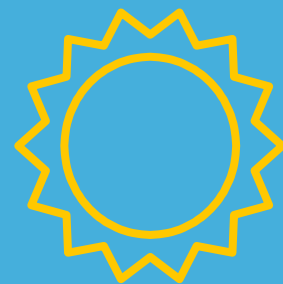


CALIDAD DE DATOS EN SERIES DE TIEMPO



Un enfoque metodológico aplicado
en una **red meteorológica**

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Estrin, Hernán
Aprea, Mariano

Un enfoque metodológico



2001 - 2010

Mediciones de temperatura máxima
disponibles desde 1961

88 ESTACIONES

Filtradas desde 231 estaciones meteorológicas

70% MEDICIONES COMPLETAS

Condición de selección según datos faltantes



1.

Detección de anomalías

Identificación de potenciales errores en las series temporales de temperatura máxima

DETECCIÓN DE ANOMALÍAS EN SERIES TEMPORALES

Problema general:

Identificar valores atípicos *globales* y *locales* en series estacionales.

1. Descomposición STL

La serie temporal se descompone en *tendencia*, *estacionalidad* y *residuo*. Se analiza el residuo para detectar anomalías.



2. Extreme Studentized Deviate (ESD)

Aplicación sucesiva de *test estadístico* de Grubb (basado en la distribución t de student). Clasifica datos atípicos.

Métodos robustos

Utilización de técnicas *estadísticas robustas* (mediana y MAD) para realizar el ESD.

2.

Imputación de faltantes

Uso de temporalidad y espacialidad para imputar observaciones no disponibles

IMPUTACIÓN DE DATOS FALTANTES

1. Descomposición STL

A partir de la serie temporal se hace una descomposición STL aditiva en *tendencia*, *estacionalidad* y *residuo*. Las primeras dos son señales de baja frecuencia por lo tanto se imputan de forma automática.

