ABSTRACT

The project "Tracking Social Empowerment Schemes" aims to analyze and visualize financial data from various social empowerment schemes in India. By leveraging data from publicly available sources such as data.gov.in, this project focuses on tracking key financial metrics, such as revenue, capital expenditure, and budget allocations, across different schemes and financial years. The data provides insights into the effectiveness and distribution of funds for both urban and rural facilities, in addition to comparing actuals versus budget estimates and revised estimates.

Using a Dash-based web application, the project provides an interactive platform for stakeholders to explore and analyze the data in real-time. Users can filter the data by specific schemes and visualize the trends in budgets, revenues, and expenditures through bar charts, line graphs, scatter plots, and interactive data tables. This tool is designed to offer decision-makers a better understanding of financial allocations and help optimize the distribution of resources in social empowerment initiatives.

The primary goal of the project is to facilitate informed decision-making by providing clear, accessible insights into government spending on social schemes, with a particular focus on transparency and accountability in the management of funds.

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CHAPTER 1
INTRODUCTION

1. INTRODUCTION

Social empowerment schemes play a crucial role in promoting inclusive growth and ensuring that the benefits of development reach marginalized sections of society. In India, numerous government programs have been implemented with the aim of improving the welfare of various communities, particularly in rural and urban areas. However, one of the challenges in effectively managing and monitoring these schemes is the lack of real-time tracking and transparent financial reporting. Accurate tracking of financial allocations, expenditures, and outcomes is essential for ensuring that the resources are being utilized efficiently and effectively.

The project **"Tracking Social Empowerment Schemes"** addresses this challenge by analyzing and visualizing key financial data from these schemes. The data used in this project is sourced from publicly available government datasets, specifically from data.gov.in, which provides detailed records of financial allocations, expenditures, and other relevant metrics across multiple schemes. This includes revenue, capital expenditure, budget estimates, revised estimates, and actuals for different financial years.

Through the use of a Dash-based web application, this project aims to provide a user-friendly platform for stakeholders, including policymakers, researchers, and citizens, to access, analyze, and visualize the financial data of these schemes. The application allows users to explore different schemes, compare budgeted and actual expenditures, and track the performance of these schemes across different regions, facilitating more informed decision-making.

By leveraging interactive data visualizations such as bar charts, line graphs, and scatter plots, this project offers a comprehensive view of how funds are allocated, utilized, and managed. It aims to enhance transparency, accountability, and efficiency in the execution of social empowerment programs, ultimately contributing to better outcomes for the communities they serve.

1.1 PURPOSE

The "Tracking Social Empowerment Schemes" project aims to provide a transparent and interactive tool for monitoring and analyzing the financial performance of government social empowerment programs. By visualizing key financial metrics such as revenue, capital expenditure, and budget estimates, the project enhances transparency, making it easier for stakeholders—including policymakers, government agencies, and citizens—to understand how funds are allocated, spent, and managed across various schemes. This helps foster informed decision-making, highlighting discrepancies and trends between budgeted and actual expenditures.

The project also aims to optimize resource allocation by enabling users to identify inefficiencies and areas where funds could be better utilized. With its interactive dashboards and visualizations, the platform makes complex financial data more accessible and understandable. By promoting accountability and improving data accessibility, the project

ultimately seeks to improve the effectiveness of social empowerment schemes, ensuring resources are distributed efficiently and equitably to maximize social impact.

1.2 Intended Audience

The "Tracking Social Empowerment Schemes" project is designed for a diverse set of users involved in or impacted by government welfare programs. The primary audience includes government agencies, such as finance ministries and social welfare departments, who need to monitor the financial performance of schemes in real-time. This audience can use the system to ensure that funds are being allocated and spent efficiently across regions and schemes. Additionally, civil society organizations (CSOs) and non-governmental organizations (NGOs) focused on social welfare can benefit from tracking budget utilization and identifying gaps in resource distribution. The application is also targeted towards the general public, particularly those living in rural or underserved areas, to give them a better understanding of how social schemes are impacting their communities. Lastly, researchers and academics studying social welfare policy can use the system to gather data for analysis and publication.

