WOMEN'S PROFESSIONAL WELL-BEING INDEX AROUND THE WORLD

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EXECUTIVE SUMMARY – PROJECT GOALS

Objective

- This project aims to develop a comprehensive Global Women's Professional Well-Being score using key datasets that reflect various aspects of women's professional well-being across countries.
- The score will provide valuable insights into women's professional well-being in countries and globally.

Industry Relation

- This project is closely aligned with industries focused on gender equality, workplace well-being, human resources, corporate social responsibility, and global development.
- By developing a Global Women's Professional Well-Being score, the project aims to provide actionable insights for businesses, non-governmental organizations (NGOs), policymakers, and international organizations.

UNDERSTANDING WOMEN'S PROFESSIONAL WELL-BEING GLOBALLY

Project Context

We wanted to build a professional well-being score app where one can enter an entity name and view its professional well-being score, as well as suggestions and solutions for improving the score.

Below are the economic and social indicators for various variables & metrics we incorporated in our models:

Country Codes	Years	Average Hours Worked
Employment-population Ratio	Gender wage gap	Labor force
GDP per capita	School years	Paid leave
Agriculture	Industry	Female Share of Employment in Services

DATA SOURCE, SELECTION, & COLLECTION PROCESS

Our World in Data – Women's Rights (Data Sources)

- Focused on 3 relevant columns in each data set: Entity, Code, & Year

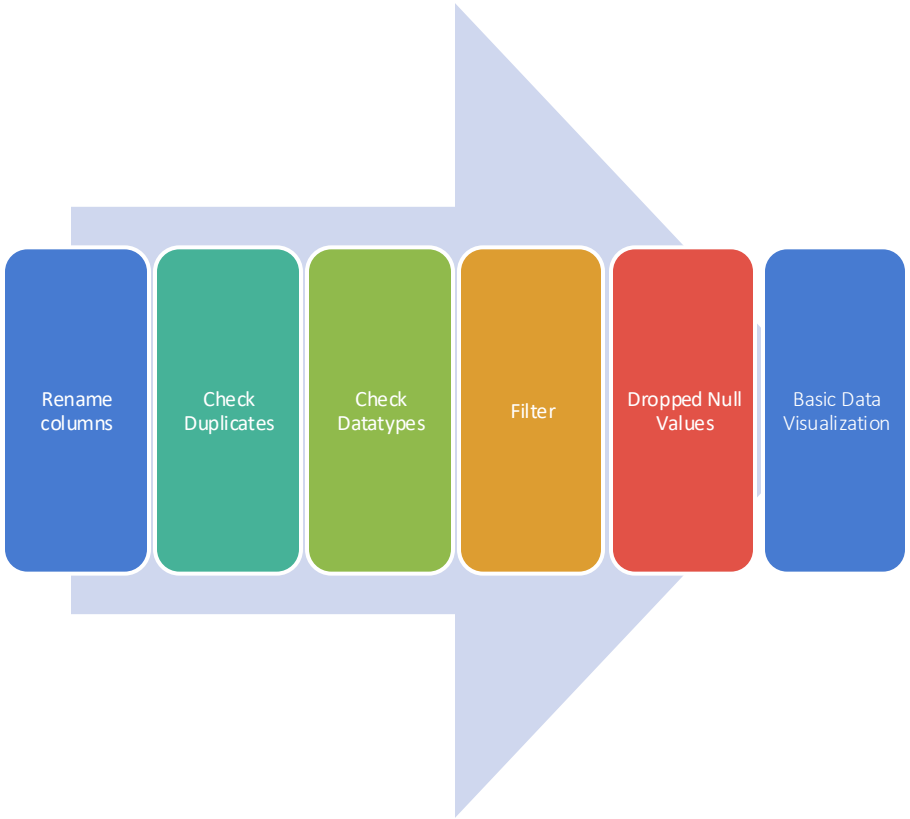
7 Datasets Used in our Analysis

- average-usual-weekly-hours-worked-women-15-years-and-older.csv
- female-employment-to-population-ratio.csv
- female-labor-force-participation-rates-by-national-per-capita-income.csv
- gender-wage-gap-oecd.csv
- mean-years-of-schooling-female.csv
- paid-leave-at-least-14-weeks-mothers.csv
- share-of-female-workers-by-sector.csv

