

University of Virginia  
 SYS 6016: Machine Learning  
 ML4VA Project Rubric

CRITERIA	RATING				SCORE (PTS)
	Excellent (5 pts)	Good (4 pts)	Fair (2 or 3 pts)	Poor (0 or 1 pt)	
MILESTONE 1: LITERATURE REVIEW					
Articles	Gathers information from multiple, research-based sources.	Gathers information from multiple sources.	Gathers information from a limited number of sources.	Gathers information from a single source.	/ 5
Theme	Well-organized, demonstrates logical sequencing and structure.	Well-organized, but demonstrates illogical sequencing or structure.	Weakly organized with no logical sequencing or structure.	No organization, sequencing, or structure.	/ 5
Background/ Foundation	Reaches detailed conclusions from the evidence offered.	Reaches conclusions from the evidence offered.	There is some indication of conclusions from the evidence offered.	Made no conclusions from the evidence offered.	/ 5
Research Question	Forms research questions through the literature review that are clearly stated.	Forms research questions through the literature review.	Research questions were not formed but could be formed through the literature review.	Research questions were not formed and are not apparent from the literature review.	/ 5
Supporting Materials	Provides clearly appropriate evidence to support position.	Provides adequate evidence to support position.	Provides inappropriate or insufficient evidence to support position.	Provides little or no evidence to support position.	/ 5
References	Properly and explicitly cited. Reference list matches citations.	Properly cited. May have a few instances in which proper citations are missing.	The report has several instances of improper use of citations. Contain several statements without appropriately citing.	The report lacks proper citations or includes no citations.	/ 5

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<b>Subtotal</b> minus 3 pts per late day					/30
<b>Recommendations:</b>					
<b>MILESTONE 2: PROPOSAL WRITING</b>					
<b>Proposal Overview</b>	Effectively and insightfully develops a set of testable, supportable, and impactful study hypotheses.	Develops a set of motivation as well as supportable hypotheses.	Develops at least a hypothesis.	Hypotheses are not testable or justifiable.	/ 5
<b>Statement of the Problem and hypotheses</b>	Articulates a concise and interesting hypothesis about a significant, empirical linguistic problem and its broad significance.	Presents an interesting hypothesis and describes its importance.	Provides a general discussion of the hypothesis and relevant issues, but does not discuss its broader significance.	Shows a fundamental lack of understanding of the problem. Poorly written, incomplete, and lacks structure.	/ 5
<b>Supporting Data/Evidence</b>	Provides clearly appropriate evidence to support the position.	Provides adequate evidence to support the position.	Provides inappropriate or insufficient evidence to support the position.	Provides little or no evidence to support the position	/ 5
<b>Focus</b>	The proposal is well-organized and has a tight and cohesive focus that is integrated throughout the document.	The proposal has an organizational structure, and the focus is clear throughout.	The proposal is somewhat focused or has minor drifts in the focus.	The document lacks focus or contains major drifts in focus.	/ 5
<b>Clarity and Organization</b>	The proposal is well-written, and ideas are well developed and explained.	The proposal effectively communicates ideas. Some sections lack clarity.	The proposal communicates ideas adequately. Many sections lack clarity.	The proposal is poorly written and confusing.	/ 5

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<b>References and Citations</b>	Properly and explicitly cited. Reference list matches citations.	Properly cited. May have a few instances in which proper citations are missing.	The report has several instances of improper use of citations. Contain several statements without appropriately citations.	The report lacks proper citations or includes no citations.	/ 5
<b>Subtotal</b> minus 3 pts per late day					/30
<b>Recommendations:</b>					
<b>MILESTONE 3: MODEL DESIGN AND IMPLEMENTATION</b>					
<b>Data Collection</b>	Raw data, including units, are recorded in a way that is appropriate and clear. The title of the data table is included.	Raw data, including units, are recorded although not as clearly or appropriately as they might be. The title of the data table is included.	Raw data, including units, are not recorded in a way that is appropriate and clear. The title of the data table is not included.	No mention of the data collection process.	/ 5
<b>Problem Connecting</b>	Gathers sufficient relevant data, conducts data analytics using scientific methods, makes appropriate and powerful connections between analysis and real-world problems, and provides constructive guidance in decision making.	Collects and documents just enough data, employs proper techniques to retrieve insightful information from data, and makes reasonable recommendations	Data is inadequate or unstructured. Uses inappropriate methods to analyze data. Suggestions are not persuasive.	Data is inadequate or unstructured. No methods are used to analyze data and fails to retrieve useful information. No suggestions are given for a solution.	/ 5

