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"NATIONAL RESEARCH UNIVERSITY HIGHER
SCHOOL OF ECONOMICS"
MOSCOW INSTITUTE OF ELECTRONICS AND MATHEMATICS
TECHNICAL SPECIFICATION*

EXERCISE

for independent work according to an individual course plan
"Project Workshop "Python in Data Science""

Predicting Personal Income Level Based on Socio-Economic Data

USER MANUAL

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1. Install Prerequisites

Python 3.10

To begin, ensure that Python is available on your system:

- For Windows users: Open Command Prompt and enter: `python --version`
- For Linux or macOS users: Use Terminal and type: `python3--version`

If Python is already installed, you should see output resembling: **Python 3.10.6** or higher.

Python Not Detected?

In case your system doesn't recognize the command:

- Visit the official Python website: <https://www.python.org/downloads/>
- Choose the latest stable release (ideally version 3.10 or above).
- Launch the installer. Important: Be sure to enable the "Add Python to PATH" option before selecting "Install Now".

Anaconda

To verify whether Anaconda is installed on your system:

- Open a command-line interface (e.g., CMD or Terminal) and execute: `conda --version`

If installed correctly, you'll see an output similar to: **conda 24.x.x**

Anaconda Not Found?

If the command isn't recognized, you'll need to install Anaconda:

- Navigate to the official download page: <https://www.anaconda.com/download>
- Select the appropriate installer for your operating system.
- Launch the installer and proceed with the default installation options (no changes needed during setup).

2. Project

After downloading Work.zip, locate it (usually in your Downloads folder) and extract it.

Make sure the path is something like this: **YourPath\Work\Work\Scripts** (for example)

You'll get a folder with the following structure:

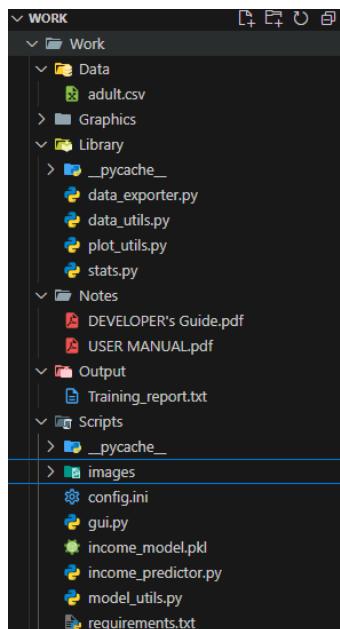


Figure 1 - Project Structure

3. Virtual Environment

After extracting the Zip file, Open **anaconda Prompt**

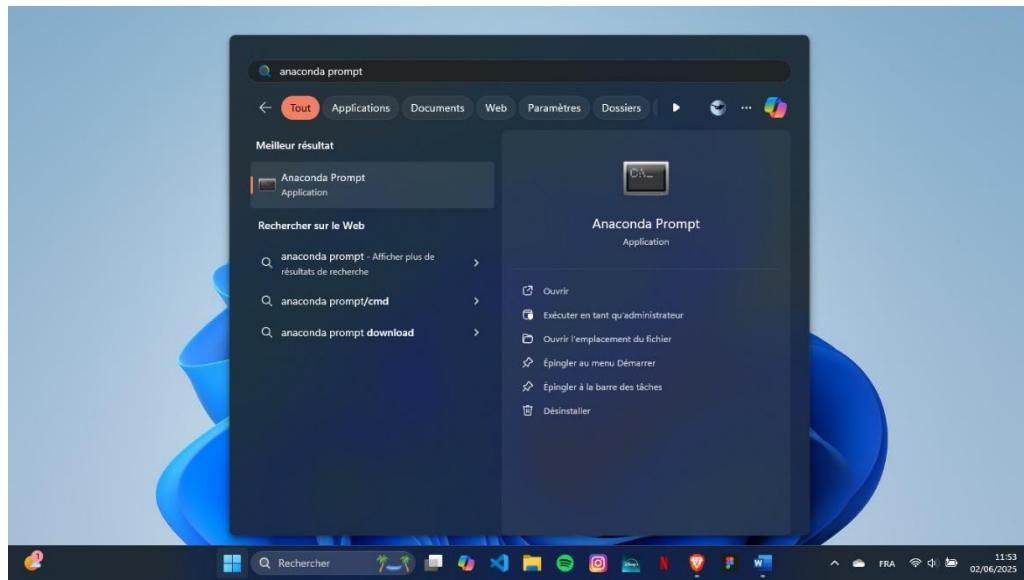


Figure 2 - Anaconda Prompt

Access the path to your extracted Work folder, it should be something like: **YourPath\Work**

