IT-Tage 2021

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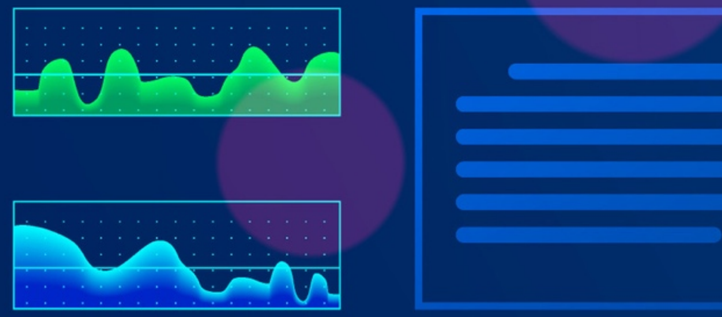
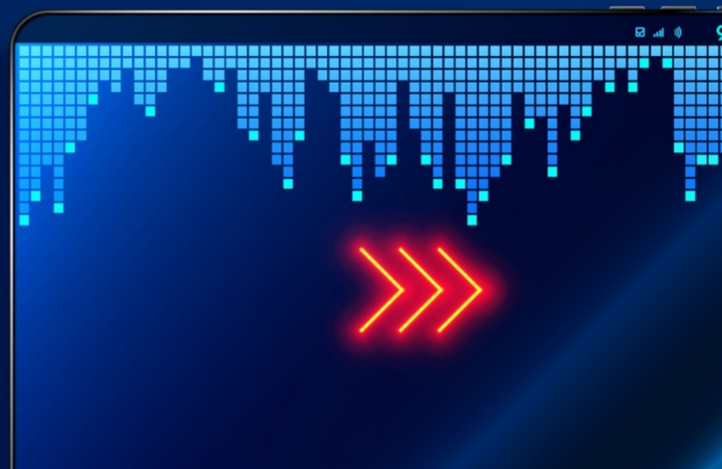
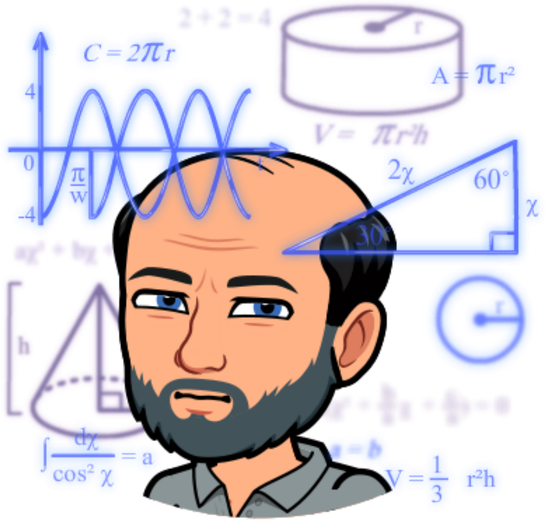
Thomas Hütter

# 50 ways to show your data





# 50 ways
# to show your data

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# 50 ways to show your data

Thomas Hütter, Diplom-Betriebswirt

- Application developer, consultant, accidental DBA, author
- Worked at consultancies, ISVs, end user companies
- SQL Server > 6.5, former „Navision“ > 3.0, R > 3.1.2
- Speaker at Data&Dev events around Europe

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# Agenda

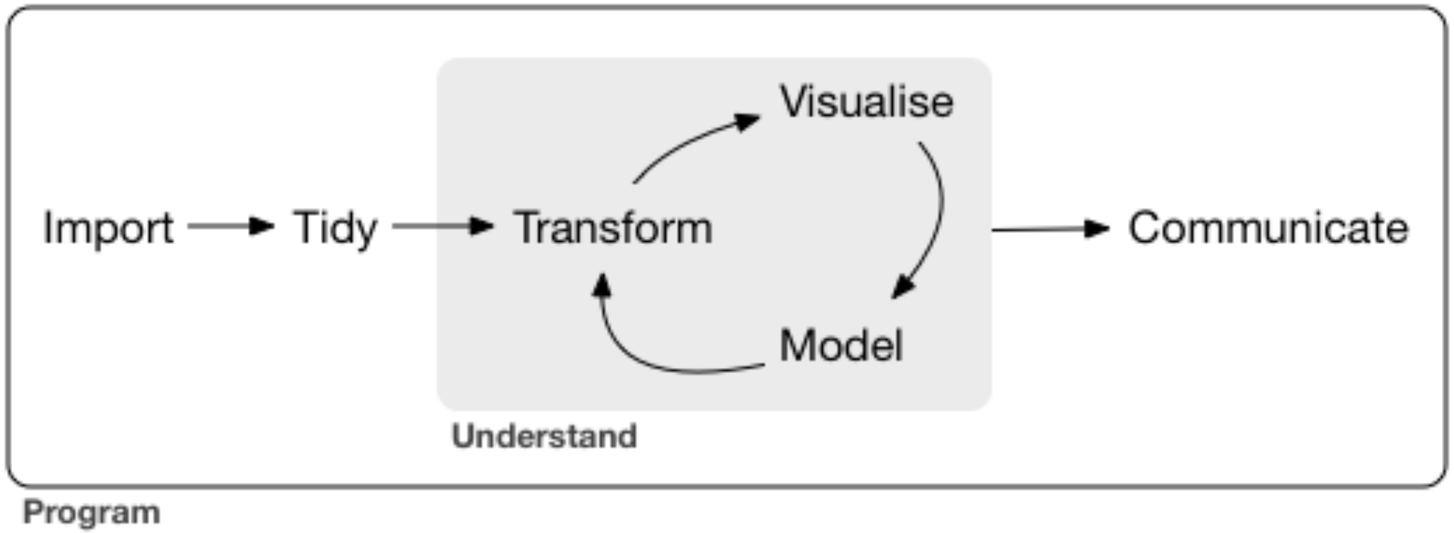
- What’s the fuzz about this R language?
  - The philosophy of tidy data:
    - import, manipulate, visualize, communicate
- A grammar of graphics: ggplot2
- Introducing RStudio
- Fancy ggplot2 graphs and some fancy friends:
  - from facets
  - via waterfalls and radar
  - to animated plots and yet some extras
- Round-up, resources