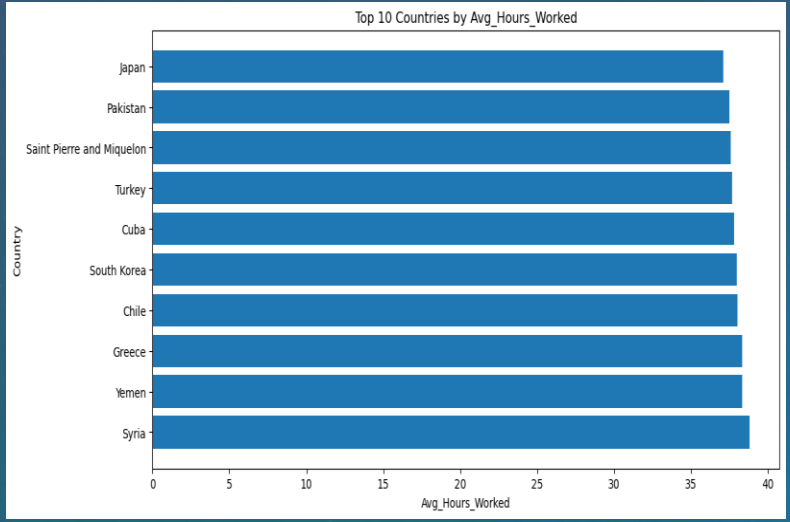
Reason for Choice:

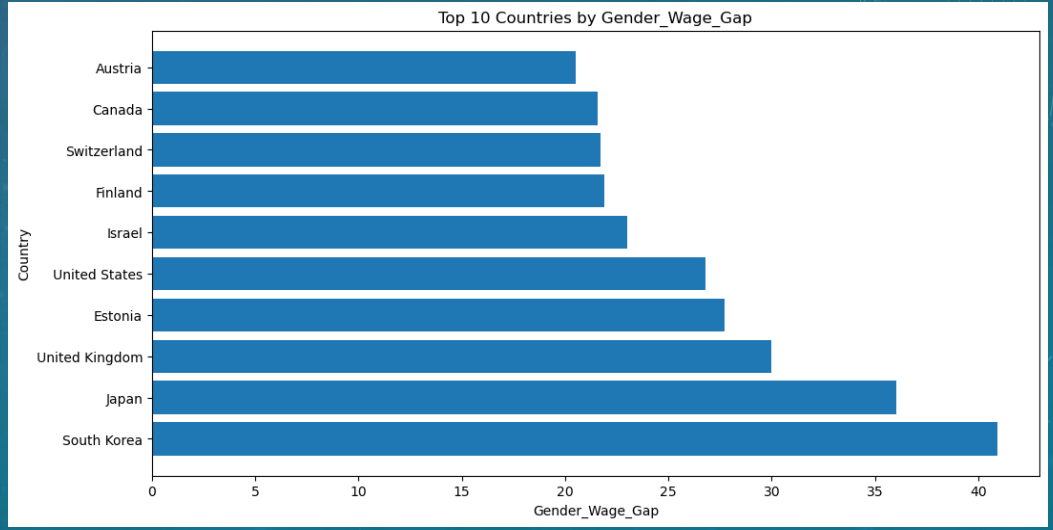
- The features we chose are indicators of professional development and well-being.
- The global data provides a large sample size, enhancing the reliability of predictive models

