# Privacy pitfall of telecommunication in Australia

DATA7002 Xuanru Liu 45663264

### Background

According to the statistical results of Australian Bureau of Statistics, more than 30 manufacturers have entered the Australian telecommunications market since 1997. In recent years, the Australian communications industry has also been showing a growing trend, especially in the popularization of mobile phones. In 2015, Australia ranked eighth in the world in terms of smartphone penetration rate. In addition, the business of mobile phones and other wireless Internet devices in Australia has also increased significantly, and second only to the United States in internet access. One example is that the number of mobile phone subscriptions increased by about 38%, from 16 million units in June 2012 to 22 million units in June 2016. Besides, each mobile users in Australia is receiving 1.16 services, and this growing trend in the telecommunications industry will continue.[[1]](#footnote-0)

At present, the entire telecommunications industry in Australia is basically monopolized by the three giants Telstra, Vodafone and Optus. The three companies continue to improve their business characteristics and service levels in the increasingly fierce competition, with a view to attracting more customers and increasing market share under the rapid development of the telecommunications industry. However, the ethical, legal and technical issues existing still lead to some problems, conflicts and dilemma in Australia’s telecommunication area. For example, many companies in the telecommunications industry have experienced Internet security incidents or vulnerabilities, and more than two-thirds of these enterprises have been affected by the loss of employee productivity (67%).[[2]](#footnote-1)

This part mainly introduces the development background of the telecommunications industry in Australia. In the following parts, I will introduce and discuss data science issues, conflicts or dilemmas related to the Australian telecommunications industry from the three directions of ethics, law and technology, and think about the current solutions and the importance of these three points in real life.

### Introduction

In this essay, I will mainly take Telstra, Vodafone and Optus, the three major telecommunications companies in Australia, as examples to detailed describe the information pitfall caused by telecom companies. To begin with, the problem, conflict or dilemma of ethics will be talked about in this essay. Firstly, I will introduce the nature of moral inquiry and philosophical analysis in telecommunications companies, and the approaches to philosophical ethics. In addition, I plan to describe what kind of data and information will be collected and how they will be used and managed by these telecommunications companies in Australia. And then I will introduce the decision-making and problem solving during telecommunications companies’ business process. Secondly, I will also focus on whether some business behaviors of Australian telecommunications companies are legal. In this part, I try to determine whether the government has provided a reasonable legal basis for specific business behaviors and whether the company is taking advantage of legal loopholes. Thirdly, statistical techniques are also significant for companies to process the data and information collected. Therefore, I plan to introduce several possible technologies and how they are utilized by the Australian telecommunications industry. Apart from this, some possible solutions and the meaning of ethics, law and technology applied to the communications industry will be emphasized. And finally, I will draw a conclusion to summarize the points mentioned in my essay.

1. **Problems and solutions**

• Ethics

As a natural phenomenon, ethics contains the principles for dealing with the relationship between man and man, man and society and man and nature. It exists in all aspects of human society and also contains the basic moral norms to be followed by various industries.[[3]](#footnote-2)

At first, I will use the example of Telstra to describe the philosophical ethics including descriptive ethics, metaethics and normative ethics. Descriptive ethics mainly contains a description of individual’s behavior or the moral standards they claim to obey. One of Telstra’s regulations is that all people in Australia, no matter where they live or work, should be able to enjoy services on an equal basis. This regulation complies with the Australian Telecommunications Law and all employees should comply with it. Metaethics mainly reflects the essence of ethics and provides explanations about ethics. Normative ethics is thinking and talking about what is right and wrong, good and bad, valuable and not valuable. For example, most individuals believe that the Telstra’s regulation mentioned above is excellent because it ensures that all people have fair rights. However, a small number of people may think that non-citizens should not enjoy certain services because they do not need to pay taxes.

Besides, this course also provides a certain description of ethical behavior. Take a Telstra employee as an example and his ethical behavior mainly includes: (1) Recognizing that things may be different or even better. For example, when faced with work problems such as job adjustments, the employees need to face and solve problems with a positive attitude. (2) Recognition of others, such as being able to treat customers of different skin colors equally, (3) Accepting different opinions, such as being able to accept the objections raised by customers in the process of handling business and provide positive feedback on them.[[4]](#footnote-3)

