DOCUMENATION REPORT FOR R SHINY APPLICATION

Abstract

This report provides the explanation for the R shiny app created for the final project

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Contents

Introduction 2
Design 2
Sheet 1 3
Sheet 2 4
Sheet 3 5
Sheet 4 6
Sheet 5 7
Implementation 8
User guide: 10
Introduction Tab: 11
CHAPTER 1: War on Terror (Suicide and Drone sub-tab) 11
CHAPTER 1: War on Terror (Suicide by Target sub-tab) 12
Chapter 2: Casualties: (Overview) 12
Chapter 2: Casualties: (Suicide Bombings) 13
Chapter 2: Casualties: (Drone Strikes) 13
Chapter 3: Affect (Emigration by Type Skill) 14
Chapter 3: Affect (Emigration by Type Provinces) 14
Chapter 3: Affect (Emigration by Location) 15
Data: 15
Conclusion: 16

Introduction

Precise description of what message you wanted your narrative visualisation to convey and who the intended audience is

The September 11 attacks in New York City and Washington DC gave rise to the United States 'War on Terror'. This term was originally against Al Qaeda and the US-led mission in Afghanistan. However, due to the high impact of this mission in Afghanistan, many Taliban and Al Qaeda members alike started crossing into Pakistan's northern regions through the border. This caused high pressure by the US on Pakistan's government to intervene and retaliate. The United States from the year 2004 started its target on militant groups in the two northern regions of Pakistan, Khyber Pakhtunkhwa (KPK) and the Federally Administered Tribal Areas (FATA).

Pakistan has suffered in both micro as well as macro levels due to the impact of terrorism and drone strikes conducted. The terrorist attacks in Pakistan are mainly done through suicide attacks. Hence this visualisation focuses only on attacks done by terrorist groups by suicide bombing.

In this visualisation the focus has been kept on three main issues. Firstly, the locations of the suicide attacks and drone strikes, which are shown as total as well as by the target type of the suicide attacks. Secondly, the casualties occurred by these two attacks, which tries to convey the message that the main casualties by both attacks are the civilians of Pakistan. Thirdly, the impact of the lack of security on the Pakistani population which is shown by the number of people emigrating out of Pakistan.

The objective of this visualisation is to be able to provide insight on the impact of US's war on terror on Pakistan at a macro level and hope to convince the Military/Government Officials to act to control and limit this impact on Pakistan.

Since the main purpose of the visualization is to demand action, the audience of this is Pakistan's military and government. This visualisation will also be publicly available as to spread awareness and so that there is more pressure on the government/military to take action.

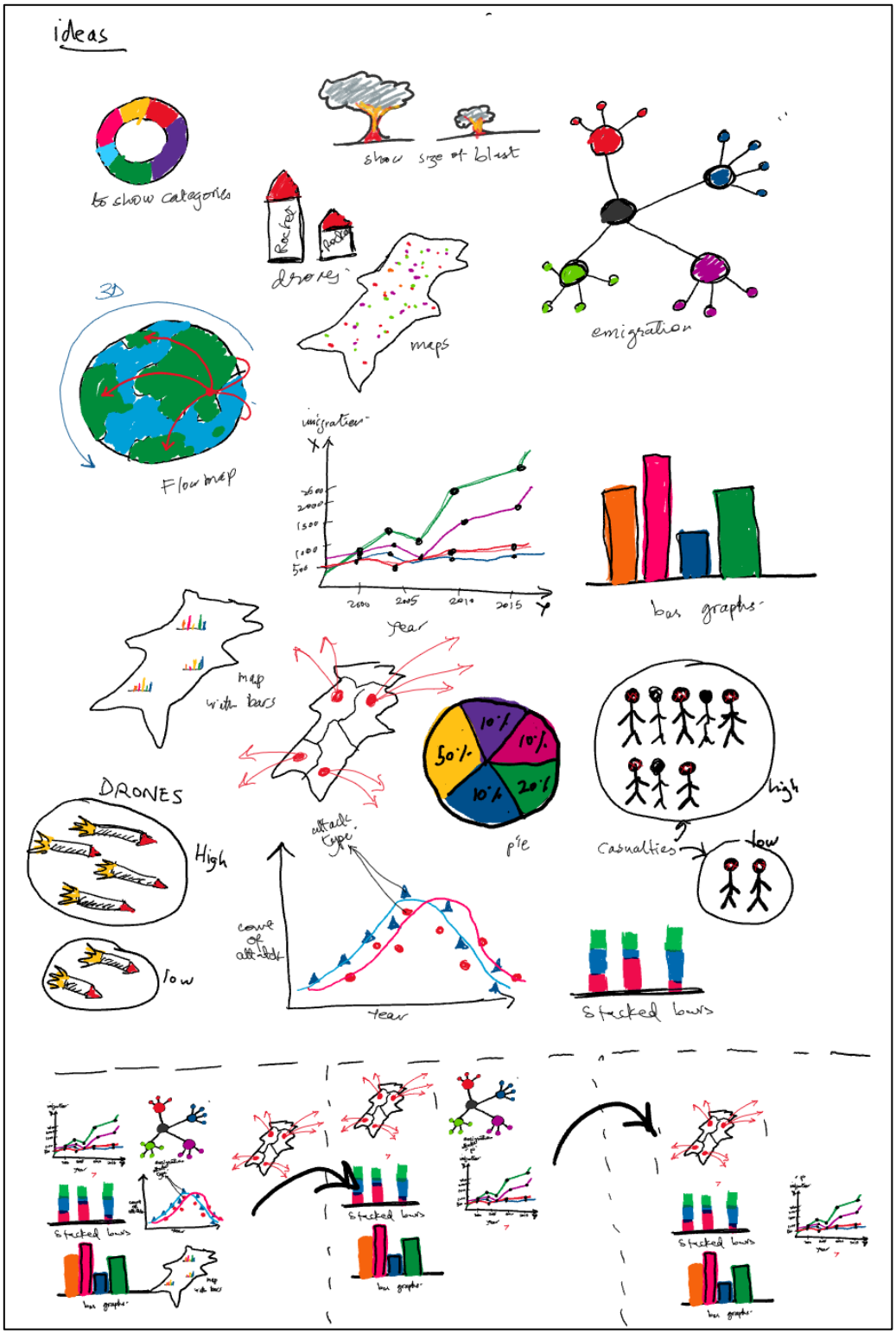
Design

Description of the visualization design process including the 5 design sheets detailing the alternatives you considered and the reasons for choosing your final design.