1.3 SCOPE

The project aims to track and visualize the financial data related to the implementation of social empowerment schemes, primarily in India. It is designed to analyze a broad range of financial metrics, including revenue allocation, budget estimates, capital expenditure, and actual spending over multiple years. The system offers interactive visualizations, enabling users to explore trends in funding allocation across states and districts. By providing such insights, the project aims to highlight regional disparities and inefficiencies in the distribution of funds. The scope also includes providing detailed views of individual schemes, with a focus on their financial performance and usage. The project does not only offer high-level overviews but also allows for detailed comparisons between budget estimates and actual spending, further enhancing the accuracy of financial reporting in social welfare.

CHAPTER 2
LITERATURE SURVEY

2. LITERATURE SURVEY

Kumar, A., & Sahu, A. (2019) This paper reviewed the challenges in the financial tracking of government schemes, particularly in developing countries. It highlighted the lack of effective tools to monitor the performance and financial status of schemes and suggested that digital dashboards could fill this gap by offering real-time data on resource utilization and allocation.

Gupta, R., & Sharma, P. (2020) The study focused on the role of big data analytics in the public sector, especially for monitoring social welfare schemes. It discussed how big data tools could be leveraged to analyze financial performance, improve budget accuracy, and predict future funding needs, ultimately improving the efficiency of social empowerment initiatives.

Singh, M., & Rani, S. (2017) This research examined the financial tracking methods used in Indian government schemes. It concluded that there is a significant gap in monitoring and reporting financial expenditures and suggested that automated financial tracking systems with visualization capabilities could ensure better accuracy and accountability.

Kaur, J., & Raghavan, R. (2021) This study explored the benefits of geospatial data in monitoring social welfare programs. It highlighted the effectiveness of location-based data in identifying regional disparities in fund allocation, helping ensure that resources are directed to areas most in need.

Johnson, P., & Chen, L. (2018) This paper discussed the use of real-time financial dashboards in government programs. It concluded that dashboards significantly improve the ability to track and compare actual spending against budget estimates, which helps improve resource allocation and enhances decision-making processes.

Sharma, V., & Joshi, S. (2020) The study examined the use of financial reporting systems in the public sector and how they contribute to better management of funds in social empowerment schemes. It recommended the adoption of integrated systems for transparent reporting and performance evaluation of financial allocations.

Li, T., & Wang, X. (2019) This research investigated the role of machine learning algorithms in forecasting the financial needs of social welfare schemes. It highlighted how predictive analytics could help governments allocate resources more effectively and anticipate future funding requirements.

CHAPTER 3
ANALYSIS

3. ANALYSIS

3.1 EXISTING SYSTEM

Currently, the majority of systems available for monitoring government schemes rely heavily on static reports and require manual intervention for data updates. These systems tend to be complex and difficult for non-technical users to interpret, making it hard for citizens and even some policymakers to access and analyze data effectively. Furthermore, these systems may not integrate well with other sources of data, leading to fragmented information and a lack of a unified view of social scheme performance. While some governmental organizations do provide online dashboards, many of them lack the interactive elements necessary for comprehensive data exploration and decision-making.

3.1.1 Disadvantages of Existing System

The key disadvantages of the current systems are:

- **Limited Interactivity:** Users are unable to filter data, compare different schemes, or view trends over time in an engaging and dynamic way.

- **Siloed Data:** Data from different sources or regions is not always integrated, making it hard to get a comprehensive view of social scheme performance.

- **Lack of Real-Time Data Updates:** Many existing systems depend on periodic updates, leaving gaps in the information available to users.

- **Complexity for Non-Experts:** Existing tools may not be intuitive for the general public or non-technical users, limiting their effectiveness in providing transparency to a wider audience.

- **Manual Data Entry:** Much of the data in these systems is entered manually, increasing the potential for human error and inconsistencies.

