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## **Distributional Job Listings Across Australia in 2018**

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Report for  
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## 1 Introduction

Job types, job locations, rising demand for certain job categories, these are just some of the aspects of job hunting that many working people around the world are intrigued by. In this report, you will find an in depth analysis into the distribution of job listings across Australia. The report will analyze 3 main sections of job distribution within Australia, broken down by:

- 1) The change in demand by job category
- 2) The change in demand for jobs by city
- 3) The change in demand by job type

Our motivation to choose this as our research topic is prompted by experiencing first hand the cataclysmic effects of the coronavirus and the impact it has had on the job market globally. It has been an unfortunate scenario to witness unemployment rates skyrocket in major cities around the world. Thus, we want to visualize the changes in demand to jobs of all types and categories in Australia, particularly in the major cities.

## 2 Data set and Methodology

### 2.1 Source of Data

To portray the change of job demand in Australia, we used an Australia job listing data that downloaded from [Kaggle](#) provided by [PromptCloud](#), a web-scraping company. Originally, this data was scraped from [Seek](#) job board. This data set has a [CC BY-SA 4.0](#) license, where people are free to share and adapt the data.

The other data source that also being utilised in this report is a cost of living dataset from [Numbeo](#). It is a crowd-source global database of quality of life information. From the [website's term of use](#), it is mentioned that use, reuse, and distribution of Numbeo's content are allowed. Hence, the data could be used legally in this report. Further, the table of Cost of Living Index by City 2018 was scraped using `rvest` and `polite` package.

### 2.2 Limitations of Data

- Data collection method: Even though the origin of data set was provided (obtained from Kaggle, collected by PromptCloud and scraped from Seek), it is hard to verify the credibility of the data set, whether the data was obtained in full and in completeness (with no observations being collected incorrectly). Instead the data was use as it at the time of obtaining from Kaggle.

- Sample size: The collection period ran from 20 April 2018 to 26 October 2018 which accounted for 6 months of 2018. A sample set contained observations for less than one year period may hinder the ability to reflect seasonal cycle or pattern of the studied objects, which in turns may limit the explanatory power of the data set.
- Scope of discussion: The data set was tidied, visualised and interpreted under personal opinions of a group of individuals from which view, to some, may be bias and incompleteness based on the personal experience and knowledge of the authors.

## 2.3 Methodology

### 2.3.1 Cleaning the dataset and inspect the missing values

##	pageurl	crawl_timestamp
## 1	https://www.seek.com.au/job/36028685	2018-04-20 03:57:04 +0000
## 2	https://www.seek.com.au/job/36028693	2018-04-20 03:52:46 +0000
## 3	https://www.seek.com.au/job/36027858	2018-04-20 04:12:01 +0000
## 4	https://www.seek.com.au/job/36028687	2018-04-20 03:51:23 +0000
## 5	https://www.seek.com.au/job/36026414	2018-04-20 04:14:42 +0000
## 6	https://www.seek.com.au/job/36027190	2018-04-20 04:05:15 +0000
## 7	https://www.seek.com.au/job/36028057	2018-04-20 03:51:41 +0000
## 8	https://www.seek.com.au/job/36028164	2018-04-20 03:45:12 +0000
## 9	https://www.seek.com.au/job/36025868	2018-04-20 04:31:05 +0000
## 10	https://www.seek.com.au/job/36026088	2018-04-20 04:25:11 +0000
## 11	https://www.seek.com.au/job/36026178	2018-04-20 04:12:25 +0000
## 12	https://www.seek.com.au/job/36025490	2018-04-20 04:43:59 +0000
## 13	https://www.seek.com.au/job/36025840	2018-04-20 04:43:05 +0000
## 14	https://www.seek.com.au/job/36026083	2018-04-20 04:20:03 +0000
## 15	https://www.seek.com.au/job/36026992	2018-04-20 03:58:42 +0000
## 16	https://www.seek.com.au/job/36026394	2018-04-20 04:23:34 +0000
## 17	https://www.seek.com.au/job/36027739	2018-04-20 04:04:49 +0000
## 18	https://www.seek.com.au/job/36028885	2018-04-20 03:42:59 +0000
## 19	https://www.seek.com.au/job/36027703	2018-04-20 03:58:19 +0000
## 20	https://www.seek.com.au/job/36018356	2018-04-20 04:14:30 +0000
## 21	https://www.seek.com.au/job/36025946	2018-04-20 04:16:09 +0000
## 22	https://www.seek.com.au/job/36025551	2018-04-20 04:43:02 +0000

## 23 <https://www.seek.com.au/job/36029192> 2018-04-20 03:42:21 +0000  
 ## 24 <https://www.seek.com.au/job/36026076> 2018-04-20 04:17:45 +0000  
 ## 25 <https://www.seek.com.au/job/36026334> 2018-04-20 04:17:01 +0000  
 ## 26 <https://www.seek.com.au/job/36026236> 2018-04-20 04:13:14 +0000  
 ## 27 <https://www.seek.com.au/job/36026026> 2018-04-20 04:19:41 +0000  
 ## 28 <https://www.seek.com.au/job/36026165> 2018-04-20 04:21:51 +0000  
 ## 29 <https://www.seek.com.au/job/36025566> 2018-04-20 04:36:22 +0000  
 ## 30 <https://www.seek.com.au/job/36026625> 2018-04-20 04:25:15 +0000

##	job_title
## 1	Package Lead - Pipeline Installation
## 2	Department Manager - Bakery - Campbelltown Region
## 3	Freight Handler
## 4	Warehouse Assistant
## 5	HR Truck Subcontractors
## 6	Administrative Officer, Education unit
## 7	Traffic Controller - Sunshine Coast
## 8	Mortgage Broker Assistant
## 9	Manager Violence Abuse and Neglect
## 10	Mortgage Broker
## 11	Linesmen / Line Mechanics - Relocation Opportunities
## 12	Parts Interpreter
## 13	Safety Officer - Suzlon Energy Australia
## 14	Sales Assistants - MIDAS Warringah
## 15	Occupational Therapist - Aged Care
## 16	Sub Contractor Installers
## 17	Electrician - RIW
## 18	IT TECHNICAL SPECIALIST - Microsoft Exchange & Office 365
## 19	Fulltime Chef with Asian cooking using 17" wok with handle
## 20	Developer Programmer
## 21	Operations Manager
## 22	Learning & Development Specialist
## 23	Clerical/Admin support
## 24	Field Officer - Group Training

## 25	Territory Manager - Diabetes - LAUNCH
## 26	Business Development Manager
## 27	Senior Business Officer
## 28	Senior Animal Compliance and Information Services Officer
## 29	Agile Business Analyst - Digital - Permanent - Sydney - ASX Listed Organisation!
## 30	Business Analyst
##	category
## 1	Mining, Resources & Energy
## 2	Retail & Consumer Products
## 3	Manufacturing, Transport & Logistics
## 4	Manufacturing, Transport & Logistics
## 5	Manufacturing, Transport & Logistics
## 6	Administration & Office Support
## 7	Construction
## 8	Banking & Financial Services
## 9	Healthcare & Medical
## 10	Banking & Financial Services
## 11	Mining, Resources & Energy
## 12	Trades & Services
## 13	Human Resources & Recruitment
## 14	Retail & Consumer Products
## 15	Healthcare & Medical
## 16	Trades & Services
## 17	Trades & Services
## 18	Information & Communication Technology
## 19	Hospitality & Tourism
## 20	Information & Communication Technology
## 21	Mining, Resources & Energy
## 22	Human Resources & Recruitment
## 23	Administration & Office Support
## 24	Human Resources & Recruitment
## 25	Healthcare & Medical
## 26	Sales

