

Probing the Relationship Between Education and Homelessness in the USA

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1.

Project Summary

Our topic:

We are exploring the relationship between homelessness and education in the USA with an aim to identify trends that may predict the number of homeless people in a state.

Our Motivation:

The swift and unexpected onset of a global health crisis in 2020 led many states to issue stay-at-home orders to curtail the rate of infection. Without homes to retreat to, our homeless population was most vulnerable during the pandemic. We may not be able to predict or control the next devastating public health crisis, but is there an aspect to homelessness that we might govern to reduce the size of those affected? That is what we hope to discover.

Our Datasets:

Homelessness in the United States, 2007 to 2016

The raw data set contains Point-in-Time (PIT) estimates and national PIT estimates of homelessness as well as national estimates of homelessness by state and estimates of chronic homelessness from 2007 - 2016 .

U.S. Education Dataset:

The dataset is designed to bring together multiple facets of U.S. education data (K-12 financial, enrollment, and achievement data) from 1992 - 2017 into one CSV.



2.

Exploring the Data



3.

Analyzing the Data

Machine Learning Model

Data Preprocessing

Preprocessing the Homelessness Dataset

- Read raw data from CSV
- Drop unneeded columns – we decided that the shelter name was not relevant to the data
- Create a key column that will allow us to join to the education dataset
 - Extract year from Year column
 - Concatenate year with state, ex: 2007_AK
- Create bins for the Measures column to reduce the categories to either Sheltered, Unsheltered, or Other
- Drop original Measures column
- Group by State_Year, Year, State, Groups to aggregate the Count
- Flatten the table so that each year/state will have one record
 - Create 3 columns: Sheltered_Cnt, Unsheltered_Cnt, Other_Cnt and store count under appropriate column

Preprocessing the Education Dataset

- Read raw data from CSV
- Drop unneeded columns - columns with too many null values
- Create a key column that will allow us to join to homeless dataset
 - Convert long state name to abbreviated state: ALASKA --> AK
 - Concatenate year with state, ex: 2007_AK
- Replace NaN with zeros
- Convert floats to int
 - Merged dataset
- Join homeless dataset and education dataset on the key: state_year
- Drop duplicate columns
- Reorder columns so the count columns are at the end
- Encode State column with get_dummies
- Use Standard Scaler on the X features

Preliminary Engineering

Preliminary feature engineering includes reducing the 20+ Measures categories to just 3 categories, scaling the features using Standard Scaler, and encoding the categorical column (State) using `get_dummies`. We chose the features to be the state, year, total state revenue, total state expenditure, number of students in high school, and number of students in all grades to be the features. We wanted to see if this combination of columns could be used to accurately predict homeless counts for subsequent years.

Model Choice

- We chose a multivariate multiple regression model, because we had more than two independent variables, more than one dependent variable, and we wanted to predict a continuous value. The benefits of multivariate regression is that we can get a more realistic picture than when just observing one dependent variable. This technique can also provide a more powerful test of significance than typical multiple regression. A limitation of multivariate analysis is that you need to have large datasets to overcome high standard errors. Our dataset may not be large enough to overcome this limitation.
- To determine whether this model is a good fit, I got the R-squared score, which was 97.8%. This indicates a good fit. However, it may not be accurate, because our dataset might not be big enough to overcome the limitations of using a multivariate regression model. Despite this limitation we decided to use this statistic, because R-squared shows the fraction of the variance between values predicted and the value rather than the mean of the actual.