3.2 Problem Statement

The main problem with existing systems is the lack of an integrated, user-friendly platform that provides real-time access to financial data related to social empowerment schemes. There is no comprehensive tool that allows for easy comparison across regions, schemes, and years, and current tools are either too complex or too static to serve as effective monitoring solutions. This issue impedes the ability of stakeholders especially policymakers and citizens to evaluate how resources are being allocated and spent. In the absence of such a platform, it becomes challenging to assess the efficiency and impact of government welfare programs, hindering the effectiveness of the schemes and potentially leading to financial mismanagement.

3.3 PROPOSED SYSTEM

The proposed system is an interactive web-based platform that allows users to track and analyze the financial performance of social empowerment schemes. The system integrates data from multiple sources, providing a consolidated view of the budgets, expenditures, and revenues across schemes. Users can filter the data by scheme, financial year, region, and other variables to explore the impact of social welfare programs. The platform features dynamic visualizations such as bar charts, line graphs, and scatter plots to help users understand complex data trends. By allowing users to interact with the data, the system enables stakeholders to identify inefficiencies, track the utilization of funds, and make informed decisions regarding resource allocation.

3.3.1 Advantages of Proposed System

The proposed system offers several advantages over existing solutions:

- **Real-Time Data Updates:** The system fetches and displays the most up-to-date financial information, ensuring that users have access to current data.

- **Interactive Visualizations:** By allowing users to interact with the data, the system makes it easier to explore complex relationships between different financial variables.

- **Data Integration:** Unlike existing systems, the proposed solution integrates data from multiple sources, creating a unified view of social empowerment scheme performance.

- **User-Friendly Interface:** The system is designed to be accessible to both technical and non-technical users, making it an ideal tool for a broad range of stakeholders.

- **Data-Driven Decision Making:** The ability to analyze trends and compare schemes allows decision-makers to allocate resources more effectively and ensure better governance.

3.4 COMPARISON WITH EXISTING SYSTEMS

Existing systems for tracking financial data in social empowerment schemes are often manual and static, with limited ability to analyze data interactively or in real time. This makes it difficult for users to gain deep insights into trends and disparities. In contrast, your proposed system provides real-time tracking, data integration, and interactive visualizations, offering better accessibility and actionable insights.

- Data Visualization: Often rely on basic tables, bar charts, and pie charts, which are difficult to interpret when dealing with large datasets. These systems may not allow users to drill down into specific metrics, leading to limited insights about trends over time or across different regions.

- Real-Time Data Tracking: Typically update data manually, which means there can be significant delays between when the data is collected and when it is reflected in the system. This lag reduces the timeliness of the information and can lead to decisions being made based on outdated data.

- Accuracy of Reporting: Accuracy is often compromised due to human errors in data entry, inconsistencies across multiple data sources, or lack of validation checks. These errors can lead to incorrect financial reporting, which undermines the reliability of the data used to track and manage social empowerment schemes.

3.5 TECHNOLOGICAL CONSIDERATIONS

To develop an effective system for tracking financial data in social empowerment schemes, key technologies include cloud storage (e.g., AWS) for data management, and Python with Pandas for data processing. Real-time updates can be facilitated through platforms like Apache Kafka, while visualization tools like Plotly allow for interactive data exploration.

For regional analysis, geospatial tools like Google Maps can be used. The user interface should be responsive, built with frameworks like React.js or Dash, and security features like role-based access control ensure data protection. Scalable cloud infrastructure and automation tools like Apache Airflow help manage data efficiently, while compliance with reporting standards ensures regulatory alignment.

3.6 POTENTIAL CHALLENGES

Potential challenges in developing a system for tracking financial data in social empowerment schemes include ensuring data accuracy across multiple sources, which may require robust validation processes. Managing large datasets and real-time updates demands scalable cloud infrastructure for efficient performance.

User adoption may be a hurdle, so creating an intuitive interface is crucial. Additionally, ensuring data security and regulatory compliance is essential due to the sensitive nature of financial information. Lastly, integrating geospatial and financial data for accurate analysis may present technical challenges, especially if reliable data sources are unavailable.

CHAPTER 4
SYSTEM ARCHITECTURE

4. SYSTEM ARCHITECTURE

The architecture of the "Tracking Social Empowerment Schemes" project adopts a robust client-server model that ensures efficient data management and user-friendly access. At its core, the system is divided into distinct layers to facilitate seamless integration and scalability:

- User Interface Layer: The front-end is designed to deliver an intuitive experience through interactive dashboards and visualizations, enabling users to explore and analyze data trends effortlessly.

