

DECLARATION: I understand that this is an **individual** assessment and that collaboration is not permitted. I have read and I understand the plagiarism provisions in the General Regulations of the University Calendar for the current year, found at <http://www.tcd.ie/calendar>. I understand that by returning this declaration with my work, I am agreeing with the above statement.

A2.1 Visualization Analysis

Tracking the Flow of Military Equipment to (US) Police Departments

1. Data Types

1) 1 **quantitative, measurement** attributes:

Military expenditure: quantitative, measurement, diverging.

2) 3 **derived quantitative** attributes:

Military expenditure for each military goods.

Each state contribution to military expenditure.

Per person contribution of each state to military expenditure.

3) 1 **derived categorical** attributes:

Military expenditure for three general types of military equipments.

2. Visual Encoding Channels

Color is used for categorical encoding of types of military equipments and the location of geographical position of each state.

3. Tasks

1) Compare cost of per person between all of the states.

2) Identify the trend of spending on different types of military equipment.

3) Query and compare values of military cost at utility trucks, MRAP and Aircraft.

Overnight Stays in (US) National Parks

1. Data Types

1) 2 **quantitative, measurement** attributes:

Night: quantitative, sequential, measurement

Temperature: quantitative, sequential, measurement, interval

2) 2 **derived quantitative** attributes(same types corresponding to above):

Average of temperatures for the four seasons.

Number of nights spent per month per accomodation type.

3) 2 **derived categorical** attributes:

Number of nights spent for four types of accomodation including lodging(yellow), RV(blue), tent(green), backcountry(red).

Temperature being warm or cold relative to average.

2. Visual Encoding Channels

Position(left-to right then top-bottom) is used to arrange the individual facets by park.

Angular position in the individual facets is used to arrange the categorical attribute season.

Radial position in the individual facets is used to encode the actual numbers of nights spent.

Color is used for categorical encoding of four types of accomodation (into lodging, RV, tent, backcountry).

3. Tasks

1) Summarize the parks suitable for tent accommodation in the east and west of the United States.

2) Compare the temperature and types of accomodation of Mountain and Tundra.

3) Summarize the best parks to visit in spring.

World Population data

1. Data Types

1) 3 **quantitative, measurement** attributes:

Population: quantitative, measurement, sequential.

Internet User: quantitative, measurement, sequential.

Mobile Subscription: quantitative, measurement, sequential.

2) 3 **derived quantitative** attributes(same types corresponding to above):

Actual population for each country from 2005 to 2013.

Actual and percentage of Internet users for each country from 2005 to 2013.

Actual and percentage of Mobile subscription for each country from 2005 to 2013.

3) 1 **derived categorical** attributes:

Number of people for three types including country(orange), internet user(blue), mobile subscription(green).

The color depth indicates the number of population, internet users and mobile subscriptions.

2. Visual Encoding Channels

Position(left-to right) is used to arrange the individual facets by types(population of country, internet user, mobile subscription).

Color is used for categorical encoding of three types of human statistical category (into population of country, internet user, mobile subscription).

3. Tasks

- 1) Compare trends between internet users and mobile users.
- 2) Identify the relationship between the national population and the number of Internet users.
- 3) Summarize the country with the fastest development of internet technology.

A2.2 Visualization Design

CCCS-CIC-AndMal-2020 Dataset (<https://www.unb.ca/cic/datasets/andmal2020.html>)

1. Data Types

Virus family: number

Virus captured samples: number

2. Tasks

- 1) Compare the transmission ability of different types of Trojan.
- 2) Summarize the relationship between the number of families and the number of samples.
- 3) Summarize the most vulnerable aspects of computers.

3. Visualize data set

Firstly, I will draw a histogram, taking the virus type as the abscissa, the number of virus families and the number of captured samples as the ordinate, where the left ordinate represents the number of families, and the right ordinate represents the number of captured samples. Secondly, according to the number of virus types, I will draw 14 dot maps. Different colors represent different virus family names, and the size of dots represents the number of captured samples.