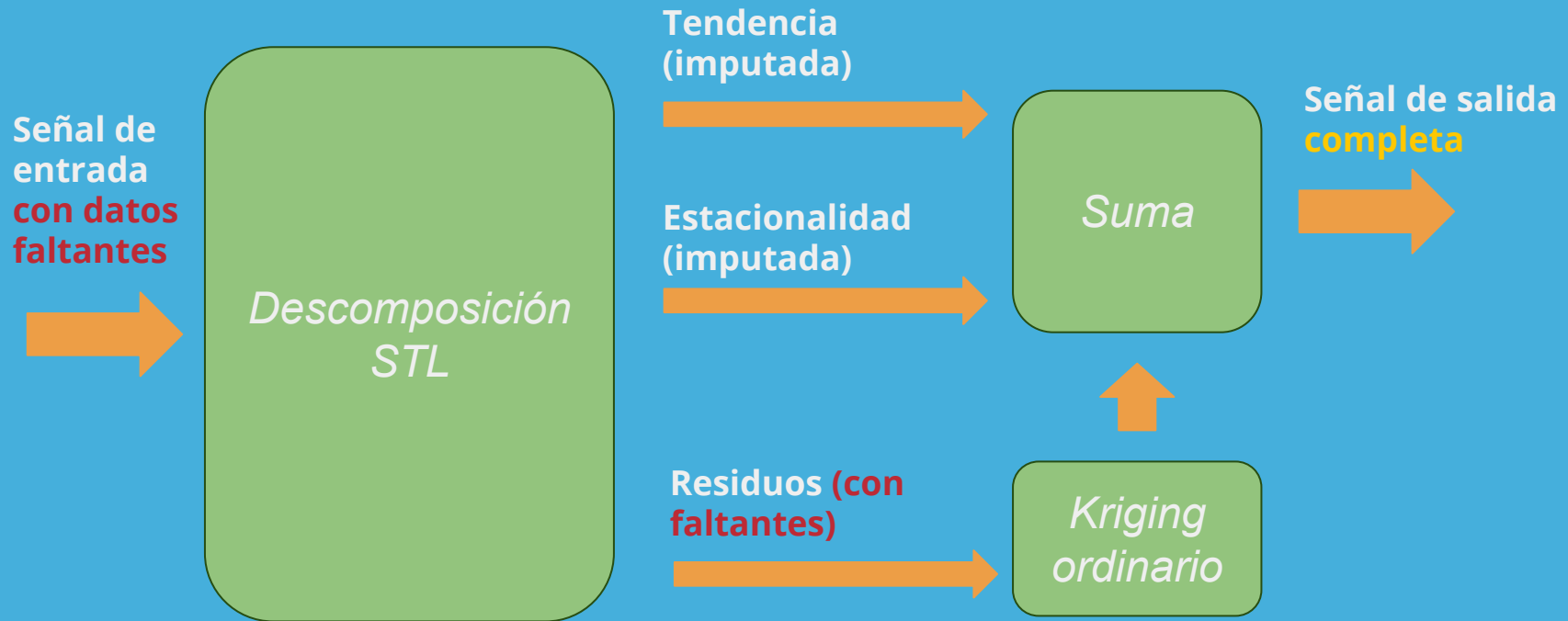
2. KRIGING

El residuo tiene alta frecuencia y debemos utilizar otro enfoque. Usamos una herramienta de interpolación geoestadística denominada *Kriging*.

KRIGING ORDINARIO

Esta técnica requiere un campo de media constante y cuya varianza dependa solamente de la distancia. Estas condiciones se cumplen para el caso de los residuos de temperatura.

IMPUTACIÓN DE DATOS FALTANTES



3.

Regionalización climática

Clustering de las series temporales completas

AGRUPAR ESTACIONES EN REGIONES HOMOGÉNEAS EN RELACIÓN A LA TEMPERATURA

Distancia CORT

Combina proximidad entre los valores de las series (euclídea) con proximidad entre comportamientos de las mismas (correlación temporal de primer orden)



Cl. Jerárquico Aglom. (Ward)

Permite observar los sucesivos agrupamientos y examinar su dinámica en la dimensión espacial

$$d_{CORT} = \Phi_k(CORT) * dEUC_{XY}$$

$$CORT = \frac{\sum_{t=1}^{T-1} (X_{t+1} - X_t)(Y_{t+1} - Y_t)}{\sqrt{\sum_{t=1}^{T-1} (X_{t+1} - X_t)^2} \sqrt{\sum_{t=1}^{T-1} (Y_{t+1} - Y_t)^2}}$$

$$\Phi(k, x) = \frac{2}{(1 + e^{kx})}, k \geq 0$$

Validación Interna

A falta de verdad de campo se busca regiones geográficamente contiguas

¡GRACIAS!

¿Preguntas?

¿Respuestas?

Instructions for use

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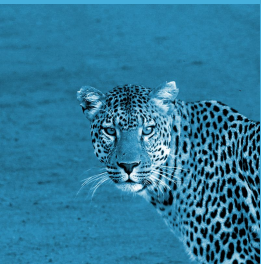
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Hello!

I AM JAYDEN SMITH

I am here because I love to give presentations.

You can find me at:

@username

1.

TRANSITION HEADLINE

Let's start with the first set of slides

“

*Quotations are commonly printed as a means of
inspiration and to invoke philosophical thoughts
from the reader.*

■ THIS IS A SLIDE TITLE

- Here you have a list of items
- And some text
- But remember not to overload your slides with content

Your audience will listen to you or read the content, but won't do both.



BIG CONCEPT

Bring the attention of your audience over a key concept using icons or illustrations

YOU CAN ALSO **SPLIT** YOUR CONTENT

White

Is the color of milk and fresh snow, the color produced by the combination of all the colors of the visible spectrum.

Black

Is the color of ebony and of outer space. It has been the symbolic color of elegance, solemnity and authority.