- Access Folder: `cd YourPath\Work\Work`
- Create virtual environment: `conda create --name income_predictor python=3.10`
- Activate it: `conda activate income_predictor`
 - **(Base)** will change into **(income_predictor)** which means the environment is activated
- Now Acces Folder: `cd YourPath\Work\Work\Scripts`
 - Install all dependencies: `pip install-r requirements.txt`
- Open Anaconda Navigator and select the environment you created.
- Search for Spyder, install it, then launch it.
- In Spyder, **open income_predictor.py** and **config.ini** from the **Work\Work\Scripts** folder.

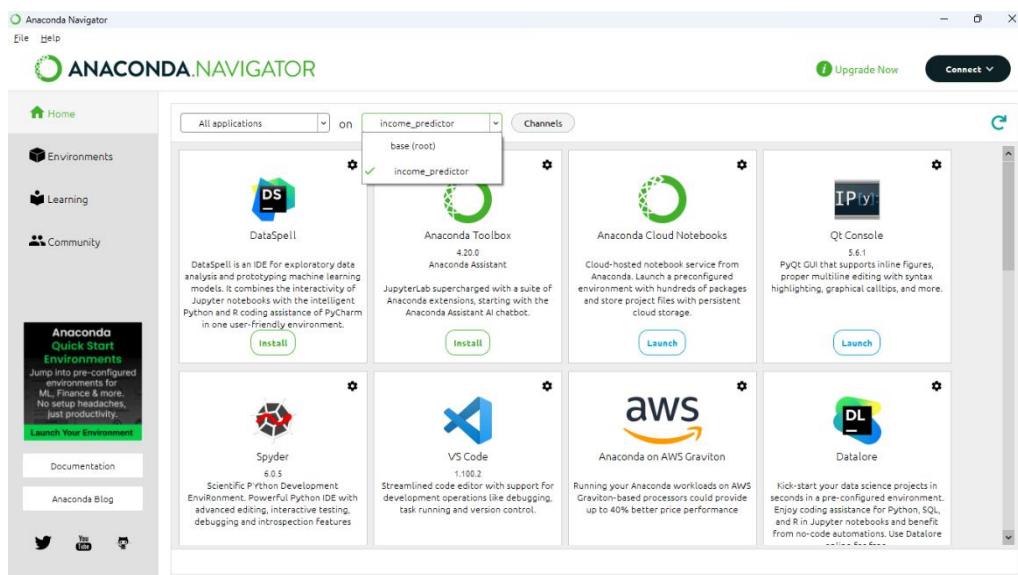


Figure 3 - Environment selection

Within this file, exists the configuration of the app, from here the user can change the colors and fonts of the app.

```
1 [interface]
2 window_width = 800
3 window_height = 1200
4 bg_color = beige
5 font_family = Arial
6 font_size = 12
7 sidebar_font_size = 14
8 report_button_color = yellow
9 button_color = grey
10 image_max_width = 800
11 image_max_height' = 500
12 export_button_color = green
13
14
```

Figure 4 - App configuration

4. Python Interpreter

In Spyder, go to **Tools > Preferences > Python Interpreter**, then browse and select the interpreter from the environment you created (e.g., `income_predictor\python.exe`).

Click Apply, and restart Spyder if prompted.

