HEART FAILURE CLINICAL RECORDPROJECT REPORT

(Project Semester January-May 2024)

Heart failure clinical record

Submitted by

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Programme and Section: B.Tech CSE and KM054

Course Code: INTB233

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CERTIFICATE

This is to certify that Anugula Rahul bearing Registration no. 12109266 has completed INTB233 project titled, **"Heart failure clinical records"** under my guidance and supervision. To the best of my knowledge, the present work is the result of his/her original development, effort and study.

Baljinder Kaur

Assistant Professor

School of Computer Science and Engineering

Lovely Professional University

Phagwara, Punjab.

Date: 18/04/2024

DECLARATION

I, Anugula Rahul, student of CSE under CSE/IT Discipline at, Lovely Professional University, Punjab, hereby declare that all the information furnished in this project report is based on my own intensive work and is genuine.

Date: 18-04-2024

Signature

Registration No. 12109266   Name of Student: Anugula Rahul

Acknowledgment

    The satisfaction that accompanies the successful completion of this project would be in complete without the mention of the people who made it possible, without whose constant guidance and encouragement would have made efforts go in vain. I consider myself privileged to express gratitude and respect towards all those who guided us through the completion of this project.

    I convey thanks to my project guide Baljinder Kaur of the Computer Science and Engineering Department for providing encouragement, constant support, and guidance which was of great help in completing this project successfully.

    Last but not least, we wish to thank our parents for financing our studies in this college as well as for constantly encouraging us to learn engineering. Their personal sacrifice in providing this opportunity to learn engineering is gratefully acknowledged.

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1. Introduction

Introducing the Heart Failure Clinical Record Dashboard, meticulously crafted to provide a comprehensive view of patient data and treatment outcomes. Powered by advanced analytical tools, such as Tableau, this dynamic visualization tool offers healthcare professionals a user-friendly platform to track and analyze key metrics related to heart failure management.

From patient demographics and medical history to treatment plans and medication adherence, every aspect of heart failure care is brought to life through interactive charts, graphs, and heatmaps. Healthcare providers can easily access and interpret data on patient outcomes, hospital readmissions, and adherence to clinical guidelines, enabling them to make informed decisions and tailor treatment strategies to individual patient needs.

Moreover, the versatility of Tableau allows for seamless integration with electronic health records (EHRs) and other healthcare data sources, providing a holistic view of patient health and enabling benchmarking against national guidelines and best practices. With customizable views, filtering

options, and on-the-fly visualizations, healthcare professionals can explore data trends, identify areas for improvement, and track progress over time.

In essence, the Heart Failure Clinical Record Dashboard powered by Tableau transcends tradition

2. Scope of Analysis:

The scope of analysis for the Heart Failure Clinical Record Dashboard, developed using Tableau, encompasses a thorough exploration of patient data and treatment outcomes within the healthcare setting. Firstly, the dashboard delves into the demographic distribution of heart failure patients, identifying factors such as age, gender, and comorbidities, providing insights into patient profiles and potential risk factors. Secondly, it analyzes treatment modalities utilized, facilitating the identification of trends, disparities, and opportunities for optimization in patient care approaches. Thirdly, the dashboard tracks key clinical indicators and outcomes over time, enabling stakeholders to discern patterns, monitor progress, and evaluate the effectiveness of interventions. Additionally, it highlights readmission rates and discharge dispositions, shedding light on care transitions and post-discharge management strategies. Lastly, the analysis includes an examination of medication adherence and follow-up appointments, providing insights into patient compliance and continuity of care. Through this comprehensive scope of analysis, healthcare providers gain a nuanced understanding of heart failure management practices, empowering them to make informed decisions and enhance patient outcomes.

3. Drawbacks or limitations of the existing system

The existing system for analyzing heart failure record data encounters several notable limitations that compromise its overall efficiency and efficacy, despite benefiting from Tableau's visualization capabilities. One significant drawback lies in the reliance on manual data processing methods, which are prone to human error and can result in inaccuracies within the analysis of patient records. Moreover, the system's scalability may be constrained, particularly in managing larger datasets or accommodating the evolving complexities of heart failure patient data over time.

Additionally, if the system predominantly offers static reports or pre-defined dashboards, it may hinder users' ability to conduct dynamic and nuanced analyses, limiting their capacity to uncover actionable insights and respond promptly to changes in patient outcomes and treatment protocols.

Furthermore, data silos and integration challenges may impede the system's ability to access and consolidate information from diverse sources, leading to fragmented insights and inhibiting a comprehensive understanding of heart failure management practices.

