

Elements of Machine Learning and Data Science

Part III: AI / Empirical Analysis & Performance Evaluation — Exam Notes (Living Document)

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January 29, 2026

Exam likelihood: High (overall AI / Empirical & Evaluation part)

This document is structured to match the lecture topics exactly and is designed for adding **exam-style notes**, **common traps**, and **visual summaries**.

Contents

1	Data Quality and Preprocessing	2
1.1	Introduction	2
1.2	Missing Values	2
1.3	Outliers	2
1.4	Transformation & Normalization	2
1.5	Reduction	2
2	Responsible Data Science	3
2.1	Part I: Introduction to RDS	3
2.2	Part II: Confidentiality	3
2.2.1	Risks	3
2.2.2	Encryption	3
2.2.3	Anonymization	3
2.2.4	Quasi-identifiers	3
2.2.5	K-Anonymity	3
2.2.6	L-Diversity	3
2.2.7	T-Closeness	3
2.3	Part III: Fairness	3
2.3.1	Fairness measures	3
2.3.2	Itemsets / association rules revisited	3
2.3.3	Effect (rule / outcome)	3
2.3.4	Making decision trees fair	3
3	Evaluation	4
3.1	Key Questions for Evaluation	4
3.1.1	How good is an ML model?	4
3.1.2	How good could an ML model be?	4
4	Performance Optimization	5
4.1	Hyperparameter Optimization	5
4.2	Model Selection	5

1 Data Quality and Preprocessing

1.1 Introduction

1.2 Missing Values

1.3 Outliers

1.4 Transformation & Normalization

1.5 Reduction

2 Responsible Data Science

2.1 Part I: Introduction to RDS

2.2 Part II: Confidentiality

2.2.1 Risks

2.2.2 Encryption

2.2.3 Anonymization

2.2.4 Quasi-identifiers

2.2.5 K-Anonymity

2.2.6 L-Diversity

2.2.7 T-Closeness

2.3 Part III: Fairness

2.3.1 Fairness measures

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3 Evaluation

3.1 Key Questions for Evaluation

3.1.1 How good is an ML model?

3.1.2 How good could an ML model be?

4 Performance Optimization

4.1 Hyperparameter Optimization

4.2 Model Selection