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<b>Development of Idea</b>	Logical, testable prediction(s) are identified and tested in the first experiment.	One or more follow-on experiments are conducted to expand theoretical conclusions or rule out alternative explanations.	Logical, testable prediction(s) are identified and tested in a single experiment.	The logic underlying the experiment is incorrect, badly explained, or missing entirely.	/ 5
<b>Model Design</b>	The model works and meets all of the specifications.	The model works and produces the correct results and displays them correctly. It also meets most of the other specifications. The design is reasonably easy to understand.	The model produces some results but does not display them correctly. Delivered on time but in an incorrect format. The code is readable only by someone who knows what it is supposed to be doing.	The model is producing incorrect results. The code is poorly organized and very difficult to read.	/ 5
<b>Model Implementation</b>	The implementation is exceptionally well-organized and very easy to follow.	The implementation is reasonably efficient without sacrificing readability and understanding.	A logical solution is easy to follow, but it is not the most efficient.	The solution is problematic and the implementation is inefficient.	/ 5
<b>Logical Flow</b>	A clear, complete, and properly ordered chain of deductive steps leads from the hypothesis to the conclusion..	The chain of deductive steps is complete and correctly ordered.	One or more intermediate deductive steps are missing or unclear, but the correctness of the proof is not compromised.	The hypothesis or conclusion is missing or incorrectly stated. The stated chain of deductions does not lead to the stated conclusion.	/ 5
<b>Subtotal</b> minus 3 pts per late day					/30
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MILESTONE 4: PROJECT CHECKPOINT AND CONTRIBUTION					
<b>Recap and Summary</b>	Clear and concise. States the problem, findings, methodology, and significance.	Organized well. States the research problem, findings, methodology, and significance.	Has an introduction to the findings. Statement of the problem, findings, methodology, and/or significance may need some more organizational work.	Introduction to the problem or findings missing or not developed in a clear way. Findings, methodology, and/or significance not well-organized.	/ 5
<b>Organization</b>	Well-organized and demonstrates logical sequencing and structure.	Well-organized but demonstrates illogical sequencing or structure.	Weakly organized with no logical sequencing or structure.	No organization, sequencing, or structure.	/ 5
<b>Methods and Approaches</b>	Study design manifests a deep understanding of the field. Discusses the limitations of the study design and potential bias. Clear connection between methodology and data analysis.	Creative methodology and study design. Clear discussion of connection between methodology and data analysis.	Choice of methodology and study design shows basic competence but lacks originality. Limited discussion of study biases and/or limitations within the study design. Connection between the methodology and the data analysis are underdeveloped.	Uses a methodology and/or data that does not lend itself well to the study of the question. Shows lack of awareness of limitations within the study design. No clear connection between the methodology and the data analysis.	/ 5
<b>Preliminary Experiment</b>	The design of the experiment is novel. Independent and dependent variable(s) have been identified, and possible confounding factors are controlled.	Appropriate independent and dependent variable(s) are used. Adequate care has been taken to control possible confounding factors.	Inappropriate independent and/or dependent variable(s) are used. Limited effort has been taken to control possible confounding factors.	Experiments were not formed and are not apparent from the document.	/ 5