■ IN TWO OR THREE COLUMNS

Yellow

Is the color of gold, butter and ripe lemons. In the spectrum of visible light, yellow is found between green and orange.

Blue

Is the colour of the clear sky and the deep sea. It is located between violet and green on the optical spectrum.

Red

Is the color of blood, and because of this it has historically been associated with sacrifice, danger and courage.

■ A PICTURE IS WORTH A THOUSAND WORDS

A complex idea can be conveyed with just a single still image, namely making it possible to absorb large amounts of data quickly.

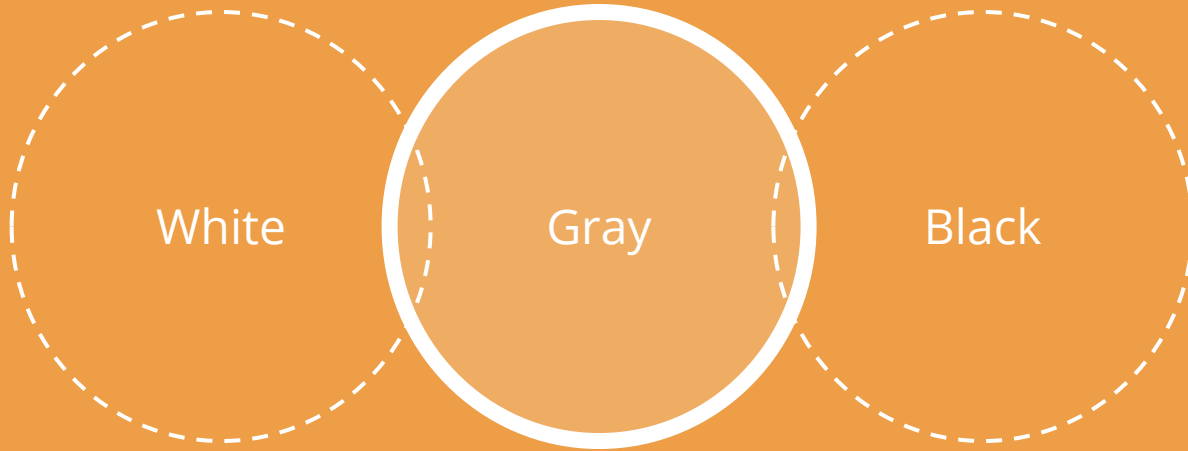




WANT **BIG** IMPACT?

Use BIG image.

USE CHARTS TO EXPLAIN YOUR IDEAS



OR **DIAGRAMS** TO EXPLAIN COMPLEX IDEAS



Example text.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Fusce rutrum dictum magna.

Example text.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Fusce rutrum dictum magna.

AND TABLES TO COMPARE DATA

	A	B	C
Yellow	10	20	7
Blue	30	15	10
Orange	5	24	16



MAPS



89,526,124

Whoa! That's a big number,
aren't you proud?



89,526,124\$

That's a lot of money



185,244 users

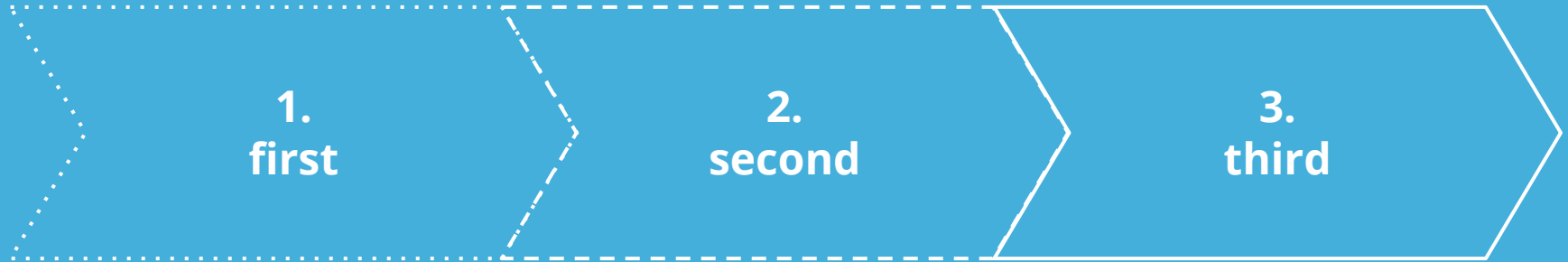
And a lot of users



100%

Total success!

