AI Contribution Markers

ISE 572: Industry 4.0 Machine Learning - Final Project

Student Disclosure Guidelines

Purpose

Responsible use of AI is both an important part of your learning in this course and a valuable skill for your career.

AI writing detectors are increasingly used in academic settings, but they are imperfect tools. They can flag well-written human work as AI-generated, and more importantly, they cannot detect the most valuable parts of your project, such as your problem framing, your data decisions, your debugging process, and your interpretation of results. A student who has spent 40 hours building a pipeline and used AI only to polish their final sentences could be unfairly penalized by a detector. Therefore, **we do not rely on detection. Instead, we learn how to disclose and describe AI usage.**

NOTE 1: There is no wrong answer in this framework. What matters is honest reflection on where AI helped and where you worked independently. That reflection is itself a skill this course values.

NOTE 2: It will not be used against you. In rare cases where most dimensions are marked as A5, the instructor will reach out for further clarification.

NOTE 3: This disclosure is worth 10 points and is awarded for completion and honest reflection.

The Six Dimensions

Your project involves six distinct types of intellectual work. Each one can involve a different level of AI use. You are asked to disclose your level for each dimension independently.

1. **Ideation:** problem selection, ML approach choice, hypothesis forming, defining success criteria
2. **Data decisions:** gathering datasets, feature engineering, handling missing values, test/train strategy, deciding what to include or exclude
3. **Coding:** data loading scripts, preprocessing scripts, model architecture, training, and evaluation scripts
4. **Debugging & troubleshooting:** diagnosing errors, fixing model issues, resolving pipeline failures, retraining models for performance improvement
5. **Interpretation & analysis:** interpreting results, explaining metrics in your industrial context, drawing business conclusions, drawing inferences on the performance of the model
6. **Writing:** report prose, structuring arguments, summarizing findings, framing Industry 4.0 context

AI Marker Definitions (CYPHER AI Usage Marking)

Background: CYPHER AI Usage Marking was developed by the URI CYPHER Center (www.uri.edu/cypher), initiated by CYPHER's CAIO, Prof. Yan Lindsay Sun, with contributions from CYPHER faculty and student members.

We have chosen the CYPHER marking framework for the following three reasons:

(1) It follows URI's AI Responsible Usage Guiding Principles (https://its.uri.edu/ai-at-uri/), Transparency: Clearly disclose when AI tools are used to create content or inform decisions.

(2) Other marking systems used in higher education often (a) only disclose substantial usage, (b) focus on public-facing communications, and/or (c) are either too simple to capture the complexity of human-AI collaboration or too complex to adopt.

(3) The CYPHER marking framework can be easily expanded to fit the needs of this class.

Description: The expanded descriptions beneath each level explain what that level looks like across the six project dimensions.

A0	**Human Authored**
Original	Content created entirely by a human author.
What this looks like across your project:	
Ideation	You identified the problem, chose the ML approach, and defined all success criteria entirely on your own, without consulting any AI tool for direction or suggestions.
Data Decisions	All choices about features, preprocessing strategy, handling of missing values, and train/test split were made independently based on your own analysis and reading.
Coding	Every line of code was written by you. You may have used documentation, Stack Overflow, or course materials, but no AI tool generated or completed any part of your code.
Debugging	You diagnosed and resolved all errors independently. You read error messages, traced the logic yourself, and found fixes without AI assistance.
Interpretation	You formed all conclusions about your results independently. What the metrics mean, what the model struggles with, and what the business implications are. All your own thinking.
Writing	Every sentence in the report was written by you from scratch. No AI tool was used for drafting, restructuring, or rephrasing any part of the document.