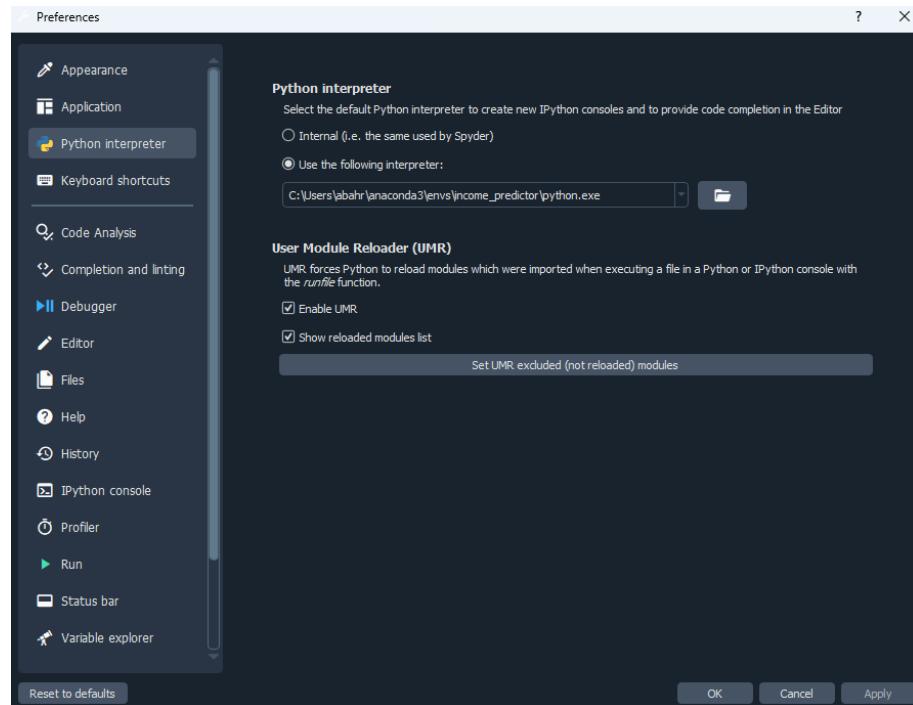


Figure 5 - Python interpreter

You should see the environment we are using at the bottom of Spyder, make sure it's the right one:

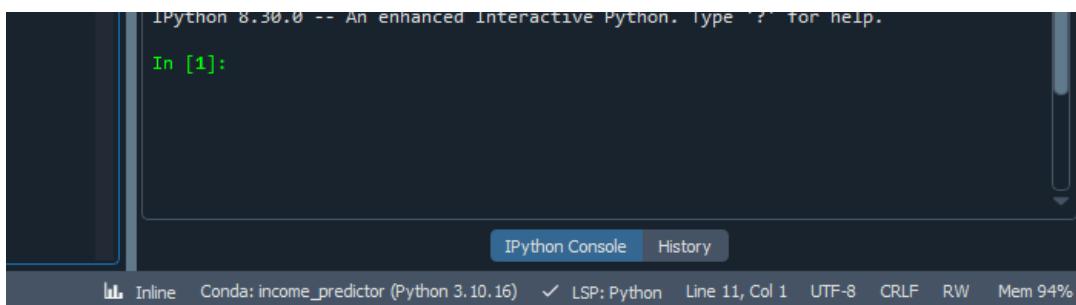


Figure 6 - Environment check

5. Run the Program

Now go to the `income_predictor.py` file opened in Spyder and run it and the GUI must appear

6. USER MANUAL

Loads the dataset from file, replaces missing values, and prepares the data for analysis. Use this button to start working with the dataset.



Figure 7 - Load & Clean Data

Displays a detailed summary of the dataset, including number of rows/columns, missing values, and basic statistics. Useful for quickly understanding data quality and structure.