OUR PROCESS IS EASY



Let's review some concepts

Yellow



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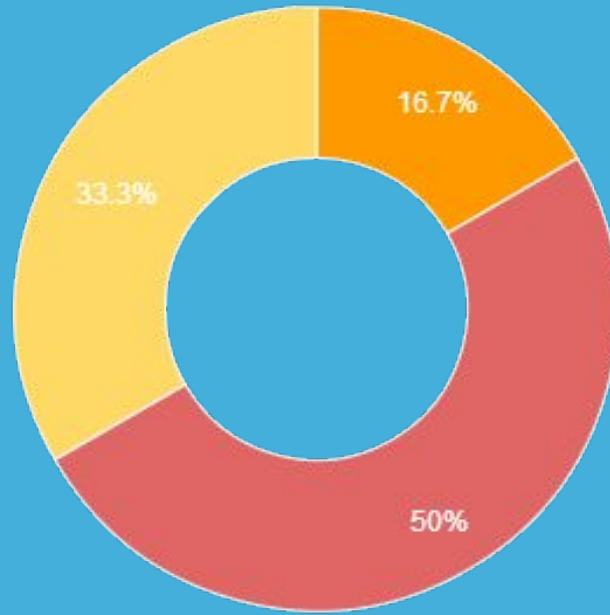


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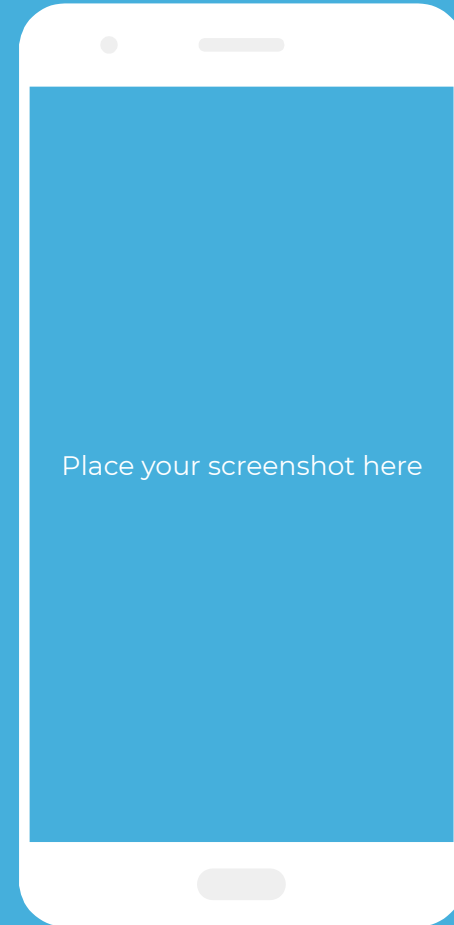