## 27	Government & Defence
## 28	Government & Defence
## 29	Information & Communication Technology
## 30	Information & Communication Technology
##	company_name
## 1	FIRCROFT AUSTRALIA PTY LTD
## 2	Coles
## 3	Zoom Recruitment & Training
## 4	Private Advertiser
## 5	Sands Fridge Lines
## 6	ANZCA
## 7	Evolution Traffic Control
## 8	Howitt Partners
## 9	Hunter New England Local Health District
## 10	Private Advertiser
## 11	Hard Hat Recruits
## 12	AHG QLD
## 13	Yudo
## 14	MIDAS
## 15	Western Health
## 16	Totally Outdoors
## 17	Protech NSW
## 18	Eighty20 Solutions
## 19	Chinchin's At Kotomoon
## 20	Bluetech IT Solution
## 21	Metso Australia Limited
## 22	West Recruitment
## 23	Hallis
## 24	TABMA Workforce & Career Development
## 25	Heng & Hurst
## 26	National Distribution Centre Services
## 27	Department of Economic Development, Jobs , Transport and Resources
## 28	City of Greater Geelong

## 29		Xpert Group
## 30		Hays Information Technology
##	city	post_date
## 1	Perth	2018-04-19T05:41:52Z
## 2	Sydney	2018-04-19T05:42:19Z
## 3	Sydney	2018-04-19T04:51:51Z
## 4	Bundaberg & Wide Bay Burnett	2018-04-19T05:42:02Z
## 5	Perth	2018-04-19T03:22:40Z
## 6	Melbourne	2018-04-19T04:11:11Z
## 7	Sunshine Coast	2018-04-19T05:04:32Z
## 8	Melbourne	2018-04-19T05:11:49Z
## 9	Melbourne	2018-04-19T02:38:34Z
## 10	Melbourne	2018-04-19T02:53:23Z
## 11	Perth	2018-04-19T03:01:04Z
## 12	Brisbane	2018-04-19T02:10:13Z
## 13	Melbourne	2018-04-19T02:35:42Z
## 14	Sydney	2018-04-19T02:53:11Z
## 15	Melbourne	2018-04-19T04:00:53Z
## 16	Melbourne	2018-04-19T03:20:47Z
## 17	Sydney	2018-04-19T04:45:13Z
## 18	Sydney	2018-04-19T06:06:13Z
## 19	Melbourne	2018-04-19T04:47:47Z
## 20	ACT	2018-04-19T03:10:41Z
## 21	Perth	2018-04-19T02:44:45Z
## 22	Sydney	2018-04-19T02:14:13Z
## 23	Sydney	2018-04-19T06:10:37Z
## 24	Sydney	2018-04-19T02:52:38Z
## 25	Adelaide	2018-04-19T03:15:43Z
## 26	Sydney	2018-04-19T03:07:16Z
## 27	Melbourne	2018-04-19T02:48:59Z
## 28	Geelong & Great Ocean Road	2018-04-19T03:00:54Z
## 29	Sydney	2018-04-19T02:15:38Z
## 30	ACT	2018-04-19T03:35:47Z

##

## 1 The Role: General Execution Accountable for safe and efficient planning and execution of

## 2

## 3

## 4

## 5

## 6 Maternity leave contract ending May 2019 Full time

## 7

## 8

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## job\_type job\_board geo state

## 1 Contract/Temp seek AU



## 2	Full Time	seek	AU	South West & M5 Corridor
## 3	Casual/Vacation	seek	AU	Parramatta & Western Suburbs
## 4	Full Time	seek	AU	
## 5	Contract/Temp	seek	AU	
## 6	Contract/Temp	seek	AU	CBD & Inner Suburbs
## 7	Casual/Vacation	seek	AU	
## 8	Part Time	seek	AU	CBD & Inner Suburbs
## 9	Full Time	seek	AU	CBD & Inner Suburbs
## 10	Full Time	seek	AU	
## 11	Full Time	seek	AU	
## 12	Full Time	seek	AU	CBD & Inner Suburbs
## 13	Full Time	seek	AU	CBD & Inner Suburbs
## 14	Full Time	seek	AU	North Shore & Northern Beaches
## 15	Contract/Temp	seek	AU	Western Suburbs
## 16	Contract/Temp	seek	AU	Bayside & South Eastern Suburbs
## 17	Contract/Temp	seek	AU	North West & Hills District
## 18	Contract/Temp	seek	AU	Parramatta & Western Suburbs
## 19	Full Time	seek	AU	CBD & Inner Suburbs
## 20	Full Time	seek	AU	
## 21	Full Time	seek	AU	Fremantle & Southern Suburbs
## 22	Contract/Temp	seek	AU	CBD, Inner West & Eastern Suburbs
## 23	Contract/Temp	seek	AU	CBD, Inner West & Eastern Suburbs
## 24	Full Time	seek	AU	CBD, Inner West & Eastern Suburbs
## 25	Full Time	seek	AU	
## 26	Full Time	seek	AU	CBD, Inner West & Eastern Suburbs
## 27	Full Time	seek	AU	CBD & Inner Suburbs
## 28	Full Time	seek	AU	
## 29	Full Time	seek	AU	CBD, Inner West & Eastern Suburbs
## 30	Contract/Temp	seek	AU	
##				salary_offered
## 1				
## 2				
## 3				\$34 - \$39 p.h.

```
## 4
## 5
## 6
## 7
## 8          $20 - $29.99 per hour
## 9
## 10    $70,000 - $89,999 base plus commission
## 11
## 12
## 13
## 14
## 15
## 16
## 17 $45 per hour, Benefits: Overtime, Travel %
## 18          $150,000 - $179,999
## 19    $60,000 - $69,999 plus super
## 20          $65,000 - $74,999
## 21
## 22    $90k - $95k p.a. + Super
## 23                                32.76
## 24
## 25
## 26
## 27          $93,867 - $113,572
## 28
## 29
## 30
```

There are things to note before we clean:

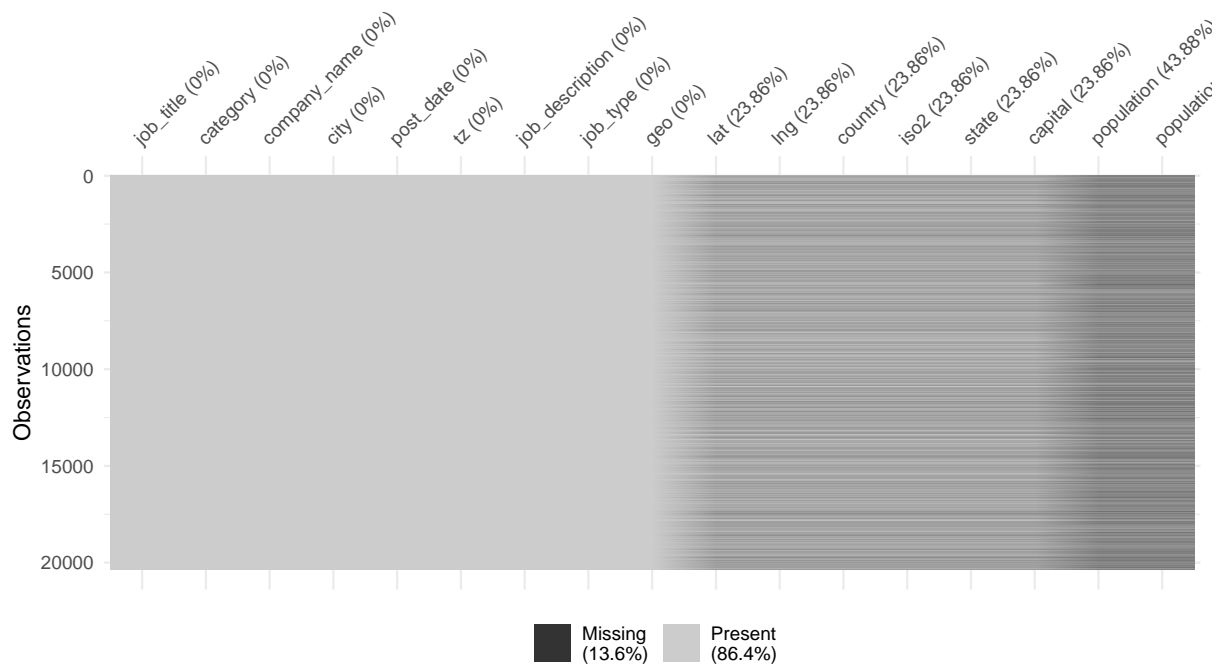
- city: there are observations that have multiple cities nested in one row.
- post\_date: dates are coupled with time stamps, thus in character format not in date format.

Table 1: The

pageurl	crawl_timestamp	job_title
https://www.seek.com.au/job/36028685	2018-04-20 03:57:04 +0000	Package Lead - Pipeline Installation
https://www.seek.com.au/job/36028693	2018-04-20 03:52:46 +0000	Department Manager - Bakery - Camp
https://www.seek.com.au/job/36027858	2018-04-20 04:12:01 +0000	Freight Handler
https://www.seek.com.au/job/36028687	2018-04-20 03:51:23 +0000	Warehouse Assistant
https://www.seek.com.au/job/36026414	2018-04-20 04:14:42 +0000	HR Truck Subcontractors
https://www.seek.com.au/job/36027190	2018-04-20 04:05:15 +0000	Administrative Officer, Education unit
https://www.seek.com.au/job/36028057	2018-04-20 03:51:41 +0000	Traffic Controller - Sunshine Coast
https://www.seek.com.au/job/36028164	2018-04-20 03:45:12 +0000	Mortgage Broker Assistant
https://www.seek.com.au/job/36025868	2018-04-20 04:31:05 +0000	Manager Violence Abuse and Neglect
https://www.seek.com.au/job/36026088	2018-04-20 04:25:11 +0000	Mortgage Broker
https://www.seek.com.au/job/36026178	2018-04-20 04:12:25 +0000	Linesmen / Line Mechanics - Relocati
https://www.seek.com.au/job/36025490	2018-04-20 04:43:59 +0000	Parts Interpreter
https://www.seek.com.au/job/36025840	2018-04-20 04:43:05 +0000	Safety Officer - Suzlon Energy Austral
https://www.seek.com.au/job/36026083	2018-04-20 04:20:03 +0000	Sales Assistants - MIDAS Warringah
https://www.seek.com.au/job/36026992	2018-04-20 03:58:42 +0000	Occupational Therapist - Aged Care
https://www.seek.com.au/job/36026394	2018-04-20 04:23:34 +0000	Sub Contractor Installers
https://www.seek.com.au/job/36027739	2018-04-20 04:04:49 +0000	Electrician - RIW
https://www.seek.com.au/job/36028885	2018-04-20 03:42:59 +0000	IT TECHNICAL SPECIALIST - Microso
https://www.seek.com.au/job/36027703	2018-04-20 03:58:19 +0000	Fulltime Chef with Asian cooking usin
https://www.seek.com.au/job/36018356	2018-04-20 04:14:30 +0000	Developer Programmer
https://www.seek.com.au/job/36025946	2018-04-20 04:16:09 +0000	Operations Manager
https://www.seek.com.au/job/36025551	2018-04-20 04:43:02 +0000	Learning & Development Specialist
https://www.seek.com.au/job/36029192	2018-04-20 03:42:21 +0000	Clerical/Admin support
https://www.seek.com.au/job/36026076	2018-04-20 04:17:45 +0000	Field Officer - Group Training
https://www.seek.com.au/job/36026334	2018-04-20 04:17:01 +0000	Territory Manager - Diabetes - LAUNC
https://www.seek.com.au/job/36026236	2018-04-20 04:13:14 +0000	Business Development Manager
https://www.seek.com.au/job/36026026	2018-04-20 04:19:41 +0000	Senior Business Officer
https://www.seek.com.au/job/36026165	2018-04-20 04:21:51 +0000	Senior Animal Compliance and Inform
https://www.seek.com.au/job/36025566	2018-04-20 04:36:22 +0000	Agile Business Analyst - Digital - Perm
https://www.seek.com.au/job/36026625	2018-04-20 04:25:15 +0000	Business Analyst

- state: nearly 30% of state information is missed. Multiple name of states are nested in one row and are not in uniform format.
- geo: contained both geography for Australia and New Zealand.
- salary\_offered: mostly absent.

In order for the data to be used, we need to separate the nested column and observations, filter the data to include Australia only and filled out the state information, using the simplemap's list of cities and states in Australia ([Australia Cities Database \(2019\)](#)) to match with the cities in our data set.



**Figure 1:** Missing value visualization after columns and rows separation

This is the data set after we have done the cleaning, choosing only the variables needed for the analysis:

```
##                                job_title
## 1      Package Lead - Pipeline Installation
## 2 Department Manager - Bakery - Campbelltown Region
## 3                                Freight Handler
## 4                                Warehouse Assistant
## 5                                Warehouse Assistant
## 6      HR Truck Subcontractors
##                                category      company_name
## 1      Mining, Resources & Energy  FIRCROFT AUSTRALIA PTY LTD
## 2      Retail & Consumer Products      Coles
## 3 Manufacturing, Transport & Logistics Zoom Recruitment & Training
## 4 Manufacturing, Transport & Logistics      Private Advertiser
## 5 Manufacturing, Transport & Logistics      Private Advertiser
## 6 Manufacturing, Transport & Logistics      Sands Fridge Lines
##                                city post_date      tz
```

```
## 1          Perth 2018-04-19 05:41:52Z
## 2          Sydney 2018-04-19 05:42:19Z
## 3          Sydney 2018-04-19 04:51:51Z
## 4      Bundaberg 2018-04-19 05:42:02Z
## 5 Wide Bay Burnett 2018-04-19 05:42:02Z
## 6          Perth 2018-04-19 03:22:40Z
##
## 1 The Role: General Execution Accountable for safe and efficient planning and execution of t
## 2
## 3
## 4
## 5
## 6
##
##          job_type geo          state
## 1 Contract/Temp AU Western Australia
## 2      Full Time AU   New South Wales
## 3 Casual/Vacation AU   New South Wales
## 4      Full Time AU           Queensland
## 5      Full Time AU           Queensland
## 6 Contract/Temp AU Western Australia
```