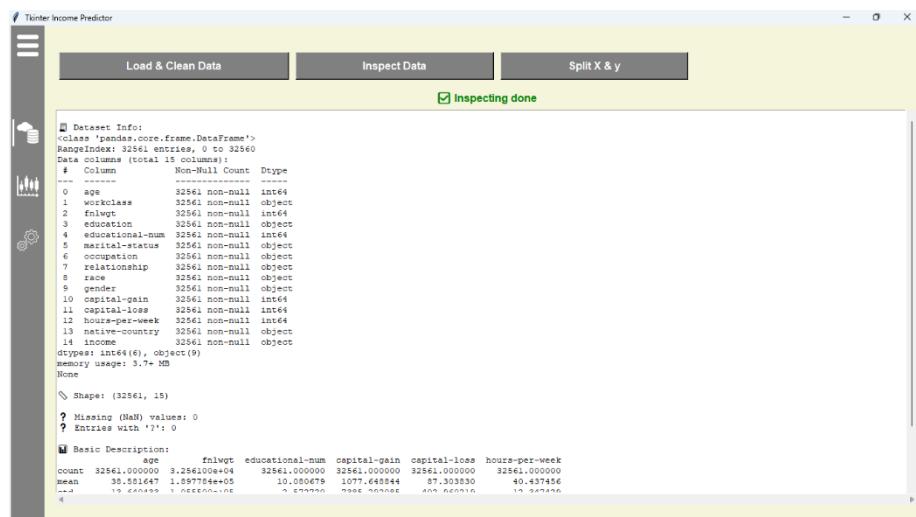


Figure 8 - Inspect Data

Separates the dataset into input features (X) and the target variable (y). This step is required before training a machine learning model.

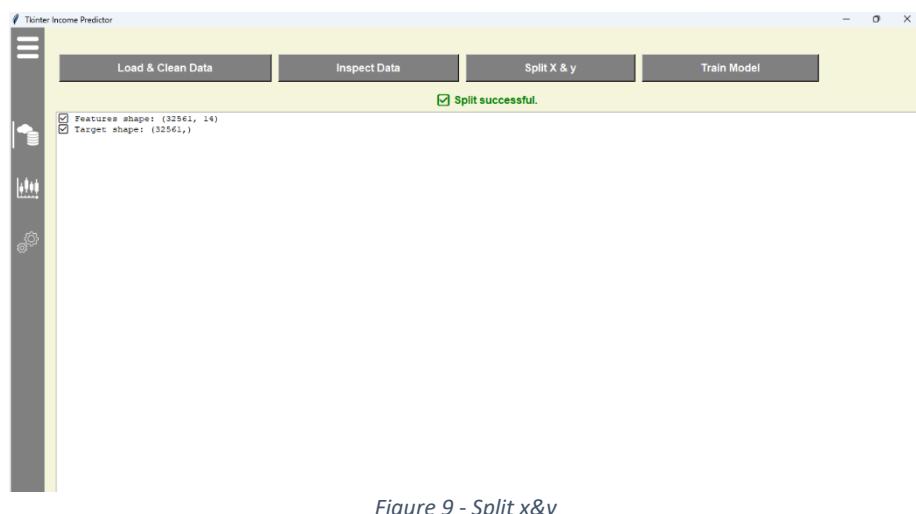


Figure 9 - Split x&y

Trains a classification model (Random Forest) on the prepared data and displays the accuracy and classification report. Ensure the data is split before using this button.

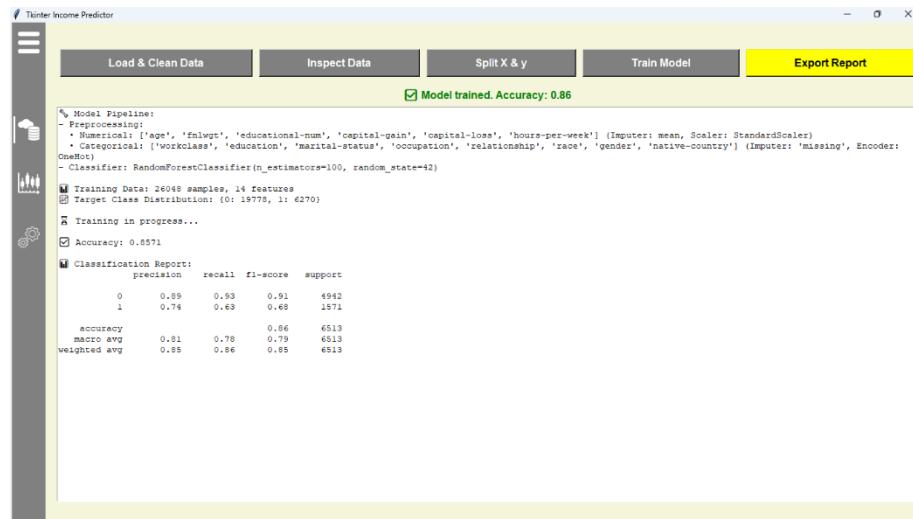


Figure 10 - Train model

Saves the latest training report (accuracy and metrics) as a text file. This allows you to keep a record of model performance for documentation or analysis.