# What's the fuzz about this **R** language?

- Programming language for statistical computing, analysis, visualization - widely used by statisticians, data miners, analysts, data scientists
- Created by **R**oss Ihaka and **R**obert Gentleman, Uni Auckland, in 1993 as an open source implementation of the (1970s) S language
- GNU project, maintained by the R Foundation for Statistical Computing, compiled builds für Mac OS, Linux, Windows, supported by R Consortium
- Extensible through user-created packages, > 18500 available on CRAN
- Commercial support, e.g. since 2007 by Revolution Analytics, acquired by Microsoft in 2015, now provide Microsoft R Open, R Server
- Support for R now built into SQL Server, R Visuals in Power BI, Azure ML, Data science VM

# The philosophy of tidy data

What a typical data analysis/data science project may look like




The components of the Tidyverse (ggplot2 being one part) cover these tasks and can help you to accomplish them in a concise manner.

figure © 2017 Wickham/Grolemund: „R for Data Science“

# A grammar of graphics: ggplot2

- „The grammar of graphics“, a 2005 book by Leland Wilkinson et al. served as a foundation for implementing the R package ggplot2
- My simple approach to „what is needed to describe a graph“:
  - data: *what do you want to show*
  - aesthetic mappings: *which relations are there to show*
  - geometries: *how do you want to show it*
  - extras:
    - guides: axes, scales and legends
    - labels, annotations
    - facetting, coordinate systems
    - colours, themes
    - …

# 50 ways to show your data

- facets
  show small multiples, apply the big picture to subsets of your data
- violins
  show more detail of the data distribution than a box plot
- lollipop charts [ggalt]
  alternative to charts with lots of nearly-similar-size bars,
  on screen: reduce moiré, on paper: reduce waste of ink
- encircling areas [ggalt]
  draw attention to certain regions or groups of points,
  visualize clustering

# 50 ways to show your data

- jitter plots / counts charts
  show information otherwise hidden by overlapping points
- avoiding overlap of text labels [ggrepel]
  avoid overlap of text labels
- parliament diagrams [ggpol]
  by seat number or vote distribution
- tree maps [treemap]
  display hierarchical data as nested rectangles

# 50 ways to show your data

- waterfall diagrams [waterfall(s)]
  show up- and down development of a single measure
- correlograms [(gg)corrplot]
  show correlation between several variables at once
- marginal histograms and boxplots [ggExtra]
  show distribution details for the dimensions of a scatter plot
- radar charts [ggradar]
  compare multiple measures for few items

# 50 ways to show your data

- maps [ggmap]
  include geospatial information
- animated plots [gganimate]
  automatically show development over time
- Chernoff faces [ggChernoff]
  everyone likes smilies, don’t they?
- More extras:
  facet zooming [ggforce], diverse themes [ggthemes, ggTech],
  interactive: tooltips [ggiraph]

# Round-up / conclusions

- Even with open source products like R, a lot is possible in terms of analysis and compelling visualizations

- Applying the Tidyverse philosophy and tools, ggplot2 and it’s extensions, graphs can be constructed in a very concise manner, with very small effort of coding

- But - even in this context - sometimes less is more:
  Don’t overdo/overload, carefully choose colours/shapes,
  consider the occasion of your presentation
  (Chernoff faces are not suitable for every audience)

# Credits & resources / inspired by:

- Get base R and packages: https://cran.r-project.org/index.html
- Get RStudio: https://www.rstudio.com/products/rstudio/download/

- Selva Prabhakaran's Top 50 ggplot2 Visualizations Master List
  (use under Creative commens license, referred to as „Top 50 list")
- A list of ggplot2 extensions https://exts.ggplot2.tidyverse.org/
- The ggplot2 reference online http://ggplot2.tidyverse.org/reference/

- R Graphics Cookbook, by Winston Chang, O'Reilly, ISBN 978-1449316952
- R for Data Science, Hadley Wickham & Garrett Grolemund, O'Reilly,
  ISBN 978-1491910399, also online at http://r4ds.had.co.nz

- Data sources: www.formel1.de, data.worldbank.org, www.kleve.de

# 50 ways to show your data

Thank you for your interest & keep in touch:

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- de.linkedin.com/in/derfredo
- www.xing.com/profile/Thomas_Huetter

This file and the demo script can be found at:
https://j.mp/DerFredoITT21