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<b>Plan for Completion</b>	Illustrates the project structure with a timeline for each step. Notes showing plan of actions, foreseen workload, etc. are clearly planned.	Includes the project structure with a timeline for each step. Notes showing plan of actions, foreseen workload, etc. are presented.	Project structure with a timeline for each step is not always clearly shown. Notes showing plan of actions, foreseen workload, etc. are incomplete or difficult to follow.	Documents are incomplete and unclear.	/ 5
<b>Member Contribution</b>	The team worked well together to achieve objectives. Each member contributed in a valuable way to the project. All data sources indicate a high level of mutual respect and collaboration.	The team worked well together most of the time, with only a few occurrences of communication breakdown or failure to collaborate when necessary. Members were mostly respectful of each other.	The team did not communicate well. Some members would work independently, without regard to objectives or priorities. A lack of respect and regard was often noted.	The team did not collaborate. Most members would work independently, without regard to objectives or priorities. A lack of respect and regard was frequently noted.	/ 5
<b>Subtotal</b> minus 3 pts per late day					/30
<b>Recommendations:</b>					
<b>MILESTONE 5: MODEL TUNING AND INTERPRETATION</b>					
<b>Model Tuning</b>	Explores various model architectures (i.e., different hyperparameter values). Evaluates each model's ability to generalize unseen data.	Explores some model architectures (i.e., different hyperparameter values). Evaluates each model's ability to generalize unseen data.	Explores no more than a single model architecture (i.e., different hyperparameter values). Lack of evaluation of model's ability to generalize unseen data..	No mention of hyperparameter tuning.	/ 5

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<b>Feature Importance</b>	The feature importance is fully interpreted and compared with literature values.	The feature importance is interpreted and compared with literature values, but not as fully as they might be.	The feature importance is not interpreted in a logical way or compared with literature values.	No such discussion of feature importance.	/ 5
<b>Model Interpretation and Limitations</b>	The limitations and weaknesses are discussed, and suggestions are made for how to limit or eliminate them.	The limitations and weaknesses are discussed, but few or no suggestions are made for how to limit or eliminate them.	The limitations and weaknesses are not discussed, nor are suggestions made for how to limit or eliminate them.	No such interpretation or limitation was discussed.	/ 5
<b>Implication to society</b>	Demonstrates an exemplary implication to society.	Demonstrates a proficient implication to society.	Demonstrates a developing implication to society.	Demonstrates no implication to society.	/ 5
<b>Subtotal</b> minus 2 pts per late day					/20
<b>Recommendations:</b>					
<b>MILESTONE 6: MODEL DEPLOYMENT AND SCALE-UP</b>					
<b>Deployment Strategy</b>	Comprehensive strategy to deploy the model on multiple platforms including cloud, mobile devices, and/or browsers.	Good strategy to deploy the model on multiple platforms including cloud, mobile devices, and/or browsers.	A strategy to deploy the model on one platform: cloud, mobile devices, or browsers.	No strategy for deployment.	/ 5
<b>End-User Testing</b>	Well-developed plan for end-user testing of the model and services.	Developed plan for end-user testing of the model and services..	Weakly organization for end-user testing with no clear transition to service.	No organization or plan for end-user testing.	/ 5

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<b>Model Evolution and Versions</b>	Integrates versioning control and an automated retraining of the models on a regular interval on updated data.	Shows some versioning control and a retraining plan of the models.	Lack of evidence to deploy new versions of the models.	No mention of model versioning and retraining.	/ 5
<b>Scale up Handling</b>	Demonstrates excellent handling of a cloud platform to scale up service.	Demonstrates good handling of a cloud platform to scale up service.	Demonstrates some handling of a cloud platform to scale up service.	No mention of scaling up service.	/ 5
<b>Subtotal</b> minus 2 pts per late day					/20
<b>Recommendations:</b>					
<b>MILESTONE 7: PROJECT PRESENTATION</b>					
<b>Audience Hook</b>	The presentation of the material was original and presented in a creative way that held the audience's attention.	The presentation of the material was appropriate, but only somewhat held the audience's attention.	The audience had to make considerable effort to understand the underlying logical and flow of ideas.	The presentation lacked creativity and did not hold the audience's attention.	/ 5
<b>Coherence</b>	The idea, argument, and solution were clearly stated, and examples were appropriate. The transitions and flow were easy to follow. Slides were error-free and logically presented.	The idea, argument, and solution were clearly stated, but 1) not all examples were supportive illustrations; 2) the transitions and/or flow were somewhat difficult to follow; and/or 3) slides were error-free and logically presented.	The thesis, argument, solution, and examples were not clearly stated. The conclusion was unclear. The transitions and flow were not logical. Slides contained errors and a lack of logical progression.	No coherence, transition, or structure.	/ 5



