Artificial Intelligence for Sciences and Humanities

Homework 5: Hello, World!

DO NOT POLLUTE! AVOID PRINTING, OR PRINT 2-SIDED MULTIPAGE.

In this homework you will implement your first AI model. Each problem is worth 20 points.

Problem 1. Define the goal of your AI system.

Problem 2. Describe the data that you will use; describe its features, and their numerical representations.

Problem 3. Describe your response.

Problem 4. Collect your data. Present it as a table or file.

Problem 5. In this homework we will use a linear model. Describe $f(\mathbf{x})$ and its main components.

Problem 6. In this homework we will use a mean squared error loss. Describe this loss and its main components.

Problem 7. Recall that for this setup, the optimal weights can be learned in closed form as $\mathbf{w}^\star = (\mathbf{X}^\mathsf{T}\mathbf{X})^{-1}\mathbf{X}^\mathsf{T}\mathbf{y}$. Deliver python code to learn $\mathbf{w}^\star$.

Problem 8. What is $\mathbf{w}^\star$?

Problem 9. Obtain a new sample. Describe its feature vector.

Problem 10. Predict the response of your new sample.