- Data Processing Layer: This layer handles the cleaning, processing, and management of large datasets, ensuring the data is accurate, reliable, and ready for analysis.

- Database Layer: Acts as the backbone of the system, storing financial and geospatial data in a structured format for easy retrieval and query handling.

- Integration Layer: This component connects the system with external APIs and real-time data sources, allowing the architecture to stay dynamic and current.

- Cloud Infrastructure Layer: Designed for scalability and resilience, this layer supports high-volume data processing and ensures consistent performance with resource management and backup mechanisms.
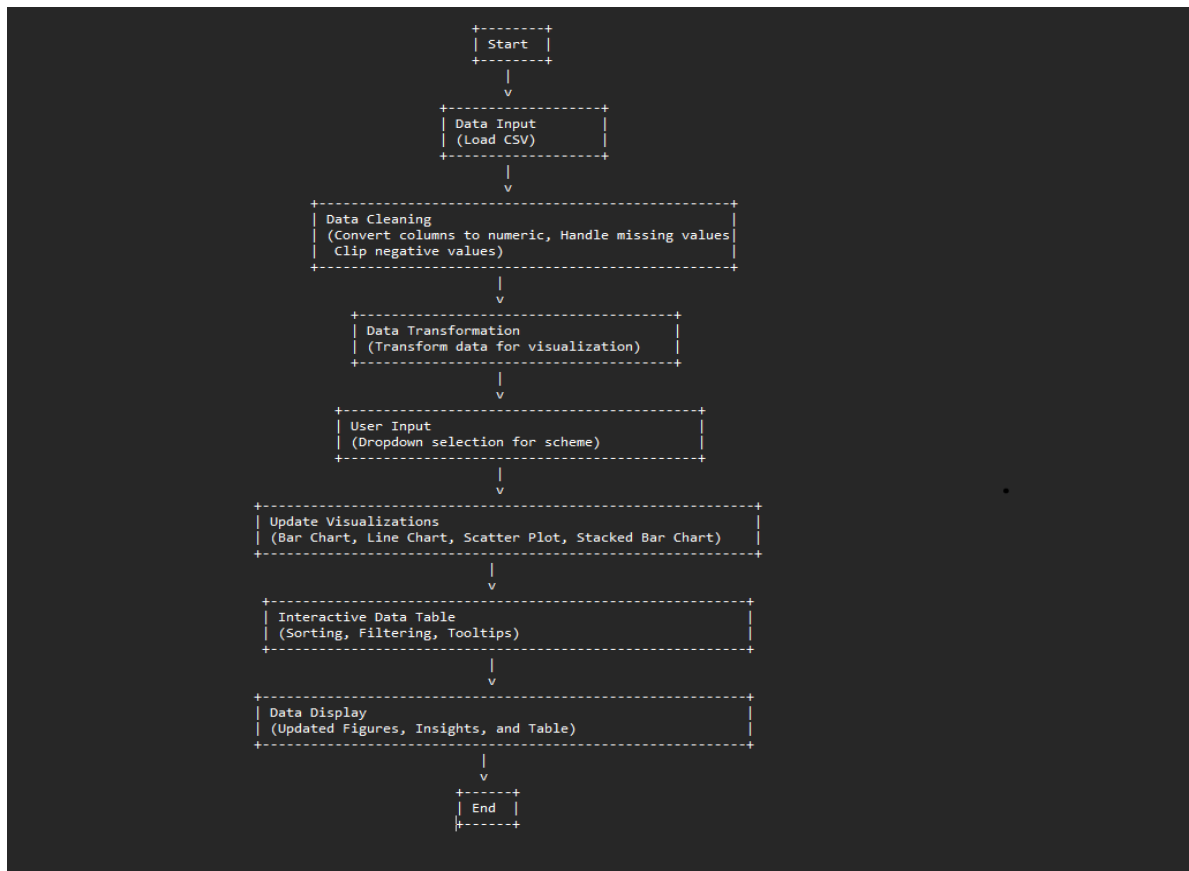

Fig 4. 1 system Architecture

4.1 SYSTEM CONFIGURATION

The project uses a web-based dashboard built with Dash, Plotly, and Pandas to display key metrics, trends, and insights regarding government funding for social empowerment schemes.

