



Data and Information Visualization:

## Key Principles in Data Visualization

## Acknowledgement

Most of the contents were taken from Andy Kirk. Data Visualization: A Successful Design Process. Pact Publishing. 2012, chapter 1-2

# Visualization Skills for the masses

*The skills required for **most effectively displaying information** are not intuitive and rely largely on principles that must be learned.*

Stephen Few (Show Me the Numbers)

# Visualization Design Objectives: Key Principles

1. Strive for forms and functions
2. Justifying the selection of everything we do
3. Creating accessibility through intuitive design
4. Never deceive the receiver

# 1. Strive for forms and functions

- Form versus function or style over substance?

*Form follows function—that has been misunderstood. Form and function should be one, joined in a spiritual union.*

Frank Lloyd Wright

# Example

**August 30, 2012**

8:00 am EDT

(time of forecast download)

top speed: **30.4 mph**

average: **5.5 mph**

Unzoom

1 mph

3 mph

5 mph

10 mph

15 mph

30 mph

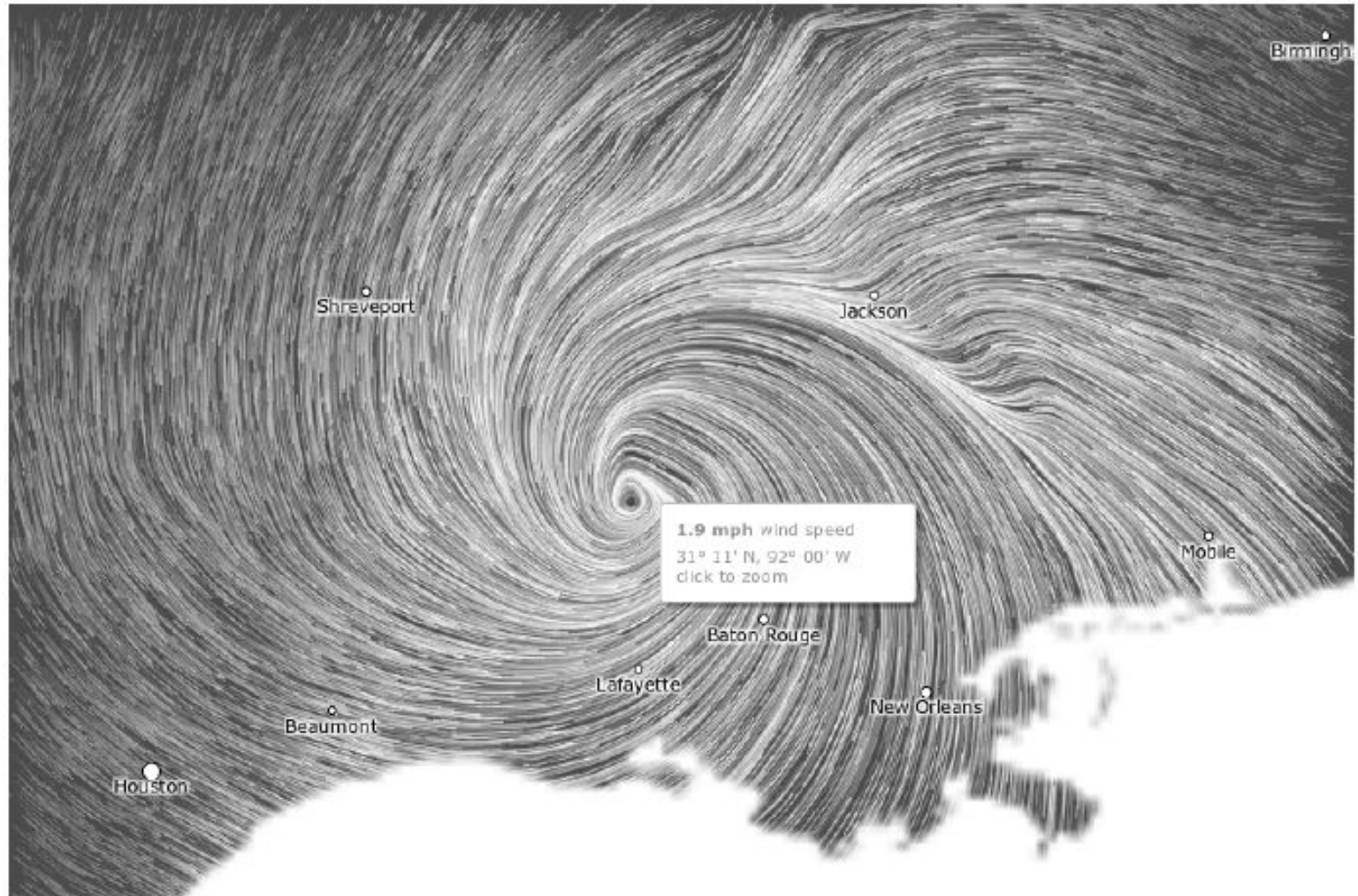


Image from "Wind Map" (<http://hint.fm/wind/>) created by Fernanda Viégas and Martin Wattenberg

# General Advice

- Initially focus on securing the functional aspects of your visualization (build the house)
  - achieve the foundation of something that informs (functions)
  - then exploring the ways of enhancing its form (decorate the house).
- By practicing, you will be more confident in synthesizing the two demands in harmony

## 2. *Always* Justifying the selection of everything we do

- Everything you do is thoroughly:
  - planned,
  - understood,
  - and reasoned.

We`re so busy thinking about if we can do things, we forget to consider whether we should

Amanda Cox (Graphics Editor at New York Times)



# Deliberate Design

- The inclusion, exclusion, and execution of every single mark, characteristic, and design feature is done for a reason
- Design features include:
  - the use of a shape,
  - the selection of a color pallet,
  - the position of a label
  - or the use of an interaction

# Example

<https://bit.ly/305t66L>



Image from "Literary Organism" (<http://itsbeenreal.co.uk/index.php?/wwwords/literary-organism/>), created by Stefanie Posavec

### 3. Creating accessibility through intuitive design

*Overload, clutter, and confusion are not attributes of information, they are failures of design.*