■ A ■ B ■ C

You can copy&paste graphs from Google Sheets

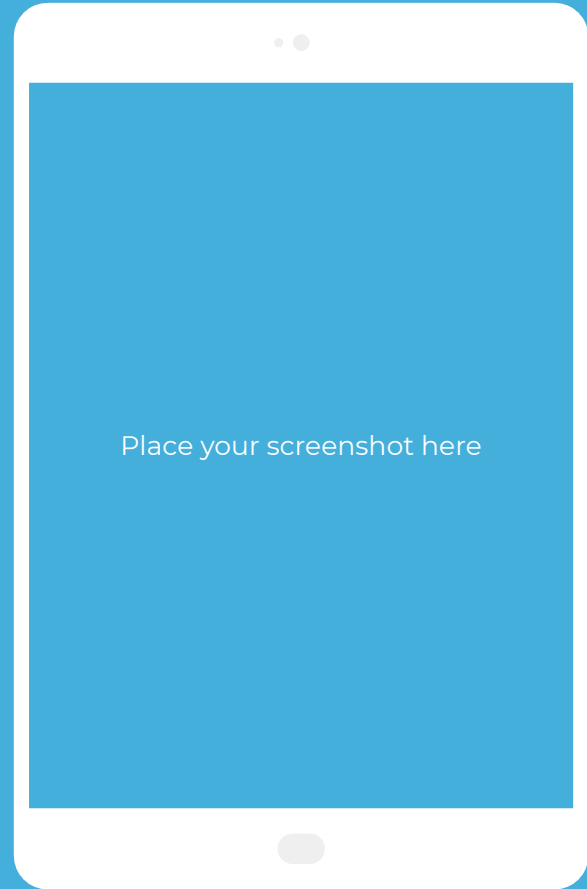
MOBILE PROJECT

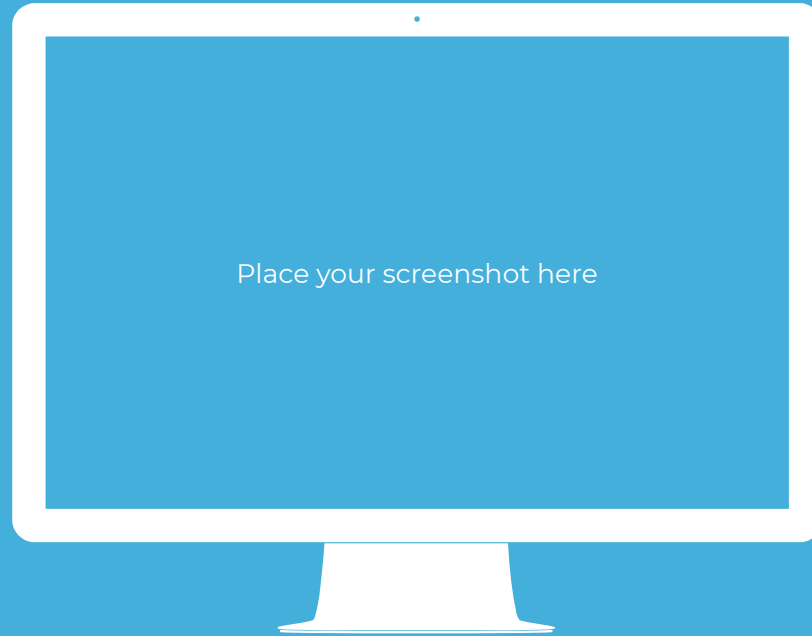
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THANKS!

Any questions?

You can find me at @username & user@mail.me

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- Titles: **Montserrat**
- Body copy: **Open Sans**