Machine Learning Model

Data Preprocessing

Instructions for use

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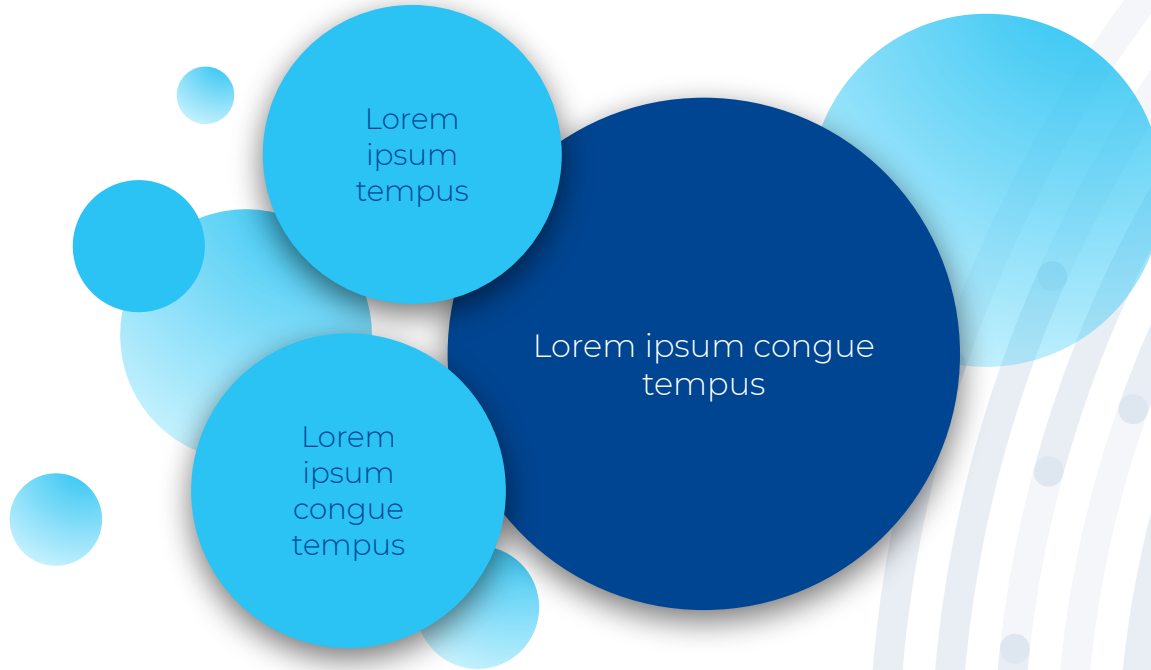
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Use diagrams to explain your ideas



And tables to compare data

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

Maps



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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

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.

