This manual is about an easy-to-use model that predicts if a patient has heart disease

USER MANUAL FOR A MODEL FOR PREDICTING HEART DISEASE

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SECTION 1: INTRODUCTION

Heart disease covers a range of different conditions that could affect the heart. It is one of the most complex diseases to predict given the number of potential factors in the body that can lead to it. Healthcare organizations collect and produce large volumes of data on a daily basis. Information technology allows automatisation of processes for extraction of data that help to get useful knowledge and regularities.

Goal

This manual is about an easy-to-use model that predicts if a patient has heart disease.

The model is based on the Random Forest Classification technique and it achieves accuracy of around 95%. Our objective is to deliver the model, which may save lives and decrease the cost of the healthcare services.

Before being delivered, the functionality of this model was carefully tested. We ask you to read the User Manual in details before operating with the model. Following the directions in this manual will protect you from any false predictions. Keep this User Manual and store it near the model for further information. The instructions should be followed carefully to avoid any misinterpretation. The model should only be used after the instructions below have been read carefully. The model should not be operated by children or anyone who has not read the instructions.

SECTION 2: SYSTEM REQUIREMENTS

Recommended System Requirement

Processors:

Intel® Core™ i5 processor 4300M at 2.60 GHz or 2.59 GHz (1 socket, 2 cores, 2 threads per core), 8 GB of DRAMIntel® Xeon® processor E5-2698 v3 at 2.30 GHz (2 sockets, 16 cores each, 1 thread per core), 64 GB of DRAMIntel® Xeon Phi™ processor 7210 at 1.30 GHz (1 socket, 64 cores, 4 threads per core), 32 GB of DRAM, 16 GB of MCDRAM (flat mode enabled)

Disk space: 2 to 3 GB

Operating systems: Windows® 10, macOS*, and Linux*

Minimum System Requirements

Processors: Intel Atom® processor or Intel® Core™ i3 processor

Disk space: 1 GB

Operating systems: Windows* 7 or later, macOS, and Linux

Python* versions: 2.7.X, 3.6.X

SECTION 3: DOWNLOAD THE MODEL ONTO YOUR COMPUTER

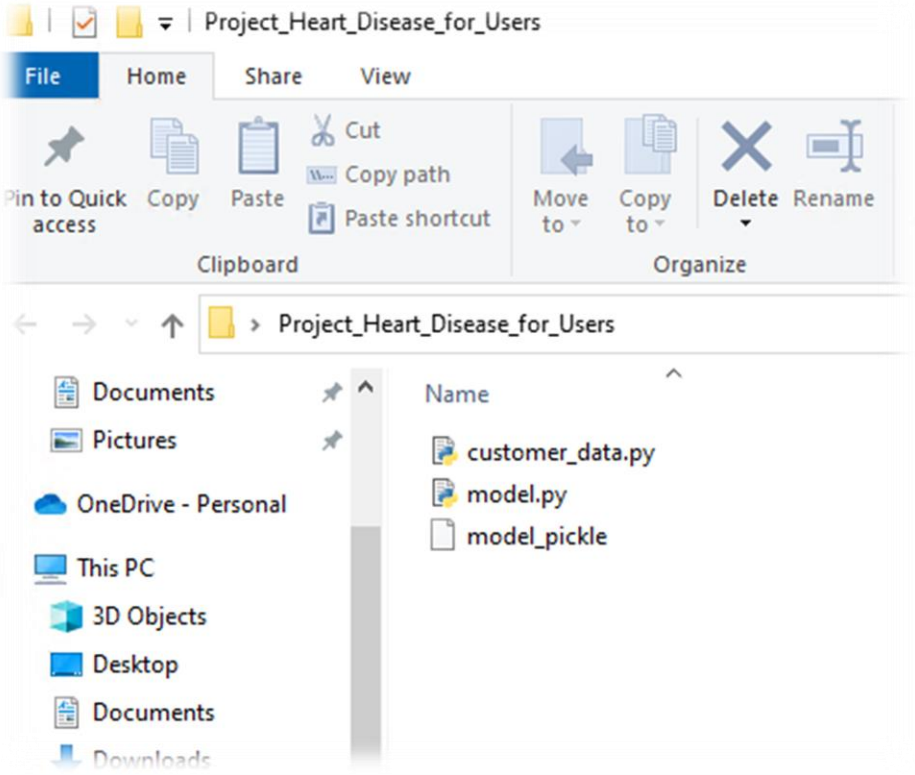
1. Download the model from this link below or insert the CD in the CD-ROM.

   https://drive.google.com/drive/folders/1sDa7kishdCL3-VXvQnkubREhZyyTPD4z?usp=sharing

2. Unzip the folder called: Project_Heart_Disease_for_Users
3. Copy the unzipped folder called: Project_Heart_Disease_for_Users
4. Paste the folder on your computer in a desired place, e.g.: on drive C:\

Inside the folder "Project_Heart_Disease_for_Users" there are three files:

1. "customer_data.py" → This files takes the input from the user. The user does not need to open it.
2. "model_pickle" → This is the trained model. The user does not need to open it.
3. "app.py" → The main file that runs the model. The user needs to open it. After entering the required information, the model will predict if the patient has a heart disease or not.



