Mobile Visualisation

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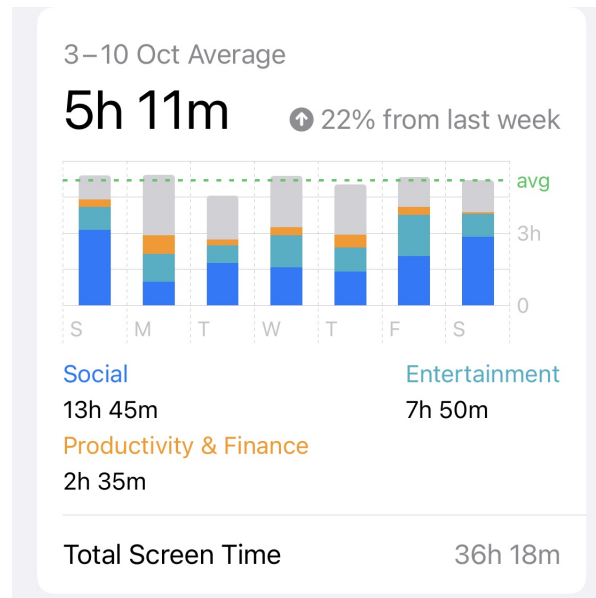[2]University of Zurich, Switzerland 21-744-115

Figure 1: Screen Time graph

Abstract
With the advent of smartphones, data visualization on mobile devices has become important to produce insights into everyday life experiences. Data visualization on this new generation of devices should become more prevalent and interactive for the users. In this factsheet, we are going to discuss how designs for smart devices should incorporate various factors for better visualization like resolution, form factor, orientation etc.

1. Introduction

In the year 2021, there are 6.378 billion smartphone users (which is around 80% of the world's population) [3]. One may or may not have access to a laptop or desktop at all times but has easy access to a mobile phone. Better data visualization on mobile phones leads to effortless access of data, better user engagement, information processing, and interaction. Visualization on mobile phones is a huge challenge for visual designers. They have to adapt their design to fit smaller screen size of phones and make it appealing to users. In the following sections, we are going to discuss design approaches on mobile phones versus desktop and design patterns that can be used in developing good visualization on mobile phones.

1.1 Motivation

Good data visualization helps to make quick and well informed decisions. For example, in banking apps, a user can identify issues with their bank accounts, spending patterns, investments etc. and identify areas of improvement. Users are more attracted to multimedia data as it is easier to interpret and has less cognitive load than plain text. The designers are therefore motivated to design interactive and good data visualization for mobile phones to enhance user experience.

2. Mobile versus Large Screen

In this section, we are going to compare visual designs based on devices on which they are going to be displayed. These designs should highlight the story of data and minimize cognitive load on users [1].
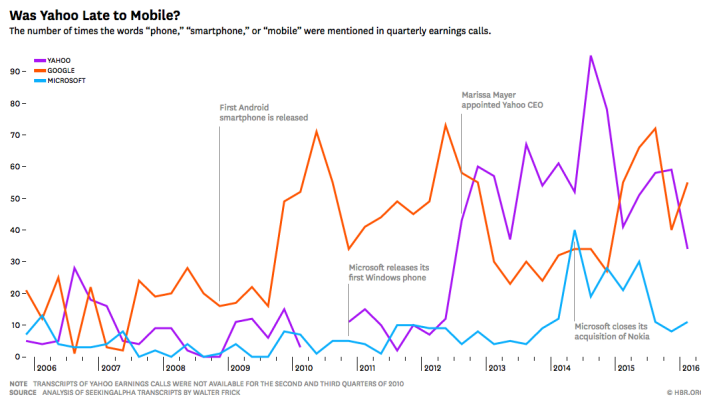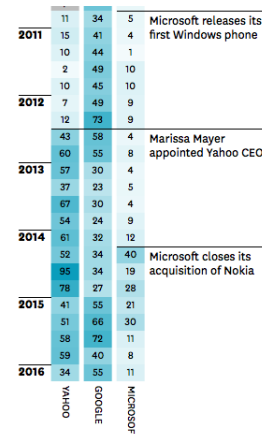

