university of groningen

faculty of science and engineering

Master's Thesis

Unofficial Master Thesis Template for the University Of Groningen

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To fulfill the requirements for the degree of
Master of Science in Artificial Intelligence
at the University of Groningen

July 13, 2023

Abstract

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Acknowledgements

Before I begin, I would like to express my grattitude to my supervisors, friends and ChatGPT.

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Chapter 1

Chapter Title

1.1 Research Question Formatting

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How does X affect Y?

1.2 Citations

The most notable work in Reinforcment Learning is that of Temporal Difference Learning (Sutton, 1988). Or cite in text: The work of Sutton (1988) is the most ...

1.3 Equations

See Equation 1.1. Or inline equations with $y = mx + b$.

$$G_t^\lambda = (1-\lambda) \sum_{n=1}^{T-t-1} \lambda^{n-1} G_{t:t+n} + \lambda^{T-t-1} G_{t:T} \tag{1.1}$$

[1] Example footnote

1.4 Figures

Figure 1.1, shows a basic figure.

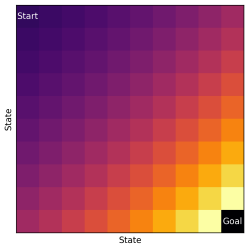
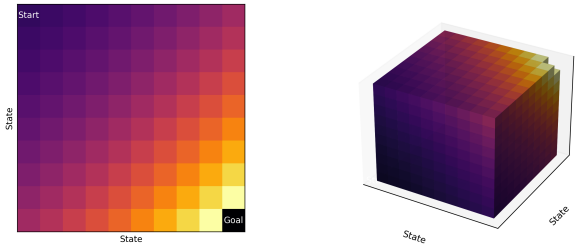


Figure 1.1: Figure caption



(a) Subfigure 1 (b) rubfigure 2

Figure 1.2: Figure with subfigures

1.4.1 Inline Figure

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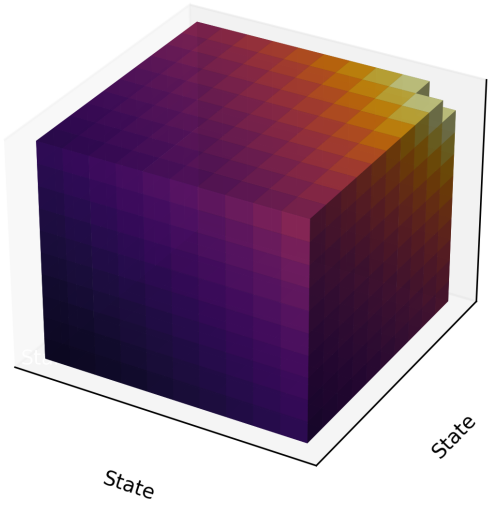

Figure 1.3: Sed hendrerit dui elit, non semper dolor consectetur eget. Fusce dignissim tellus a hendrerit posuere. Pellentesque imperdiet pulvinar orci, in tempor dui rutrum at. Duis porttitor porttitor dolor, sit amet imperdiet erat venenatis nec. Donec vehicula quam vitae mi fermentum, nec vehicula ligula viverra. Proin consequat suscipit arcu nec semper. In quis turpis nec mi tristique euismod sed nec eros. Donec laoreet facilisis tellus sit amet rhoncus. Proin eu ligula massa. Morbi tristique enim nunc

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1.4.2 Tikz

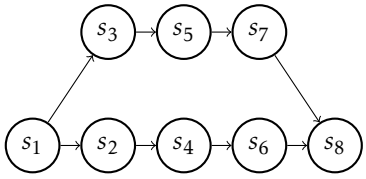

Figure 1.4: A Tikz figure

1.5 Tables

Table 1.1: Table caption usually above the table

Name	Type	Top Speed
Audi	Sport	200
BMW	Comfort	160
Tesla	Electric	170
Mercedes	Comfort	170

1.6 Code

Algorithm 1 Algorithm caption

$w \leftarrow 0$ ▷ w is a column vector of size $|\mathcal{S}|$
$\mathbf{M} \leftarrow 0$ ▷ $\mathbf{M}$ is a matrix of size $|\mathcal{S}| \times |\mathcal{S}|$
for each episode **do**
  $e \leftarrow 0$
  for each s, s' and r of episode **do**
    $e(s) \leftarrow e(s) + 1$ ▷ Tabular accumulating trace
    $\mathbf{M} \leftarrow \mathbf{M} + \beta e \mathbf{s}^\top + \beta\gamma e \mathbf{s}'^\top \mathbf{M} - \beta e \mathbf{s}^\top \mathbf{M}$ ▷ $\mathbf{s}$, $\mathbf{s}'$ in bold marks the state as one-hot vector $|\mathcal{S}|$
    $\delta \leftarrow r + \gamma v_w(s') - v_w(s)$
    $w \leftarrow w + \alpha \mathbf{M} \mathbf{s} \delta$
    $e \leftarrow \gamma \lambda e$
  end for
end for
return w

Bibliography

Sutton, R. S. (1988). Learning to predict by the methods of temporal differences. *Machine Learning*, *3*(1), 9–44. https://doi.org/10.1007/BF00115009

Appendix

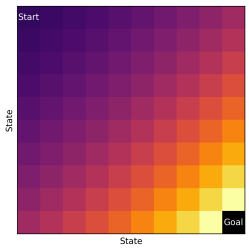

Figure A1: Appendix figure