DATA CLEANUP & EXPLORATION PROCESS

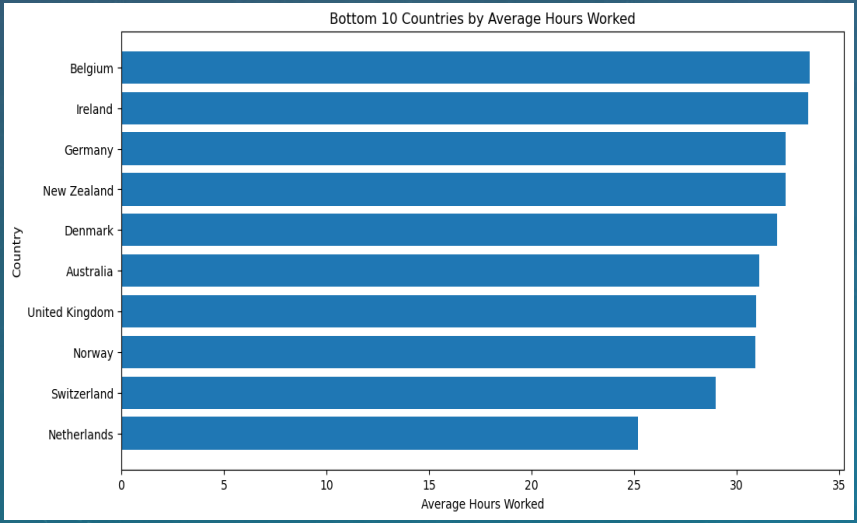


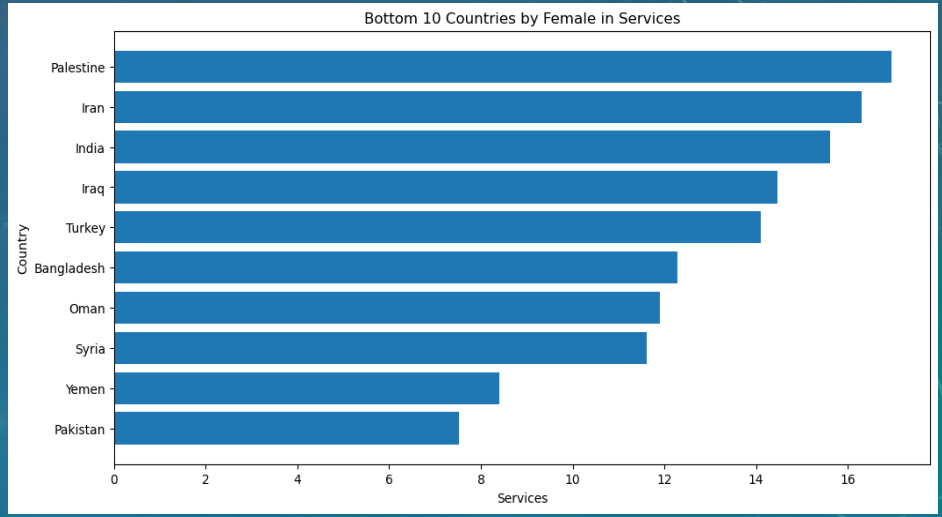
TOP 10 COUNTRIES BY AVERAGE HOURS WORKED & GENDER WAGE GAP



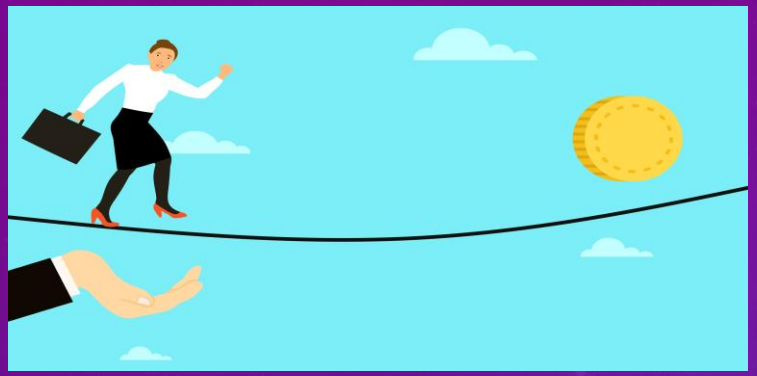


BOTTOM 10 COUNTRIES BY AVERAGE HOURS WORKED & FEMALE IN SERVICES





HOW DID WE ACHIEVE OUR PROJECT GOALS?



Steps Taken:

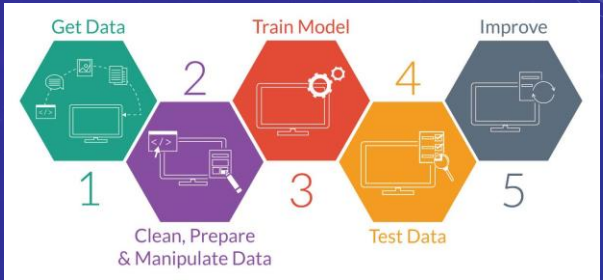
- Defined target variable
  - Professional wellbeing score
  - Scale 0-1
- Scale the columns
- Split the data into training and testing sets
- Applied multiple regression models to test and train our dataset

Models used:

- Random Forest Regressor model
- LightGBM Regressor model:
- Linear Regression Model:
- Gradient Boosting Regressor:
- XGBoost Regressor:
- Neural Network Model: ReLU Activation Function

Building Gradio App

- We used LLM-OPENAI – to connect through API key to build explanations and suggestions functions to display results in the Gradio app.



