SLIDE 1— TITLE PAGE

1. **Thank you for coming today.**
2. **We appreciate your joining us to watch our presentations.**
3. **Today my fellow colleagues and I would like to present our Capstone Project.**
4. **We're going to share our findings about Happiness across the World.**

SLIDE 2—CONTENTS

1. **Here are the sections of our presentation. …proceeds as follows.**
2. **We'll start off with an Introduction**
3. **Then move on to Exploratory Data Analysis or EDA**
4. **Then we look into our Models**
5. **Next we have a little Bonus for you**
6. **Finally we end with the Outlook for further research and on future developments**

SLIDE 3— INTRO: WHR

1. **I'm going to give you a general overview of the data, of what we're going to be exploring today.**
2. **We took the data used for the World Happiness Report**
3. **Which comes out once a year.**
4. **The time period of data is 18 YEARS, 2005 to 2022.**
5. **OveralL, 165 countries have participated but not every year. (195 RECOGNIZED COUNTRIES, ROUGHLY 84% OF TAKE PART).**

SLIDE 4 Aiming & Framing the World Happiness

1. Happiness matter to everyone
2. On the individual level, we all seek to find happiness.
3. On a national level, happiness is also of interest.
4. Policy makers of the differing governments want happy productive citizens.
5. It ensures the well-being of the nation
6. Naturally questions arose about happiness
7. Where are folks the happiest, in which countries? Then further… what factors have an influence on happiness levels?
8. Hence we aimed to set out to Create a …Predictive Model for the Happiness Index

SLIDE 5 FEATuRES:

1. Let's get to know the features of the dataset.
2. The World Health Report is based on surveys from the Gallup World Poll and data from the Worldbank Databank.
3. The questions asked the respondents to rank or give a yes/no answer.
4. The average of their answers were then tallied up for each country.
5. First off, we have the life ladder or happiness index which is our target or what we want to predict.
6. Social Support refers to whether or not you have

got someone to count on in times of trouble.

7. Freedom to Make Life Choices: is the response to "Are you satisfied or dissatisfied with your freedom to choose what you do with your life?"
8. Perception of Corruption "Is corruption widespread throughout the government and businesses or not?"
9. positive Attitude- have you experience a lot of positive emotions (laughing, enjoyment, learning something interesting) yesterday
10. negative Attitude 07 have you experienced a lot of negative emotions yesterday (worry, sadness, anger)?
11. Factual data about the countries are based on info from the worldbank
12. Healthy_life_expectancy_at_birth— Average number of years that a person can expect to live in "full health"
13. Gdp_per_capita- shows the health of a country's economy. It is the total value of the goods and services produced in a country during a specific period of time, usually a year.

SLIDE 6 LIFE LADDER

1. The Happiness Index or the Life Ladder (as I mentioned in the slide before) is the target or what we are aiming to predict
2. How is it determined? The individual is asked…
3. The top of the ladder 10 represents the best possible

life for you and the bottom of the ladder. 0 represents the worst possible life for you.

4. On which step of the ladder do you stand now in your opinion?

SLIDE 7– Further Features Considered

1. We brought in more variables . We wanted to improve our model's performance
2. Crime INdex- perception of crime
3. Health Care Exp Index is designed to reflect the quality of a healthcare system b
4. Population Density people lving per sqkm of country
5. Average years of school for adult of age 25 years or more: Human Development Index.
6. Cost of Living Index in USD
7. The Gini index measures Inequality of wealth distribution
    a. A Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.
8. To ensure data accuracy, we have implemented filtering measures to identify and exclude potential spam from our calculations. Our algorithms identify users who exhibit spam-like behavior and their inputs are not considered in the calculations. This helps maintain the integrity of the data and pro
9. Environmental Pollution Index NUmbeo The data in this section is derived from surveys conducted by

visitors to our website. Questions in these surveys are designed to be similar to many scientific and government surveys.

a. Each entry in the survey is assigned a number within the range of -2 to +2, where -2 represents a strongly negative perception and +2 represents a strongly positive perception.

b. To make survey results easier to interpret for our users, we present them on a scale ranging from 0 to 100. This scale allows for a clear and straightforward understanding of the data, enhancing user experience and facilitating meaningful comparisons.

SLIDE 9: Happiest Countries, 1st Place

Winners(2005-2022)

You are probably wondering which countries are the happiest? On this Slide you can see the winners since 2005 to 2022.