Moreover, while Tableau provides powerful visualization tools, if the existing system lacks interactivity or user-friendly features, it may fail to fully leverage Tableau's potential to engage healthcare providers and facilitate data-driven decision-making. Without intuitive interfaces and interactive functionalities, stakeholders may encounter difficulties in exploring patient data thoroughly and extracting meaningful insights to inform treatment strategies and improve patient outcomes.

Addressing these limitations is paramount to optimizing the heart failure record analysis system. By implementing automated data processing solutions, enhancing scalability to accommodate growing datasets, and fostering seamless integration with electronic health records (EHRs) and other healthcare data sources, the system can overcome current constraints and unlock its full analytical potential. Moreover, by prioritizing interactive visualization features and user-friendly interfaces within Tableau, healthcare providers can enhance their ability to explore patient data dynamically, derive actionable insights, and drive informed decision-making processes that improve heart failure management practices and patient care.

4. Source of DataSet:

The dataset is taken from Kaggle. Kaggle is a platform that hosts a variety of datasets from different domains such as healthcare, finance, sports, and more. The datasets on Kaggle are contributed by users and organizations from all over the world.To access datasets on Kaggle, you first need to create an account on the platform. Once you have an account, you can search for datasets using the search bar on the Kaggle homepage or browse through the datasets by category.About: An Adidas sales dataset is a collection of data that includes information on the sales of Adidas products. This type of dataset may include details such as the number of units sold, the total sales revenue, the location of the sales, the type of product sold, and any other relevant information.Adidas sales data can be useful for a variety of purposes, such as analyzing sales trends, identifying successful products or marketing campaigns, and developing strategies for future sales. It can also be used to compare Adidas sales to those of competitors, or to analyze the

effectiveness of different marketing or sales channels.There are a variety of sources that could potentially provide an Adidas sales dataset, including Adidas itself, market research firms,government agencies, or other organizations that track sales data. The specific data points included in an Adidas sales dataset may vary depending on the source and the purpose for which it is being used.

Here are the details of my chosen data set.

- Name: Heart failure clinical record
- Link: https: https://www.kaggle.com/datasets/andrewmvd/heart-failure-clinical-data
- Format: CSV
- No. of data sets: 1
- Number of Rows: 300
- Number of columns: 13
- Size: 11.9KB
- Date Fields:
    i.   Age
    ii.   Aneamia
    iii. Creatinine phosphokinase
    iv.   Diabetes
    v.   Ejection fraction
    vi.   platelets
    vii. serum creatinine
    viii. Sex
    ix.   Smoking
    x.   Time
    xi.   Death
    xii. Death event
    xiii. **5. ETL process**

Extracted the data set from the Kaggle which contains the date of heart failure clinical record from the years 2020,2021.

Transformed the data by removing the state of Alaska.

Loaded the dataset into the Tableau.

Created dashboard using the Tablea

6. Analysis of DataSet

6.1Visualization:

i. Introduction: This section provides a visual representation of the geographic distribution of heart failure cases across different regions within the healthcare system. By analyzing patient data at the regional level, stakeholders can gain insights into the prevalence of heart failure, demographic trends, and healthcare utilization patterns. Through interactive maps, users can easily identify regions with higher concentrations of heart failure patients, allowing for targeted resource allocation, strategic planning, and the development of tailored interventions. Additionally, trends in heart failure prevalence and outcomes across different regions can inform healthcare providers about variations in disease burden and help guide efforts to improve care delivery and patient outcomes.

ii. General Description: The section on "Regional Distribution of Heart Failure Cases" within the heart failure clinical record dashboard provides a comprehensive overview of the geographic distribution of heart failure patients within the healthcare system. By visualizing patient data at the regional level, stakeholders gain valuable insights into the prevalence of heart failure and associated demographic factors. This analysis enables them to identify regions with higher concentrations of heart failure cases, facilitating targeted interventions, resource allocation, and the development of region-specific care strategies. Armed with this information, healthcare providers can improve care coordination, optimize healthcare delivery, and enhance patient outcomes for individuals living with heart failure.

iii. Analysis Result:

Utilizing a map visualization, the heart failure clinical record dashboard showcases the geographic distribution of heart failure cases, allowing stakeholders to identify regions with varying levels of disease prevalence. The map enables a visual understanding of disease burden and healthcare utilization patterns across different regions. By analyzing patient data spatially, stakeholders can pinpoint areas with higher concentrations of heart failure cases and allocate resources accordingly to address gaps in care delivery. Moreover, the map can highlight regions where targeted

interventions or community outreach programs may be needed to improve early detection, access to care, and overall management of heart failure.
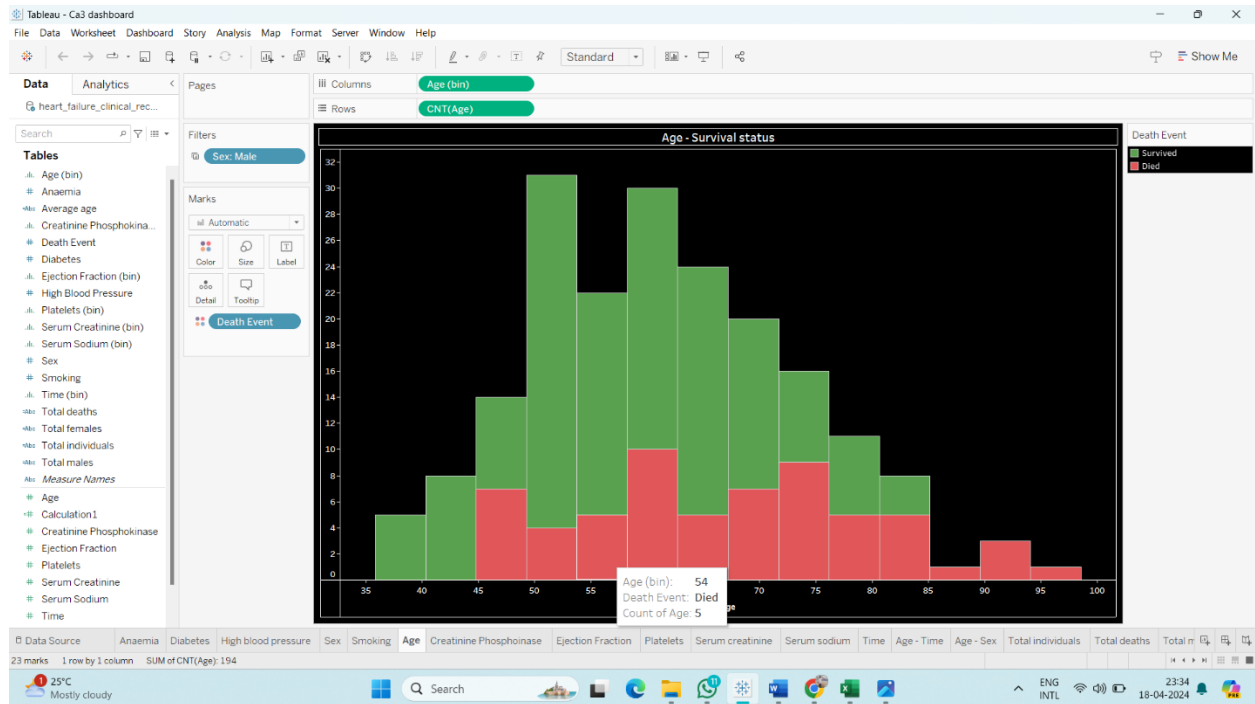
7. List of Analysis with Results

Geographic Distribution of Heart Failure Cases (Map Visualization): The map visualization showcases the geographic distribution of heart failure cases within the healthcare system, allowing stakeholders to pinpoint regions with higher and lower prevalence rates. It enables a visual understanding of disease burden and healthcare utilization patterns across different regions. By analyzing patient data spatially, stakeholders can identify areas with higher concentrations of heart failure cases and allocate resources effectively to address gaps in care delivery. Moreover, the map can highlight regions where targeted interventions or community outreach programs may be needed to improve early detection, access to care, and overall management of heart failure.