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<b>Speaking Skills</b>	Team members were poised and had clear articulation. Speakers demonstrated good volume and eye contact. Enthusiasm and confidence was exuded.	Team members were mostly audible and/or fluent on the topic, but speakers demonstrated fair volume, and/or eye contact was broken with the audience; light discomfort with public speaking was exuded.	Team members were often inaudible and/or hesitant, and relied heavily on notes. Speakers made distracting gestures with little or no audience eye contact. A high level of discomfort with public speaking was exuded.	Team members were not presenting or present during the allotted time.	/ 5
<b>Member Participation</b>	Every team member spoke and participated at a very high and balanced level.	Not all team members spoke and/or participated in a high and balanced level.	Only one member spoke when others did not participate.	Team members were not presenting or present during the allotted time.	/ 5
<b>Content</b>	The presentation contained an abundance of material that clearly related to the main arguments. External research was used to justify arguments or solutions.	The presentation contained material to support the main arguments, but 1) not all material clearly related to the main arguments; and 2) limited external research was used to justify arguments or solutions.	Major aspects of the analysis or recommendations were absent. No external research was used to justify arguments or solutions.	Team members were not presenting or present during allotted time.	/ 5
<b>Supporting Material</b>	All relevant information was obtained, and information sources are valid. Analysis and design considerations were well-supported by the information.	Sufficient information was obtained, and most sources were valid. Analysis and design considerations were mostly supported by the information	Analysis and design considerations were not supported by the information collected.	Insufficient information was obtained, and/or sources lack validity.	/ 5
<b>Creative use of Technology</b>	Exceptional usage of graphics, Internet resources, photographs, sound, and /or video to enhance presentation.	Some use of graphics, Internet resources, photographs, sound, and /or video to enhance presentation.	Little use of graphics, Internet resources, photographs, sound, and /or video to enhance presentation.	No use of graphics, Internet resources, photographs, sound, and /or video to enhance presentation.	/ 5

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<b>Organization</b>	Well-organized, demonstrates logical sequencing and structure.	Well-organized, but demonstrates illogical sequencing or structure.	Weakly organize with no logical sequencing or structure.	No organization, sequencing, or structure.	/ 5
<b>Reflections</b>	All reflections demonstrate students' progress and knowledge development. Reflections incorporate the what, so what, and now what in artifacts.	Most reflections demonstrate students' progress and knowledge development. Reflections incorporate the what, so what, and now what in artifacts.	Difficulty expressing reflection demonstrates level students' progress and knowledge development. Reflections incorporate the what, so what ,and now what in artifacts.	Considerable difficulty in expressing reflections demonstrates the level of students' progress and knowledge development. Reflections incorporate the what, so what, and now what in artifacts.	/ 5
<b>WOW Factor</b>	The presentation was imaginative and effective in conveying ideas to the audience.	The presentation techniques used were effective in conveying main ideas, but were a bit unimaginative.	The presentation failed to capture the interest of the audience and/or is confusing in what was communicated.	No organization, sequencing, or structure.	/ 5
<b>Subtotal</b> minus 5 pts per late day					/50
<b>Recommendations:</b>					
<b>MILESTONE 8: PROJECT REPORT</b>					
<b>Grammar and Mechanics</b>	The report is well-written, and ideas are well-developed and explained. The paper is free of grammatical, spelling, and punctuation errors.	The report effectively communicates ideas. Some sections lack clarity. Grammatical, spelling, and punctuation errors are rare and do not detract from the paper.	The report communicates ideas adequately. Many sections lack clarity. Several grammatical, spelling, or punctuation errors interfere with the reading of the paper.	The report is poorly written and confusing. Grammatical, spelling, and punctuation errors substantially detract from the report.	/ 5