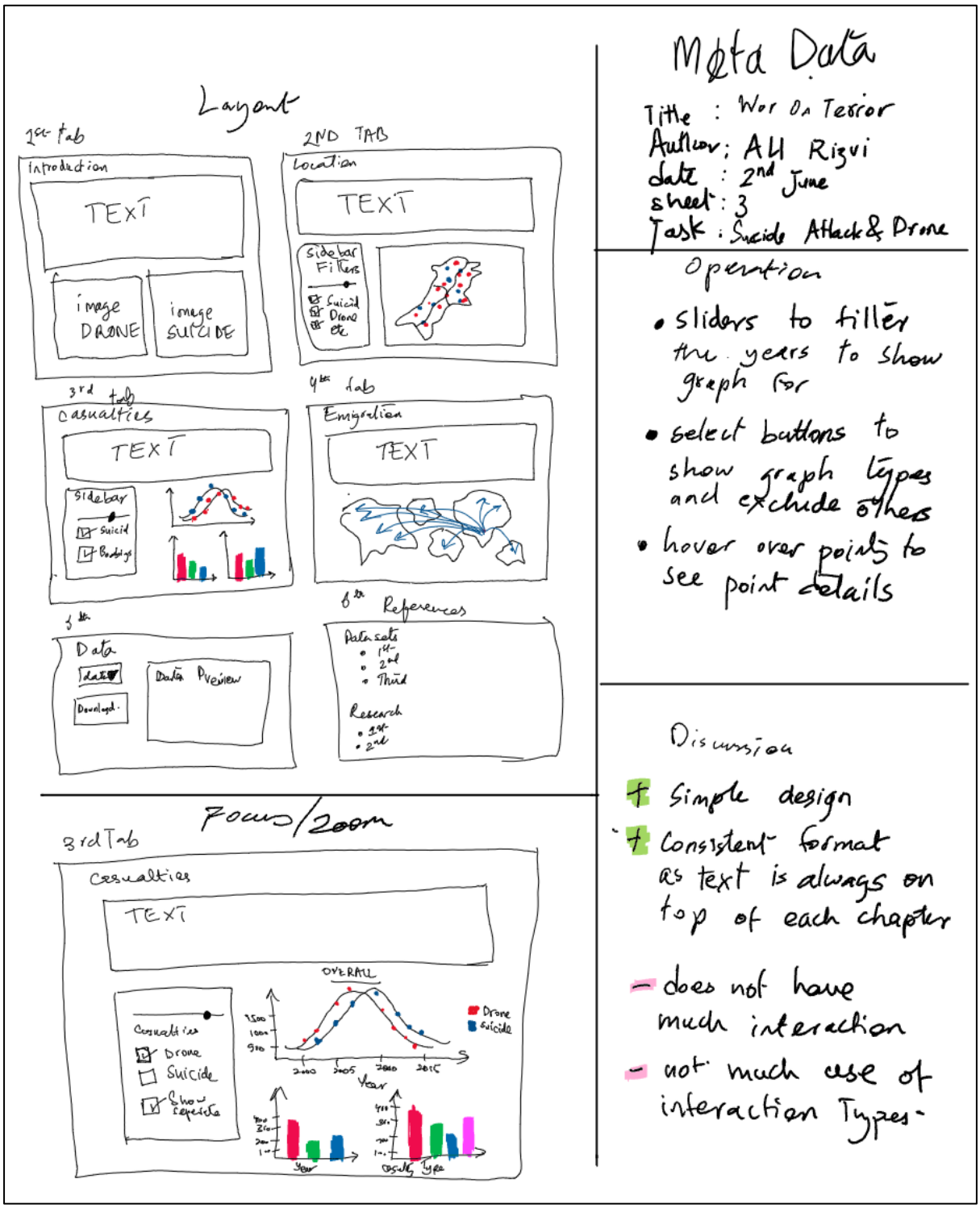
The implementation of the design of the visualisation is based on the 5 design sheet methodology which makes use of 5 sheets; the first containing the random flow of ideas for the visualisations; the second till fourth contain the different implementation alternatives; the fifth is the final design implementation selected from sheets two till four.

The 5 sheets for this method are provided below:

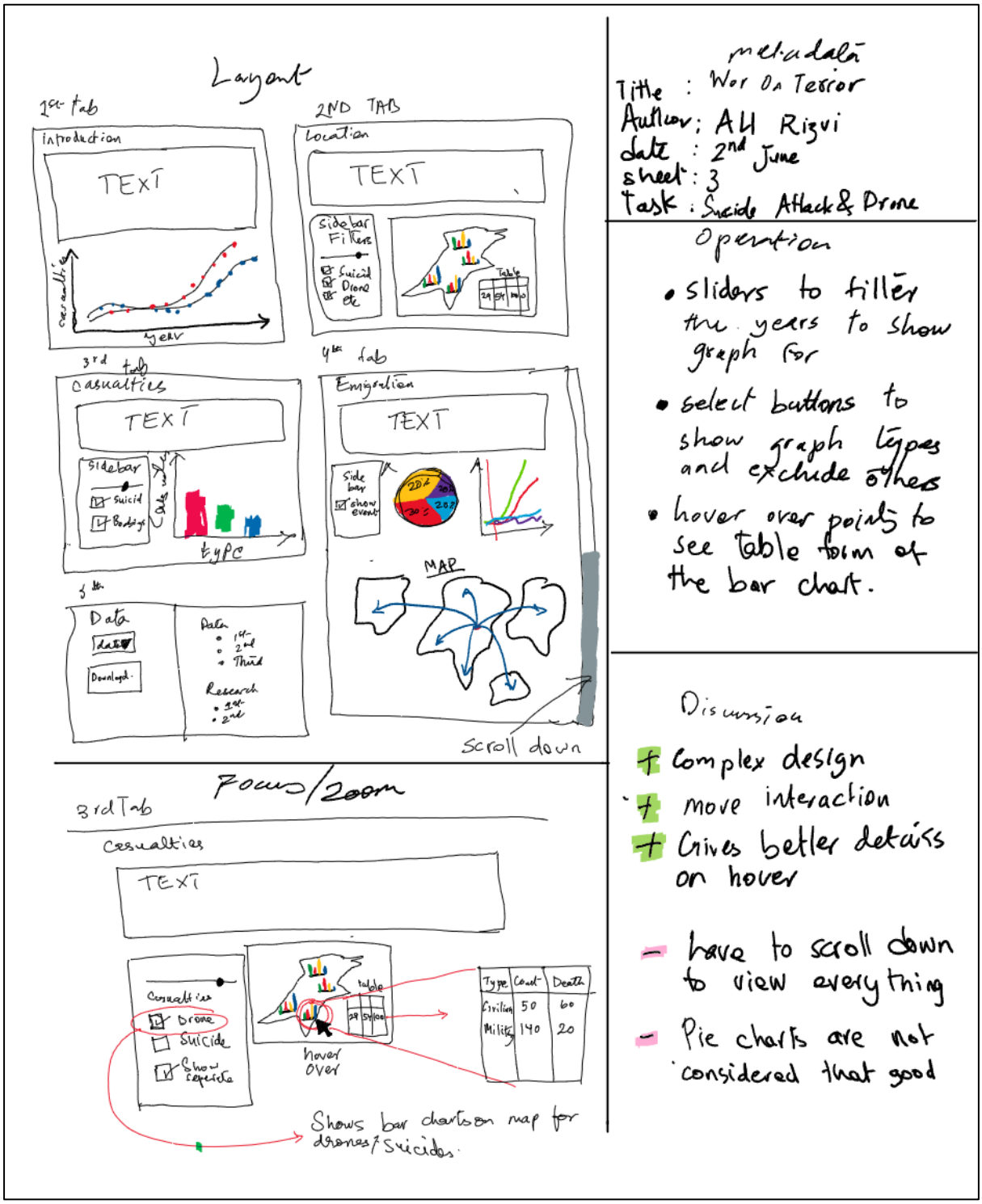
Sheet 1


ideas
to show categories
show size of blast
drones
maps
emigration
3D
Flow map
immigration
year
bar graphs
map with bars
pie
DRONES
High
low
casualties
high
low
stacked bars

Sheet 2


Layout
1st tab
Introduction
TEXT
image DRONE
image SUICIDE
2ND TAB
Location
TEXT
Sidebar Filters
Suicid
Drone
etc
3rd tab
Casualties
TEXT
Sidebar
Suicid
4th tab
Emigration
TEXT
5th
Data
Data Preview
6th References
Data sets
1st
2nd
Third
Research
2nd
2nd
Focus/Zoom
3rdTab
Casualties
TEXT
OVERALL
Casualties
Drone
Suicide
Show Legends
Drone
Suicide
Year
Year
Casualty Type
Meta Data
Title : War On Terror
Author: Ali Rizvi
date : 2nd June
sheet : 3
Task : Suicide Attack & Drone
Operation
• sliders to filter the years to show graph for
• select buttons to show graph types and exclude others
• hover over points to see point details
Discussion
+ Simple design
+ Consistent format as text is always on top of each chapter
- does not have much interaction
- not much use of interaction Types.