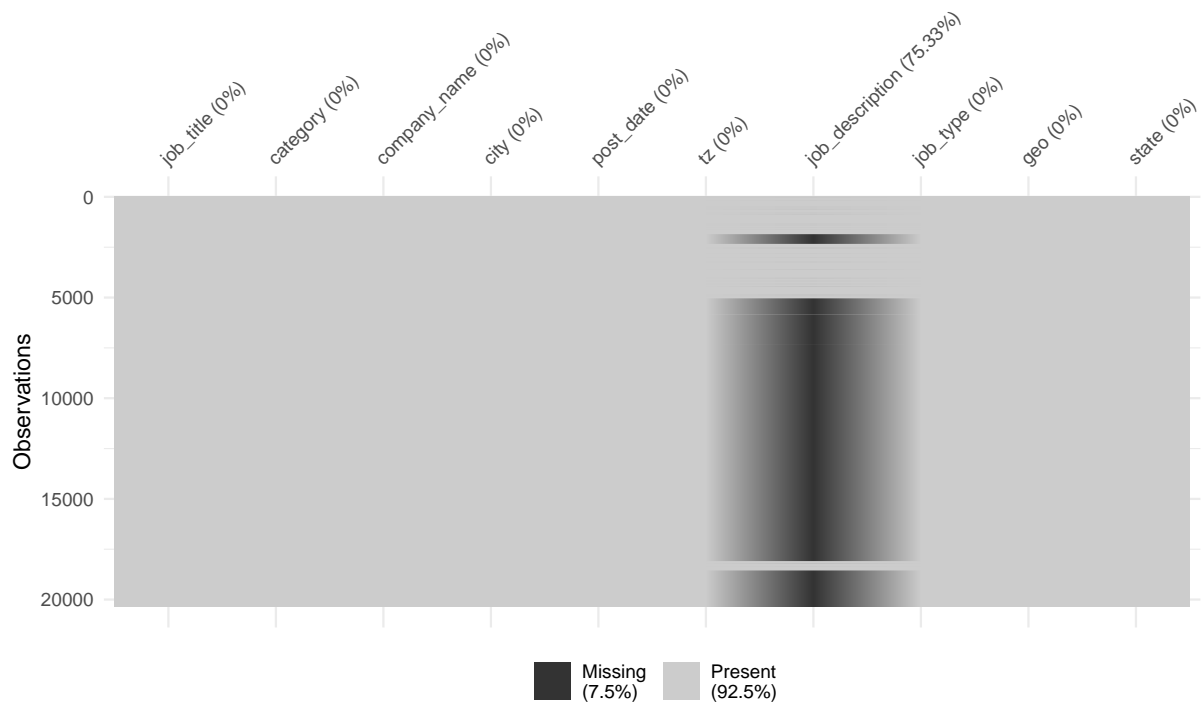
After that, we inspect the missing values in the dataset.

A quick overview showed that out of all variables chosen, job description is the only variable that had missing values and at a really high ratio - 75.3%, other variables are fully present. However, job description is not of importance for this study, hence we can conclude that this data set requires no further cleaning and is ready for use.

## 2.4 Analyzing the data

An exploratory data analysis is performed to observe the change in job demand across Australia in 2018. We used a variety of plots using the functions in `ggplot2`. We also incorporated tables and did a correlation analysis using Pearson coefficient correlation.

## 3 Analysis and Conclusions



**Figure 2:** *Missing values visualization after the cleaning*

### 3.1 Analyze the change in demand by job category

There are 30 jobs category in this dataset and table 2 list the number of jobs per category from April to November in 2018. The category of trades and services was the most popular jobs category in 2018 in Australia and information and communication technology was the second which the job posting number almost the same as the first place. From Labour Market Information Portal ([LMIP data portal n.d.](#)) known that those two categories have been in short supply in Australian labour market. Because of the small population and culture influence(Burgess (2018)) said automation cannot completely replace manual, so far trade and services fully occupied the top spots.

For a better timely observation through every month, figure 3 shows each jobs category requirement change in difference month which not only show the shortage job, but also show some category is becoming saturated. It is more clearly show whether there is some job category in high demand every month in a year, whether there is a job have seasonal requirement, for example, accounting would have a high demand in June every year before the end of financial year, some categories have high demand in Christmas. Meanwhile, figure 4 a graph list top five jobs category in each month. There are 7 categories became the most frequently appeared in the list, for example accounting, administration and office support, healthcare and medical, hospitality and tourism, information and communication technology, Manufacturing, Transport and Logistics, Trade and Services. In October,