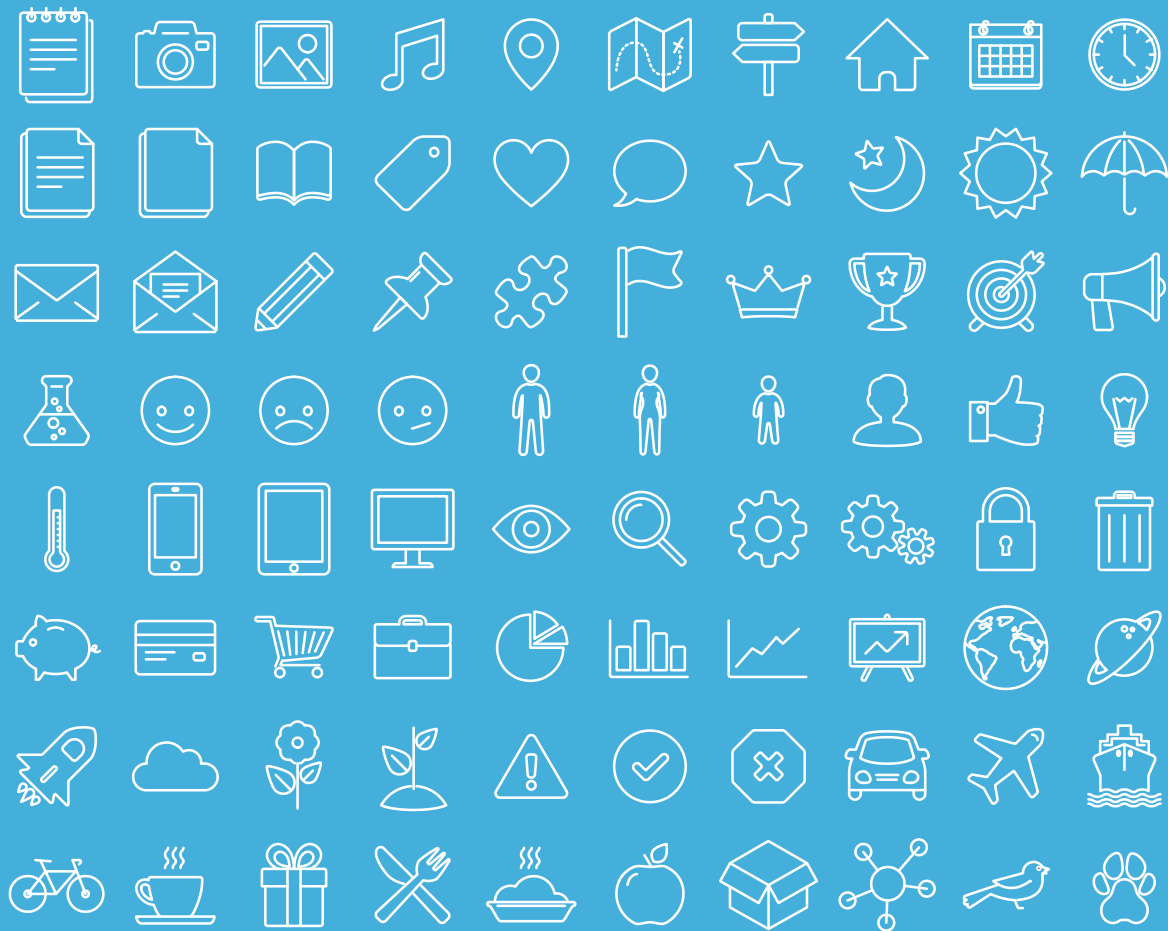
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<https://www.fontsquirrel.com/fonts/open-sans>

- Teal (background) **#45afdc** / Teal (text) **#1d98c7**
- Gold (background) **#ed9e46** / Gold (text) **#ffc800**