Frontend Layer (User Interface)

- Dash Framework: A Python framework for building interactive web applications.

- Plotly: For dynamic charting (e.g., bar charts, line charts, scatter plots).

- HTML/CSS: Basic web design and layout. Bootstrap (via dash_bootstrap_components) is used for responsive design.

Backend Layer (Server-Side)

- Python: Core programming language for data processing and logic handling.

- Pandas: Library for handling data manipulation and cleaning.

- Dash Callbacks: Used to make the app interactive, updating charts and tables dynamically based on user inputs.

4.1.1 Software Requirements

- Python 3.x: The primary programming language used to implement the system's functionality.

- Dash Framework: A Python web framework used to build interactive web applications, especially for visualizing data.

- Plotly: A visualization library for generating interactive plots and charts.

- Pandas: A Python library used for data manipulation and cleaning.

- SQL Database (Optional): A database may be used to store and manage large datasets, allowing for efficient querying and retrieval of data.

4.1.2 Hardware Requirements

- Processor: Intel Core i5 or equivalent (recommended for smooth operation).

- RAM: At least 8 GB of RAM (for handling large datasets and ensuring optimal performance).

- Storage: Minimum 2 GB of free space (to store the web application, dataset, and other files).

- Network: Stable internet connection for fetching real-time data and ensuring the web application is accessible to users.