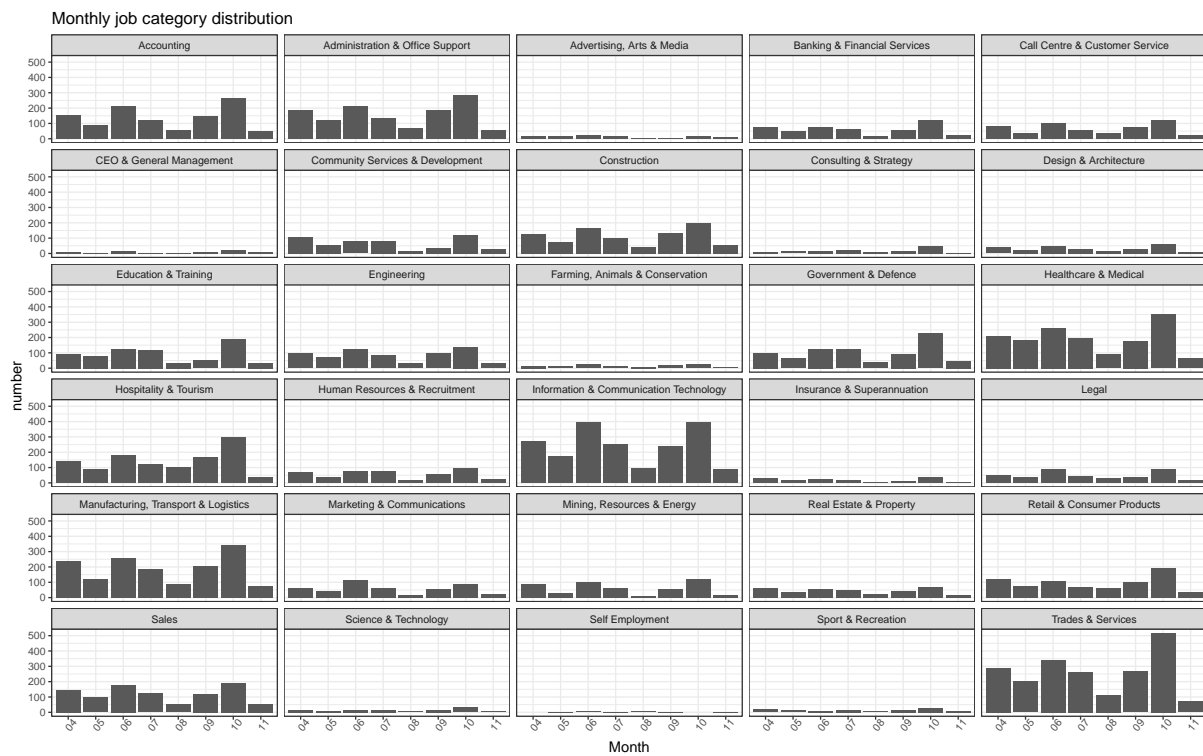


Figure 3: Monthly job category distribution

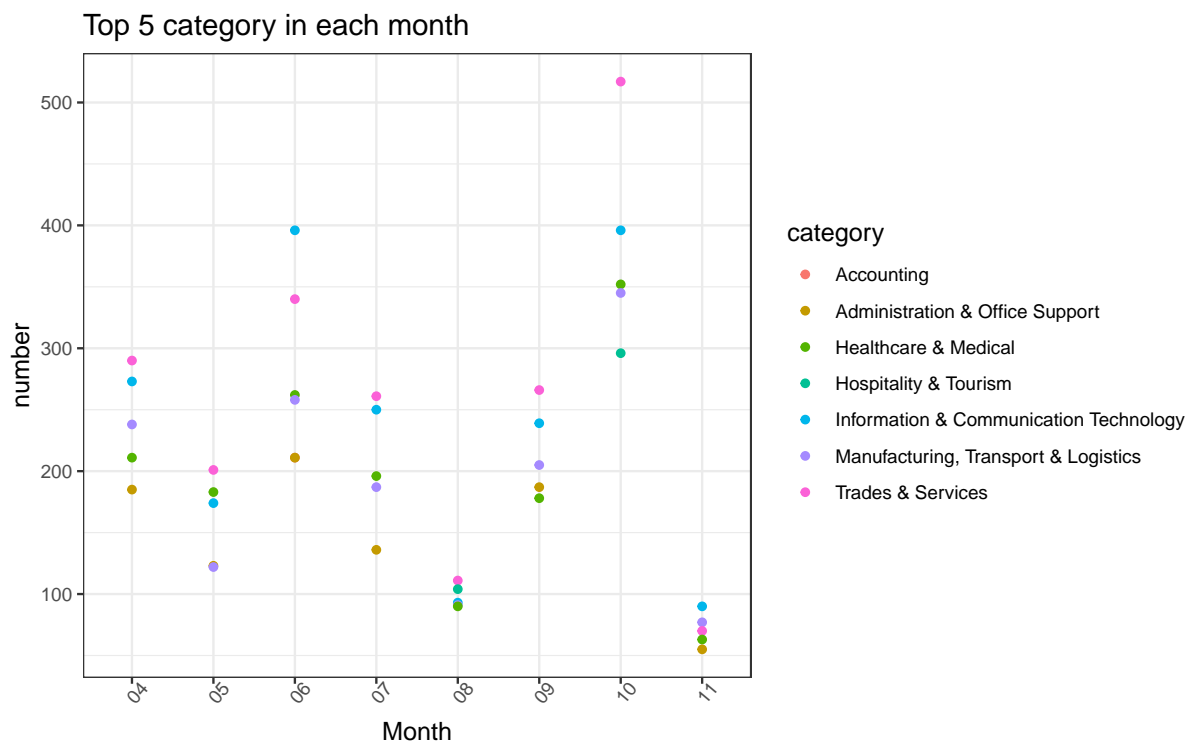


Figure 4: Top 5 category in each month

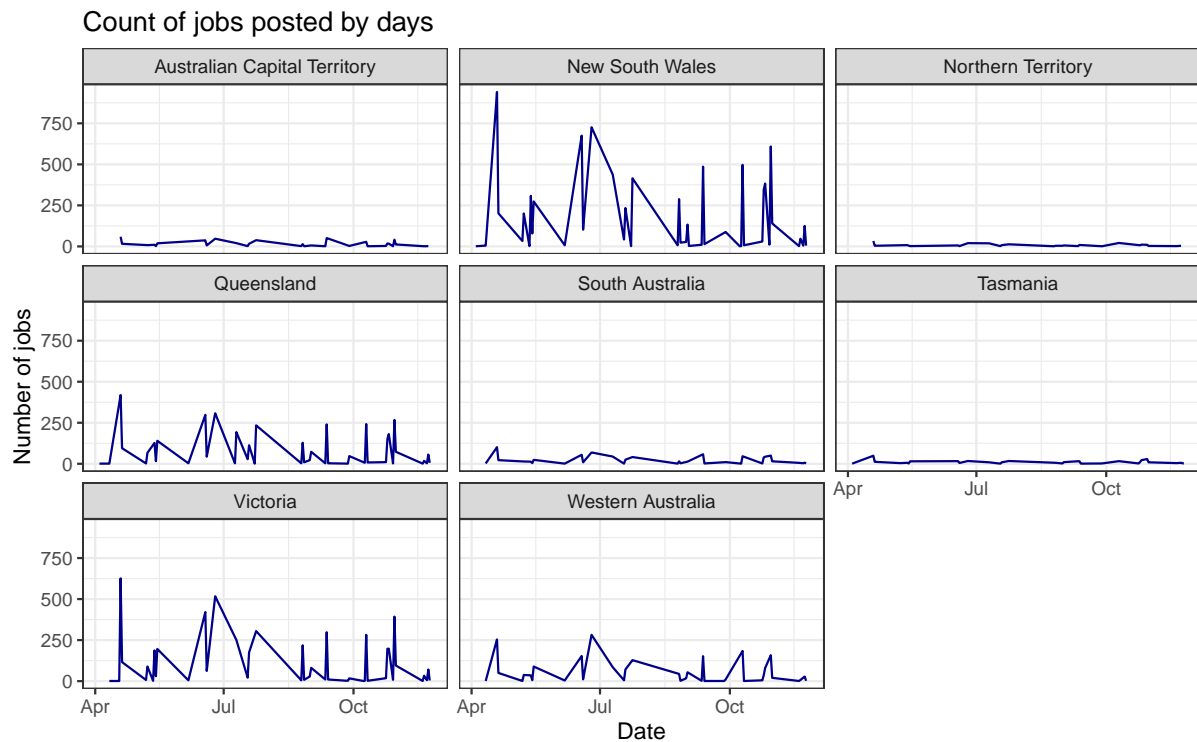
**Table 2:** *The number of jobs per category*

category	number
Self Employment	16
CEO & General Management	82
Advertising, Arts & Media	104
Farming, Animals & Conservation	108
Science & Technology	108
Sport & Recreation	108
Insurance & Superannuation	133
Consulting & Strategy	139
Design & Architecture	247
Real Estate & Property	352
Legal	385
Human Resources & Recruitment	448
Marketing & Communications	461
Banking & Financial Services	468
Mining, Resources & Energy	492
Community Services & Development	526
Call Centre & Customer Service	534
Engineering	665
Education & Training	723
Retail & Consumer Products	766
Government & Defence	810
Construction	894
Sales	961
Accounting	1084
Hospitality & Tourism	1141
Administration & Office Support	1250
Manufacturing, Transport & Logistics	1523
Healthcare & Medical	1535
Information & Communication Technology	1911
Trades & Services	2056

there were more vacancy and labour requirement than other month. Forbes (**Forbes\_2019**) shown a statistics report that most industries would figure out what they need in September because holiday was coming and finish job before year-end. Thus, October became the busiest month for recruiting that the number of job posting in additional increase. When it comes to November, the number of jobs posting number in whole labour market got a sharp drop that a new round of hiring has end in October and all goes quiet before Christmas and New Year.