In addition, ethics also plays an important role in the processing of data science. The key point of data ethics is to grasp the boundaries of the use of data, which means that the any analysis and utilization of data under the premise of protecting the human rights and privacy of users. The data and information collected by telecommunications companies cover almost every aspect of people’s lives, such as name, phone number, email address, ID number, bank card number and even home address. All of them are non-research data and the use and management of them usually create some moral dilemmas in real life. This is because some residents believe that it is unnecessary for telecommunications companies to collect such detailed personal information and this behavior will increase the risk of privacy and security issues. On the one hand, the telecommunications companies usually collect customers’ data and information to send product advertisements, mail bills, analyze customer portraits and predict customer needs. The detailed customer information can also prevent crimes for purposes such as fraud. However, it is true that the acquisition of a large number of customer information will benefit the company's business and social security, but it also brings some potential safety hazards. Once the customer's personal information is intentionally or unintentionally leaked by the telecommunications company, the customer may suffer from telephone fraud, spam bombing and other difficulties. On the other hand, most ordinary employees can access customers' personal information in the data management process of communication companies. This condition is convenient and efficient for customers to change their personal information or product businesses. However, occasionally, a small number of employees may change customers’ mobile phone packages to improve their achievements without allowance, which will result in economic losses to customers. Therefore, it has also become a moral dilemma for the development of the telecommunications industry whether to pursue better services at the risk of exposing some personal information or to improve the entry threshold of employees at the risk of possible decline in service speed.

Critical thinking is an excellent method to help people obtain a solution of the ethical dilemma since it will encourage people think critically and fairly. This is because the critical thinking has great advantages in solving moral problems. In this part, I will use the example of Telstra company to describe the tool box for reasoning. Firstly, the syllogism is an important content of logical arguments and here is one successful syllogism of this example:

Premise1: All telecommunications companies collect customers’ bank account number.

Premise2: Telstra is a telecommunications company.

Conclusion: Telstra collects customers’ bank account number.

The second step is the conceptual analysis which mainly includes definition providing, concepts elucidating, distinctions making and similarities identifying. Thirdly, the consistency and case comparison means that individuals must be able to identify the ethical differences between the two situations when making different decisions or things in some similar situations. For instance, Telstra requires customers to provide their home address. If customers need to receive physical telephone bills, they are willing to provide this information, but customers who prefer to receive online telephone bills will object to the collection of this information. And finally, achieving reasoning from principles, consequences and virtues. The process of critical thinking shows that this method can help people think more comprehensively in the ethical dilemma, so as to make more rational choices, and finally get the best solution to the problem.

• Legal

Australia is a country which focuses on privacy and personal data protection. It has been more than 30 years since the establishment of the Privacy Act 1988. And the privacy protection law has been continuously improved during this period. In 2010, The Office of the Australian Information Commissioner (OAIC) was established. Then, the Australian Privacy Principles introduced in 2014 aims to regulate the collection and processing of private information by government, companies and other enterprises. In this stage, I will introduce laws in telecommunication and privacy fields, the existing problems of these them and their contributions to the protection of citizens' rights.[[5]](#footnote-4)

The Privacy Act 1988 stipulates that all information that can identify a specific individual is within the protection scope of the privacy law, including the individual's name, address, telephone number, birthday, bank information, etc. In Australia, the law regulates the collection, use and disclosure of personal information, but these data and information are not "owned" by anyone.

To begin with, I would like to introduce some contents of Telecommunications Act 1997 which is the current law of Australia in the telecommunications industry. The Telecommunications Act contains many provisions which deal with personal information held by carriers, carriage service providers and others. First of all, the customer privacy protection is an important part in the Telecommunications Act 1997, and most of them are formulated on the basis of the Privacy Act 1988. [[6]](#footnote-5)This part mainly includes the protection of customer private information, the intrusive use of telecommunications by operators or service providers, the monitoring or recording of communications, the records of calling numbers, and the records products and services provided by merchants to customers. In most cases, the employees of the supplier will strictly obey the above privacy protection regulations. However, sometimes the supplier will harm the privacy and interests of the customer. For example, the Optus will launch the parent-child calling card service at the beginning of each school season, which means that two students use two calling cards for a package service together, but the deduction path is only bound to one student's bank card. The original intention of this business is to attract more international student customers with cheap and affordable calling card packages. However, in order to pursue higher personal business achievement, some employees violate the industry standards and use the bank card information provided by the customer to privately change the binding information of the customer's calling card package. As a result, the two students who handled the parent-child calling card were deducted at the same time. It can be seen that only strict compliance with privacy principles can effectively protect customers' personal information. However, it is very necessary to further strengthen the protection of customer privacy information in the telecommunications industry. This not only requires greater penalties for violations of personal privacy, but also requires the formulation of more standardized industry standards that keep pace with the times.

