Name:

Block:

Machine Learning Project Proposal

**Introduction:**

Machine learning is a relatively old concept, the idea of which was first conceptualized alongside the development of programming itself. Deep-learning, and the use of neural networks, is a more recent endeavor, seeing its first commercial uses in the early 2000s.[1](https://www.forbes.com/sites/bernardmarr/2016/02/19/a-short-history-of-machine-learning-every-manager-should-read/?sh=7feda66d15e7) Today, the application of machine learning design is commonplace, and is used in many applications, ranging from email spam filtering to Amazon’s Alexa’s speech recognition.

**Goal:**

Propose a machine learning project to be used in a business that helps solve a real-world issue and discuss what is needed to implement that plan

**Instructions:**

1. Read instructions and then read this WHOLE document
2. Make sure to read rubric to see what will be graded
3. Follow all the steps in the **Steps** section
4. Edit paper, make it look nice, turn it in

**Steps**:

1. **Brainstorm** an idea
2. **Ask** the right questions
3. **Plan** on how to get the data
4. **Consider** what features your program will look for
5. **Predict** the benefits of your program

**Brainstorming:**

1. To begin, you first need a good project idea. Don’t limit your ideas by any metric. Suppose that you have all the cash, time, resources, and skill to make your vision come true. You want to build a machine learning robot that swims through the oceans and uses lasers to pulverize trash that it identifies through its non-binary classification AI vision system? Cool, sounds good. You just have to provide the plan for how you are going to make that a reality and provide a reason why that project is needed. (Also, no taking my idea, go get your own).
2. Need some existing projects to get those brain juices flowing? Check out these links:
   * 1. [7 Real World Examples](https://www.datasciencecentral.com/7-real-world-examples-of-machine-learning-in-current-times/) [CTRL + click to open, or CMD + click for Mac]
     2. [6 Machine Learning Program Use Cases](https://www.salesforce.com/eu/blog/2020/06/real-world-examples-of-machine-learning.html)
     3. [10 More Machine Learning Program Use Cases](https://hackr.io/blog/real-world-machine-learning-applications)
3. How do I brainstorm?
   * 1. Identify a problem
4. Could this problem be improved upon its speed, efficiency, organization, accuracy, or skill level?
5. Do people actually want this problem solved or do you just think it’s cool? [It might be hard to get funding if you just think its cool but there isn’t a real-world need for the problem to be solved]
   * 1. Identify a pattern
        + 1. How could a program learn the pattern?
          2. How can the current process be automated?
     2. Identify a purpose
        + 1. Does this project preserve or save something valuable?
          2. Does this project help gather or provide information?
          3. Does this project help improve the efficiency or accuracy of an existing system?
          4. Does this project provide a difficult skill?
          5. Other

**Ask:**

1. Is this project attainable?
   1. Is it physically possible?
   2. Is it technologically available?
   3. Is it testable?
      1. There needs to be enough data to train and test the program
      2. The program needs to be able to have access to this data
2. **What does your project do?**
   1. This is the most important question you can ask. Similar to the minutiae of ‘Is this image a cat?’ verses ‘Does this image contain a cat?’, changing your question now is a lot easier than changing your question after your program is in development or has already been developed.
   2. What data do you want to include or exclude?
      1. Eg. Including cartoon cats or not
3. What are the timelines for this project?
   1. If the project won’t be complete until 5 years from now, will it still be relevant / worth it?
4. What are the risks?
   1. What happens when your program is incorrect?
   2. Are there any liabilities if your program is incorrect?
   3. Are there any liabilities if you program discards a piece of data, but it should have actually been a piece of data that was selected?
      1. Eg. You create a machine learning application that scouts for NBA players playing on college teams. Your machine works—but some percentage of the time, a star talent is missed and not selected. No liability here, but huge costs of relying fully on a program

**Plan**:

1. How many instances (objects) will you need to collect?
2. How many people will you need to help you collect this data?
3. Will the collection of this data have a cost?
   1. Most likely it will. Consider travel costs, wage costs (for the people you hire!), equipment costs, business costs, pollution costs, time costs, rental costs, and any other applicable costs.
   2. Whatever estimate cost you come up with, double it. Better safe than sorry. Hidden costs will always come up down the road during the later phases of your project

**Consider**:

1. What features will help the program learn about the data?
   1. How will the program read the data?
      1. Eg. Image processing, audio processing, visual sensors, multiple-input processing, etc
   2. Is the data going to be labeled or unlabeled or labeled after each instance?
      1. These are supervised, unsupervised, and reinforcement learning, respectfully
   3. How many features do you think you will need?
   4. What is your list of possible features?
      1. Aim for 3 to 5 features
2. Are there any other requirements for the development of your project?
   1. Eg. Collaborations with other companies, use of other software, existing ML applications that could be used or expanded upon, etc

**Predict:**

1. How much money / time / material do you envision your program saving or earning?
   1. Regardless of the medium, a good goal should be quantifiable and should have a timeline by which you expect to meet that goal
2. What jobs will be created through the initiation of this project?
3. What is the total cost? (You should have the number from the **Plan** section)
4. What is the worst-case scenario if the program performs poorly?
   1. Lay out your liabilities and potential faults upfront
5. Why will people get excited about this project?
   1. This is your elevator pitch. If you’ve completed the questions up to this point, your answer should come forth naturally

**Proposal Instructions**:

The part that is graded is the proposal. You can see the rubric at the end of this document to see what receives points. The questions above are a guide to help you write the proposal and formulate your ideas and plan for the implementation of your machine learning project.

The written proposal should have an introductory paragraph, a middle (detail-oriented) paragraph, and a conclusion. The introduction should include what real-world solution your machine learning project aims to help solve, the goals of the program, why people would benefit from this program, and why this program will help benefit other businesses. The middle paragraph should explain all information relevant to collecting data, the costs of the project, the timeline of the project, the details on identifying features, the procedures for implementing the project, the collaborations involved, and the potential risks and liabilities of the project. The concluding paragraph should restate the goal of your project, the timeline of the project, what the project aims to save or earn or benefit, a statement on how much funding the program is looking to obtain, and a rehashing of why you think people will get excited about the project, and why you think it is worth pursuing.

At the beginning of the template below, fill-in the pertinent information of your machine learning project before beginning the written proposal.

**<Title of the Proposal / Project Name>**

Goal:

Timeline:

Costs:

Benefits:

Proposal:

<Write your proposal here>

Rubric

Total Possible Points: 100

|  |  |  |  |
| --- | --- | --- | --- |
| Section | Details | Points Earned | Total Points |
| Information above proposal | Title, goal, timeline, costs, benefits |  | 5 |
| Introduction | Real-world application |  | 5 |
| Discussion of timeline |  | 5 |
| Benefits provided from successful project implementation |  | 5 |
| Total words: At least 200 |  | 10 |
| Middle | Data collection explanation |  | 5 |
| Costs of project and timeline |  | 5 |
| Plans for feature creation |  | 5 |
| Plan for project implementation (production) |  | 5 |
| Collaborations |  | 5 |
| Risks and liabilities |  | 5 |
| Total words: At least 400 |  | 10 |
| Conclusion | Goal of project |  | 5 |
| Timeline of project |  | 5 |
| Benefits of project (predicting quantities) |  | 5 |
| Funding request |  | 5 |
| Why its worth it / why people will get excited about it |  | 5 |
| Total words: At least 150 |  | 5 |
| Totals: | |  | 100 |