

Data Visualization

An Introduction

Made Satria Wibawa, M.Eng.



Artwork: Tamar Cohen, Andrew J Buboltz, 2011, silk screen on a page from a high school yearbook, 8.5" x 12"

DATA

Data Scientist: The Sexiest Job of the 21st Century

by [Thomas H. Davenport](#) and [D.J. Patil](#)

From the October 2012 Issue

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When Jonathan Goldman arrived for work in June 2006 at LinkedIn, the business networking site, the place still felt like a start-up. The company had just under 8 million accounts, and the number was growing quickly as existing members invited their friends and colleagues to join. But users weren't seeking out connections with the people who were already on the site at the rate executives had expected. Something was apparently missing in the social experience. As one LinkedIn manager put it, "It was like arriving at a conference reception and realizing you don't know anyone. So you just stand in the corner sipping your drink—and you probably leave early."

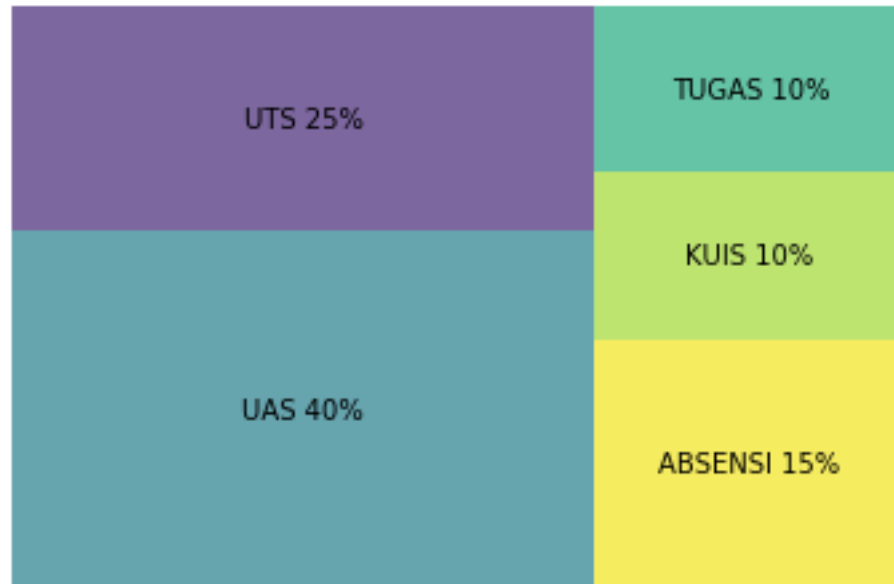
Goldman, a PhD in physics from Stanford, was intrigued by the linking he did see going on and by the richness of the user profiles. It all made for messy data and unwieldy analysis, but as he began exploring people's connections, he started to see possibilities. He began forming theories, testing hunches, and finding patterns that allowed him to predict whose networks a given profile would land in. He could imagine that new features capitalizing on the heuristics he was developing might provide value to users. But LinkedIn's engineering team, caught up in the challenges of scaling up the site, seemed uninterested. Some colleagues were openly dismissive of Goldman's ideas. Why would users need LinkedIn to figure out their networks for them? The site already had an address book importer that could pull in all a member's connections.

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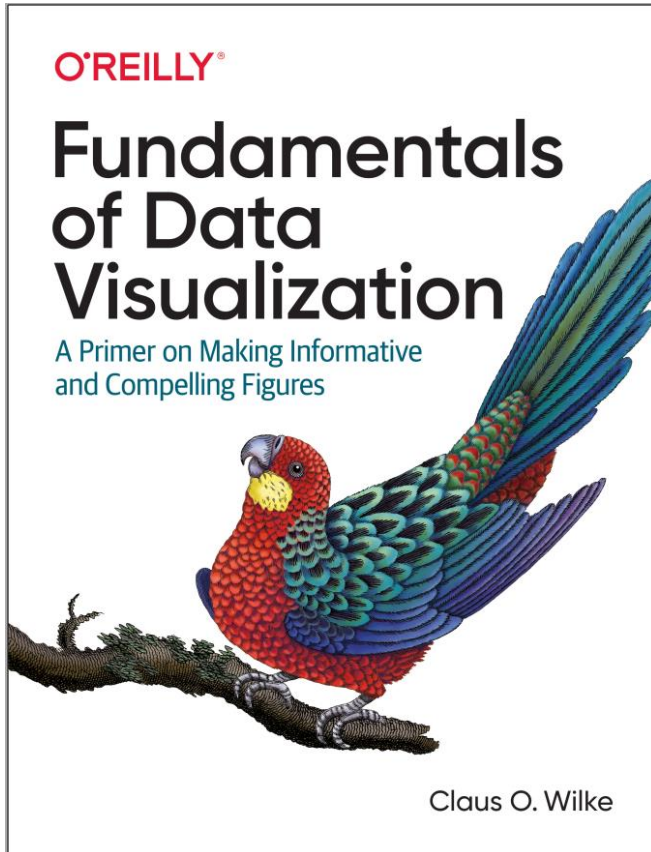
KOMPOSISI PENILAIAN