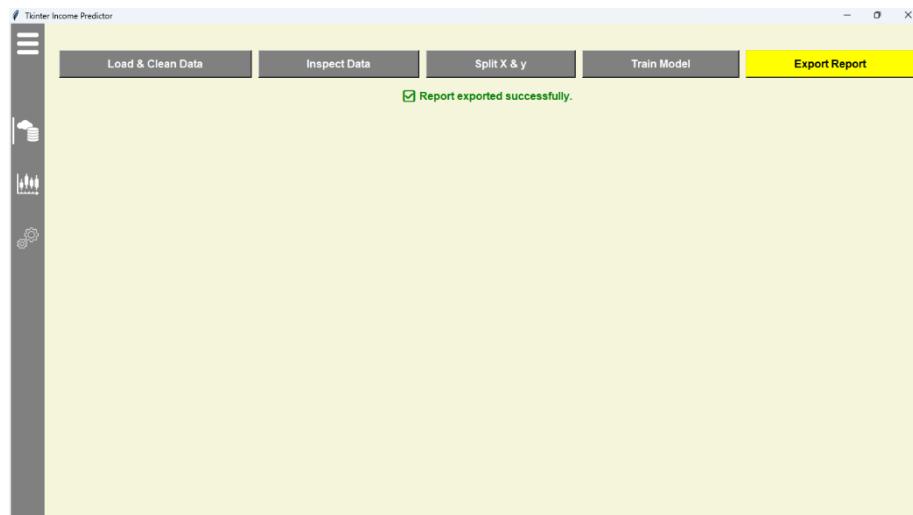


Figure 11 - Export report

Use this dropdown to select the type of chart you want to generate. Available options include distributions (e.g., age, income), comparisons (e.g., education vs. income), and a correlation heatmap. Choose one and generate it, the resulting plot appears directly in the interface.

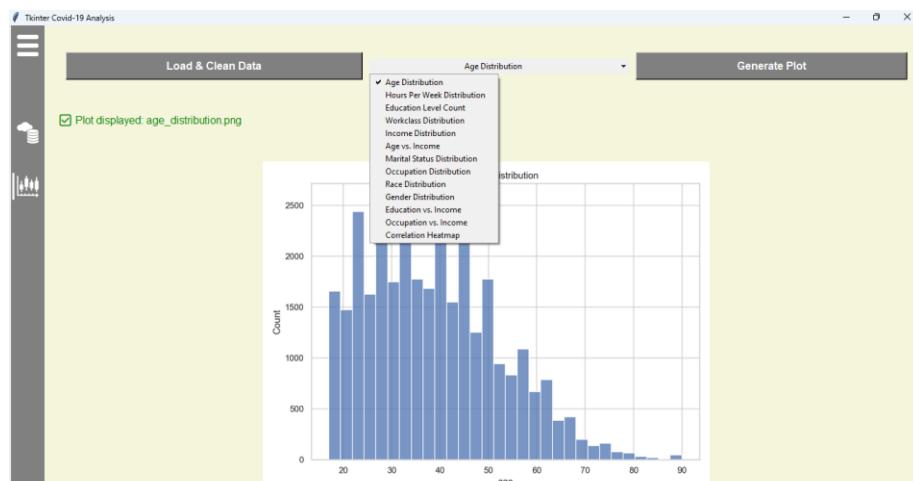


Figure 12 - Plot generation

Use this page to customize the appearance and layout of the application interface. You can select font families and sizes, button colors, and the background theme. All options are provided as dropdowns for quick selection. Once you're done, click "Save Configuration" — the application will restart to apply your changes.



Figure 14 - Configuration

Figure 13 - Export report