In addition, the Australia Privacy Principles also made relevant regulations on the collection, management and use of solicited personal information. Firstly, APP3 of the Australia Privacy Principles shows that telecommunication companies can only collect the reasonably essential information and the personal consent must be obtained when some sensitive information is collected, such as the bank account number or personal home address.[[7]](#footnote-6) Besides, the communication company originally collected the customer’s personal email address to facilitate the customer to receive various business information of the company. If the communication company discloses this information to the cooperative advertisers without permission, the customer will be bombarded by spam. To prevent this condition, the APP6 regulates that the use and disclosure of information must and can only be limited to the purpose for which the information was originally collected. [[8]](#footnote-7)Apart from this, information abuse and illegal access also occur from time to time in real life in the telecommunications industry. One of the reasons is that the online and offline business of telecommunications companies is difficult to update simultaneously. For example, a customer fills in a form in an offline store to sign a new phone card, and then canceled this card online. Although the customer's personal information in the company's system has been destroyed, the offline store may store the information form for a while before processing the form. During this period of time, personal information is easily leaked and abused. The APP11, which emphasizes the protection of personal information security, is established to solve these problems.[[9]](#footnote-8) This principle regulates that APP entities must take reasonable measures to protect private data and information from abuse, interference, loss, and unauthorized access. And after confirming that the information will not be used again, the information must be destroyed or de-identified.

Strengthening the protection of individuals' right to privacy is not only an important goal of the continuous improvement of Australian privacy law, but also an important direction of privacy legislation all over the world. For example, the GENERAL DATA PROTECTION REGULATION issued by the European Union in 2018 specifies in more detail the right to use and the strict protection of data by any company that stores or processes the personal information of EU citizens. And the DATA AVAILABILITY AND TRANSPARENCY BILL established in 2020 by U.S. also made new regulations about data availability, sharing, and use.[[10]](#footnote-9)

These laws not only force businesses comply with principles, standardize operation and build customer trust, but also protect citizens' privacy from infringement. Therefore, privacy legislation is of great significance to industry norms and social progress.

• Techniques

After collecting data and information legally and ethically, these data will be processed by using several techniques to give play to their value. In this stage, I will introduce some statistical and machine learning methods which can be used to solve problems of communication companies.

At the beginning, estimates of population parameters can be evaluated using confidence intervals. Here, I regard the Vodafone company as an example of the experiment and assume this company plan to use the hypothesis testing to determine whether it will abandon paper forms as a way to collect personal information . Firstly, the null and the alternative hypotheses will be formulated: H0: filling in the paper information form will increase the risk of information disclosure, H1: filling in the paper information form will not increase the risk of information disclosure. [[11]](#footnote-10)Then the company will decide to retain or reject H0 based on the calculation results. However, this process may cause two kinds of errors: rejecting H0 when it is true(Type I error) or retaining H0 when it is false(Type II error). Hence, the company can set the significance level as 0.05 or 0.01 and get the confidence interval which means the probability that original hypothesis is correct. Then the distribution and result of the test statistic under H0 can be successively obtained. And finally, the company can decide whether H0 will be accepted or rejected according to the P- value.

In the process of data analysis, telecommunication companies usually use machine learning techniques to get predicting and evaluating results. These human-centered machine learning applications can make decisions automatically about users, draw user’s profile and interact with users.[[12]](#footnote-11) And one important topic is to learn to assess ML systems adversarially in the process of using these techniques. Here, I plan to use A Voice of Customer System to describe how telecommunication companies assess ML systems adversarially. Firstly, determining research question is an essential part to judge whether a research is ethical and socially acceptiable. The intersection of machine learning and ethics mainly includes privacy, fairness, transparency and explainability. [[13]](#footnote-12)The problem which meets the above four requirements is worthy of study on the premise of conforming to moral standards. When companies apply the Voice of Customer System to their collected data, communication companies themselves are the biggest beneficiaries. Although customers can enjoy higher quality and personalized services, they also bear the risk of personal privacy disclosure. In addition, collecting data is also an important part before applying the machine learning technologies. This is because some bias may be caused if only collect data for a specific population. One example is that if the company only collects and analyzes the voices of male customers and ignores the samples of female customers, the bias will be increased and the outcome will not represent true class distribution. Besides, some problems caused in the stage of collecting data may also influence individuals’ lives. For instance, communication companies may get an outcome that people who speak fast are more likely to have mood swings by analyzing their users’ information. If this result is published, people who speak fast may be affected during the job interview. Therefore, not all users are willing to participate in the study and the company also need to consider whether the outcome is lawful, ethical and the social influence of it. As for methods, the communication companies can use some deep learning methods, such as neural network, to extract the voice features, and then the classification methods, such as random forest and RNN, can be used to classify the voice with different labels. All models need to be interpretable, which means that the analyst can explain what is learned in each part of the model to understand why the whole model is effective for the whole input space.[[14]](#footnote-13) Apart from this, the evaluation is also significant for the techniques and the misclassification may cause huge material and spiritual loss. One commmon method is first to use the cross validation method to split the data into training and testing set. Then the analyst can use the prediction and true values to calculate the accuracy. This method can help company judge the usability of their techniques and timely detect misclassification, and then companies can use the evaluation results to reduce the negative impact of misclassification on the company's operation and customer life as soon as possible.