*Edward Tufte*

# Example (1)

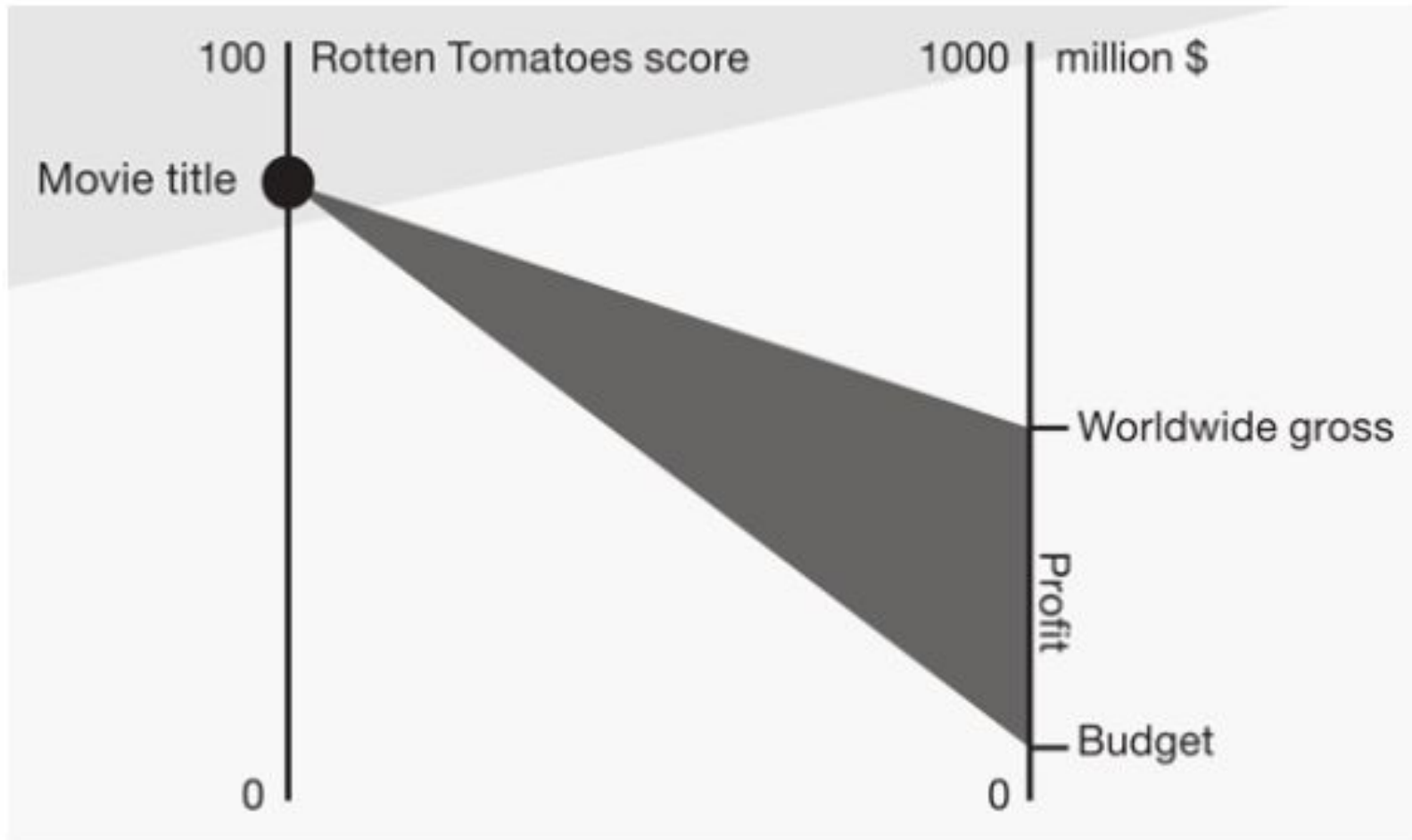


Image from "Spotlight on Profitability" (<http://www.szucskrisztina.hu>),  
created by KrisztinaSzucs