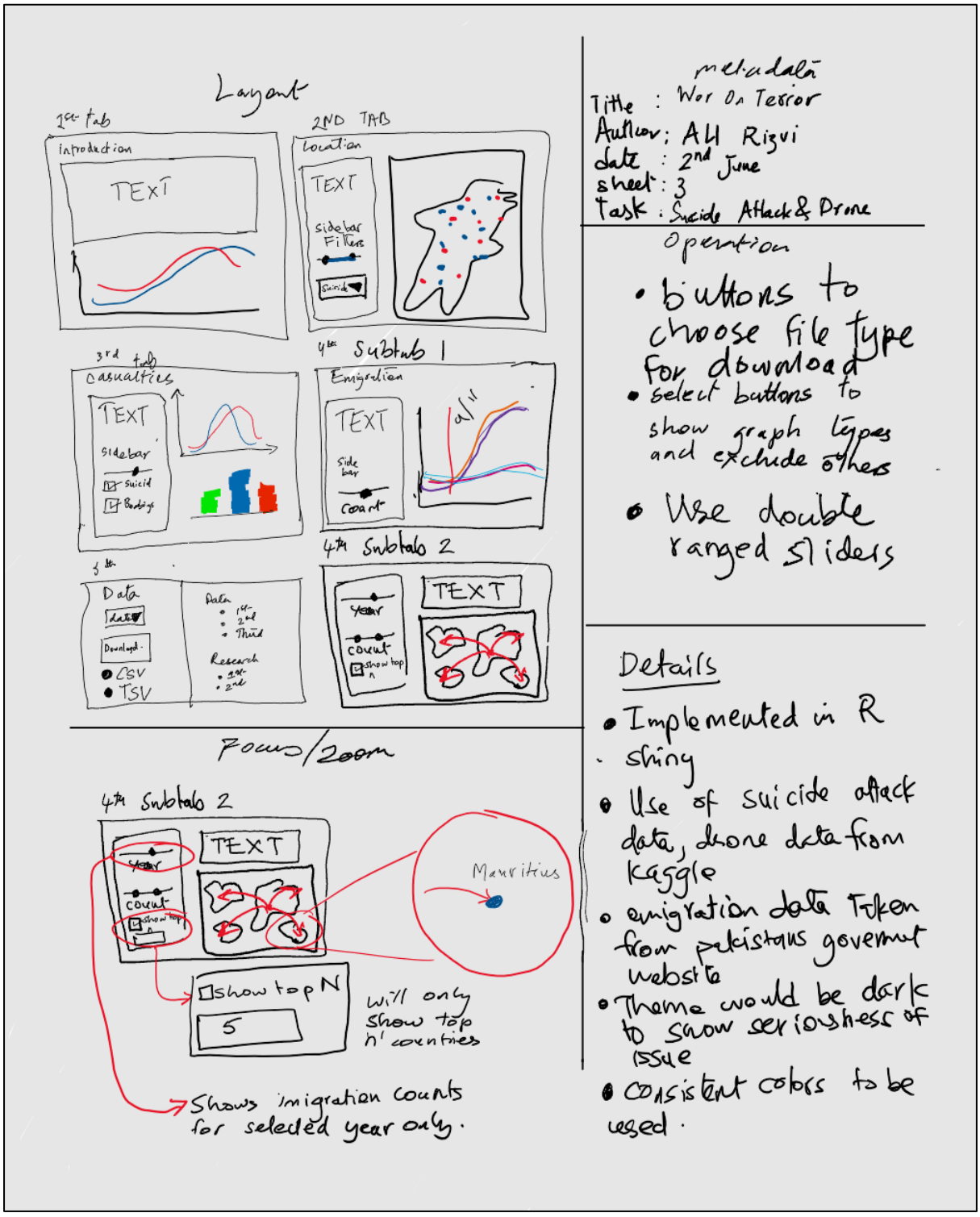
Sheet 3


Layout
1st tab
Introduction
TEXT
casualties
year
2ND TAB
Location
TEXT
Sidebar Filters
Suicid
Drone
etc
Table
3rd tab
casualties
TEXT
Sidebar
Suicid
Bombing
Data
type
4th tab
Emigration
TEXT
Side bar
show event
MAP
5th
Data
Download
Data
1st
2nd
Third
Research
1st
2nd
Scroll down
Focus/Zoom
3rdTab
Casualties
TEXT
Casualties
Drone
Suicide
Show legends
table
hover over
Type
Count
Death
Civilian
50
60
Milit
140
20
Shows bar charts on map for drones/suicides.
metadata
Title : War On Terror
Author: Ali Rizvi
date : 2nd June
sheet : 3
Task : Suicide Attack & Drone
Operation
• sliders to filter the years to show graph for
• select buttons to show graph types and exclude others
• hover over points to see table form of the bar chart.
Discussion
+ Complex design
+ more interaction
+ Gives better details on hover
- have to scroll down to view everything
- Pie charts are not considered that good

Sheet 4

Layout
1st tab
Introduction
TEXT
video to explain
2ND TAB
Location
TEXT
sidebar
Filters
3rd tab
Casualties
TEXT
sidebar
suicid
4th Subtab 1
Emigration
TEXT
Side bar
count
4th Subtab 2
TEXT
year
count
Data
data
Download
CSV
TSV
Focus/Zoom
4th Subtab 1
Emigration
TEXT
Side bar
count
DUBAI
US
UK
slider to filter nodes
On hover label subnodes
metadata
Title : War On Terror
Author: Ali Rizvi
date : 2nd June
sheet : 3
Task : Suicide Attack & Drone
Operation
• buttons to choose file type for download
• select buttons to show graph types and exclude others
• Use double ranged sliders
Discussion
+ complex design
+ Use of subtabs
+ Video to explain project
- some visualisations are very complex

Sheet 5



In sheet 5, the final design, many different approaches of implementation were chosen from different sheets between 2 and 4. In the final design some specific approaches taken were:

- Darker theme: To stress on the seriousness of the issue.
- Tabs and sub tabs: These are included to provide a better understanding of the story. This is also done so that the user does not have to scroll down when one a tab.

- Some of the graphs were excluded as they would be difficult to create in R shiny, such as the connect nodes shown in sheet 4.

Implementation

Description of the implementation including libraries used and reasons for the implementation decisions for your narrative visualisation.

For the visualization to be able to efficiently convey the message across, a chapter wise story line was created. Hence, the slide/presentation genre out of the seven for this visualisation was implemented. It includes the following tabs and subtabs:

- **Introduction**: This provides an overview of what the backstory is and why the visualisation was created in the first place.
    - Interactions:
        - Hover over points to be able to view the attack type, cumulative deaths, cumulative counts of attacks for that type, with the month and year of the information.
        - Toggle between graphs to view them in isolation.
- **Chapter 1: War on Terror**: This tab shows the locations of the different suicide and drone strike attacks. The purpose of this tab is to show the audience that the suicide attacks mainly occur in the norther regions of Pakistan, i.e. the regions where the drone strikes are occurring. This is to show that the suicide attacks are mainly a retaliation against the drone strikes. To provide this evidence efficiently, his tab includes two sub-tabs, which are listed below:
    - **Suicide and Drone**: This shows a map showing coloured circle markers for each drone/suicide bombing attack.
        - Interactions:
            - Hover over markers to show total casualties
            - Uncheck markers by type (suicide attack or Drone strike) to be able to view them in isolation.
            - Slider filter to be able to control the markers shown according to the desired casualty counts.
    - **Suicide by Type**: The map in this tab shows the coloured circled markers for each suicide bombing attack coloured by the target type of the attack.
        - Interactions:
            - Hover over markers to show total casualties
            - Uncheck markers by the suicide attacks intended target type to be able to view them in isolation.
            - Slider filter to be able to control the markers shown according to the desired casualty counts.
- **Chapter 2: Casualties**: Next, the visualisation tries to convey to the user that the main casualties for both the drone strikes and the Suicide bombing attacks are civilians. To convey this message this tab includes three sub-tabs.
    - **Overview**: This tab shows the timeline of the suicide attacks as well as the drone strikes by year and the count of attacks. The purpose of this tab is to show that the

start of the drone strikes triggered the immense rise in the suicide attacks being conducted by the terrorists.
        - Interactions:
            - Brush over multiple points to be able to view the summary of the points in terms of the total casualties, total count of attacks by the type of attack.
            - Button to view the US related political events during that period.
    - **Suicide Bombings:** This tab shows the suicide bombing attacks in isolation from the drone strikes. The purpose of this is to be able to view the casualties by type and prove that in almost all the cases the count of casualties of civilians is highest compared to others.
        - Interactions:
            - Brush over multiple points to be able to view the summary of the points given by two bar charts. One shows the total casualties of those points by type. The other shows the count of those casualties by year.
            - There also a table provided at the bottom that gives the details of those points in the dataset.
    - **Drone strikes:** Like the suicide bombing tab, this tab shows the drone attacks in isolation from the suicide bombings. The purpose of this is to be able to view the casualties by type and prove that in almost all the cases the count of casualties of civilians is highest compared to others.
        - Interactions:
            - Brush over multiple points to be able to view the summary of the points given by two bar charts. One shows the total casualties of those points by type. The other shows the count of those casualties by year.
            - There also a table provided at the bottom that gives the details of those points in the dataset.
- **Chapter 3: Affect:** This tab focuses on the impact of the above on the security of people of Pakistan. To be able to show how the people perceive the security condition of Pakistan, the emigration of the people of Pakistan, outside the country is taken as a proxy. What it tries to show is that after 9/11 there was a sudden increase in the emigration counts, mainly from provinces closest to the northern regions of Pakistan, i.e. where there are the highest counts of the suicide and drone attacks. The main This tab includes two subtabs:
    - **Emigration by Type:** This tab shows the emigration counts by the skill type and the provinces as well as the total count of emigrations by skill type/provinces.
        - Interactions:
            - Switch view between viewing the emigrations by skill type or by provinces.
            - Check boxes to be able to include/exclude the provinces/skill types to plot.
    - **Emigration by Location:** This tab shows on a map, where the people of Pakistan are emigrating to.
        - Interactions:
            - Toggle between showing the top n countries, countries with emigration counts higher than 500 and emigration counts lower than 500.
- **Data:** This tab is for the users to be able to download the data from the app.

        - Interactions:
            - Select which file to download
            - Select the file type
            - The name of the file when it gets downloaded
            - Download button
- **References:** The references for the data as well as the part of the inspiration is mentioned here.

The visualisation was created using R shiny. The libraries used and their purpose for this implementation are mentioned below:

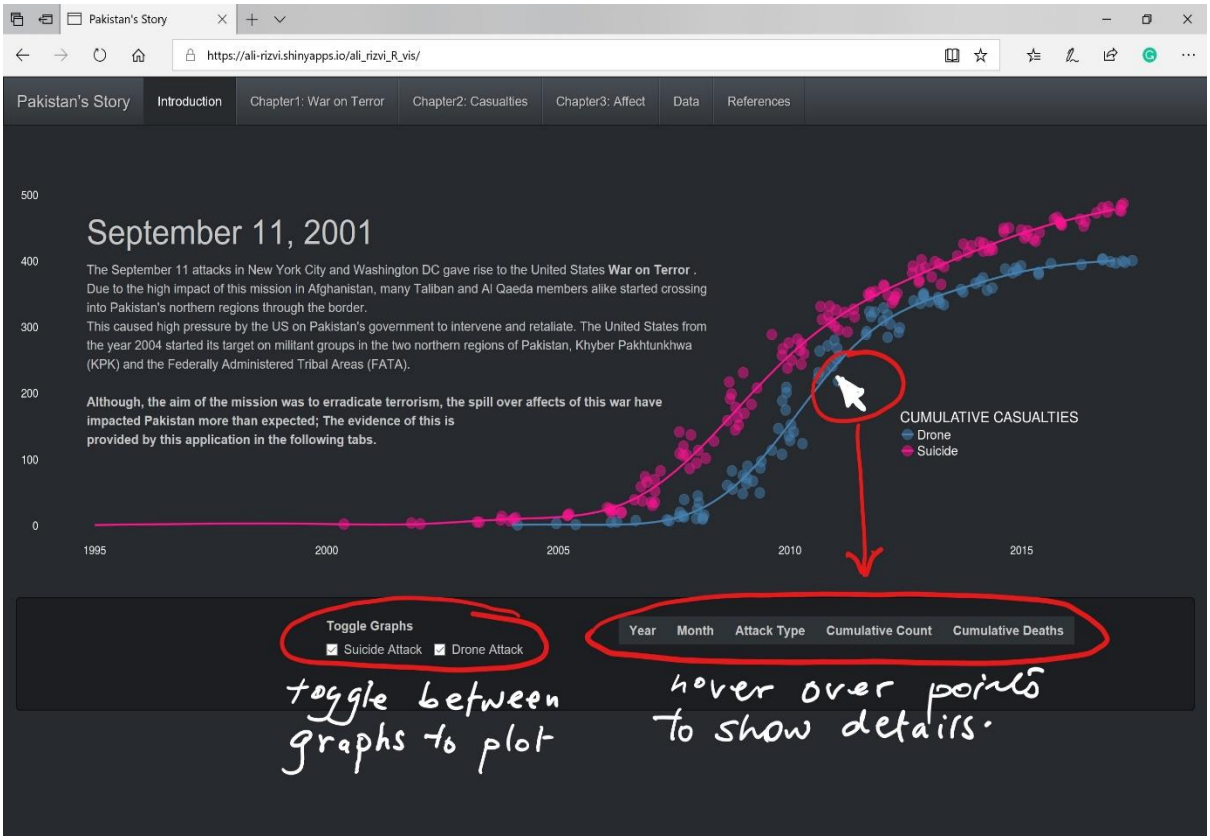
Library	Purpose
shiny	Used to create shiny interactive application in R.
ggplot2	Used to plot most of the graphs, such as those for casualties and the graph include in the introduction.
leaflet	Used to plot the map for suicide and drone locations in Chapter 1.
geosphere	Used to create the flow map for emigrations
mapproj	Used to create the flow map for emigrations
Ggmap	Used to create the flow map for emigrations
dplyr	Used to do data manipulation easily within R such as using pipes.
tidyr	Used to gather datasets for creating data frames that could be used in multiple graphs
stringr	Used to apply regexes on string data and replace values and filtering data frames
mgcv	Used to plot gam smoother to plots for casualties
DT	Used to create Data Tables
tidyverse	Used to create tibbles for data frames
shinythemes	Used to change the theme of the shiny app from default to dark

User guide:

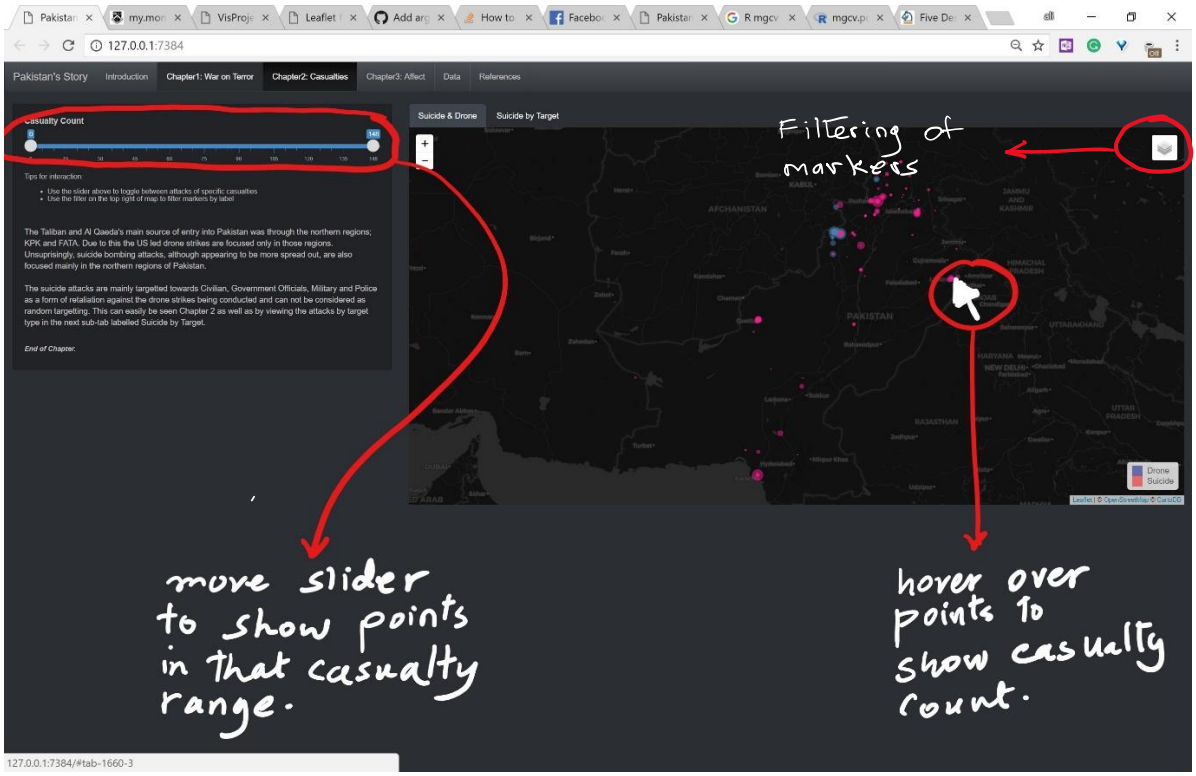
Instructions for viewing and exploring the narrative visualisation using a standard web browser and images showing how the visualization works.

This section provides information regarding the navigation of the application and the use of the interactive features that it offers. Screen shots of the application are provided with annotations of what the interactive visualisation would do.

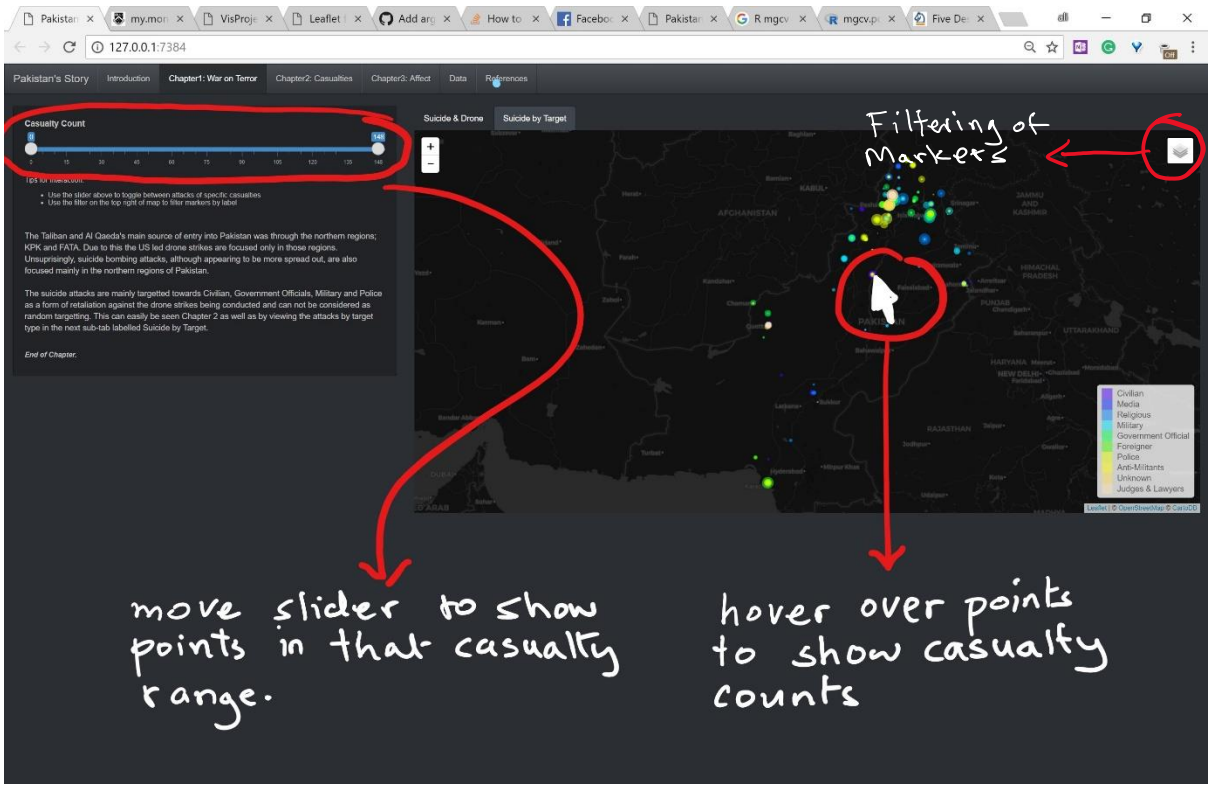
Introduction Tab:



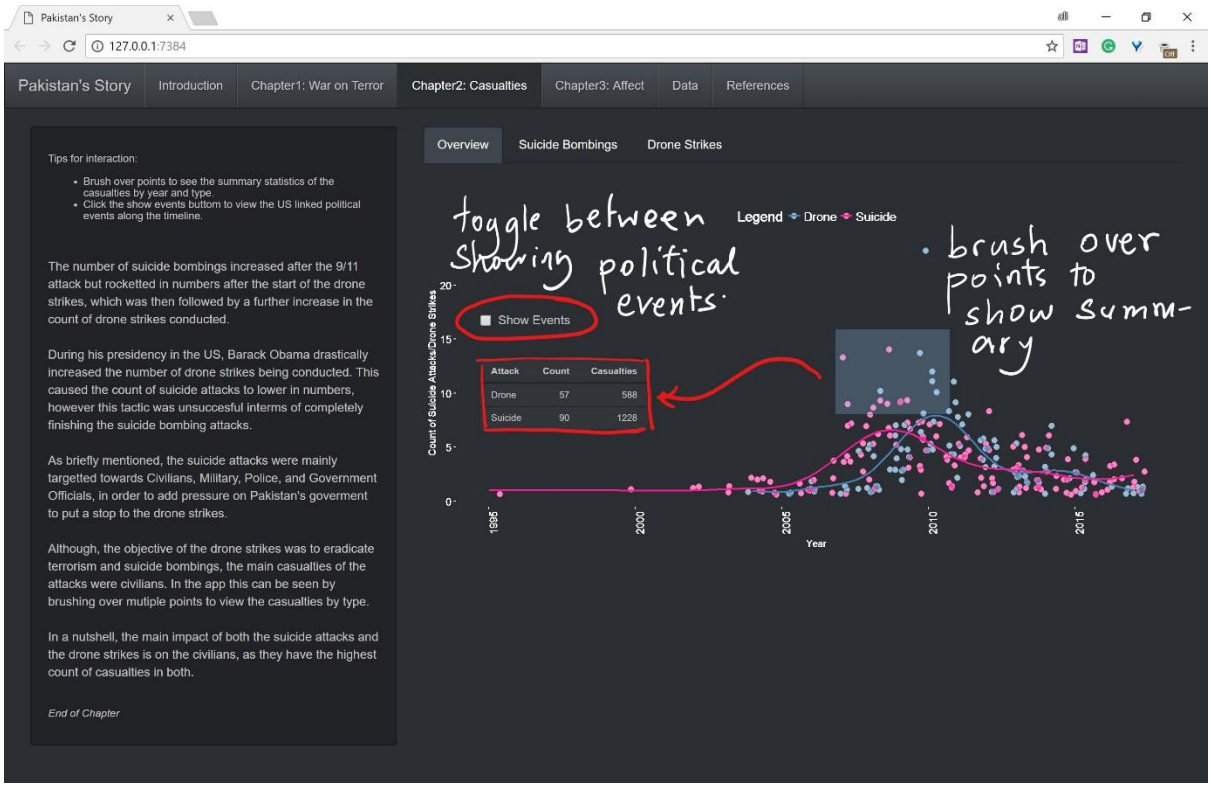
CHAPTER 1: War on Terror (Suicide and Drone sub-tab)