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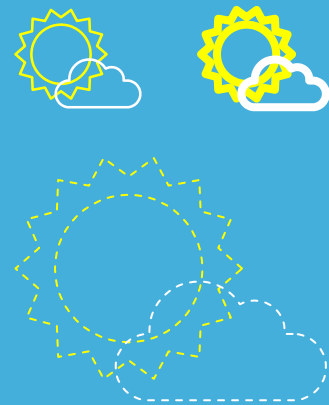
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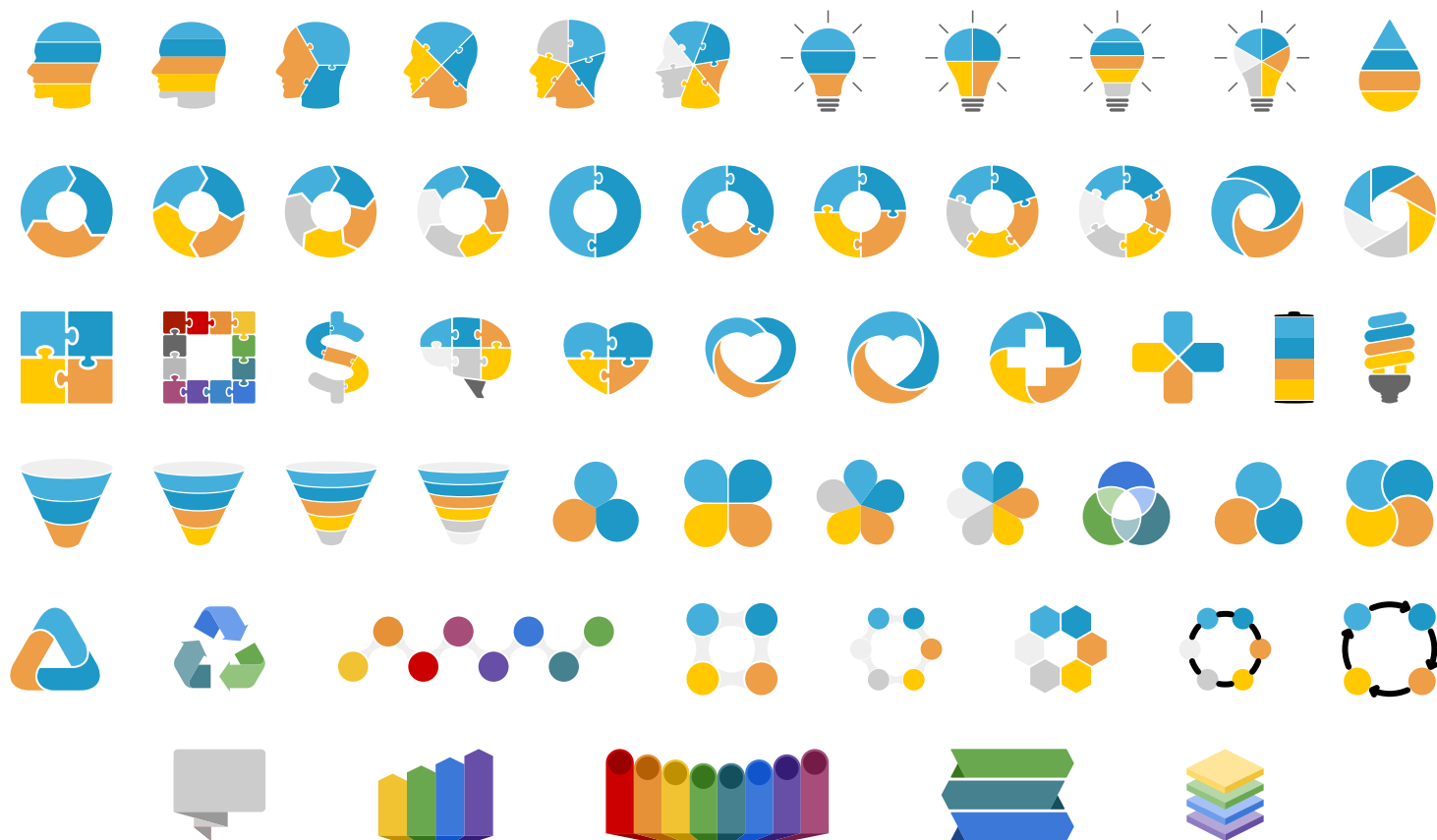
- Resize them without losing quality.
- Change line color, width and style.

Isn't that nice? :)

Examples:



Diagrams and infographics



Now you can use any emoji as an icon!

And of course it resizes without losing quality and you can change the color.

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<https://twitter.com/googledocs/status/730087240156643328>



and many more...



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or commercial use



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professional and
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visuals