Yellow

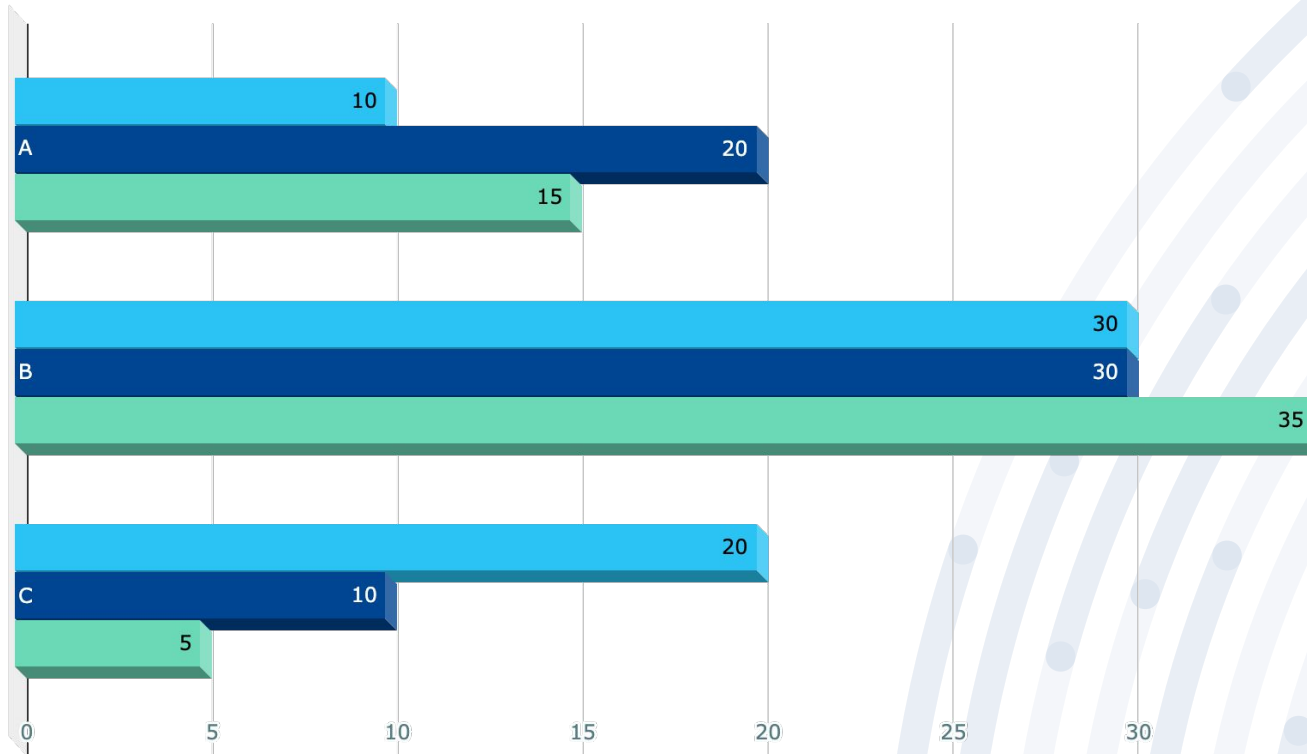
Is the color of gold, butter and ripe lemons. In the spectrum of visible light, yellow is found between green and orange.

Blue

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

Red

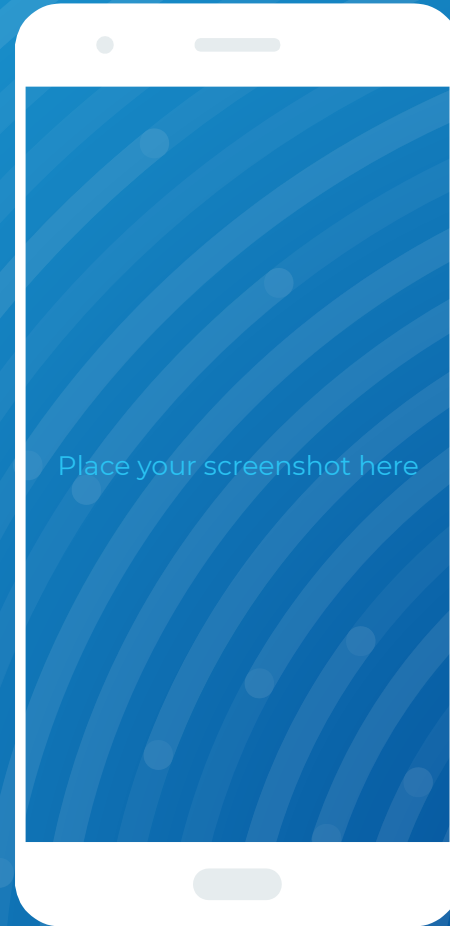
Is the color of blood, and because of this it has historically been associated with sacrifice, danger and courage.