As you can see Finland & Denmark are the top countries in terms of happiness index. Finland has won 8 times and Denmark has won 7 times, whereas

Canada, Norway and Switzerland have won just one time each.

SLIDE 10: Average Level of Happiness (2005-2022)

Let's take a look where the happiest countries are. Since we didn't have all the data for each country and for every year, here we did an average over the whole time span to get an overview.

The color gradient represents the level of the life_ladder.

The darker the purple the more happy the country is.

The deeper yellow the country is, the lower the happiness index.

SLIDE 12: CORRELATION TO LIFE LADDER

Why are some countries happier than others?

Which factors could lead to more happiness?

On this slide you can see the correlation to happiness index (life_ladder).

How strong and which direction the relationship between features and life_ladder is shows the correlation coefficient which is a number between -1 and 1. The closer to one, the stronger the correlation.

And here you can see that we have strong correlation between life_ladder and GDP per capita, social support, Healthy life expectancy at birth. But we also have negative correlation between Environment pollution Index and life_ladder.

We suspect the reason for the low correlations to the life_ladder could be that we didn't have enough Data.

Which features did we use to predict the target (life_ladder)?, which model did we use and how it performed, you will see on the upcoming Slides

SLIDE 14: Baseline Model

We ran the base model with the variable with the highest correlation : GDP per Capita.

We tried several algorithms and chose K-nearest neighbors. It performed the best.

The idea of the KNN algorithm is that *similar things are near*.

So the algorithm searches for a given number of neighbors of a datapoint,

Then calculates the average of the neighbors

And assigns this target value to the datapoint.

In order to evaluate how well our model performed we compared the average error between the predicted life ladder value and actual life ladder value.

So that would be, (namely) the absolute error and the percentage error.

Our Baseline Model has the absolute error of 0.52 and the percentage error of 10,2%

There is room for improvement..

SLIDE 15 Sort Out the Variables …

…depending on whether they improve the model or not.

And in the end we identify 7 Variables that made our model better.

Let's take a closer look at those variables we (decided to) keep.

SLIDE 16: Best Performance Model

We improved the model, that means we minimized the error for the prediction. The selected variables are: ...

Each time we added another variable the error decreased.

We stuck to KNN algorithm. It was superior to the the other algorithms we tried.

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SLIDE 17:

In the model performance table you can see how we improved the model.

SLIDE 18/19: Bonus

And now, We have a little bonus…

During our project, on World Happiness Day, March 20th, 2024

the new the Happiness Report for 2023 was released

We took this data and looked at it. And we also used it to test our model.

SLIDE 20: Happiness Index in Europe, 2023

The map on the left shows the countries of Europe, coloured according to the level of the Happiness Index. The color gradient is in the middle of the picture and you can see, The darker purple the country, the happier it is.
The chart on the right shows the Happiness Index with bars.
As we can see, Finland has won again this year with a happiness-index of 7.7.
In 2nd place is Iceland and in third place is Denmark.
In the bar plot we have added our prediction with stars.
As you can see, some indices we can predict more accurately, others less so.
Overall, the average error for our model has not changed, even with the new data. It is still at 5,9%.

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SLiDES–SUmmary

1. The results of our analyses show
2. the happiest european countries are denmark and finland
3. In the rest of the world the happiest countries are and
4. 7 Variable Enhance the Performance of our Predictive Model

SLiDES Outlook for the future

1. Expand current research
2. Denmark, Finland , western countries according to our findings here have gotten it right, so to speak.
3. Let’s dig further into indices and uncover additional factors that can predict and make a

better model.

4. A blueprint or template can be made for other countries to follow.
5. What we've examined has only scratched the surface
6. Our Findings warrant also further understand about the nature and design
7. Inherent flaws due to bias do our western ideals of ranking translate into every culture,
8. Perhaps happiness is not the end all be all? Or the correct metric? Is happiness too fleeting momentary and hedonistic? Perhaps a clearer more precise definition of happiness is in order: A differentiation between a life filled with fleeting momentary hedonistic pleasures and one marked by an abiding purpose and deep sense of fulfillment.
9. So those a few things we can ponder

FINAL SLIDE

WE THANK YOU AGAIN FOR YOUR ATTENTION. SEE YOU AT THE Q & A.