Demographic Breakdown of Heart Failure Patients (Stacked Bar Charts): Stacked bar charts provide a detailed breakdown of heart failure patients by demographic factors such as age, gender, and comorbidities, facilitating comparisons and trend analysis over time. These visualizations allow stakeholders to identify demographic trends, disparities, and opportunities for tailored interventions. By examining changes in patient demographics across different regions,
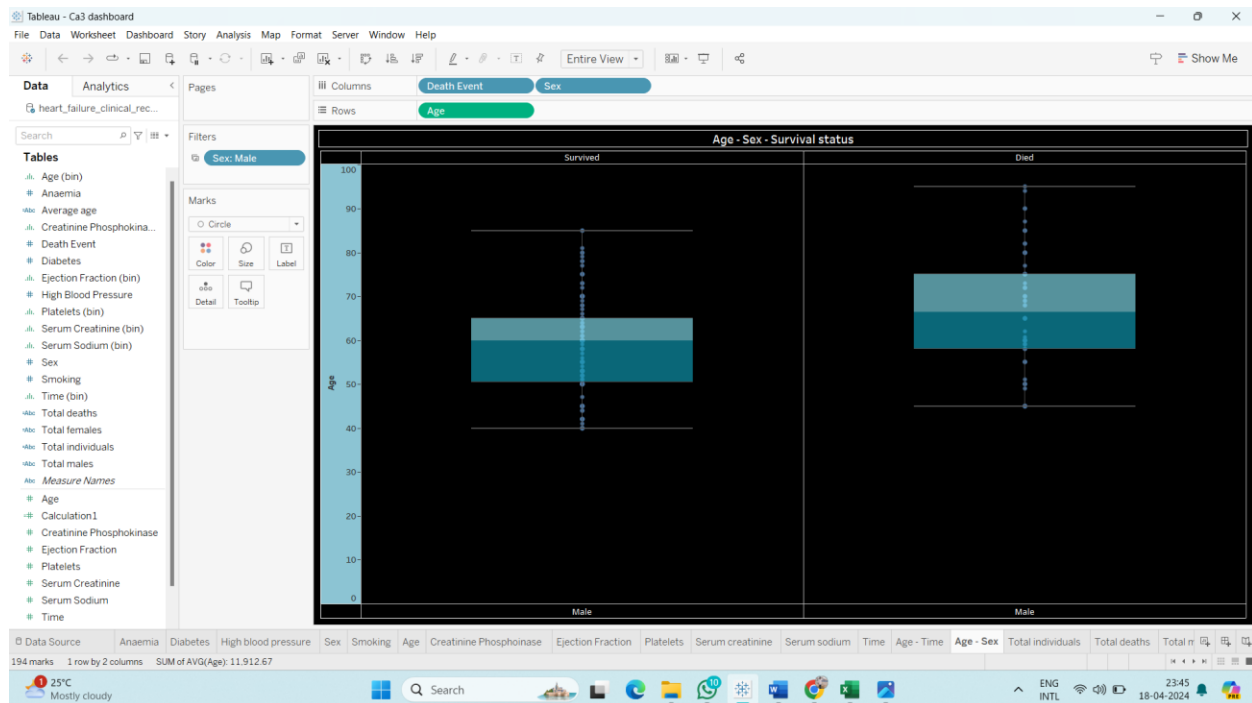
stakeholders can tailor their care strategies, resource allocation, and education efforts to meet the specific needs of diverse patient populations effectively.

Trends in Heart Failure Management Over Time (Area Charts): Area charts offer a comprehensive view of trends in heart failure management over time, illustrating changes in clinical indicators, treatment modalities, and patient outcomes. These visualizations enable stakeholders to identify patterns and changes in care delivery practices, facilitating informed decision-making regarding quality improvement initiatives, resource allocation, and care coordination efforts. By analyzing trends in heart failure management discretely, stakeholders can pinpoint factors driving improvements or disparities in patient outcomes and adjust strategies accordingly to optimize care delivery and patient outcomes.

