Goal

1. Objective: Goal is to make an AI Agentic System repsonsible for being a Mechanic Assistant.

Things I've been considering[subject to be updated on a consistent basis]

1. Will need to find a dataset that consists of tuples that reference data utilized to identify a particular probelm using fault diagnosis.
2. Will need to learn some of the LLM APIs to facilitate project
3. Need to utilize ML Lifecycle to guide system development.
4. Need to know what Technology Stacks you all are most familiar with.
5. Need to develop understanding of fundamentals of ML to get an understanding of what data may be needed to help the Agentic SYstem be a reliable mechanic assistant
6. The 2000 page book linked here is a good resource. I will be using this when assignign certain tasks to help with solving particular problems: https://www.mlsysbook.ai/assets/downloads/Machine-Learning-Systems.pdf
7. Will need to create some sort of schema that references the data that will be used in project[may make the learning data and the data for hosting the AI separate?]

Current Status of Project

1. [Report: 8/30/25] Currently in process of planning this system like a regular, non-intelligent system with the intention to implement the intelligence of the system later on. Also, working on learning some of the nuances and reviewing the statistics required to utilize machine learning properly.

Supporting Resources I think will be useful

- Textbook linked here: https://www.mlsysbook.ai/assets/downloads/Machine-Learning-Systems.pdf
- For Lectures 1 - 4, the following sources may be useful: Chapter 1, Chapter 5, Chapter 7 .
- Also, here is a table that references the contents of the ppt we need:

Slide Number	**Desc of Desired Contents**
0	a) Indicate title for project that represents project. b) Provide a list of memebrs in team **ideally with their 1) headshot, 2) name, 3) major, and 4) their role in project**. Need to

Slide Number	Desc of Desired Contents
	give brief desc of why teammates decided to collaborate. REQUESTS: "Please make sure everything in your slides is high quality (high-res pictures, not many words, and clean)
1	a) DIsplay the probelm you'll be investigating and: 1) Why it's interesting and why its interesting to YOU, 2) Indicate the type of project it is[ideally, it'd be best to find a real problem that's real and convince audious that it's a real problem, and show passion to create a system or tool when you develop it].
2	a) Must propose solution, and specify if the solution used is a 1) New Method, 2) New algorithm, or 3) New tool. b) Need to dientify the key outcome/delievarble. c) **Ideally, this slide should contain a NICE FIGURE TO CONTEXTUALIZE your solution[aka a flowchart of some sort]**. "If there are existing implementations, will you use them, and how? Ideally, annotate them in the figure. How do you plan to improve or modify such implemenations? You don't have to have an exact answer at this point, but you should have a general sense of how you'll approach the problem you're working on. (cont here on pdf page 97 @ this link: https://pooyanjamshidi.github.io/mls/lectures/csce585_2024_01_slides_mlsys_course_overview.pdf)
3	a) "How will you **evaluate** your results? 1) Qualitatively[What kind o fresutls do you expect(e.g. plots or figures)? 2) Quantitatively[what kind of analysis will you use to evlauate and/or compare your results(e.g., what performance metrics or statistical tests)? 3) "What are the existing soltuions that you want to compare against them (if you know them already)? **This does**

Slide Number	Desc of Desired Contents
	not have to be comprehensive at this point, BUT this list will be updated based on how your project will evolve throughout the semester.

NOTE: Disregard the flowchart, it's contents will change as time goes by. Also, there will be a document that will be updated regularly linked here: https://docs.google.com/document/d/1B1jBPpEfRxFyJ4gSKq-Ki2ofSD7o7ByJSfIh6NABOZ4/edit?tab=t.0. Once I have yall's emails, you'll be able to access it.

- Body of the flowchart:

%% Goal: Goal is to make an Agentic System responsible for acting as a AI Mechanic Assistant.

%% Things to consider: a) In the event that this needs to be downsized, it is plausible to focus on a SUBSET of mechanics. b) Plan on using github to facilitate use of issues to assign tasks. c) Thought about being group leader if that's fine with you all. d) Ideally, when assigning tasks I will provide some supporting material that will be useful when trying to solve problem. e) Here's a link to my git repo that displays an example of what the project design via flowchart would look like: https://github.com/ArdoineDocteur/RepoAssociatedWResume/blob/main/README.md . Look at the Job Ocean proj for reference.