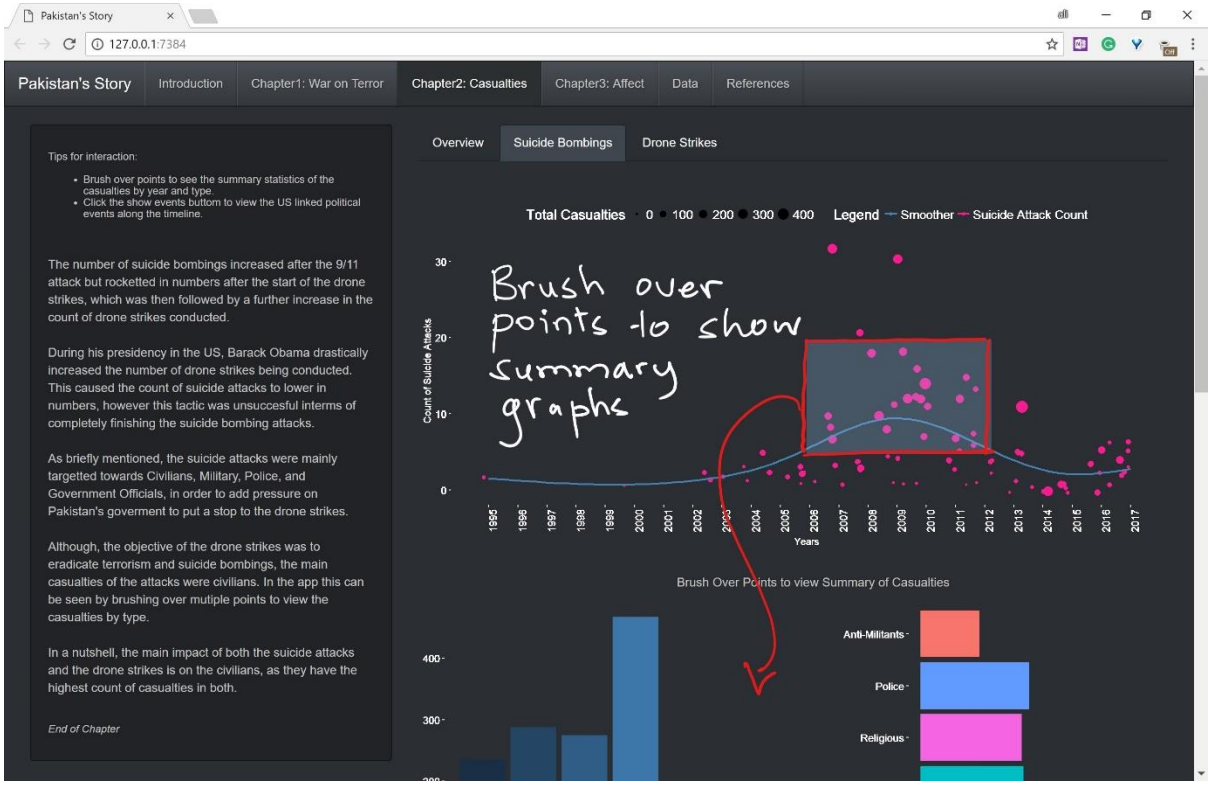
CHAPTER 1: War on Terror (Suicide by Target sub-tab)



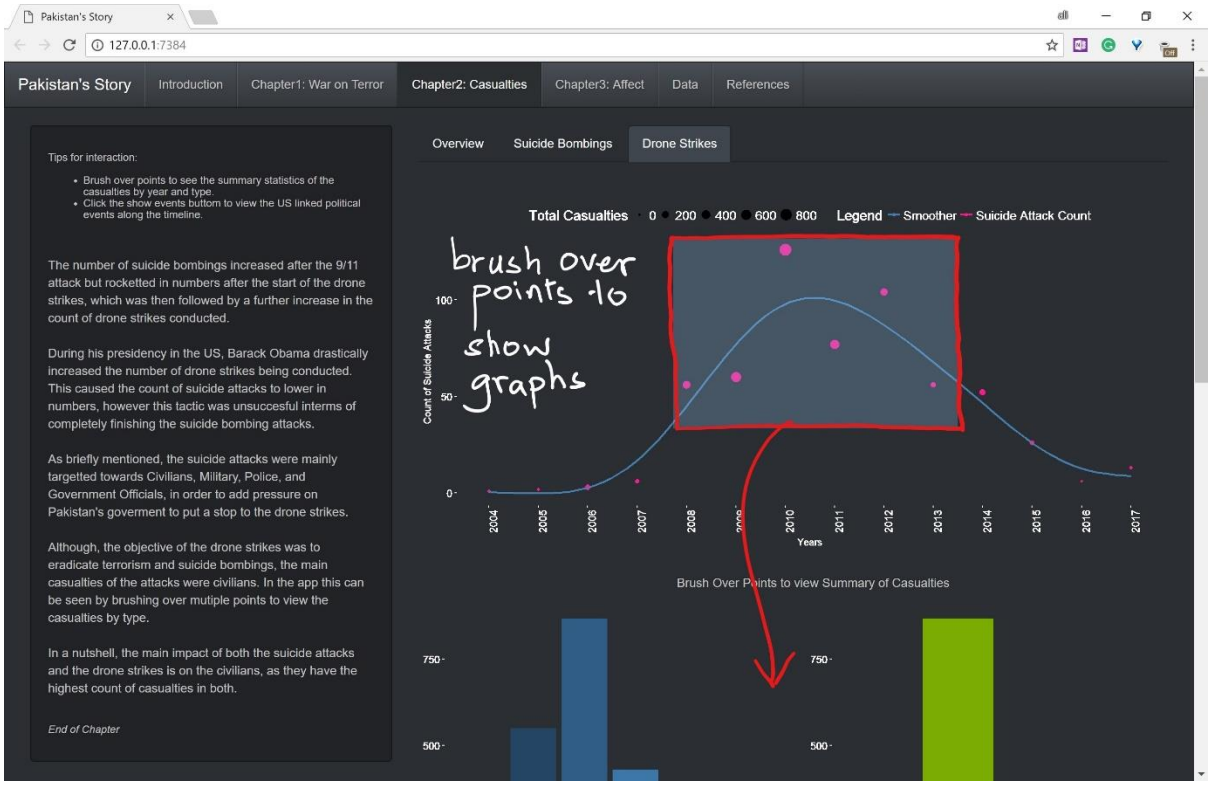
Chapter 2: Casualties: (Overview)