# Example (2)

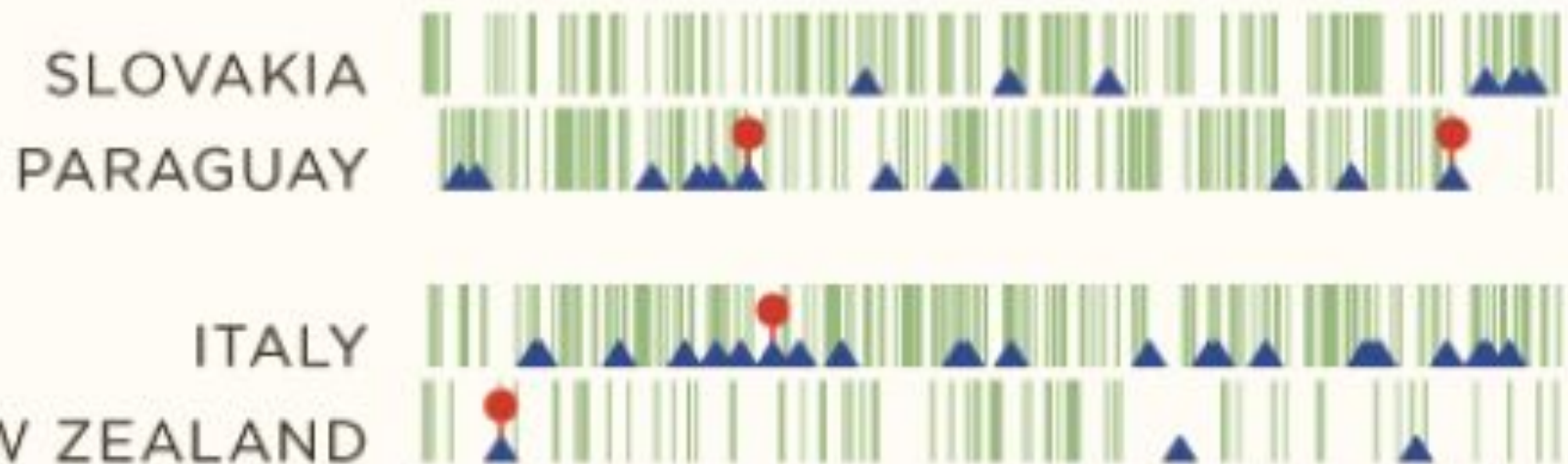


Image from "Umbro World Cup Poster" (<http://www.mikemake.com/Umbro-s-World-Cup-Poster>),  
created by Michael Deal