### **3.2 Analyze the change in job demand by states**





**Figure 5:** *Daily job count by states*

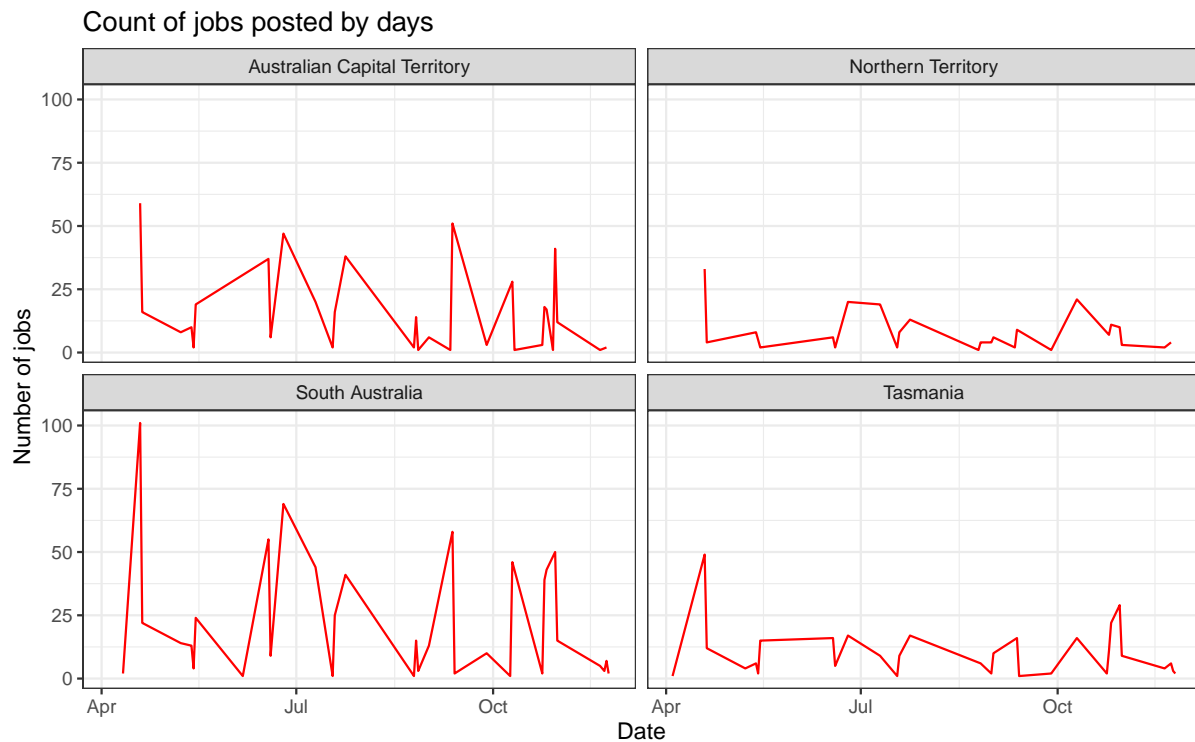
### 3.2.1 Change in demand

Looking at figure 5, we could see that NSW, Victoria and Queensland lead the national job pool with highest counts observed among all the states. The patterns of job post appeared to look similar across the states with the highest peak in April, followed by two other minor peaks on July.

To have a better look at the states with lower job counts, which are Australia Capital Territory, Northern Territory, South Australia and Tasmania, we isolated them from the high - count states and look at the change separately.

Figure 6 showed that the other four states had roughly the same pattern of job post changed.

Normally, the job hunting season usually peaks around the beginning of the year, mostly in January as most companies having robust budgets for hiring and just got out of a holiday season in December. The same situation applies for job seekers as well as people start to come back from the holiday, usually excited with new year resolution; also the annual bonus has been paid at the end of last year, making people more ready to change job starting from January Emswiler (2016). This data set, did not include data from January to March so we cannot verify the situation. However it would be safe to assume that this new year effect lasts further into April. Another peak is around July, which



**Figure 6:** Daily job counts in ACT, NT, SA and TAS

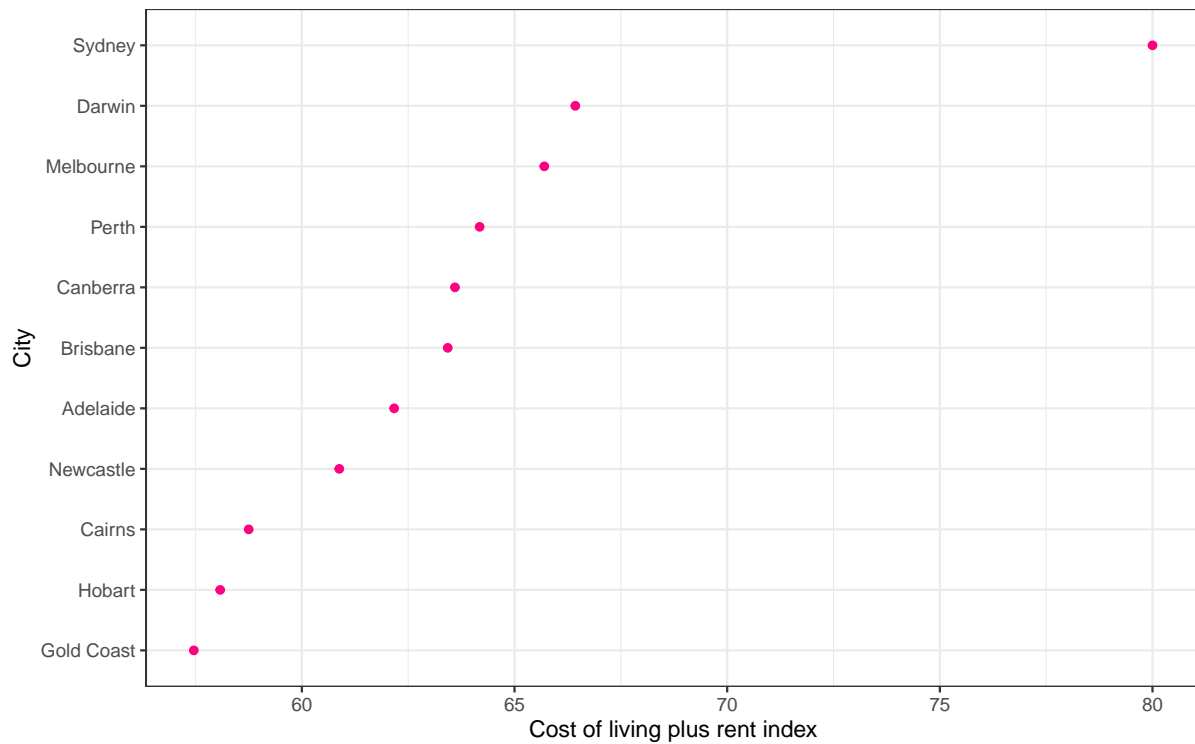
marks the start of new financial year for most companies, giving them higher budget for new hiring Emswiler (2016).

Despite the similarity in seasonal pattern, the difference in job count was prominent across the states. Big states like NSW, Victoria and Queensland held the majority of opportunities, with the highest count could even get more than 7 times higher than the highest count in the low - demand states (NSW versus South Australia). Even though it was common sense that big states would have more opportunity, the amount gap looked even more significant when presented visually.

### 3.2.2 Job demands and living cost

According to Laswell (2006), when searching for a job, cost of living should be taken into account. It also relates to the question whether the salary of the job would be enough to cover the living cost in a particular city. Therefore, in this subsection, the living cost in some cities in Australia with relatively had more job listings would be observed.

Figure 7 shows that Sydney was found to be the city with the highest living cost, about 80. Whilst generally, the living cost index in most cities in Australia ranged between 60 to 68. The figure also conveys that Gold Coast was the city with the lowest living cost in Australia.