Hospital Readmission Rates and Discharge Dispositions (Bar Graph): The bar graph depicting hospital readmission rates and discharge dispositions provides insights into care transitions and post-discharge management strategies for heart failure patients. Stakeholders can compare readmission rates among different regions or healthcare facilities, identifying opportunities for interventions to reduce readmissions and improve care continuity. By analyzing discharge dispositions, stakeholders can assess the effectiveness of post-discharge support services and identify areas for improvement in care coordination and patient education efforts.
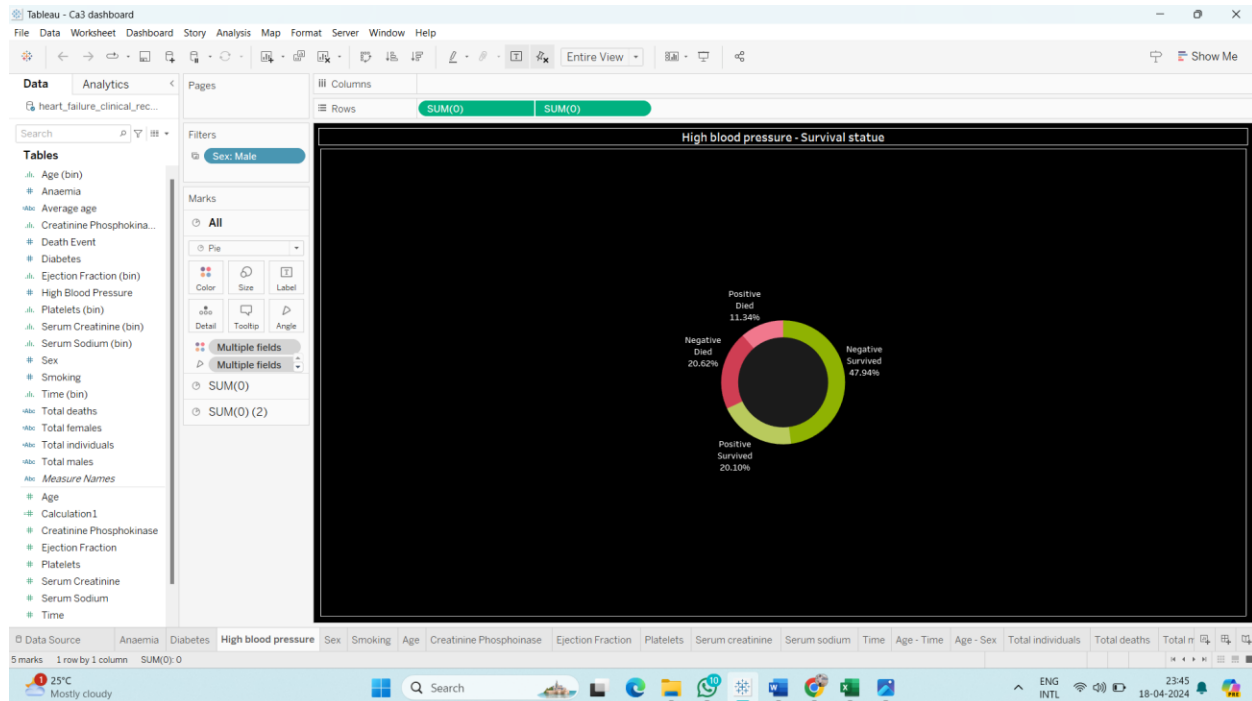
Medication Adherence and Follow-up Appointments (Packed Bubble Chart): The packed bubble chart visualizes medication adherence rates and follow-up appointment attendance among heart failure patients, providing insights into patient compliance and continuity of care. By analyzing adherence data and appointment attendance rates, stakeholders can identify barriers to medication adherence and follow-up care, such as access to medications, socioeconomic factors, or communication barriers. Moreover, the packed bubble format allows stakeholders to easily compare adherence rates and appointment attendance among different patient demographics or care settings, guiding targeted interventions and support services to improve patient outcomes and quality of care.

Dashboard Picture:

8. Future Scope

Looking ahead, there's a plethora of opportunities to expand and enhance the heart failure clinical record dashboard, leveraging Tableau's robust capabilities to deliver even greater insights and value. Firstly, incorporating predictive analytics could empower healthcare providers to forecast future trends in heart failure management based on historical patient data, clinical outcomes, and external factors such as population demographics and healthcare policies. By integrating machine learning algorithms, the dashboard could dynamically predict patient outcomes, identify high-risk individuals, and recommend personalized treatment strategies to improve patient care and reduce hospital readmissions

Moreover, expanding the geographical scope beyond a single healthcare system could provide a broader perspective on heart failure prevalence and outcomes at a regional or national level. By integrating data from multiple healthcare facilities, public health databases, and research studies, the dashboard could offer insights into regional variations in heart failure management practices, healthcare disparities, and opportunities for quality improvement initiatives.

Furthermore, incorporating real-time data feeds from electronic health records (EHRs) and remote patient monitoring devices could enable healthcare providers to monitor patient status and treatment adherence in real-time, facilitating proactive interventions and personalized care plans. By integrating Tableau with other healthcare analytics tools and platforms, such as population health management systems and telehealth platforms, the dashboard could offer a comprehensive view of the patient journey, from diagnosis to post-discharge follow-up, enabling healthcare providers to optimize care delivery and improve patient outcomes. Additionally, enhancing the interactivity and user experience of the dashboard could further engage healthcare providers and facilitate deeper exploration of patient data. By incorporating interactive features such as drill-down capabilities, filters, and dynamic visualizations, users could interactively analyze patient demographics, clinical indicators, and treatment outcomes, enabling them to identify trends, patterns, and areas for improvement more effectively. Moreover, incorporating storytelling features could enable healthcare providers to communicate key findings and best practices effectively, fostering collaboration and knowledge sharing across the healthcare organization.

In summary, the future scope for the heart failure clinical record dashboard is vast and promising, encompassing predictive analytics, regional insights, real-time monitoring, and enhanced interactivity. By leveraging Tableau's powerful capabilities and integrating diverse data sources, the dashboard can evolve into a strategic tool that empowers healthcare providers to deliver personalized, evidence-based care, improve patient outcomes, and advance the quality of heart failure management across the healthcare continuum.

THANK YOU