- Kuis *take home* minimal 1 kali
- Tugas *take home* minimal 2 kali
- UTS teori
- UAS Project minimal 2 kali

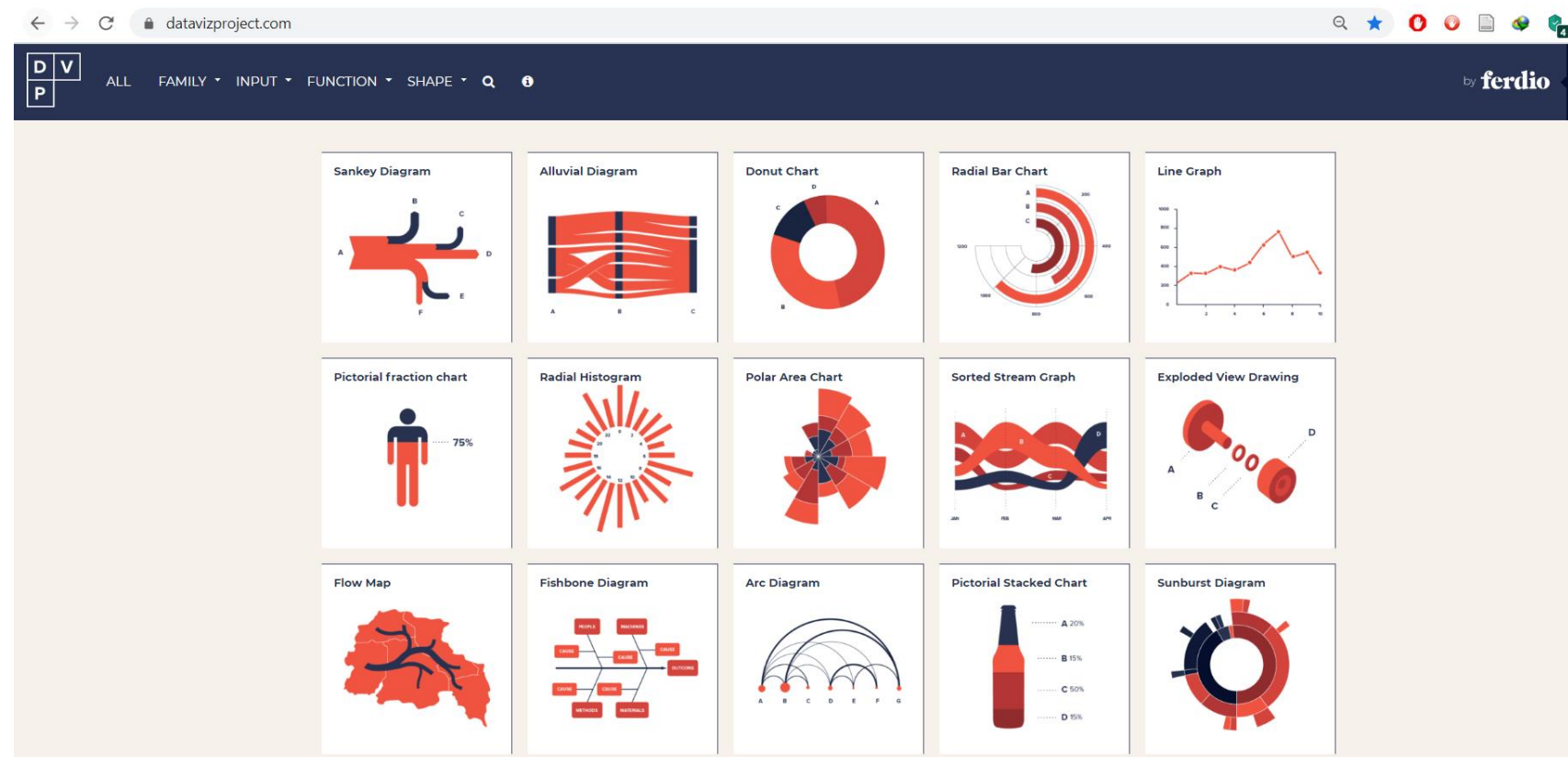
Tidak ada toleransi keterlambatan pengumpulan project, kuis dan tugas