SECTION 4: DATA REQUIREMENTS FOR THE MODEL

Missing and incorrect values in the data would lead to error. Only correct values to be provided, otherwise the model will not predict properly.

Explanation of the required data

- **age:** The person's age in years
- **sex:** The person's sex (1 = male, 0 = female)
- **trestbps:** The person's resting blood pressure
- **restecg:** Resting electrocardiographic measurement (0 = normal, 1 = having ST-T wave abnormality, 2= showing probable or definite left ventricular hypertrophy by Estes' criteria)
- **thalach:** The person's maximum heart rate achieved
- **exang:** Exercise induced angina (1 = yes; 0 = no)
- **oldpeak:** ST depression induced by exercise relative to rest ('ST' relates to positions on the ECG plot)
- **ca:** The number of major vessels (0 – 3)
- **cp:** The chest pain experienced (value 1: typical angina, value 2: atypical angina, value 3: non-anginal pain, value 4: asymptomatic)
- **thal:** A blood disorder called thalassemia (0 = normal; 1 = fixed defect; 2 = reversable defect; 4 = Hydrops fetalis)
- **slope:** The slope of the peak exercise ST segment (value 0: upsloping, value 1: flat, value 2: downsloping)

Result

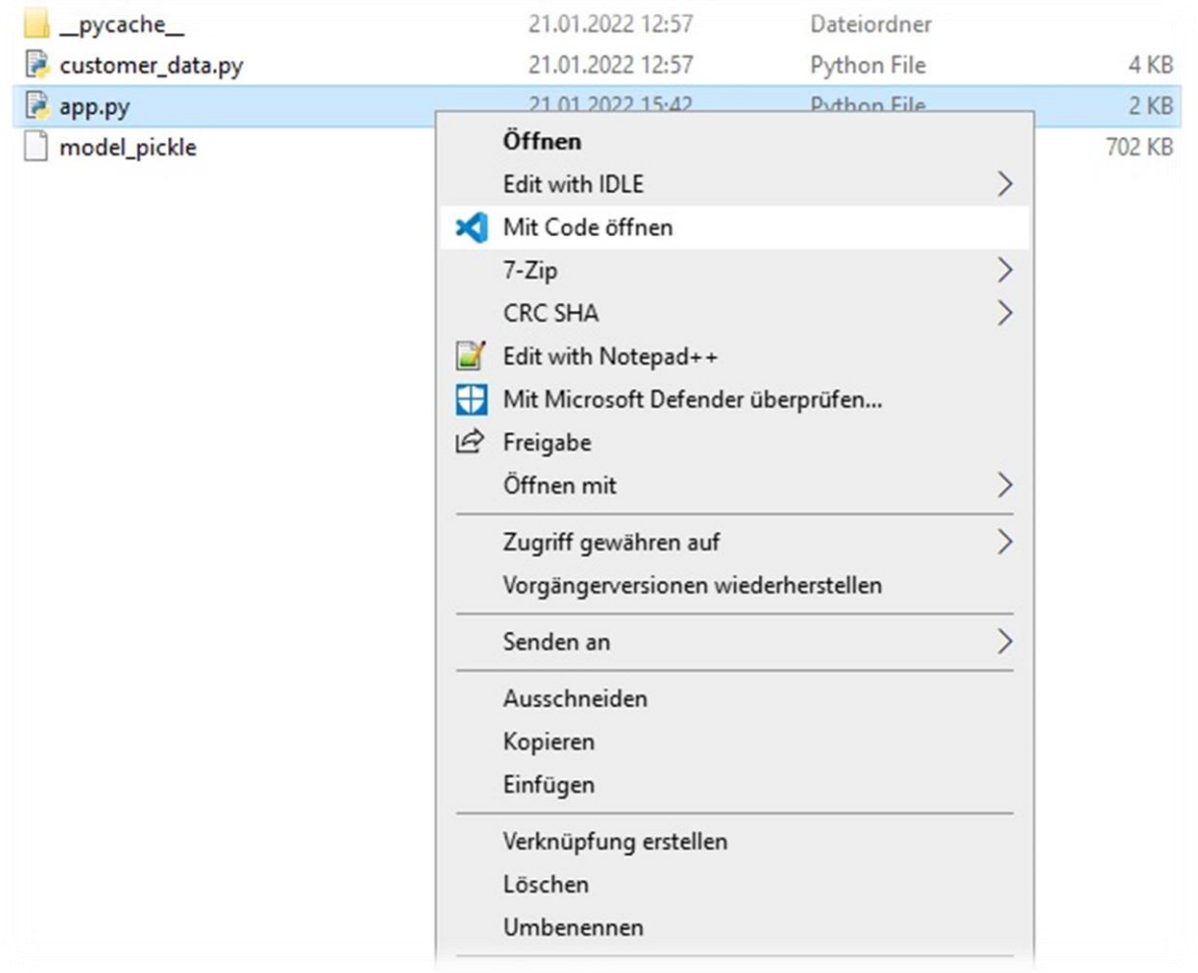
There are two types of possibilities in this model:

1. The patient is predicted NOT to have a Heart Disease
2. The patient is predicted to have a Heart Disease

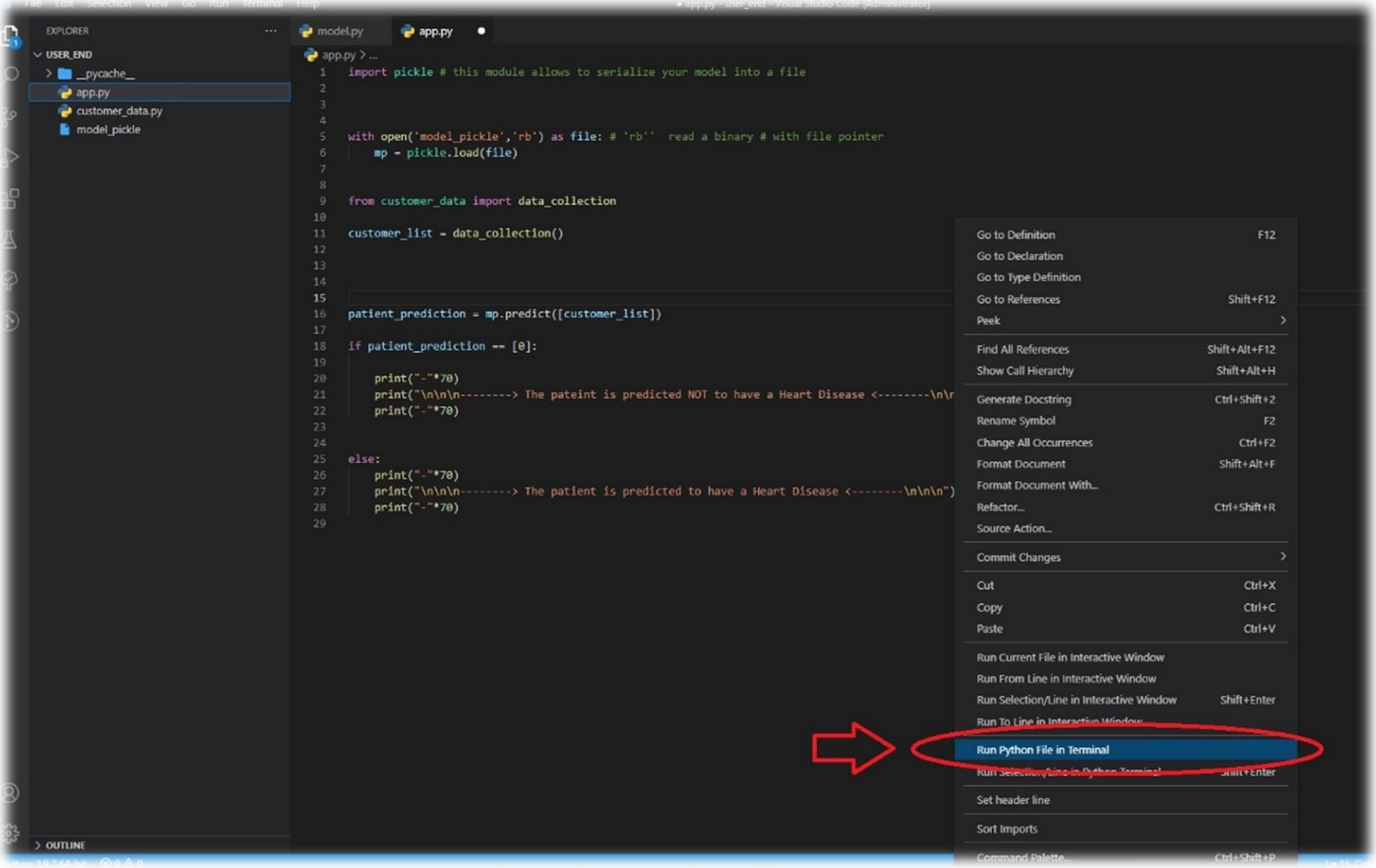
SECTION 4: INSTRUCTIONS FOR USING THE MODEL