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<b>Introduction / Motivation</b>	The introduction section provides a cogent overview of conceptual and theoretical issues related to the study hypotheses.	The introduction section provides a logical overview of the conceptual and theoretical issues related to the study hypotheses.	The introduction provides weak support for study hypotheses.	Very little support for the conceptual and theoretical issues relevant to the study hypotheses was provided.	/ 5
<b>Hypothesis</b>	Articulates a concise and interesting hypothesis about a significant empirical linguistic problem and its broad significance.	Presents an interesting hypothesis and describes its importance.	Provides a general discussion of the hypothesis and relevant issues, but does not discuss its broader significance.	Shows a fundamental lack of understanding of the problem. Poorly written, incomplete, and lacks structure.	/ 5
<b>Literature Review</b>	Places the work within a larger context. Appropriately integrates relevant material. Shows deep understanding of the significance of the research.	Provides a meaningful summary of the literature and builds a case for the research.	Cites most of the key literature. Lacks critical analysis and synthesis.	Fails to cite important, relevant literature. Does not clearly relate the literature to the student's contribution. Misinterprets the literature.	/ 5
<b>Methods and Data Sources</b>	Uses original or creative use of machine learning methods. Data are novel and appropriate for the study.	Uses existing machine learning methodology well. Data are appropriate to the study design.	Demonstrates competent use of existing methods. Collected data allow adequate testing of the hypothesis.	Uses incorrect methodology. Data are not handled appropriately.	/ 5
<b>Analysis and Interpretation</b>	Meaningful results are obtained from sophisticated data analyses. Analyses map back to the hypotheses. Discusses the limitations of the analysis.	Well-executed. Shows good understanding of the analytical methods. Provides good arguments for or against the hypotheses.	Analyses are executed correctly, but additional analyses may have yielded further insights.	Mis-analyzes data or fails to analyze relevant data. Results do not follow from the analysis, and mistakes are made in interpretation.	/ 5

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<b>Discussion/ Conclusions</b>	Places the study in a larger theoretical context. Informs our understanding of the nature of machine learning problems.	States what was done and identifies its significance and limitations.	Summarizes and repeats what was found. Does not discuss the significance or limitations of the research.	Insufficient or incoherent discussion of results. Shows lack of understanding of machine learning concepts.	/ 5
<b>Team Contribution</b>	The team worked well together to achieve objectives. Each member contributed in a valuable way to the project. All data sources indicate a high level of mutual respect and collaboration.	The team worked well together most of the time, with only a few occurrences of communication breakdown or failure to collaborate when necessary. Members were mostly respectful of each other.	The team did not communicate well. Some members would work independently, without regard to objectives or priorities. A lack of respect and regard was often noted.	The team did not collaborate. Most members would work independently, without regard to objectives or priorities. A lack of respect and regard was frequently noted.	/ 5
<b>Citations and References</b>	Properly and explicitly cited. Reference list matches citations.	Properly cited. May have a few instances in which proper citations are missing.	The report has several instances of the improper use of citations. Contains several statements without appropriate citations.	The report lacks proper citations or includes no citations.	/ 5
<b>Composition and style</b>	Writing is precise and clear. Concept of the field is clearly explained and defined. Scholarly style and format are accurately used. Demonstrates a definitive understanding of the issues being discussed.	Writing is grammatically correct, precise, and clear. Concept of the field is clearly explained and defined. Scholarly style and format are accurately used.	Writing is somewhat developed and professional. The concept of the field is understood and used properly. Spelling, punctuation, grammar, and formatting generally meet program and institutional standards.	Tone does not exhibit an understanding of the academic writing genre. Errors of spelling, punctuation, or formatting may be present.	/ 5
<b>Subtotal</b> minus 5 pts per late day					/50

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<b>Recommendations:</b>	
<b>Grand Total</b>	<b>/250</b>
<b>Final Thoughts:</b>	