REFERENSI



Referensi Buku:

1. <https://serialmentor.com/dataviz/>
2. <https://trinachi.github.io/data-design-builds/copyright-page01.html>



Beberapa Contoh Visualisasi

MATERI

- Teori
 - dasar statistik
 - teori visualisasi
 - teori diagram
- Praktek
 - pengolahan data
 - visualisasi digital



PYTHON

- Free !
- Banyak library untuk semua proses data preprocessing, data mining, data visualization (*numpy, pandas, matplotlib, seaborn, bokeh, sklearn*)
- Dokumentasi dan komunitas yang baik

Silahkan instalasi mandiri python beserta library yang dibutuhkan.
Panduan instalasi dapat dilihat di e-learning.

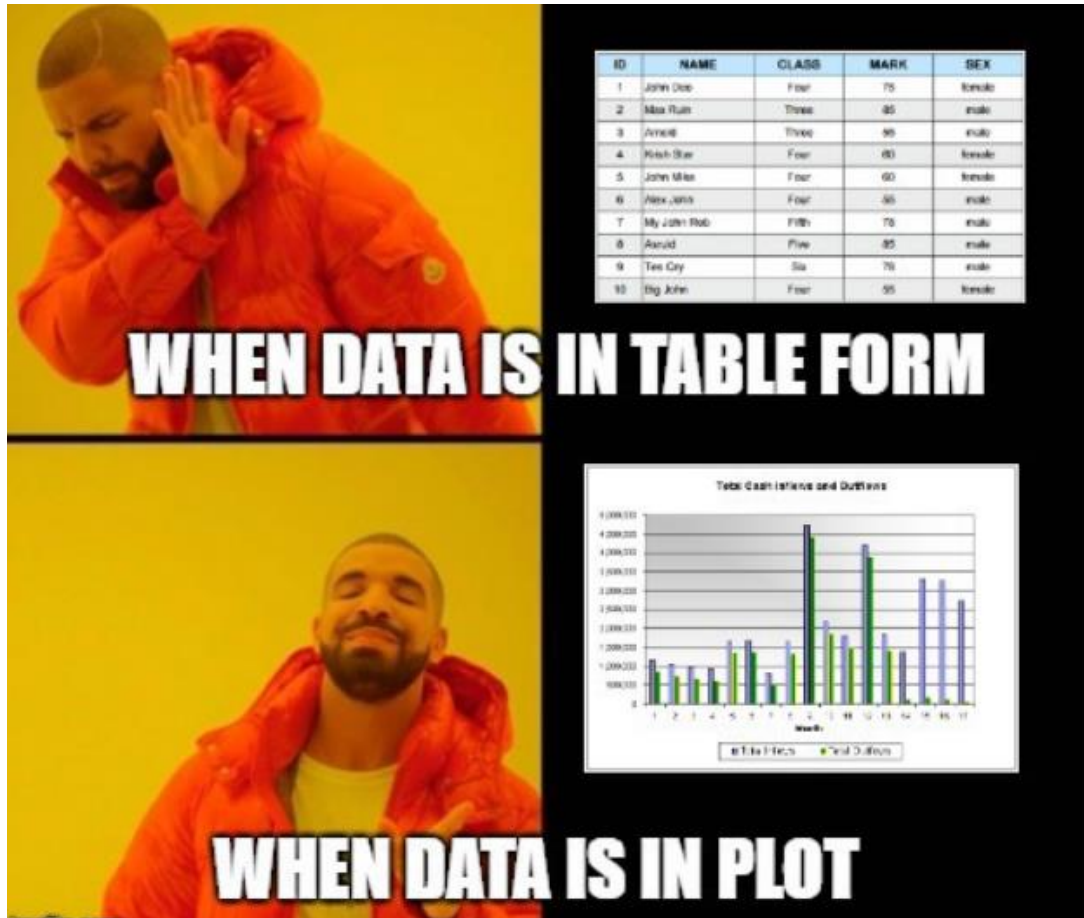
LATAR BELAKANG

| Date | US Dollar to Indonesian Rupiah Monthly Exchange Rates | |
|---------------------------|---|---|
| Monday 1 January 2018 | \$1 USD = Rp13563.0645 | US Dollar Indonesian Rupiah rate for 01/01/2018 |
| Tuesday 2 January 2018 | \$1 USD = Rp13529.9757 | US Dollar Indonesian Rupiah rate for 02/01/2018 |
| Wednesday 3 January 2018 | \$1 USD = Rp13485.8748 | US Dollar Indonesian Rupiah rate for 03/01/2018 |
| Thursday 4 January 2018 | \$1 USD = Rp13437.5489 | US Dollar Indonesian Rupiah rate for 04/01/2018 |
| Friday 5 January 2018 | \$1 USD = Rp13431.9216 | US Dollar Indonesian Rupiah rate for 05/01/2018 |
| Saturday 6 January 2018 | \$1 USD = Rp13440.154 | US Dollar Indonesian Rupiah rate for 06/01/2018 |
| Sunday 7 January 2018 | \$1 USD = Rp13432.9825 | US Dollar Indonesian Rupiah rate for 07/01/2018 |
| Monday 8 January 2018 | \$1 USD = Rp13441.3312 | US Dollar Indonesian Rupiah rate for 08/01/2018 |
| Tuesday 9 January 2018 | \$1 USD = Rp13452.2675 | US Dollar Indonesian Rupiah rate for 09/01/2018 |
| Wednesday 10 January 2018 | \$1 USD = Rp13450.2814 | US Dollar Indonesian Rupiah rate for 10/01/2018 |
| Thursday 11 January 2018 | \$1 USD = Rp13432.6404 | US Dollar Indonesian Rupiah rate for 11/01/2018 |
| Friday 12 January 2018 | \$1 USD = Rp13408.4601 | US Dollar Indonesian Rupiah rate for 12/01/2018 |