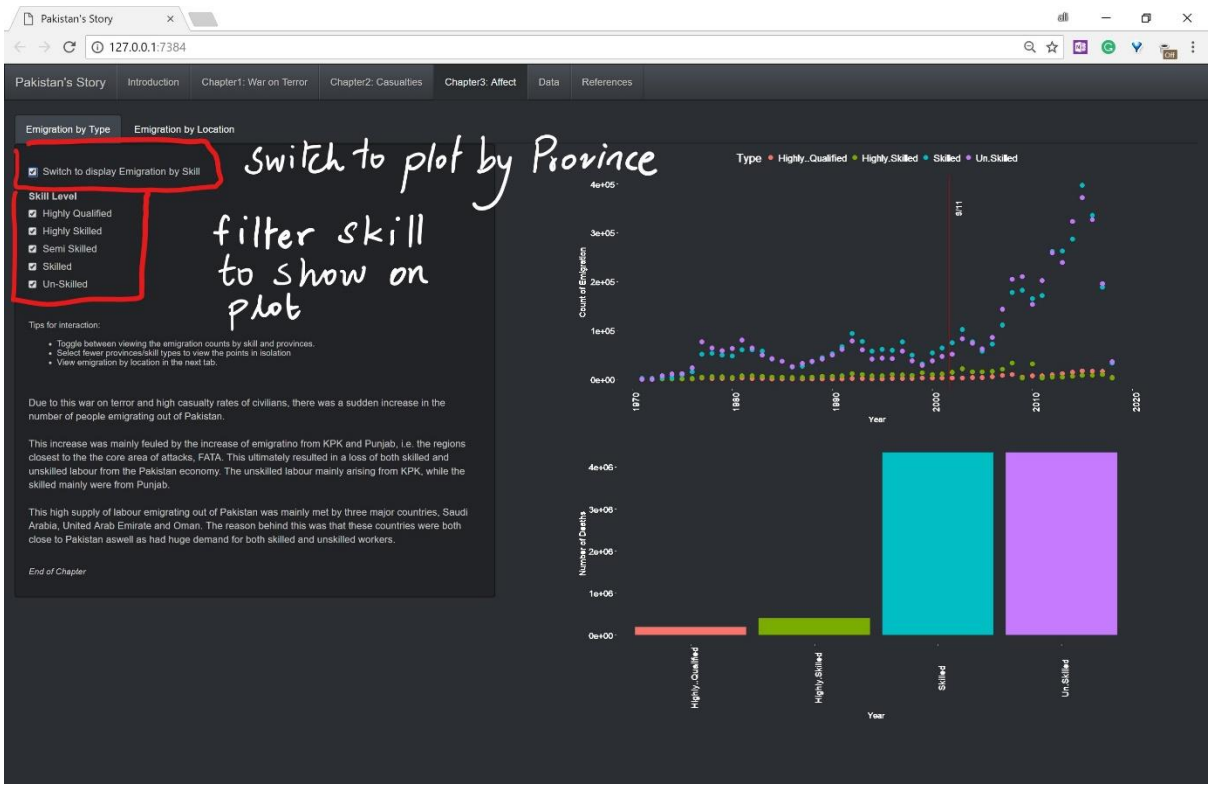
Chapter 2: Casualties: (Suicide Bombings)



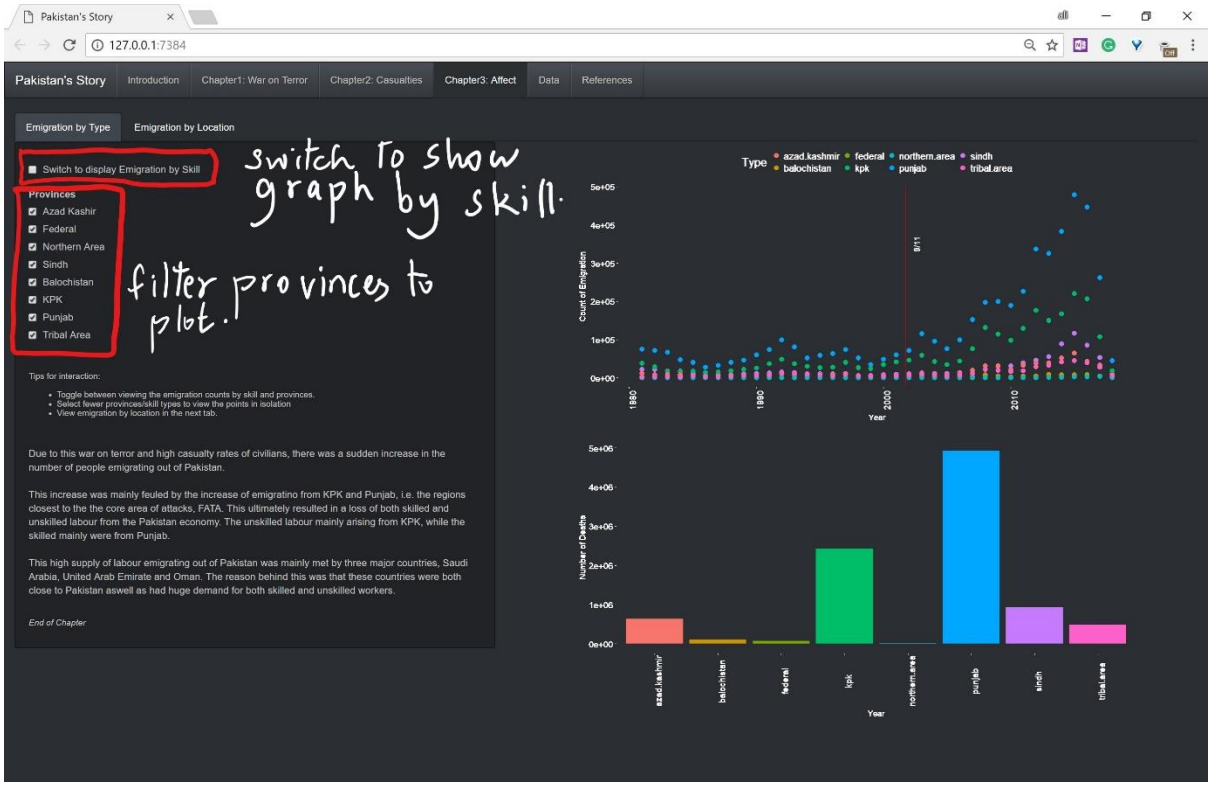
Chapter 2: Casualties: (Drone Strikes)