A1	**AI Edited**
Original	AI tools were used for grammar, clarity, and formatting.
What this looks like across your project:	
Ideation	All ideas are entirely your own. You may have used AI to reword a sentence describing your problem, but the problem itself, the approach, and the framing were not influenced by AI suggestions.
Data Decisions	All data choices are your own. AI was used only to tidy up the language in your written description of the pipeline and not to suggest any analytical decisions.
Coding	All code is your own. AI was used only to improve comments, clean up the README, or reformat docstrings, and not to write or alter any functional code.
Debugging	You resolved all bugs yourself. AI may have been used to rephrase an error message description in the report, but the actual debugging was done independently.
Interpretation	All interpretation is your own. AI may have corrected the grammar in your results section, but the analytical conclusions are entirely yours.
Writing	You wrote everything yourself and then used an AI tool (such as Grammarly or ChatGPT) to check grammar, fix spelling, or improve sentence flow. No new ideas or arguments were introduced by the AI.

Responsible AI use is critical for both this course and your future career. AI detection tools can make mistakes. Instead, we focus on learning how to disclose and describe AI usage. Honest disclosure protects you and helps build your capabilities.

A2	AI Assisted Ideation
Original	AI tools were used for brainstorming and outlining. The document was written, reviewed, and approved by the human author.
What this looks like across your project:	
Ideation	You used AI as a thinking partner to explore problem angles, ask what-if questions, or test whether your framing made sense. The AI surfaced possibilities you then evaluated and chose between. All final decisions were yours.
Data Decisions	You asked AI questions like 'what features are typically important for predictive maintenance?' to expand your thinking. You then independently evaluated those suggestions against your specific dataset and made your own choices.
Coding	You used AI to help think through an algorithmic approach or discuss whether one architecture fits better than another. The actual code was written by you. AI was a soundboard, not a code generator.
Debugging	You described a bug conceptually to an AI and asked for possible causes to consider. You then investigated those leads yourself and wrote the fix independently.
Interpretation	You discussed your results with AI to explore what different explanations might mean. The AI offered interpretive angles; you evaluated which ones applied to your context and formed your own conclusions.
Writing	You used AI to help outline the structure of a section or suggest what to include in a paragraph. You then wrote all the prose yourself from scratch based on that structure.

A3	AI Assisted Drafting
Original	AI tools were used to generate portions of the draft. The human author verified and revised the content.
What this looks like across your project:	
Ideation	AI proposed a problem framing, approach, or hypothesis that you then critically evaluated, revised, and adopted as your own. You can fully explain and defend every aspect of your final framing, even though AI helped generate it.
Data Decisions	AI suggested a preprocessing pipeline or feature engineering strategy, and you implemented it after reviewing it carefully. You made meaningful changes based on your understanding of the data and removed suggestions that did not apply.
Coding	AI-generated portions of your code, such as functions, preprocessing blocks, or evaluation scripts. Then you reviewed, tested, modified where necessary, and integrated into a pipeline you understand end to end.
Debugging	AI diagnosed an error and suggested a fix. You understood the cause, verified the fix was correct for your specific situation, and modified it where the suggested solution did not quite fit.
Interpretation	AI drafted an interpretation of your results that you reviewed carefully, revised where it was too generic or inaccurate, and supplemented with your own domain-specific understanding of the industrial context.
Writing	AI generated a draft of one or more sections. You revised those drafts meaningfully by cutting generic content, rewriting passages that did not reflect your actual project, and adding your own analysis. The submitted version is substantially different from the raw AI output.

A4	AI Generated
Original	AI tools generated most or all of the content. Human review was performed at a high level.
What this looks like across your project:	
Ideation	AI constructed the problem framing and approach. You provided the dataset and context, reviewed what AI proposed, confirmed it was sensible, and proceeded. You did not independently evaluate alternative framings.
Data Decisions	AI designed most of the data pipeline. You verified that the steps were reasonable and that the output looked correct, but did not make substantial independent analytical choices.
Coding	AI generated all the parts of the codebase. You ran it, checked that outputs were plausible, made minor edits, and submitted. You may not be able to explain every design decision in the code without referring to AI.

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Debugging	AI identified and fixed most errors. Your role was primarily to paste error messages, apply suggested fixes, and confirm the code ran. The reasoning behind the fixes came from AI.
Interpretation	AI produced the interpretation of the results. You read it, checked that the numbers mentioned matched your actual outputs, and accepted the framing largely as generated.
Writing	AI wrote most of the report. You reviewed the output for factual accuracy, ensured the model's name, dataset description, and metrics were correct, but did not substantially rewrite or restructure the content.