CHAPTER 5
IMPLEMENTATION

5. IMPLEMENTATION

5.1 IMPLEMENTATION CODE

```python
# Import Libraries
import dash
from dash import dcc, html
from dash import dcc, html, dash_table as DataTable
import dash_bootstrap_components as dbc
import pandas as pd
import plotly.express as px
# Step 1: Load the dataset
df = pd.read_csv('Centerdata.csv')


# Step 2: Clean the data
numeric_columns = [
    "Revenue", "Actuals2019-2020 - Capital", "Actuals2019-2020 - Total",
    "Budget Estimates2020-2021 - Revenue", "Budget Estimates2020-2021 - Capital", "Budget
Estimates2020-2021 - Total",
     "Revised Estimates2020-2021 - Revenue", "Revised Estimates2020-2021 - Capital",
"Revised Estimates2020-2021 - Total",
    "Budget Estimates2021-2022 - Revenue", "Budget Estimates2021-2022 - Capital", "Budget
Estimates2021-2022 - Total"
]


# Convert numeric columns and handle errors
for col in numeric_columns:
    df[col] = pd.to_numeric(df[col], errors='coerce')


# Replace NA with 0 and clip negative values
df.fillna(0, inplace=True)
df[numeric_columns] = df[numeric_columns].clip(lower=0)
```

```python
# Step 3: Create a Dash app with a Bootstrap theme

app = dash.Dash(__name__, external_stylesheets=[dbc.themes.LUX])


# Helper function to create cards for key metrics

def create_card(title, value, color):

    return dbc.Card(

        dbc.CardBody([

            html.H5(title, className="card-title"),

            html.H2(f"{value:,.2f}", className="card-text", style={"color": color})

        ]),

        className="mb-4"

    )

# Step 4: Layout of the Dash App

app.layout = dbc.Container([

    # Title Section

    dbc.Row([

        dbc.Col(html.H1("Tracking Social Empowerment Schemes", className="text-center text-primary mb-4"), width=12)

    ]),


    # Overview Section with Metrics

    dbc.Row([

        dbc.Col(create_card("Total Revenue (2019-2020)", df["Revenue"].sum(), "green"), width=4),

        dbc.Col(create_card("Total Budget (2020-2021)", df["Budget Estimates2020-2021 - Total"].sum(), "blue"), width=4),

        dbc.Col(create_card("Total Budget (2021-2022)", df["Budget Estimates2021-2022 - Total"].sum(), "orange"), width=4),

    ]),


    # Dropdown for Scheme Selection
```

```python
dbc.Row([
    dbc.Col([
        html.Label("Select a Scheme:"),
        dcc.Dropdown(
            id="scheme-dropdown",
            options=[{"label": scheme, "value": scheme} for scheme in df["Scheme"].unique()],
            value=df["Scheme"].iloc[0],
            placeholder="Select a Scheme",
            clearable=True
        )
    ], width=6),
], className="mb-4"),

# Graph Section
dbc.Row([
    dbc.Col([
        dcc.Graph(
            id="revenue-bar-chart",
            config={"displayModeBar": True}
        )
    ], width=120),

]),

dbc.Row([
    dbc.Col([
        dcc.Graph(
            id="budget-trend-line-chart",
            config={"displayModeBar": True}
        )
```

```python
        ], width=12),
    ]),

    dbc.Row([
        dbc.Col([
            dcc.Graph(
                id="scatter-revenue-vs-capital",
                config={"displayModeBar": True}
            )
        ], width=6),
        dbc.Col([
            dcc.Graph(
                id="stacked-bar-actuals-vs-revised",
                config={"displayModeBar": True}
            )
        ], width=6),
    ]),

    # Data Table Section
    dbc.Row([
        dbc.Col([
            html.H4("Interactive Data Table", className="mt-4"),
            DataTable.DataTable(
                id="data-table",
                columns=[
                    {"name": col, "id": col, "type": "numeric" if df[col].dtype in ['float64', 'int64'] else "text"}
                    for col in df.columns
                ],
                data=df.to_dict("records"),
                page_size=10,
```

```python
        filter_action="native",
        sort_action="native",
        style_table={'overflowX': 'auto', 'margin-top': '20px'},
        style_cell={
            'textAlign': 'left',
            'padding': '5px',
            'backgroundColor': '#f8f9fa',
            'color': '#212529',
            'fontFamily': 'Arial, sans-serif',
        },
        style_header={
            'backgroundColor': '#343a40',
            'color': 'white',
            'fontWeight': 'bold',
            'textAlign': 'center',
        },
        style_data_conditional=[
            {
                'if': {
                    'filter_query': '{{{col}}} > 100000'.format(col="Revenue"),
                    'column_id': 'Revenue'
                },
                'backgroundColor': '#ffcccb',
                'color': '#8b0000',
                'fontWeight': 'bold',
            },
            {
                'if': {'row_index': 'odd'},
                'backgroundColor': '#f2f2f2',
            },
```

```python
            ],
            tooltip_data=[
                {
                    col: {'value': str(value), 'type': 'markdown'}
                    for col, value in row.items()
                } for row in df.to_dict('records')
            ],
            tooltip_duration=None,
        )
    ], width=12)
])
], fluid=True)


# Step 5: Callbacks for Graphs
@app.callback(
    dash.dependencies.Output("revenue-bar-chart", "figure"),
    [dash.dependencies.Input("scheme-dropdown", "value")]
)
def update_bar_chart(selected_scheme):
    filtered_df = df if not selected_scheme else df[df["Scheme"] == selected_scheme]
    fig = px.bar(
        filtered_df,
        x="Scheme",
        y=["Revenue", "Budget Estimates2020-2021 - Revenue", "Budget Estimates2021-2022 - Revenue"],
        title="Revenue vs Budget Estimates",
        labels={"value": "Amount (in Crores)", "Scheme": "Scheme"},
        barmode="group",
        color_discrete_sequence=["#FF6347", "#4682B4", "#FFD700"]
    )
    fig.update_layout(transition_duration=500)
```

```python
    return fig
@app.callback(
    dash.dependencies.Output("budget-trend-line-chart", "figure"),
    [dash.dependencies.Input("scheme-dropdown", "value")]
)
def update_line_chart(selected_scheme):
    filtered_df = df if not selected_scheme else df[df["Scheme"] == selected_scheme]
    fig = px.line(
        filtered_df,
        x="Scheme",
        y=["Actuals2019-2020 - Total", "Budget Estimates2020-2021 - Total", "Budget Estimates2021-2022 - Total"],
        title="Budget Trends Over Years",
        labels={"value": "Amount (in Crores)", "Scheme": "Scheme"},
        line_shape="linear",
        color_discrete_sequence=["#6A5ACD", "#FF1493", "#1E90FF"]
    )
    fig.update_layout(transition_duration=500)
    return fig


@app.callback(
    dash.dependencies.Output("scatter-revenue-vs-capital", "figure"),
    [dash.dependencies.Input("scheme-dropdown", "value")]
)
def update_scatter_chart(selected_scheme):
    filtered_df = df if not selected_scheme else df[df["Scheme"] == selected_scheme]
    fig = px.scatter(
        filtered_df,
        x="Revenue",
        y="Actuals2019-2020 - Capital",
        title="Revenue vs Capital Expenditure (2019-2020)",
```

```python
        color="Scheme",

        size="Actuals2019-2020 - Total",

        hover_name="Scheme",

        color_discrete_sequence=px.colors.qualitative.Plotly

    )

    return fig

@app.callback(

    dash.dependencies.Output("stacked-bar-actuals-vs-revised", "figure"),

    [dash.dependencies.Input("scheme-dropdown", "value")]

)

def update_stacked_bar_chart(selected_scheme):

    filtered_df = df if not selected_scheme else df[df["Scheme"] == selected_scheme]

    fig = px.bar(

        filtered_df,

        x="Scheme",

            y=["Actuals2019-2020 - Total", "Revised Estimates2020-2021 - Total", "Budget
Estimates2021-2022 - Total"],

        title="Actuals vs Revised Estimates vs Budgets",

        labels={"value": "Amount (in Crores)", "Scheme": "Scheme"},

        barmode="stack",

        color_discrete_sequence=px.colors.qualitative.Set2

    )

    return fig

# Step 6: Run the app

if __name__ == "__main__":

    app.run_server(debug=True,port=8052)
```