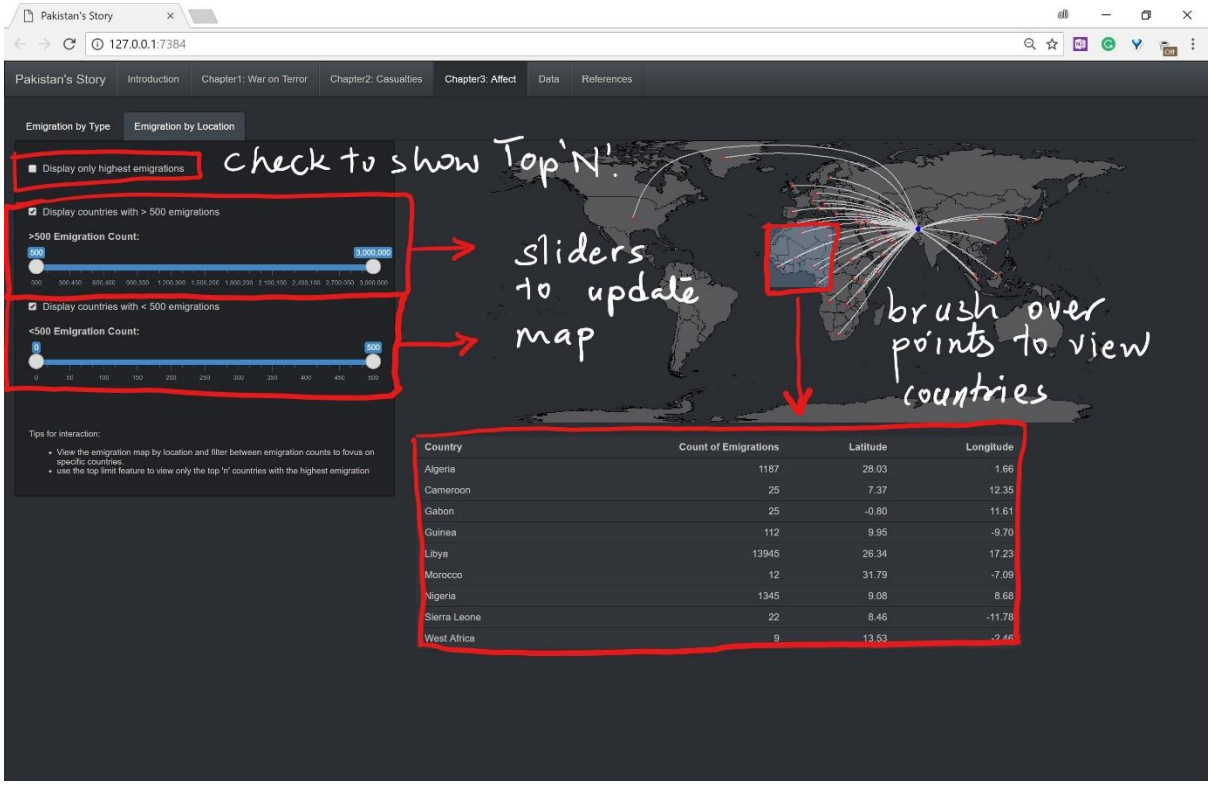
Chapter 3: Affect (Emigration by Type Skill)



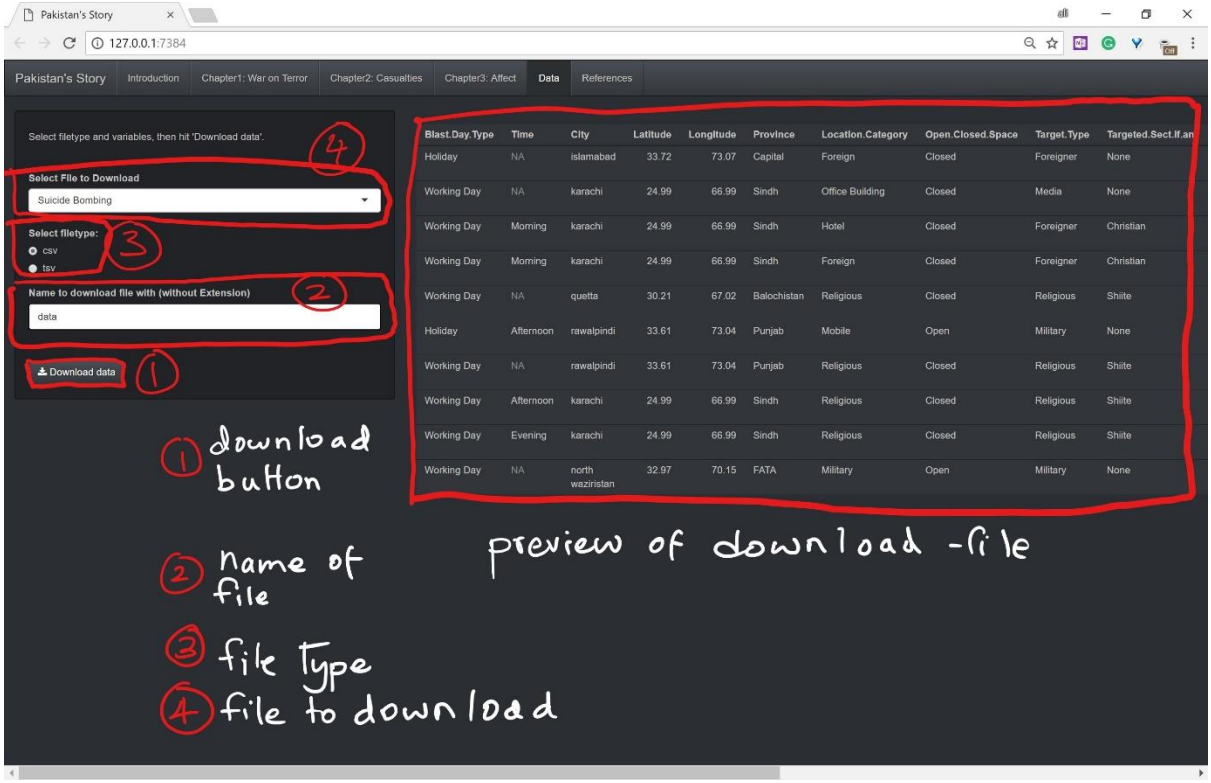
Chapter 3: Affect (Emigration by Type Provinces)



Chapter 3: Affect (Emigration by Location)



Data:



Conclusion:

Summarise what you achieved and a reflection on what you learnt in this project and what in hindsight you might have done differently to improve the result.

The app tries to convey to the audience that there is a huge hidden impact of drone strikes on the people of Pakistan. The most casualties in both the suicide bombing attacks and drone strikes are civilians. The fact that even drone strikes the most casualties are of civilians is a major issue, as the main objective of these is to target terrorists. Because of this the citizens of Pakistan are opting to emigrate out of the country and settle in foreign countries in seek of security. Hence the purpose of this app is to spread awareness and bring this issue to light so that corrective action could be taken.

To efficiently convey the message of the app, the application is kept very concise and to the point. This is so that the focus of the reader/viewer is only on the point that is being conveyed. If there were a lot more visualisations the main message of the application would have been lost or diluted among other things.

The code includes high use of interaction for providing the user with high amount of flexibility to be able to view the visualisations in what ever way they please. The data set used for this visualisation was not suitable for connecting multiple visualisations from the same dataset hence for almost all visualisations, new reactive data frames had to be created. Also since a new theme was used each visualisation had to created with a transparent background and the colours used for the points as well as the texts needed to be updated for each to create the visualisation more appealing.

In reflection, there could have been better tools to portray this message such as the use of D3. Another point is that due to the lack of time and the limitation of the tool used, more complex and interesting visualisations could not be created such as the connected nodes visualisation mentioned during the design section.

Also, the impact of the drone strikes and the suicide bombings are not limited to only the casualties and the emigration of the Pakistani citizens, hence a deeper analysis could still be conducted to further include other impacts of this war on terror on Pakistan.

Appropriate references and bibliography

Data sets

https://www.kaggle.com/zusmani/pakistandroneattacks
https://www.kaggle.com/zusmani/pakistansuicideattacks
http://beoe.gov.pk/reports-and-statistics
https://developers.google.com/public-data/docs/canonical/countries_csv

Research paper

http://watson.brown.edu/costsofwar/files/cow/imce/papers/2015/The%20Impact%20of%20Drone%20Strikes%20in%20Pakistan.pdf
Zeeshan-ul-hassan Usmani and Hira Bashir, “The Impact of Drone Strikes in Pakistan”, Cost of War Project, Brown University, December 16, 2014