MODEL TRAINING & EVALUATION

Random Forest Regressor	MSE: 6.151	R2 Score: 0.994
LGBMRegressor	MSE: 3.850	R2 Score: 0.993
Linear Regression	MSE: 1.252	R2: 1.0

Gradient Boosting Regressor	MSE: 7.164	R2: 0.987
After Hyperparameter Tuning	MSE: 3.071	R2: 0.994
XGBoost w/ Hyperparameter Tuning	MSE: 2.295	R2: 0.996
Neural Network	MSE: 2.717	R2: 0.999

RESULTS

Project Achievements

- Developed a Women's Professional Well-being Application
- Developed a comprehensive scoring system
- Provides personalized explanations and recommendations

Technical Accomplishments

- Optimized datasets for strong predictive performance
- Implemented model optimization techniques
- Utilized neural network with sequential architecture
- Integrated Gradio for user interface
- Leveraged OpenAI API for enhanced functionality

NEXT STEPS → FUTURE PURSUITS

Future Work

- Use more advance machine learning techniques such as deep learning and transfer learning
- Incorporating additional data sources
- Developing a more sophisticated explanations function that can provide more detailed and actionable insights into the factors influencing an entity's professional wellbeing score.

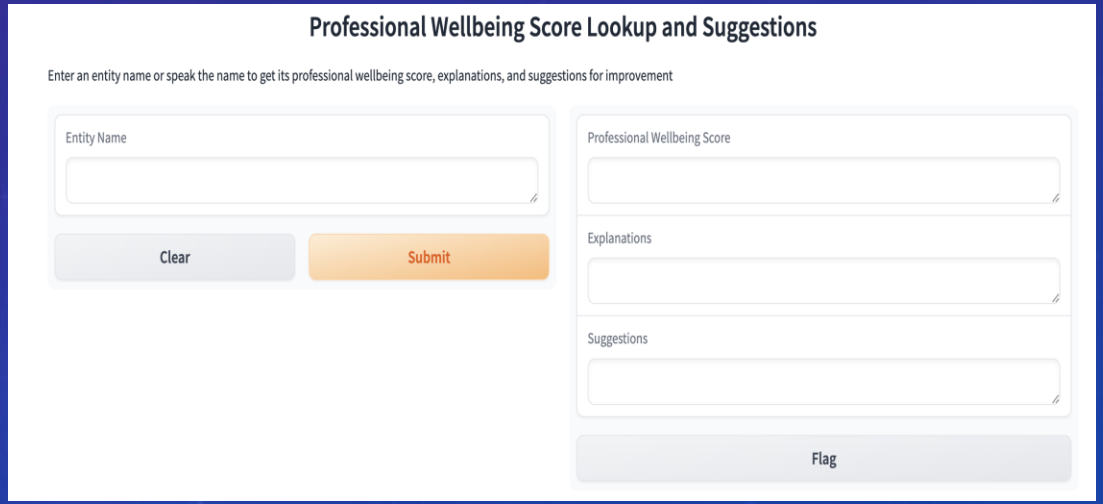
Potential Improvements

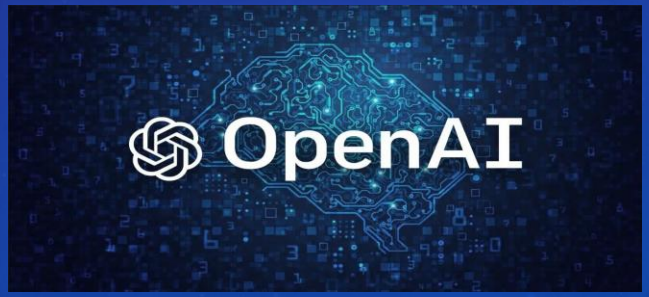
- Refining the models
- Getting the OPENAI Whisper connection to work
- Expanding the dataset to look at other factors such as women personal and social wellbeing globally.

CONCLUSIONS

Gradio App

- Created an interactive User-Friendly Interface
- Input any Country Name
- Displays Women's Professional Wellbeing Score
- Explains factors that contributed to the score
- Provides suggestions to improve the score





OpenAI API

- Integrated through the OpenAI API
- Used GPT 3.5 Turbo
- Revised code to generate better responses

QUESTIONS?