| Saturday 13 January 2018 | \$1 USD = Rp13408.184 | US Dollar Indonesian Rupiah rate for 13/01/2018 |
| Sunday 14 January 2018 | \$1 USD = Rp13409.1819 | US Dollar Indonesian Rupiah rate for 14/01/2018 |
| Monday 15 January 2018 | \$1 USD = Rp13401.426 | US Dollar Indonesian Rupiah rate for 15/01/2018 |
| Tuesday 16 January 2018 | \$1 USD = Rp13403.2018 | US Dollar Indonesian Rupiah rate for 16/01/2018 |
| Wednesday 17 January 2018 | \$1 USD = Rp13411.9153 | US Dollar Indonesian Rupiah rate for 17/01/2018 |
| Thursday 18 January 2018 | \$1 USD = Rp13407.2371 | US Dollar Indonesian Rupiah rate for 18/01/2018 |
| Friday 19 January 2018 | \$1 USD = Rp13364.9782 | US Dollar Indonesian Rupiah rate for 19/01/2018 |
| Saturday 20 January 2018 | \$1 USD = Rp13389.7106 | US Dollar Indonesian Rupiah rate for 20/01/2018 |
| Sunday 21 January 2018 | \$1 USD = Rp13365.6302 | US Dollar Indonesian Rupiah rate for 21/01/2018 |
| Monday 22 January 2018 | \$1 USD = Rp13388.2031 | US Dollar Indonesian Rupiah rate for 22/01/2018 |
| Tuesday 23 January 2018 | \$1 USD = Rp13372.5751 | US Dollar Indonesian Rupiah rate for 23/01/2018 |
| Wednesday 24 January 2018 | \$1 USD = Rp13388.9094 | US Dollar Indonesian Rupiah rate for 24/01/2018 |
| Thursday 25 January 2018 | \$1 USD = Rp13377.569 | US Dollar Indonesian Rupiah rate for 25/01/2018 |
| Friday 26 January 2018 | \$1 USD = Rp13386.3147 | US Dollar Indonesian Rupiah rate for 26/01/2018 |
| Saturday 27 January 2018 | \$1 USD = Rp13359.4164 | US Dollar Indonesian Rupiah rate for 27/01/2018 |
| Sunday 28 January 2018 | \$1 USD = Rp13308.6977 | US Dollar Indonesian Rupiah rate for 28/01/2018 |
| Monday 29 January 2018 | \$1 USD = Rp13347.3911 | US Dollar Indonesian Rupiah rate for 29/01/2018 |
| Tuesday 30 January 2018 | \$1 USD = Rp13408.4795 | US Dollar Indonesian Rupiah rate for 30/01/2018 |
| Wednesday 31 January 2018 | \$1 USD = Rp13393.2869 | US Dollar Indonesian Rupiah rate for 31/01/2018 |