You can insert graphs from Excel or Google Sheets

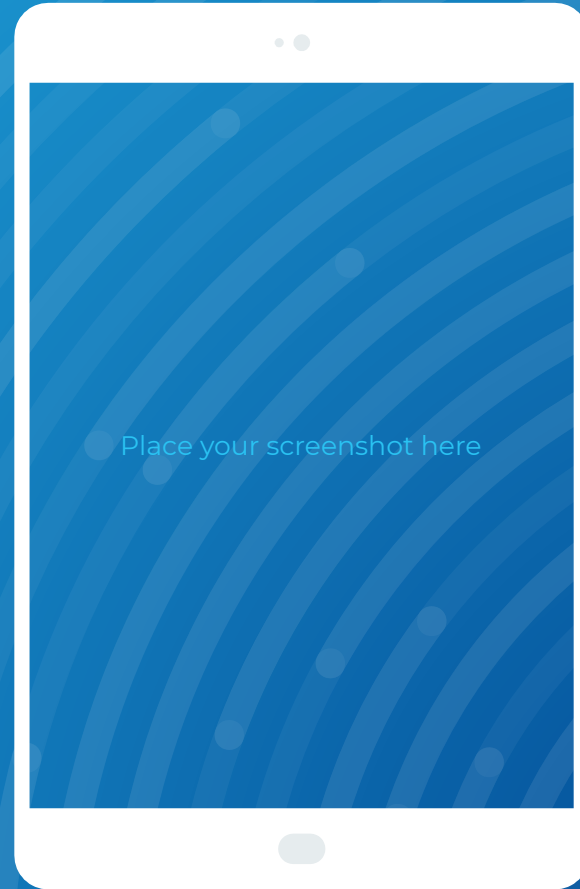
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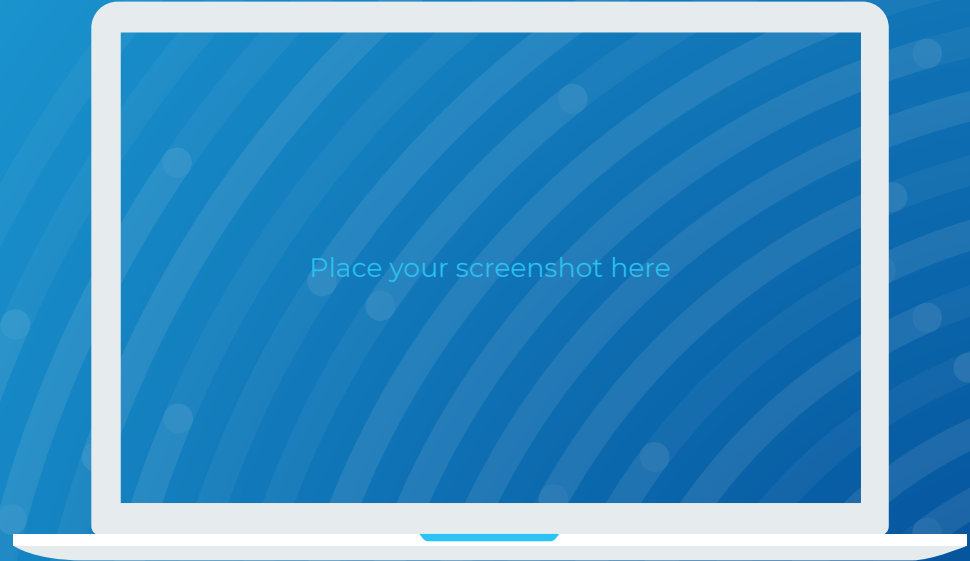
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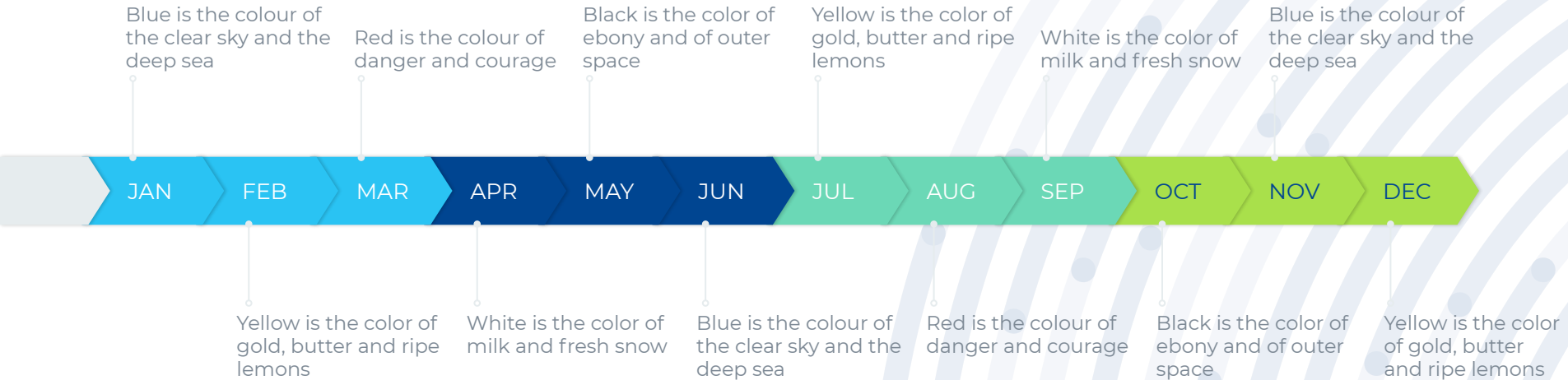


