


Computer Science 311 - Assignment 1: Developing a Machine Learning App

Your assignment is being graded.

Computer Science 311 - Assignment 1.docx

 Grading in progress

You can submit up to 3 times. You've used 1 attempt.

If you have a Study.com College Accelerator membership and are seeking college credit for this course, you must submit all assignments. Below you will find prompts and instructions for submitting your first assignment.

About this Assignment

This assignment offers an opportunity to consolidate the machine learning concepts learned in this course and apply them to practical, real-world problems. For this assignment, you will develop an application using a machine learning algorithm to predict the future price of a commodity. The assignment offers hands-on experience with the complete lifecycle of an applied AI system, from data acquisition and preprocessing to application development and model training.

Course Learning Outcomes

The following course learning outcomes are assessed in this assignment:

- Build data pipelines and utility functions for AI applications using Python programming constructs.
- Solve programming challenges using constraint satisfaction, networks, and decision tree algorithms.
- Design supervised and unsupervised machine learning models using open datasets.

Related Lessons

- Neural Networks in Machine Learning: Uses & Examples
- Supervised Learning in Machine Learning
- Support Vector Machines (SVMs): Definitions & Application

Prompt

In this assignment, you are required to develop a Python-based machine learning application that predicts the future price of a selected commodity (e.g., gold, silver, corn, natural gas, or sugar).

The application should be trained on historical data and/or macroeconomic data. You may choose any commodity with available open datasets (from platforms like Kaggle, Data.gov, Data.world, Yahoo Finance, and Google Dataset Search).

To develop the application, you may apply machine learning algorithms such as Support Vector Machines, Random Forests, or Neural Networks. You can also leverage Python libraries including NumPy, Pandas, Scikit-learn, Matplotlib, Seaborn, etc.

Your assignment must include two core components:

- the source code (written in Python and provided in .py format)
- a report that follows the guidelines outlined below

Report Guidelines

Your report must include the following sections:

- Title Page
- Name and Purpose of the Application
- Algorithms Used
- Dataset Information
- Libraries, Toolkits, and Framework
- Application Design and Implementation
- Instructions for Running the App
- Results
- Discussion and Insights
- References

Sample Template

Machine Learning App for Commodity Price Prediction

1. Name and Purpose of the App

- Provide the name of your app and explain its purpose in one paragraph.

2. Algorithms Used

- Describe which machine learning algorithm(s) were applied and why they were chosen.

3. Dataset Information

- 3.1 Dataset source/link
- 3.2 Number of records
- 3.3 Number of features
- 3.4 Description of features: Feature Name, Description, Data Type
- 3.5 Preprocessing steps (e.g., cleaning or normalization)

4. Libraries, Toolkits, and Frameworks

- List all libraries used (e.g., Pandas, NumPy, Scikit-learn) and explain their roles.

5. Application Design and Implementation

- Describe how the app works, including data flow, model training, and prediction.

6. Instructions for Running the App

- Provide a step-by-step guide on how to execute the code. Include environment setup or dependencies.

7. Results

- Include screenshots that demonstrate the app in operation and display the prediction results.

8. Discussion and Insights

- Reflect on your model's performance, limitations, and potential improvements.

9. References

- List all data sources, libraries, and references in APA style.

Formatting & Sources

Please write your paper in the APA Style format. You may refer to the course material for supporting evidence, but you must also use at least **1 credible outside source** and cite it using APA format. If you use any Study.com lessons as sources, please also cite them in APA (including the lesson title and instructor's name).

- Primary sources are original, authoritative, non-interpreted technical, legal, or organizational documents and data.
- Secondary sources come from peer-reviewed scholarly journals, such as Artificial Intelligence Review, Nature Machine Intelligence, and IEEE Transactions on Pattern Analysis and Machine Intelligence. You may use sources like JSTOR, Google Scholar, and ACM Digital Library, IEEE Xplore, ScienceDirect, and EBSCOhost to find articles from these journals. Secondary sources may also come from reputable websites with .gov, .edu, or .org in the domain. (Wikipedia is not a reputable source, though the sources listed in Wikipedia articles may be acceptable.)