USD IDR Historical Chart for Year 2018



LATAR BELAKANG



Visualisasi adalah cara 'berkomunikasi' yang efektif dan efisien

Definisi :

Data visualization (visualisasi data) adalah proses **konversi data mentah** ke informasi dalam bentuk **gambar yang mudah dimengerti** untuk memudahkan **pengambilan keputusan** yang **cepat dan efektif**.

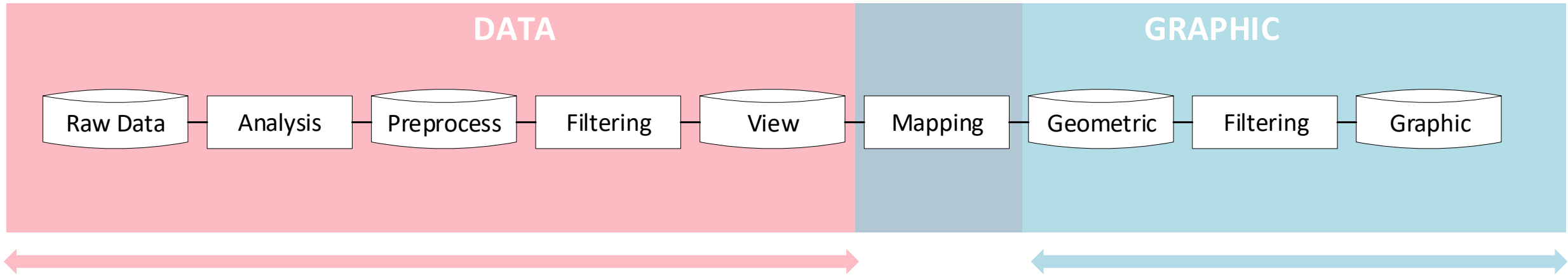
KOMPONEN DATA VISUALIZATION

- **Data.** Data apa yang tersedia, apa maknanya? Bagaimana bentuk data? Apa aspek penting dalam data? Darimana asal data?
- **Task.** Apa yang harus diolah dari data? Apa pertanyaan tentang data yang dapat digunakan untuk mendukung tujuan visualisasi?
- **Stakeholders.** Siapa yang terlibat dalam data, permasalahan dan tujuannya? Siapa yang akan melihat visualisasi final? Apa yang diharapkan dari visualisasi data?
- **Visualization.** Bagaimana cara membuat visualisasi supaya data dapat dipahami? Apa representasi dari data yang diharapkan untuk memenuhi task?

