

XINO3004 S&E International Experience 1: Presentation (Data Science/Maths 2023)

Due:

- The presentation will be given near the end of your international experience.

Marks:

- 30% of the final mark

Group assessment:

- You will work in pre-assigned teams of 4-5 members.
- Each team member is expected to understand all aspects of the project.

Delivery:

- Submission via Blackboard – see Assessments/Presentation, submit PowerPoint Slides (as pdf)
- Presentation & Questions – presentation of 5-7 minutes followed by questions from academics in the audience (up to 5 minutes)

Learning Outcomes:

- Demonstrate the ability to undertake work (e.g., a project or research) in an international context
- Critically analyse the outcomes of the project/research in an inter-cultural context
- Present the project/research in a professional and organised yet creative manner that acknowledges the audience as an active participant.

Project Background:

Australian football has been played since the 19th century throughout Australia and has become a significant part of Australian sporting culture. A match consists of two teams of 18 players on the field and four players on the interchange, played over four 20-minute quarters (Gray & Jenkins, 2010). Australian football is played across the country at numerous ability levels, with the Australian Football League (AFL) being the pre-eminent and only entirely professional men's competition of Australian football. Eighteen teams compete in the AFL competition across a 23-round home and away season. The eight best teams compete in a four-round finals series culminating in a grand final match to decide the champion.

The 2020 season was affected by the COVID-19 pandemic and reduced the number of matches ($n = 162$), with match length reduced from 20-minute quarters to 16-minute quarters. The match lengths were reduced to offset the effects of the compressed schedule due to COVID-19 interruptions.

Project objectives:

- Investigate the differences in intensity of match of the COVID-19-affected season compared to other seasons between 2018 and 2022.
- A data scientist, for each match, computed aggregated value of each performance indicator ("PI") for each team. And wishes to use this to predict the margin of victory (score of the winning team-score of the losing team)
 - As the game duration of affected COVID-19 matches in 2020 compared to regular matches was reduced by 20%, can we increase the total number of PIs by 20% on a pro-rata basis to account for the reduced match time?
 - Provide a recommendation on adjusting for the reduced match length for future analysis.

Task:

You will work in teams to investigate the problem, undertake research, analyse the results, and then present your findings

1. Work together to create a private GitHub repository where you can share your R project and relevant code scripts.
2. Create a Group Contract and all team members sign.
3. Draft a plan to identify the tasks required and by when, then allocate the tasks between yourselves in a fair and reasonable manner.
4. Using the R package, `fitzRoy`, download the data required for the project.
5. Clean and wrangle the data to produce team summaries for each match for relevant performance indicators
6. Investigate and explore the data – produce visualisations explaining the completed exploratory analysis.
7. Research suitable methods which can be implemented to identify whether there is a difference between the intensity of COVID-19-affected and non-affected matches
8. Identify whether the differences in performance indicators are statistically different between each season
9. Investigate a suitable adjustment that can be applied to the performance indicators of the 2020 season to allow for the future modelling of the margin of victory.
10. Provide a recommendation on adjusting for the reduced match length for future analysis
11. Prepare PowerPoint slide presentation
12. Present your findings and answer questions from the audience.

Audience and marking:

- Your audience will be other students and academics from Curtin and Mahidol, some individuals may not be familiar with Australian football.
- Members of the audience will mark your presentation.
- Your fellow team members will provide feedback about your individual contribution.
- See unit Presentation for marking rubric.

Milestones

- Workshop 1: Tasks 1-5
- Workshop 2: Tasks 6-8
- Workshop 3: Tasks 9-10
- Workshop 4: Tasks 11
- Presentation: Task 12

Be prepared for some intensive work sessions and to work outside the scheduled workshops, especially in the lead-up to the presentation.

Background readings and references:

- Bryan, J. (2022). Happy Git and GitHub for the userR. <https://happygitwithr.com/index.html>
- Day, J., Nguyen, R., & Lane, O. (2022). fitzRoy: Easily Scrape and Process AFL Data. In <https://github.com/jimmyday12/fitzRoy>
- Gray, A. J., & Jenkins, D. G. (2010). Match analysis and the physiological demands of Australian football. *Sports Medicine*, 40(4), 347-360. <https://doi.org/10.2165/11531400-000000000-00000>
- Josman, C., Gupta, R., & Robertson, S. (2020). Markov chain models for the near real-time forecasting of Australian Football League match outcomes. In A. K. Nagar, K. Deep, J. C. Bansal, & K. N. Das (Eds.), *Soft Computing for Problem Solving 2019* (Vol. 1139, pp. 111-125). Springer Singapore. http://link.springer.com/10.1007/978-981-15-3287-0_9
- Robertson, S., Back, N., & Bartlett, J. D. (2016). Explaining match outcome in elite Australian Rules football using team performance indicators. *J Sports Sci*, 34(7), 637-644. <https://doi.org/10.1080/02640414.2015.1066026>
- Young, C. M., Luo, W., Gastin, P., Tran, J., & Dwyer, D. B. (2019). The relationship between match performance indicators and outcome in Australian Football. *Journal of Science and Medicine in Sport*, 22(4), 467-471. <https://doi.org/10.1016/j.jsams.2018.09.235>