### Conclusion

Overall, the telecommunications industry in Australia has developed rapidly and brought convenience to people. However, the development of techniques is a double-edged sword for human society because it may also pose a certain threat to people's power and security. For customers, handling telecommunications services is also a process to give a large amount of personal information to telecommunication companies. And this will bring some risks to people's private information security. On the one hand, the use of personal information and the boundaries of it often cause some companies to fall into ethical dilemmas. On the other hand, no telecommunications company can ensure that all employees will not violate industry ethics or not misuse the customer's information. To realize the condition that customers can confidently disclose their personal information to telecommunications companies, it requires progress in three aspects: ethics, law, and technology. First of all, moral restraint is the most basic but difficultly justified part of protecting personal privacy. In the process of industry development, moral dilemmas are inevitable. Companies or individuals caught in moral dilemmas should think critically and impartiality, weigh the pros and cons, and come up with the most reasonable solution. Secondly, the law is the bottom line of morality. When the company's behavior exceeds the moral boundary, consumers should take up the weapon of law to protect their legitimate rights and interests. Meanwhile, the government should also continue to improve the legal provisions and codes to minimize the harm caused by legal loopholes to the people. In addition, the correct application of data analysis technologies can not only maximize the value of the data obtained, but also an important guarantee for the protection of personal information. All participants in the telecommunication industry must work together in these three areas, and then the rapid development of the telecommunications industry can be fully used while the individual private information can be protected from being violated.

1. Ding Pei, “Australian Communications Market Report”, IT Industry, 2017, http://www.istis.sh.cn/list/list.aspx?id=10724 [↑](#footnote-ref-0)
2. Australian Bureau of Statistics, “Business Use of Information Technology Statistics”, Business Use of Information Technology, 2017, [https://www.abs.gov.au/statistics/industry/technology-and-innovation/business-use-information-technolog y/latest-release](https://www.abs.gov.au/statistics/industry/technology-and-innovation/business-use-information-technology/latest-release) [↑](#footnote-ref-1)
3. Ethics. Chicago, Ill.: University of Chicago Press, 1938. [↑](#footnote-ref-2)
4. Martin, Jack, Jeff Sugarman, and Kathleen L Slaney. The Wiley Handbook of Theoretical and Philosophical Psychology. Chicester: John Wiley & Sons, Incorporated, 2015. https://doi.org/10.1002/9781118748213. [↑](#footnote-ref-3)
5. Australian Government, “Read the Australian Privacy Principles”, OAIC, Office of the Australian In formation Commissioner, 2014, <https://www.oaic.gov.au/privacy/australian-privacy-principles/read-the-australian-privacy-principles,> i. [↑](#footnote-ref-4)
6. Australian Government, Telecommunications Act 1997(the Office of Parliamentary Counsel, Canberra, 1997), 135. [↑](#footnote-ref-5)
7. Ibid, i. [↑](#footnote-ref-6)
8. Ibid, i. [↑](#footnote-ref-7)
9. Ibid, i. [↑](#footnote-ref-8)
10. Ibid, i. [↑](#footnote-ref-9)
11. Francis, Gregory. Hypothesis Testing Reconsidered. Cambridge: Cambridge University Press, 2019. [↑](#footnote-ref-10)
12. Sperrle, F, M El‐Assady, G Guo, R Borgo, D. Horng Chau, A Endert, and D Keim. “A Survey of Human‐Centered Evaluations in Human‐Centered Machine Learning.” Computer Graphics Forum 40, no. 3 (2021): 543–67. https://doi.org/10.1111/cgf.14329. [↑](#footnote-ref-11)
13. Alfred Benedikt Brendel, Milad Mirbabaie, Tim-Benjamin Lembcke, and Lennart Hofeditz. “Ethical Management of Artificial Intelligence.” Sustainability (Basel, Switzerland) 13, no. 4 (2021): 1974. https://doi.org/10.3390/su13041974. [↑](#footnote-ref-12)
14. Dong, Xiao, and Ling Zhou. “Geometrization of Deep Networks for the Interpretability of Deep Learning Systems,” 2019. [↑](#footnote-ref-13)