Chapter 7
Arts and Communications

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Abstract This chapter provides examples of how Fourth Industrial Revolution (4IR) technologies, including artificial intelligence (AI) are used in the Australian Media and Communications sector, including advertising, journalism, publishing, film, and TV production. One focus is the use of data analytics in advertising and journalism; another is the automation of roles previously performed by people in screen, literary and arts production. AI is now used as a production tool which has led stakeholders to suggest that in the future media production companies may work in collaboration with software and interface designers to ensure a sustainable, human-centred approach (Van der Bijli-Brouwer et al, 53:1–23, 2017). This means that the term "job sharing" takes on a new dimension as people share their jobs at increasing levels with AI technologies, as in other sectors covered in this book.

Keywords AI and libraries · Artificial intelligence · Australian media and communications automated advertising · Automated news & screen production · Data analytics · Authorship · Music and literary rights management

Introduction

This chapter explores the nature and characteristics of applications using artificial intelligence across the field of media and communications. As in other Australian industry sectors, media producers are reliant on information technology (computers and software) to drive content for the screen, the laptop or mobile phone. AI-driven information technology, web and network telecommunications are mainly used to deliver and enable the massive flows of information within what Seyfert and Roberge call an "algorithmic culture" (Seyfert and Jonathan Roberge 2016: 6).

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Industry Overview

The Australian Information Media and Telecommunications industry includes businesses engaged in newspaper and internet publishing, film production, television and radio broadcasting, telecommunications infrastructure and networks. Employment is concentrated in Sydney and Melbourne and growth has been relatively strong over the past 5 years.

Regional radio and TV take their material from city centres. Regional newspapers, often owned by family businesses, were hard hit by the COVID-19 virus (Howden 2020) The top employing occupations include journalists; film, television, radio and stage writers and directors; advertising and public relations managers; artistic directors, media producers and presenters (see Table 7.1). Employment figures for both city and regional operators can be found at the Australian Government Labour Information Portal (Australian Government 2019a).

The top three Internet Service Providers (ISPs) are Telstra, TPG and Singtel Optus (Ibis World 2019). Data Processing and web-hosting services include IBM Australia/New Zealand Holdings; Macquarie Telecom Group and the Arq Group (Ibis World 2020a). A 2020 analysis of these subdivisions suggests that they are all likely to face mixed effects from COVID-19. Growing demand for remote working and the ability to work on the cloud is anticipated to benefit Australian internet service providers and data processing services. However, the data storage services sector may face challenges from COVID-19 if demand begins to rapidly increase, as the technical resources used to construct and operate data centres are primarily sourced from overseas (Ibis World 2019, 2020a, b). It is worth noting that the COVID-19 pandemic has caused a high degree of volatility in the Australian media labour market (Australian Government 2019b).

Automation and the use of analytics to manage and optimise data are changing the configuration of workflows across media industries, especially in advertising, news journalism, libraries, publishing and the production of screen material for music, film and TV. Table 7.2 provides data on the job outlook of many occupations within the Australian media and communications industry, including specific occupations in the media and communications industry, together with the growth and impact of artificial intelligence on these occupations.

Jobs in the media and communications industry have been significantly affected by the technology available to mega-corporations that disrupt both revenue and occupations (ACCC 2019; Kohler 2020). The escalating power of the digital platforms Facebook and Google has resulted in substantially reduced advertising revenue, particularly within "traditional print (now print/online) media businesses" (ACCC 2019: 1). "Many print/online news media businesses have struggled to survive and have reduced their provision of news and journalism" (ACCC 2019:1).

In the last decade, the print media experienced a decline in revenue of 45% to AU$3 billion (Kohler 2020). Television revenue also fell considerably, whereas for newspapers it collapsed (Kohler 2020). In the last 15 years online advertising grew

Table 7.1 Employment in Australian Information, Media and Telecommunications

Top employing occupations	This industry	All industries
Telecommunications Trades Workers	18,900	27,700
Journalists And Other Writers	11,800	22,200
Film, Television, Radio and Stage Directors	11,300	14,800
Telecommunications Engineering Professionals	9100	13,200
Ict Managers	8000	51,600
Advertising, Public Relations and Sales Managers	7100	141,200
Librarians	6800	13,900
Artistic Directors, Media Producers and Presenters	6700	13,100
Graphic and Web Designers and Illustrators	5900	62,800
ICT Sales Assistants	5900	17,000
Sales Representatives	5700	84,300
Computer Network Professionals	5300	37,700
Ticket Salespersons	4800	16,700
Performing Arts Technicians	4800	14,600
Software and Applications Programmers	3800	123,200
Library Assistants	3800	8400
Contract, Program and Project Administrators	3700	131,100
Information Officers	3700	86,900
Advertising and Marketing Professionals	3700	74,000
General Clerks	3500	281,800

Sources: Australian Government: Australian Bureau of Statistics, Labour Force (trend and annual averages of original data); ABS, Education and Work; Department of Jobs and Small Business, Employment Projections – added information is available on Labour Market Information Portal lmip.gov.au

from zero dollars to AU$8 billion, and more than half of this amount is accounted for as revenue by Google and Facebook (Kohler 2020).