## 4. Never deceive the receiver

- Visualization ethics relates to the potential deception that can be created
  - intentionally
  - or otherwise
    - from an ineffective and inappropriate representation of data.
- Sometimes it can be through a simple lack of understanding of visual perception

# Example (1)

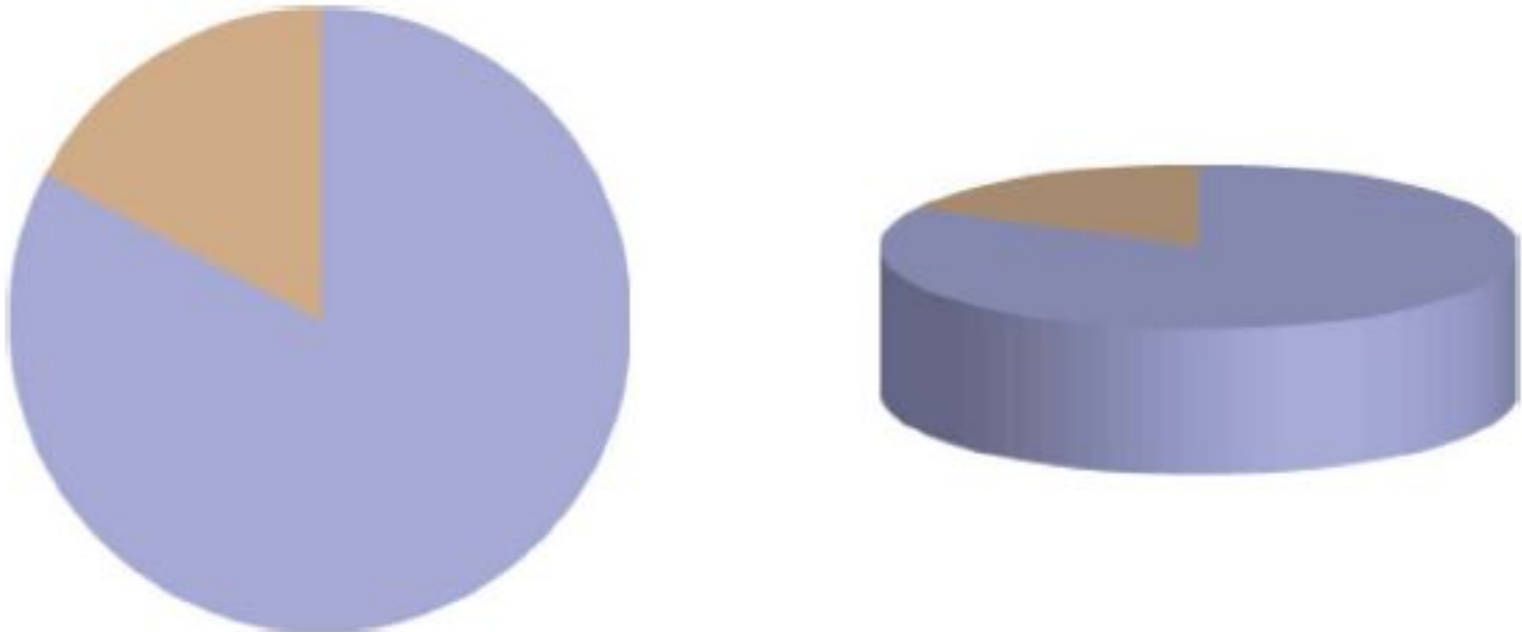


Image from "The Curious Incident of Kevins in Zurich...and other stories"  
(<http://www.researchobservatories.org.uk/EasysiteWeb/getresource.axd?AssetID=38334>) by Alan Smith.

# Example (2)



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<https://donate.wikimedia.org/>



# Example (3)



# Group Assignment 1 (2 students):

## Good and Bad Data Viz

- Find two examples of data visualization works from the internet, one for good example and another for bad example.
- Justify your judgment by applying four key principles in the DataViz.
- Report your work in the .ppt form contains:
  - Two examples of DataViz work (20 points)
  - Your justification why the chosen works good/bad (70 points)
  - Source of DataViz work (link of the source ) (10 points)
- Submit the report to the Google classrooms