MANFAAT

- Memungkinkan kita untuk melihat perspektif yang berbeda dari data
- Memungkinkan kita untuk menginterpretasi jumlah data yang sangat banyak
- Memungkinkan kita untuk melihat data yang unik
- Memungkinkan kita untuk menganalisa pola visual dalam data
- Membantu menerjemahkan pola data menjadi wawasan, menjadikannya tool untuk membuat keputusan yang efektif

PROSES VISUALISASI DATA

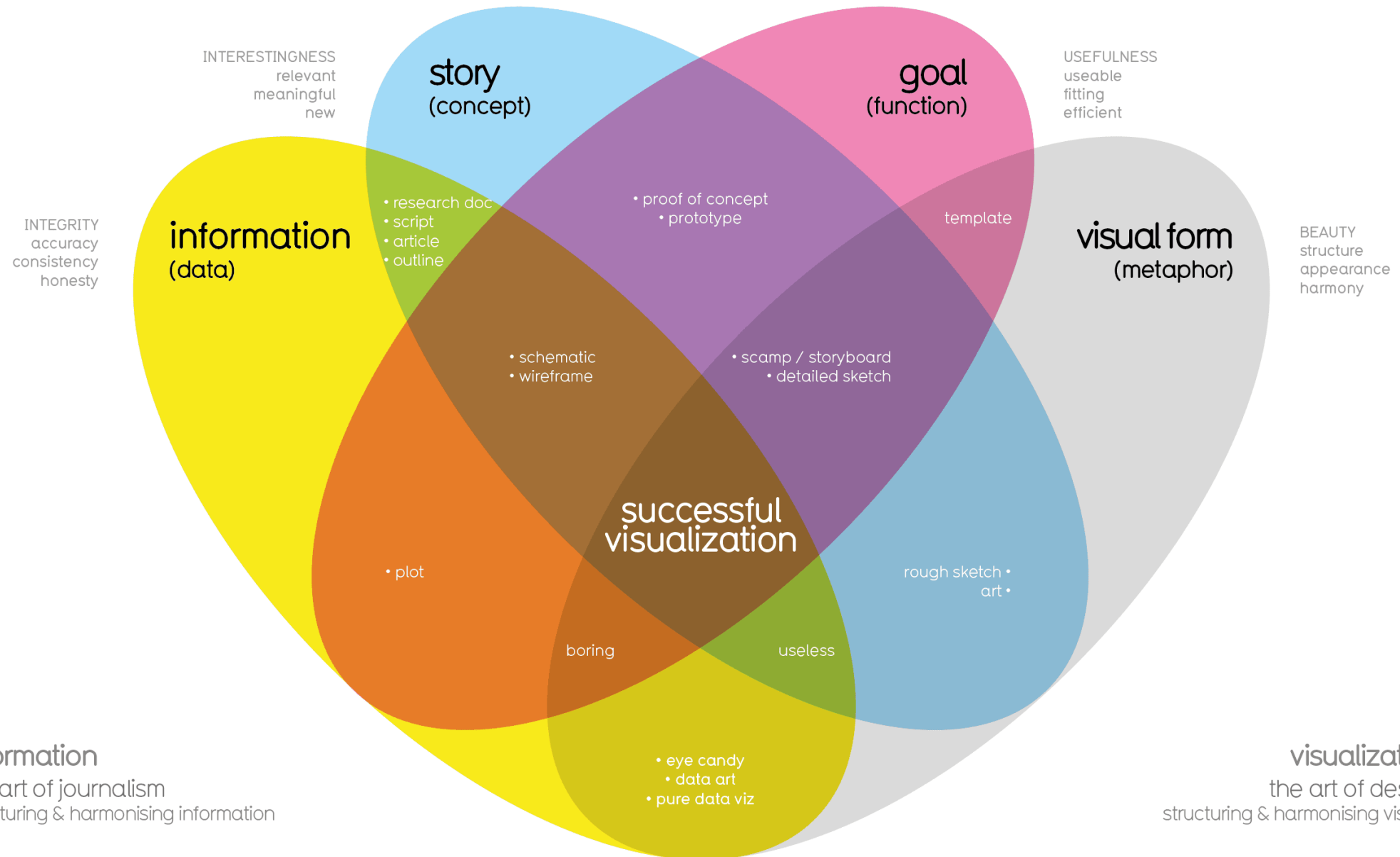


- tipe atribut
- statistik
- analisis outlier
- missing value
- feature reduction
- dsb

- teori warna
- sistem koordinat
- grafik untuk trend
- grafik untuk komparasi
- grafik untuk distribusi
- dsb

What Makes a Good Visualization?

explicit (implicit)



Q & A