%% TASK #1: Need to imagine navigation through provides interface to use AI Mechanic Assistant

flowchart TB

%% (cont here by ideating process of entity navigating through the system OR the system navigating through itself)

%% Body of nodes and edges that describe interface

description["description"] --> descIntf0["(cont here with desc) "]

%% --> descIntf0.9["(cont here if applicable, thought(s) before stopping: 1) Implementing heavy cybersecurity for program, 2) At this point, it seems like everything required for this to work is present. Thus, currently want to add things that convenience users. 3) At this point, seems like everything to support the user is acheived using the aforementioned process"]

%% (cont here, after implementing other subgraphs in code)

%% end of nodes and edges that desc interface

%% Code below addresses particular cases in regards to user interactions:

%% NOTE: Consider having below nodes and edges be a subgraph named theoretical user interactions

deci0["(cont here with user interaction(s)"]

id1["user enters login info"] --> id2["user is met with an interface that allows them to customize their exp"] --> id3["user is allowed to choose to speak with AI for advice"] --> id4["user ws met with a screen for AI settings \& a prompt"] --> id5["User sends in a prompt"] --> id6["(subgraph needs to be created here) Prompt processes request"]

% (cont here)

%% end of Code that addresses particular cases in regards to user interactions:

%% Feature(s) succeeding this point are optional

%% PN: The stuff above will be the template that I use to map out func of future projects!

%% body of how system will react to implicit and explicit requests by user via http.

subgraph systemReactions

direction TB

subgraph rel-Sets-rep

direction TB

%% (cont here by modifying inptu below by making it general to prep it for specialization w.r.t the idea at hand). UPDATE #1: 100% complete

respIntf0["System receives data x that determines y, resulting in (x,y) where x ∈ set of 2-tuples containing username and password and sends a bool value if (x,y) ∈ ρ where ρ = x ∈ U(users) in database."] --> respIntf0.1["System sends data z that determines a, resulting in (z,a) where z ∈ U(users) and a ∈ {<insert elements relevant to assigning membership to user>} and sends a bool value if (z,a) ∈ ρ where ρ = z is a y."]

respIntf0.1 --> respIntf0.1.0["System receives data from user x requesting access to w, resulting in data retreival from database referencing data associated with w where w ∈ {<insert elements relevant to data that is requested by user(s)}"] --> respInf0.1.1["If (x,w) &nin; ∪_{1 ≤ i ≤ n} ρ_i, then user isn't valid. The n relations are as follows: {<insert the relations between data and user requests that permit the request and retrieval of the data>}"]

respIntf0.1 --> respIntf0.2["System receives data from user x requesting modification to u, resulting in data update from database referencing data associated with u where u ∈ {<insert elements that are properties(x) associated with user x>}"]

respIntf0.1 --> respIntf0.3["System receives data from user x requesting DELETION to u, resulting in data DELETION from database referencing data associated with u where u ∈ {<insert elements that are properties(x) associated with user x>}"]

respIntf0.1 --> respIntf0.4["System receives data from user x requesting CREATION to u, resulting in data CREATION and adding it to database referencing data associated with u where u ∈ {<insert elements that are properties(x) associated with user x>}"]

end

subgraph regularVersion

direction TB

respIntf0["in prog"]

end

%% (cont here with non-rel-sets-rep)

%% (cont here at descIntf0.2.1[by addressing all cases where data may be modified])

%%, need to go back to UX desc and think about how relations can be used to describe modifying data, creating data, and deleting data[basically using relations to allow CRUD operations])[NOTE: In future, when writing powerpoint, goal is to transform these relations into nodes and edges to ensure that anyone can understand this process][Note as of 6/13/25: This was complete, this will be the approach taken for the rest of the backend procedures going forward. Will also have relation-sets verison as a subgraph and have the expanded, non-relation-sets version as a subgraph.

end

%%end of body of how system will react to implicit and explicit requests by user via http

%% end of body of Flowchart 4