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Timeline



Roadmap

Blue is the colour of
the clear sky and the
deep sea

1

Red is the colour of
danger and courage

3

Black is the color of
ebony and of outer
space

5

Yellow is the color of
gold, butter and ripe
lemons

2

White is the color of
milk and fresh snow

4

Blue is the colour of
the clear sky and the
deep sea

6

Gantt chart



SWOT Analysis

STRENGTHS

Blue is the colour of the clear sky and the deep sea

S

WEAKNESSES

Yellow is the color of gold, butter and ripe lemons

W

Black is the color of ebony and of outer space

OPPORTUNITIES










O

THREATS

White is the color of milk and fresh snow

T

Business Model Canvas

<div>Key Partners Insert your content</div> <div></div>	<div>Key Activities Insert your content</div> <div></div>	<div>Value Propositions Insert your content</div> <div></div>	<div>Customer Relationship Insert your content</div> <div></div>	<div>Customer Segments Insert your content</div> <div></div>
	<div>Key Resources Insert your content</div> <div></div>		<div>Channels Insert your content</div> <div></div>	
<div>Cost Structure Insert your content</div> <div></div>			<div>Revenue Streams Insert your content</div> <div></div>	

Funnel



Team Presentation



Imani Jackson

JOB TITLE

Blue is the colour of the
clear sky and the deep
sea



Marcos Galán

JOB TITLE

Blue is the colour of the
clear sky and the deep
sea



Ixchel Valdía

JOB TITLE

Blue is the colour of the
clear sky and the deep
sea

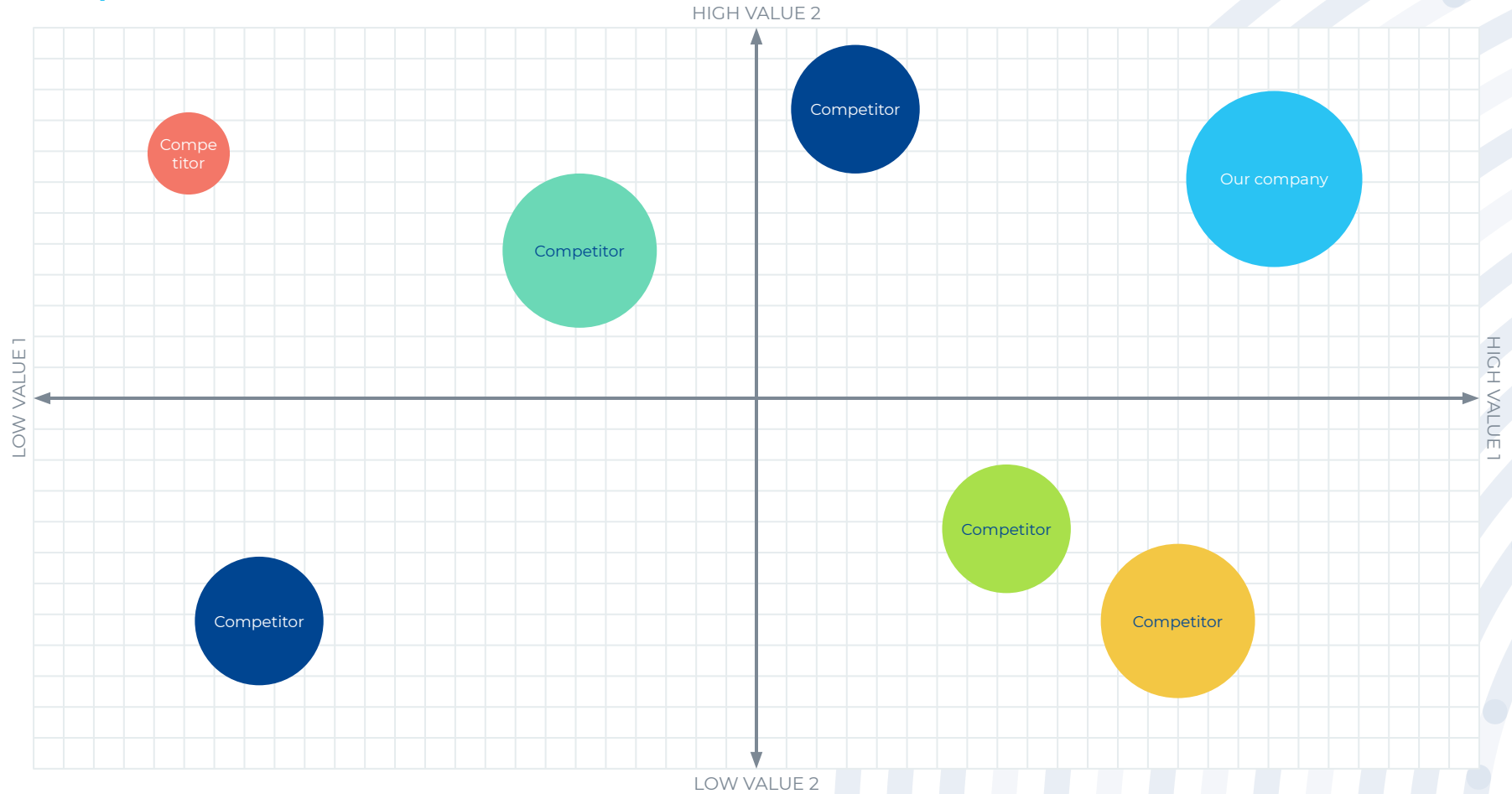


Nils Årud

JOB TITLE

Blue is the colour of the
clear sky and the deep
sea

Competitor Matrix



Weekly Planner

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
09:00 - 09:45	Task	Task	Task	Task	Task	Task	Task
10:00 - 10:45	Task	Task	Task	Task	Task	Task	Task
11:00 - 11:45	Task	Task	Task	Task	Task	Task	Task
12:00 - 13:15	✓ Free time	✓ Free time	✓ Free time	✓ Free time	✓ Free time	✓ Free time	✓ Free time
13:30 - 14:15	Task	Task	Task	Task	Task	Task	Task
14:30 - 15:15	Task	Task	Task	Task	Task	Task	Task
15:30 - 16:15	Task	Task	Task	Task	Task	Task	Task



