Data Science Toolbox Question Sheet

04.2 Outliers and Missing Data

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Block 4

Short Questions

- 1. In what circumstances might measuring anomalies using p-values be helpful, or dangerous?
- 2. A colleague claims that regression is particularly useful for detecting anomalies because you can access leverage of each data point. Discuss.
- 3. A colleague used a density-based approach based on k-Nearest Neighbours to detect several clusters in their data, as well as a set of "outliers" in low density regions. In what sense are these outliers?
- 4. How can you know that you have correctly dealt with missing data?
- 5. Describe 3 types of missing data, and order them in terms of the difficulty to handle correctly.
- 6. Describe how model-based inference can be used to deal with missing data.
- 7. Describe what is meant by "imputation" and give two examples, explaining when each would be used.
- 8. What is conservative imputation and how does it differ compared to mean imputation? In an example, describe an imputation process that is conservative.
- 9. What is the difference between complete-case analysis and available case analysis? Under which circumstances are each appropriate?
- 10. You have collected logs of connections to a particular machine on your network. Amongst other traffic, they contain a number of connections from a particular IP address, all with size zero. Consider the mean size with and without removing these duplicated events. Which is the more accurate measure of connection size, and why?