A5	**Fully AI Generated**
Original	The document was generated entirely by AI tools, with minimal or no human review. It should be treated as one of multiple possible information sources.
What this looks like across your project:	
Ideation	The problem, approach, and framing were entirely generated by AI. The student did not independently evaluate the framing or consider alternatives. The project direction was set by AI.
Data Decisions	All data handling decisions were made by AI. The student provided the dataset and accepted whatever pipeline AI produced without independent verification or critical review.
Coding	All codes were generated by AI. The student may have run the code and confirmed it produced output, but did not review the logic, test edge cases, or make any independent implementation decisions.
Debugging	All debugging was handled by AI. The student passed errors directly to AI and applied fixes without understanding the underlying cause or verifying correctness independently.
Interpretation	AI produced all conclusions. The student did not independently analyze the results or verify that the interpretation was appropriate for the specific industrial context of the project.
Writing	The entire report was generated by AI with no meaningful revision. The language may be fluent, but it does not reflect the student's own understanding of the project. The students cannot explain or defend the content in their own words.

How to Complete Your Disclosure (10 Points)

Please use the table given below. For each of the six dimensions, mark the highest level that applies to your work across the entire project.

Dimension	A0	A1	A2	A3	A4	A5
Ideation						
Data Decisions						
Coding						
Debugging						
Interpretation						
Writing						

For example, if you did not use AI throughout the project based on the guidelines given above, please mark A0. For marking, use "**YES**". Leave the space blank for the rest.

NOTE: You may mark different levels for different dimensions. Look at the example and the table below

Example Project: Predictive Maintenance for CNC Machines
SCENARIO: The team chose their own dataset (vibration sensor readings from a milling machine), independently formulated the problem from their proposal, and built the pipeline themselves. They used AI at different points for different things.

Ideation: A2. The student had already identified the problem (predicting tool wear before failure) from their proposal. They used ChatGPT to brainstorm what success criteria might look like by asking questions such as "What metrics matter most for a predictive maintenance classifier in manufacturing?" The AI suggested thinking about false negatives being more costly than false positives in this context. The student found that useful, adopted it, and built their evaluation strategy around it. The core idea was theirs; AI sharpened the thinking.

Data Decisions: A0. The student captured and examined the dataset independently, noticed class imbalance in the fault labels, and decided to use techniques taught in the class to overcome imbalance issues. No AI was consulted at any point in this process.

Coding: A0. All preprocessing scripts, the model training loop, and the evaluation code were written by the student from scratch using scikit-learn and pandas' documentation. They set random seeds, structured the files independently, and wrote the README themselves.

Debugging & Troubleshooting: A3. The students could not figure out why their validation scores were unrealistically high. They described the problem to Claude, who identified the leakage issue and explained how to resolve it. The student understood the explanation, verified it against the documentation, and rewrote the relevant section themselves.
Interpretation & Analysis: A2. After getting results, the student discussed them with an AI, asking why precision might be high but recall low in a fault detection context and what that implies operationally. AI offered several angles; the student selected the one relevant to their specific use case (missed faults leading to unplanned downtime) and wrote the business interpretation entirely in their own words.

Writing: A4. The students provided their notes, results, and section outlines to Claude and asked it to draft sections of the report. They reviewed the output and corrected it. The structure, arguments, and most of the language came from AI. The student's contribution to the writing was direction, fact-checking, and targeted revision.

Dimension	A0	A1	A2	A3	A4	A5
Ideation			YES			
Data Decisions	YES					
Coding	YES					
Debugging				YES		
Interpretation			YES			
Writing					YES	

Scoring

This disclosure is worth 10 points and is awarded for completion and honest reflection. The level you mark does not affect your score. A student who marks A4 across all dimensions and reflects thoughtfully will receive full marks. A student who leaves the table blank will not. The reflection is not a confession. It is a chance to articulate your own process, a skill that matters as much as the technical work itself.