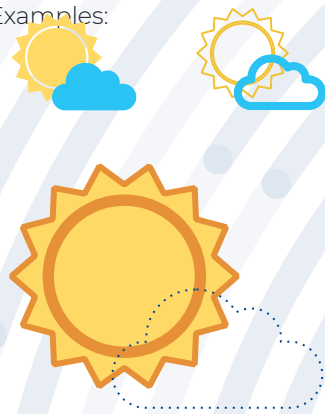
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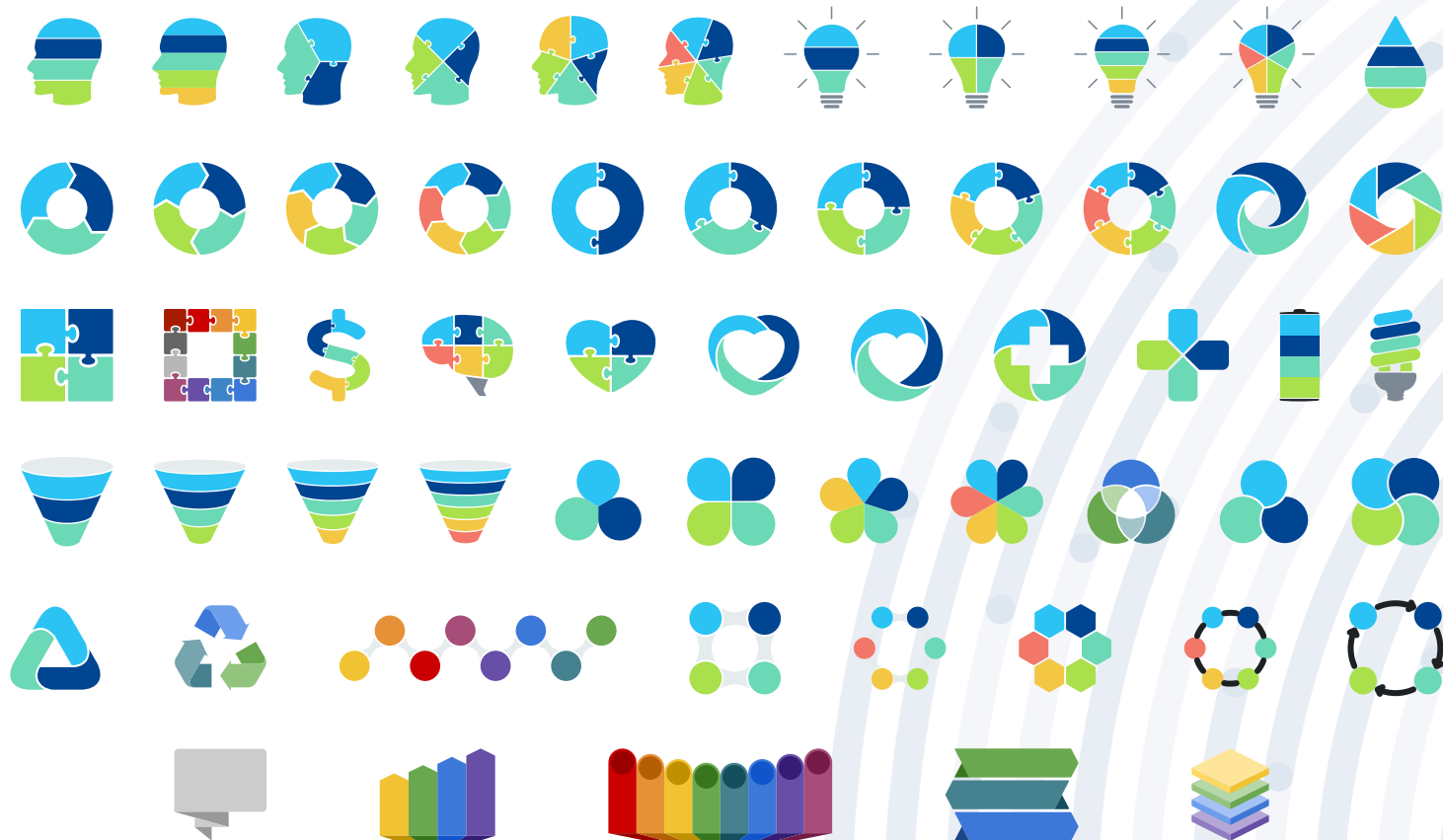
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