Project Proposal Guidelines:

The proposal is meant to focus your ideas and initial work, not limit what you may do. Ideally, you will explore a data set or modeling approach that interests you.

For any technical or research proposal the basic information is similar:

Tell a reader what it is you will do, why it is interesting and worthwhile to do the project, what is the basic approach and methods to be used, any obstacles that are known at this time. any alternatives that exist and justification for favoring one approach over the others.

Technical writing can be difficult. It is necessary to convey technical information to a wide range of readers, many who have significant knowledge about the topic and many who do not. It is up to the writer to supply “enough” background context so that the proposal makes sense without supplying excessive detail that will discourage anyone from reading all your material. Do not assume a reader will have the same level of familiarity or interest in the topic as you do. No hard and fast rules exist. What is “enough” context is subjective.

The proposal should provide the reader with enough information about the project so that it may be understood “in context” and does not seem to be a simple application of tools to a problem. Say why the work is important or useful to do. This means supplying enough basic material about the topic and not starting with details and methods to be used. Give the reader a starting point that has the basic background knowledge needed, but do not overwhelm with detail. Too much detail too soon detracts from the main idea you are trying to make clear.

Do not ramble. Do not make the reader work to understand what it is you will do

This can be difficult and it is wise to create the proposal or report and then review it after several days, this will help identify sections that are not clear. If possible, have someone else review as well.

This project is meant to give experience with the full range of machine learning tasks. So you should do initial examination and description of the data, exploratory analysis such as scatter plots and numerical summaries, application of prediction or classification techniques, presentation and analysis of results, suggestions for extension of the work, what you would do in the future if you had more time, and a conclusion.

When creating proposal and report: Tell a Story. The reader should be able to easily and quickly determine what you are trying to do, why it matters, what’s you basic approach, any limitations of that approach, and how you’ll assess performance.

In “real life” – if such a thing as “real life” exists, proposals and reports are often submitted for funding or as a project review. Often there is a competition between different projects or teams. If a proposal or report is not clear, if the reader cannot determine the basic info it contains, then it is very easy to rank it below the other proposals and reports. Effort directed at developing clear writing and speaking skill will help your career significantly.

The purpose of this proposal is mainly to identify a project of interest and determine if there is enough data to support all the needed tasks in the time available. You can change your project if needed, you are not locked into any topic.

Topics can range from:

* Application of existing techniques to a data set.
* Investigation or development of an algorithm
* Investigation and exploration of a research area

Application of existing techniques is a valid approach, and you should be able to do a good, thorough analysis with descriptions of results, tables and graphs, fairly easily. But, there will likely be issues with data sets and sometimes algorithms and libraries have bugs or, believe it or not, little documentation or poorly written documentation.

So you need to discover those issues early so you can work through them. For application projects failure to work around these issues will cost you points.

For more research focused topics you may use existing libraries and data sets to explore a research area, such as labeling objects from image files. These topics will focus more on understanding the current research and its limitations. You still need to execute the approach and describe the work being done and describe the methods used in academic papers more fully.

You will likely run into issues of some sort, such as understanding a research paper, getting a code library to run correctly, having messy data sets that need cleaning, and, please do not underestimate, if you work as a group, that you will need to coordinate your work. I will need to see evidence that each group member contributed to the project.

How to do well?

* Get started early
* Work on the project regularly, do not wait until the end of the semester is close
* Ask me about any problems or concerns you have, with the knowledge that towards the end of the semester the available time to review projects and provide suggestions is limited and the number of requests to do so increases.
* Pick a topic you are interested in

How to not do well

* Wait until late in the semester to start
* Encounter issues with data or getting the software to run, and not showing evidence of trying alternatives
* Provide references that do not fit your project
* Submit a poorly written report so I cannot tell what you did or meant to do
* Submit something you found on the Internet
  + You can use this as a starting point, but must provide references and detail what you did, and why, as compared to the existing code.

Project deliverables:

* The code and output produced
* Analysis and conclusions
* Future extensions, if time permitted

Word or PDF file allowed, as are Jupyter Notebooks ( this is the easiest way ) or MATLAB Live Script.