. There are many ways to preprocess a larger dataset like running a Spark cluster over a server or using a cloud-based services like AWS and Azure to process thedata. With the new advancement in the field of deep learning, wecan use Neural Networks algorithm on the Medical Appointment data. Neural Network works on the pattern matching methodology. It is divided into three basic parts for data modellingthat includes feed forward networks, feedback networks, and self- organization network. Feed-forward and feedback networks are generally used in theareas of prediction, pattern recognition, associative memory, and optimization calculation, whereas self-organization networks are generally used in cluster analysis.Neural Network offers distributed computer architecture with important learning abilities torepresent nonlinear relationships.

A total of 36 articles discussing 21 Web-based appointment systems were selected for this review. Most of the practices have positive changes in some metrics after adopting Web-based scheduling, such as reduced no-show rate, decreased staff labor, decreased waiting time, and improved satisfaction, and so on. Cost, flexibility, safety, and integrity are major reasons discouraging providers from switching to Web-based scheduling. Patients' reluctance to adopt Web-based appointment scheduling is mainly influenced by their past experiences using computers and the Internet as well as their communication preferences.

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