**Figure 7:** *Living cost of 2018 by city*

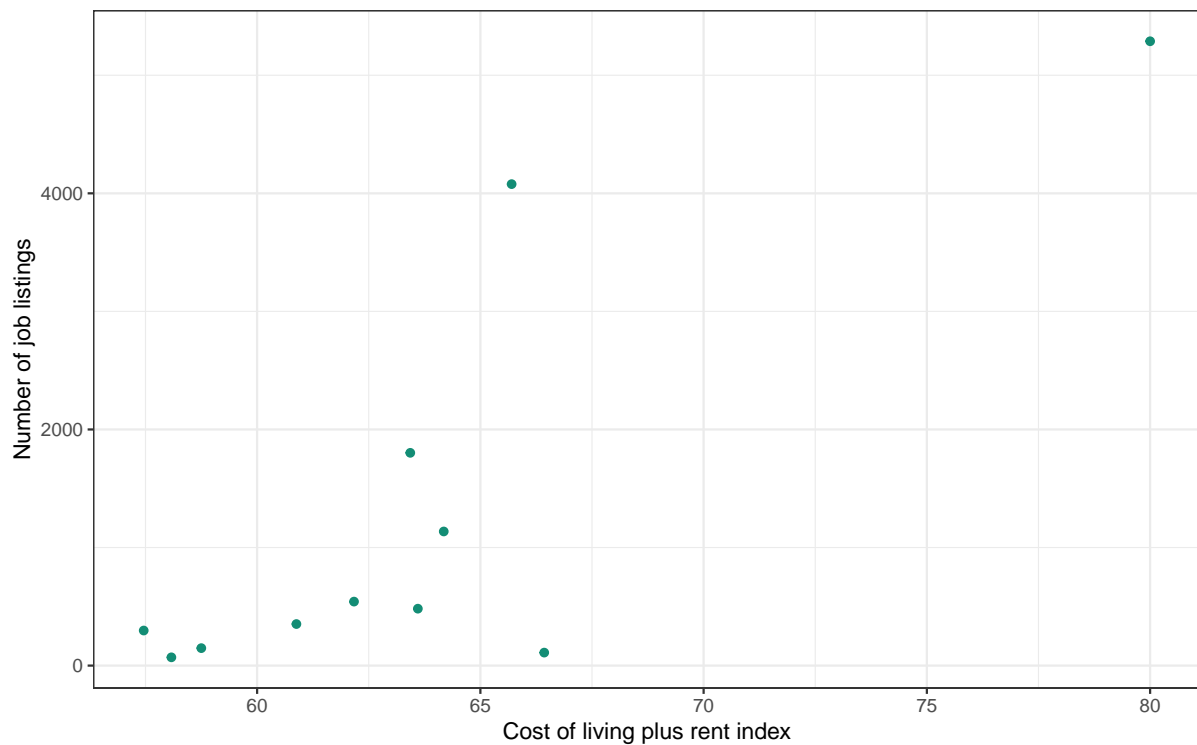
**Table 3:** *The number of job listings in some cities in Australia in 2018*

City	Number of Job Listings
Sydney	5288
Melbourne	4078
Brisbane	1802
Perth	1136
Adelaide	542
Canberra	482
Newcastle	352
Gold Coast	297
Cairns	148
Darwin	110
Hobart	70

It is also interesting to observe whether there is a correlation between the living cost in those cities and the number of job listings in there. Hence, the number of job listings in those cities would be examined first.

Table 3 conveys that Sydney, was being the cities with most job listings. These cities had more than 1000 jobs available in April to December 2018. Meanwhile, Hobart was found to be the city with the least job listings among others. The large number of job listings in Sydney was possibly due to the fact

that Sydney was placed to be the city with highest productivity in Australia (PricewaterhouseCoopers (PwC) 2015).



**Figure 8:** *Cost of living plus rent index vs Number of job listings Scatter Plot*

Figure 8 suggests that there is a possible correlation between cost of living and the number of job listings in Australia. However, the pattern can not be really seen since the number of observations is too small. Therefore, the extension of analysis was performed by using Pearson correlation coefficient. The finding is that there was a significantly positive (0.8211368) correlation between these two variables. This is inline with what DePietro (2017) stated that the increasing living cost is often associated with employment growth and income growth. Further, larger cities tend to be perceived as the expensive places to live (Weinstein 2014).

### 3.3 Analyze the change in demand by job type

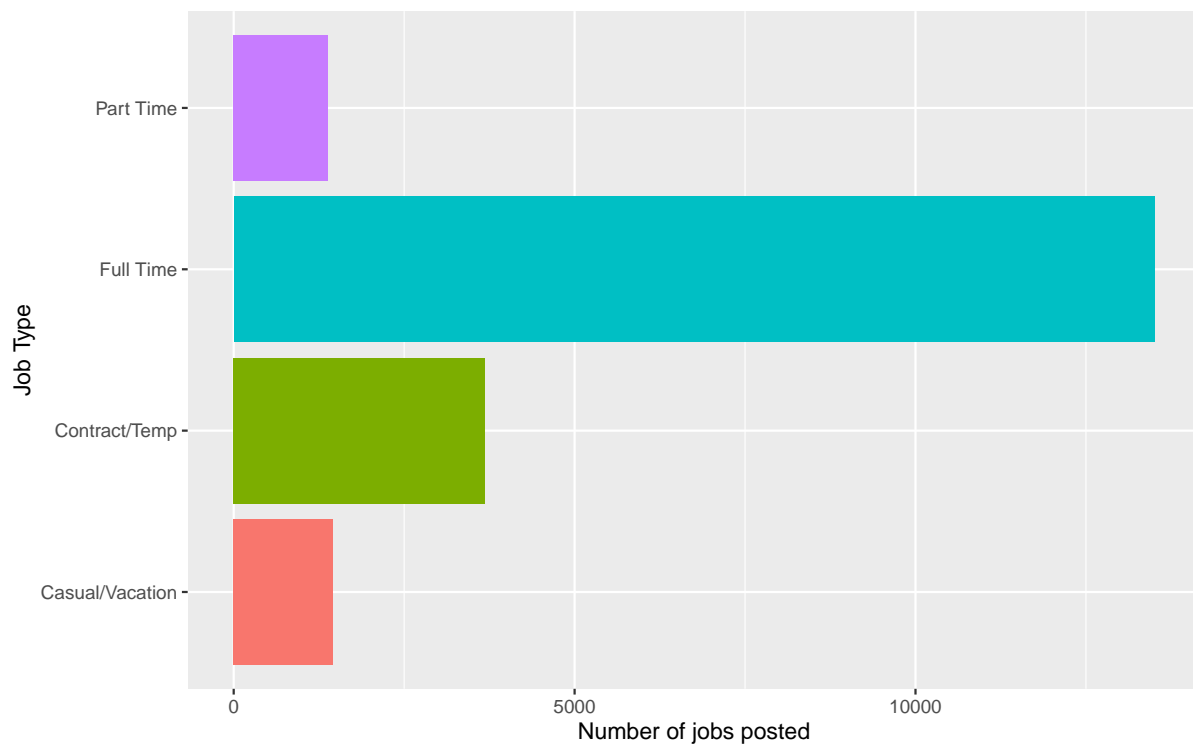
In this section, our goal is to visualize the different types of jobs such as full-time, part-time, contract and casual jobs. The changes in demand to these job types will vastly differ across the months, but it will be interesting to see which job type increased in demand in 2018.