CHAPTER 6
RESULT

6. RESULT

The output of the project is an interactive web application that displays financial data related to social empowerment schemes. The application allows users to view key financial metrics like budget estimates, actuals, and revenue, and compare these across different years and regions. Users can explore the data through various visualizations, such as bar charts, line graphs, and scatter plots, to uncover insights and track trends in government spending on social welfare programs.

- Bar Charts: Display comparisons of actual revenues against budget estimates for different years, allowing users to track discrepancies and trends.

- Line Graphs: Present the budget trends over multiple years, showing how budget allocations evolved, including actuals, estimates, and revisions.

- Scatter Plots: Show the relationship between revenue and capital expenditure for a given year, helping identify correlations and outliers.
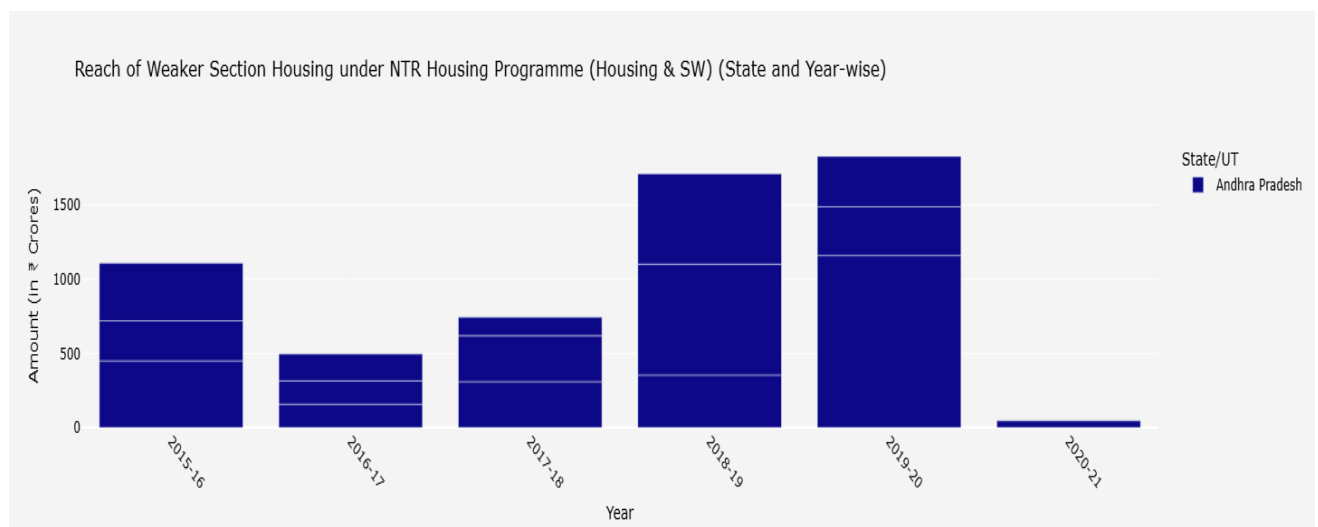