If you're unsure about how to use APA format to cite your sources, please see the following lessons:

- What is APA Format? Style & Definition
- How To Format APA Citations

Use of AI in Study.com Assignments

Acceptable use of generative AI tools such as ChatGPT is outlined in the Study.com Academic Integrity Policy; please familiarize yourself with this policy to ensure that you have appropriately cited and used AI tools in an authorized manner in the creation of your assignment. You may wish to use GPTZero to ensure that your assignment is sufficiently unique and free from AI plagiarism.

Reminders about using AI:

- AI may be used as a tool to support your process for creating this assignment but may not create or write your assignment response for you. Plagiarized submissions will not be graded and may result in disciplinary actions.
- All AI usage for this assignment must be properly cited and documented according to the guidelines in the How to Use & Cite AI Tools in College Saver Course Assignments article.
 - In addition to in-text citations and inclusion in your Works Cited for the assignment, you must submit a separate document as outlined in the Documenting and Attributing AI section of the above article.
- It is important to fact-check any output you obtain using AI as it may produce inaccuracy or misinformation.
- You are solely responsible for all submitted work that you provide with the use of AI.
- Do not input any confidential or personal information while using AI tools.

For additional information on generative AI tools, please refer to Understanding Generative AI as a Student: Uses, Benefits & Drawbacks.

Grading Rubric

Your assignment will be graded based on the following rubric:

Criteria	Excellent (5)	Good (4)	Needs Improvement (2-3)	Unacceptable (1)	Total Possible Points
Problem Definition and Algorithms (x2)	Purpose of the application is clearly explained; algorithms are well-justified and appropriate for the problem.	Clear purpose and generally appropriate algorithm choice with minor gaps.	Purpose vague or algorithm justification weak or incomplete.	No clear purpose; algorithm choice missing or incorrect.	10
Dataset & Preprocessing (x2)	Dataset source, features, size, and preprocessing steps fully and clearly described and appropriate.	Dataset and preprocessing steps clearly described and appropriate but missing some details.	Dataset and preprocessing steps description is unclear or incomplete.	Missing or inappropriate dataset information.	10
Application Design, Implementation, and Code Quality (x4)	Strong explanation of system design and workflow; code is clean, readable, and functional; implementation matches report.	Clear explanation of design and mostly functional code with minor issues.	Unclear or limited design explanation; partially functional code; structure unclear.	Missing or irrelevant design description; code nonfunctional or absent.	20
Instructions for Running the App (x1)	Complete, clear steps for setup and running the application.	Instructions are clear with small gaps that do not interfere with running the app.	Instructions incomplete or confusing in parts.	No instructions provided.	5
Results, Discussion, and Insights (x1)	Clear results with screenshots/plots; thoughtful insights on performance and limitations.	Clear results and insights but may lack detail in parts.	Results unclear or discussion superficial.	No results or no meaningful discussion.	5

Before You Submit

When you complete your assignment, we suggest taking some time to check for any errors or to add any finishing touches. We also suggest that you use online plagiarism checkers such as PlagScan or Solid SEO Tools to make sure that your assignment is not too similar to any existing materials. Plagiarized submissions will NOT be graded.

How to Submit Your Assignment

When you are ready to submit your assignment, **please fill out the following submission form by attaching a link to your assignment.**

- You may submit a link to your GitHub repository containing your work.
- You may also submit a link to your cloud storage, such as Google Drive, Dropbox, or OneDrive, containing your work. Please ensure the privacy settings allow access. For example, if you're using Google Drive, make sure the file is set to 'anyone with the link can view'.
- Regardless of the submission method, ensure that the linked repository or storage includes all necessary elements of the assignment.

You should receive your assignment grade within one week.

If you are not satisfied with the score you receive on your assignment, you may revise or rewrite it and resubmit it for grading using the same submission form above. Keep in mind that the grade you receive on your assignment is only a portion of your overall grade for the course. Please see the course syllabus for a more detailed breakdown of the grading policy.



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