#### 3.3.1 Number of jobs posted per job type

The different types of jobs being posted on seek are part time, full time, contract/temporary and casual/vacation. From Table 4, we can see that over 13500 jobs out of the roughly 20000 jobs posted are full-time jobs. It is easier to visualize just how common these types of jobs are in Figure 9, and

**Table 4:** *Number of jobs posted by job type*

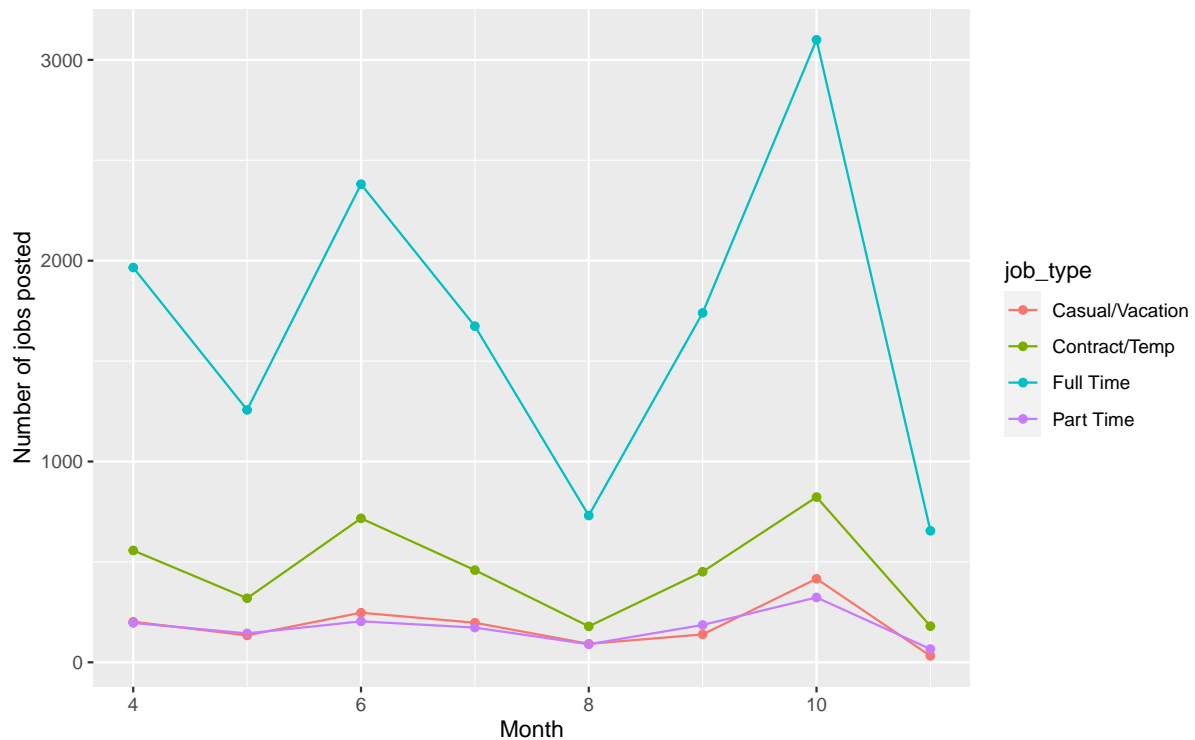
Job Type	Number of jobs posted
Casual/Vacation	1459
Contract/Temp	3685
Full Time	13504
Part Time	1382

**Figure 9:** *Number of jobs for each job type*

we can see how dominant the full-time jobs are being posted by companies. We can expect such a result as many companies seek to employ fresh graduates from universities for an entry-level role. The number of new college graduates entering the workforce is always high enough for companies to post a lot of full-time jobs, which is why it is the most popular job type. Most of the full-time jobs are being generated in the healthcare and education sectors. Specifically, the National Disability Insurance Scheme (NDIS) and aged care services are seeing an increase in demand for these types of jobs. The NDIS expects an extra 80,000 full-time jobs by 2020 Toth et al. (2018).

### 3.3.2 Fluctuations in job posting numbers by month

However, the fluctuations of these job types says more about what kinds of jobs companies are willing to offer. For example, in Figure 10, there is a large spike in full time jobs between August and October. The opposite is true when these jobs plummet down from 3100 posted jobs in October to around 700 jobs in November. Both part time and casual jobs stay relatively neutral and do not change as



**Figure 10:** *Changes in job number postings by month*

much throughout the months. Casual jobs have stayed the same since the past two decades, these jobs formed 20.6% of the workforce in February 2018 compared to 20.1 % in 1998. The reason for an uptick in the jobs posted for this category in October is because the largest proportion of people who take up casual jobs are aged 20-24, followed by people aged 15-19 Norman (2018). Thus around October, many of these people who are students are available to take on casual jobs as the summer break approaches. Interestingly, all the job types follow a similar pattern, reporting an increase in the number of jobs posted in June and October as these are the time periods for winter and summer break respectively.

### 3.4 Conclusions

The most common type of job posted on SEEK are full-time jobs. With an increasing number of graduates coming out of university, companies are finding ways to offer full-time roles to these graduates. Demand for full-time jobs is predicted to be highest in the healthcare industry with approximately 80,000 jobs needing to be filled by 2020. However, part-time and casual jobs for many different industries are still popular among individuals aged 15-19 and 20-24 even though the demand for these jobs have not changed much over the last 20 years.

In 2018, there are 30 job categories that appeared in the dataset, with trade and services and information technology ranking as the top places for the labour market requirement. Meanwhile, we

found that October was the busiest month for the recruiting and some categories have seasonally demand. Further, the number of job listings in a city has a positive correlation with its living cost. As such, states that have high living costs such as New South Wales, Victoria and Queensland hold a majority of the national job pool.

## References

- Australia Cities Database (2019). <https://simplemaps.com/data/au-cities>.
- Burgess, M (2018). *The tradies in demand across Australia*. <https://www.news-mail.com.au/news/seek-reveals-massive-job-growth-for-these-tradespe/3576318/>.
- DePietro, A (2017). *Living Is Surging In These Major Cities And What It Could Mean For 2018*. <https://www.forbes.com/sites/andrewdepietro/2017/12/28/cost-of-living-is-surging-in-these-major-cities-and-what-it-could-mean-for-2018/#3dd0282271c6>.
- Emswiler, K (2016). *This Is the Bleakest Time of Year For Job Hunting*. <https://www.popsugar.com.au/smart-living/What-Best-Time-Year-Apply-Jobs-42671369>.
- Laswell, D (2006). *A Guide for a Job Search and Moving Up*. Xlibris Corporation.
- LMIP data portal (n.d.). <https://lmip.gov.au/default.aspx?LMIP/GainInsights/IndustryInformation>.
- Norman, J (2018). *Australians landed almost 1 million new jobs in five years — so what kind of jobs are they and is that a big deal?* <https://www.abc.net.au/news/2018-04-16/australia-on-track-1-million-new-jobs-since-2013-where-are-they/9597470?nw=0>.
- PricewaterhouseCoopers (PwC) (2015). *Big City Analytics: Identifying Sydney's economic, employment, and population Centres of Gravity*. PricewaterhouseCoopers. <https://www.pwc.com.au/consulting/assets/publications/big-city-analytics-apr15.pdf>.
- Toth, J, D Richardson, C Dowling, A Bridger, and M Knox (2018). *Casual work and part-time work in Australia in 2018*. AI Group, pp. 3–6. [https://cdn.aigroup.com.au/Economic\\_Indicators/Research\\_Notes/2018/Ai\\_Group\\_casual\\_work\\_June\\_2018.pdf](https://cdn.aigroup.com.au/Economic_Indicators/Research_Notes/2018/Ai_Group_casual_work_June_2018.pdf).
- Weinstein, DE (2014). *Are big cities always more expensive?* <https://www.weforum.org/agenda/2014/11/are-big-cities-always-more-expensive/>.