Fig 6.0 Bar chart of State

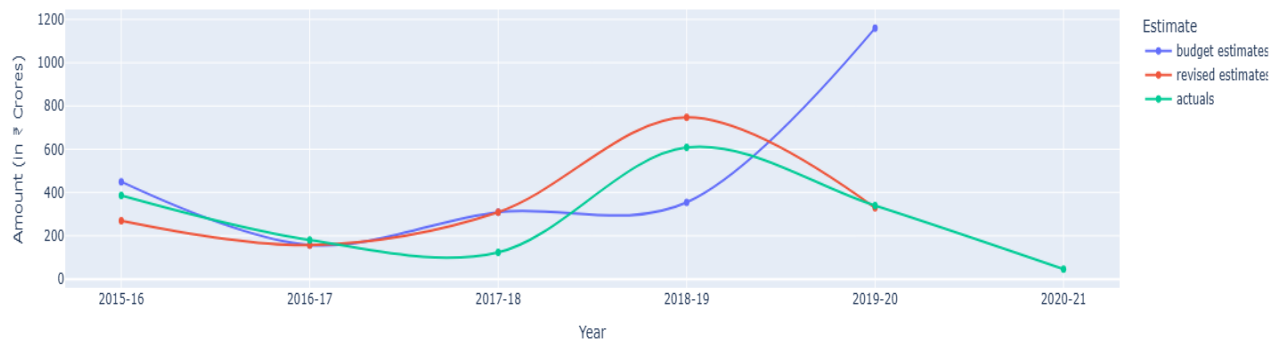Progress of Weaker Section Housing under NTR Housing Programme (Housing & SW) (Yearly)

Fig 6.1 Line graph budget estimations

Updates for Weaker Section Housing under NTR Housing Programme (Housing & SW) (Milestones)

Fig 6.2 Scatter plot in budget estimate

CHAPTER 7
CONCLUSION AND FUTURE WORK

7. CONCLUSION

The **Tracking Social Empowerment Schemes** project provides an interactive and user-friendly platform to visualize and analyze financial data related to social welfare programs. By integrating key financial metrics such as revenue, budget estimates, and actual expenditures, the system helps users track trends in government spending across different years and regions. Through dynamic visualizations, such as bar charts, line graphs, and scatter plots, users can gain actionable insights into the effectiveness and reach of social empowerment schemes. This tool aids in informed decision-making, ensuring greater transparency and accountability in public spending.

Future of Work:

Looking ahead, there are several opportunities to expand and improve the system:

- Enhanced Data Sources: Integrating real-time data and external sources like economic indicators or demographic information can enrich the analysis and provide more comprehensive insights.

- Predictive Analytics: Incorporating machine learning models could help forecast future trends in funding and spending, allowing policymakers to make more proactive decisions.

- Mobile Accessibility: Expanding the application to mobile platforms could increase accessibility and allow users to interact with the data on-the-go.

- Geospatial Analysis: Incorporating GIS (Geographic Information Systems) could provide geographic visualizations, helping to analyze regional disparities and target interventions more effectively.

- Collaboration and Sharing: Adding collaboration features like report generation, export options, and sharing capabilities can enhance the usability of the platform for different stakeholders, including government agencies, NGOs, and researchers.

CHAPTER 8
REFERENCES

8. REFERENCES

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