Firstly, you start your computer and open your preferred code editor. There are four simple steps, you should do to use the model:

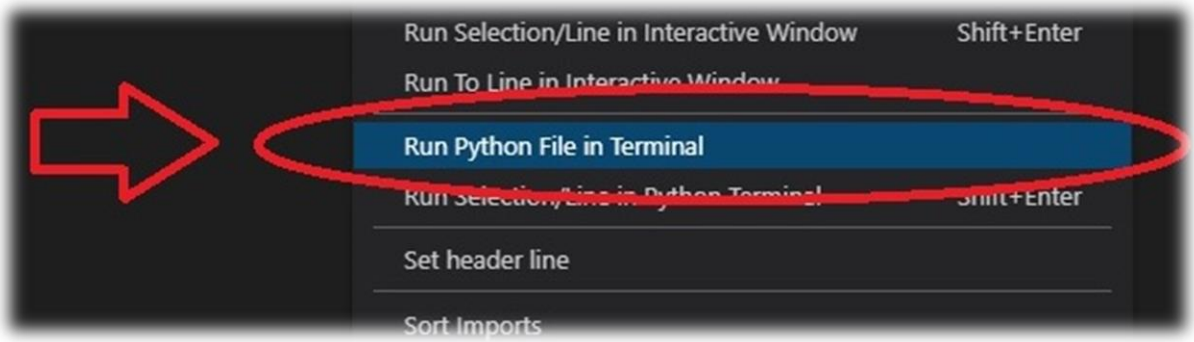
1) Open app.py in code editor



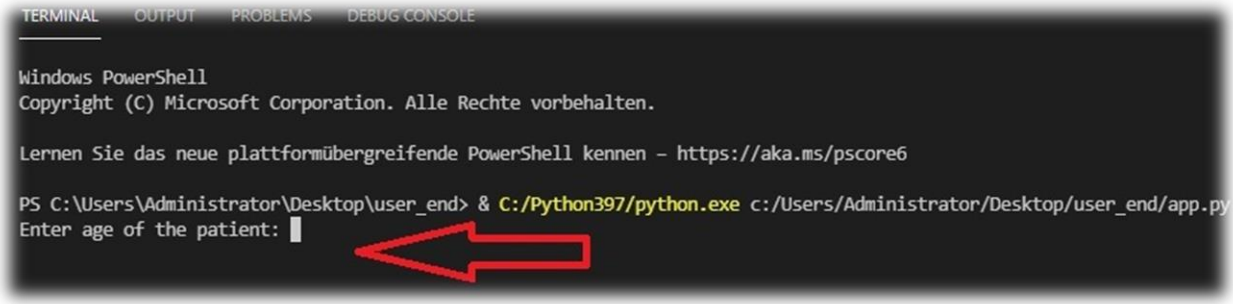
2) Run app.py in Python (Right-click on the black area near the code to open a drop down menu to select python)


EXPLORER
USER_END
__pycache__
app.py
customer_data.py
model_pickle
model.py
app.py
app.py > ...
import pickle # this module allows to serialize your model into a file
with open('model_pickle','rb') as file: # 'rb'' read a binary # with file pointer
mp = pickle.load(file)
from customer_data import data_collection
customer_list = data_collection()
patient_prediction = mp.predict([customer_list])
if patient_prediction == [0]:
print("-"*70)
print("\n\n\n--------> The pateint is predicted NOT to have a Heart Disease <--------\n\n
print("-"*70)
else:
print("-"*70)
print("\n\n\n--------> The patient is predicted to have a Heart Disease <--------\n\n\n")
print("-"*70)
Go to Definition F12
Go to Declaration
Go to Type Definition
Go to References Shift+F12
Peek
Find All References Shift+Alt+F12
Show Call Hierarchy Shift+Alt+H
Generate Docstring Ctrl+Shift+2
Rename Symbol F2
Change All Occurrences Ctrl+F2
Format Document Shift+Alt+F
Format Document With...
Refactor... Ctrl+Shift+R
Source Action...
Commit Changes
Cut Ctrl+X
Copy Ctrl+C
Paste Ctrl+V
Run Current File in Interactive Window
Run From Line in Interactive Window
Run Selection/Line in Interactive Window Shift+Enter
Run Python File in Terminal
Set header line
Sort Imports
OUTLINE

This is a zoomed section of the screenshot bellow for a better visualization:



3) Enter the data by following the instruction on the terminal (Questions will be asked one by one about the patient)



4) Results will be displayed in the Terminal (Might take some time for result to appear in Terminal)