Fig 2.1(a): Line chart on large screen

Fig 2.1(b): Scrollable heatmap on mobile screen

2.1 The above graphs display how many times words relating to mobile technology were mentioned on earnings calls by Yahoo, Google and Microsoft. Renders as a line chart on large screens and a scrollable heatmap on small screens.
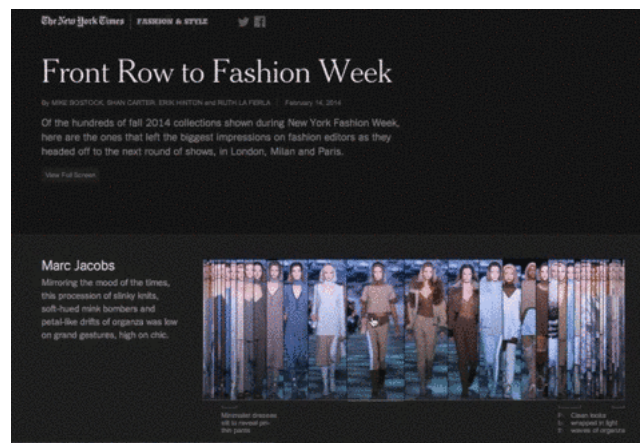

Fig 2.2:New York Fashion Week

2.2 Of the hundreds of fall 2014 collections shown during New York Fashion Week, this is how the whole collection is shown on mobile devices by New York times - by horizontally contracting all the images and expanding the selected image.

3. Guidelines for Mobile Visualization

We are going to discuss the design patterns that can be used while creating visualization for mobile based devices [2].

3.1 Inclusion of metadata: Due to mobile devices screen limitation, displaying additional metadata on vertical bars like labels or exact value, can clutter the view for the users. This can be resolved by rotating the bars 90 degrees so that the bars are stacked vertically and metadata can be included easily.

3.2 When displaying values in a table on a phone, it is challenging to see more than a few columns at a time, requiring horizontal scrolling back and forth. Instead, if each item and it's values are stacked vertically, it becomes easier to access all data with vertical scrolling.
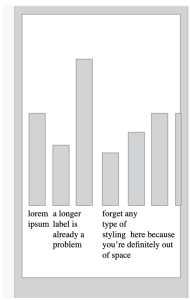
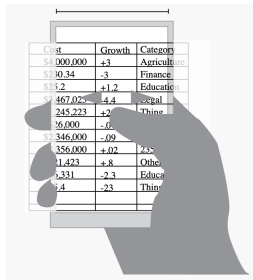Fig 3.1(a): Vertical Bar Chart

Fig 3.1(b): Stacked Bar Chart
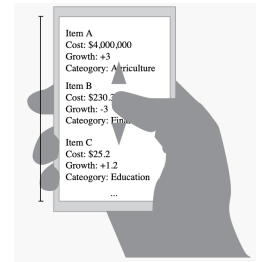

Fig 3.2(a): Table cells

Fig 3.2(b): Stacked table values

3.3 Tooltips are used to display additional information. Tooltips appear near the area where the cursor hovers. Because space is limited on a mobile phone and touch gestures utilize more space, a fixed area can be dedicated to display relevant information.
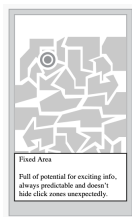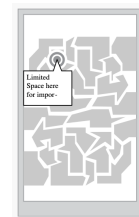

Fig 3.3(a): Tooltips

Fig 3.3(b): Fixed area for tooltip information

4. Future Work

Research on visual designs is a requirement so that designs are compatible with the ever evolving devices such as phones, dashboard of a car, smart watch, smart glass, smart refrigerator which will become common in near future and visual design should adapt for the usability and better way to showcase data.

5. Conclusion

Visual designs need to be evolved as per the needs of the users. The designers should develop visualization which is compatible with all forms of devices and data can be easily accessed, navigated through and interpreted independent of the form of device.

References

[1]   "Mobilevis". In: *MobileVis* (). URL: http://mobilev.is/.

[2]   "PatternMobilevis". In: *Mobilevis* (). URL: http://patterns.mobilev.is/.

[3]   Ash Turner. "smartphones worldwide". In: *BankMyCell* (Oct. 2021). URL: https://www.bankmycell.com/blog/how-many-phones-are-in-the-world.