The Australian Competition and Consumer Commission (ACCC) is an independent Commonwealth statutory authority with the role of ensuring fair trade. The ACCC's (2019) *Digital Platform Inquiry* investigated Facebook and Google's use of news material from Australian media companies without contributing revenue for it. Kohler (2020) and Zappone (2020) stated that the ACCC may enforce the Fair-Trade Act to induce the "global tech giants" Facebook and Google to pay for news content "harvested" from Australian media enterprises. In response, Facebook, for example, has threatened to 'block access within Australia to the news on its platform' (Kohler 2020; Zappone 2020).

> '… the ACCC, and by extension the Australian government, has decided to take on two of the world's richest and most powerful corporations, Google and Facebook, to take back some of the revenue they are sucking out of news media' (Kohler 2020)

Table 7.2 Impact of AI on jobs in Media Communication Industries

Occupations	Susceptibility to Automation %	Growth
Sales and marketing managers	14	Strong
Advertising managers	14	
Public relations managers	14	
Artistic directors	20	Moderate
Media producers	20	
Radio presenters	20	
Television presenters	20	
Authors	20	Moderate
Book and script editors	20	
Call centre team leaders and operators	20	Moderate
Computer network and systems engineers	25	Very strong
Network administrators	25	
Network of analysts	25	
Electronic engineering draughts persons and technicians	13	Moderate
Art directors, and directors (film, television or stage)	20	Moderate
Cinematographers	20	
Film and video editors	20	
Program directors (television or radio	20	
Stage managers	20	
Technical directors	20	
Video producers	20	
Gallery, library and Museum technicians	56	Decline
Graphic designers	17	Strong
Illustrators (including animators)	17	
Multimedia designers	17	
Web designers	17	
Graphic prepress trade workers	66	Stable
Chief information officers	12	Stable
ICT project managers	12	
Journalists and other writers	20	Stable
Broadcast transmitter operators	56	Decline
Camera operators	56	
Light technicians	56	
Makeup artists	56	
Sound technicians performing arts technicians	56	

Source: Created by the author using occupations listed in the information media and telecommunications industry by Job Outlook (2020), and job susceptibility due to automation forecasts by Byrd et al. (2017)

Google and Facebook depend on advertising revenue (Statista 2020). The ACCC (2019) and Kohler (2020) claim that these two digital platforms have impacted on many jobs in the Australian media sector due to the power of the digital platform corporations and the AI embedded in their operations.

AI Technologies & their Employment Impact

The following sections of this chapter summarise the main employment impacts of the 4IR technologies which are changing most components of the media and communications sector across Australia.

Automated Advertising

AI allows for concise record-keeping and helps enhance the predictive utility of data, which makes it the perfect management tool for both advertising and news journalism. Advertising, public relations and sales managers constitute the people who direct, control and coordinate advertising and marketing.

Australian researcher, Julian Thomas (2018), identifies two technologies which embody different visions of automation and the future of advertising. One is programmatic advertising 'defined broadly as the automation of the sale and delivery of digital advertising where the appearance of ads on a website is determined by software which can process user data and behaviour with high accuracy', making advertising sales "controllable, predictable and manageable at scale" (Thomas 2018: 36). Thomas (2018: 36) also describes the players in Australia's digital advertising field: the publishers who own inventory management systems and data management platforms which accumulate user data; the ad-servers which provide advertising content and measure delivery; the inventory management systems controlled by publishers and on the demand-side, inventory platforms controlled by ad buyers and finally the advertisement traders who match-make those who are buying and those who are selling, often through auctions .

Within this industry configuration, data analysts have the opportunity to design and manage a range of content-filtering and anti-tracking tools. Some AI tools can limit the reach of automated advertising, including "tactical tools which create worthless data trails, control browsers and provide some security against malvertising" – advertisements that contain malware or viruses (Thomas 2018: 37). Some software developers even play both sides of the market. They do this by forming a two-sided business model offering adblockers to consumers, while also luring advertisers for inclusion on a "white list" which guarantees that their advertisements will not be blocked. (Thomas 2018: 37). The Australian Government Job Outlook suggests that employment in these sectors shows strong future growth while jobs for

journalists and other technical writers will remain stable (Job Outlook 2020), as discussed in the next section.

AI Automated News Journalism

Reuters Digital News Report examined data from 2016–2020, finding that Australian news media remains strong and steady as the primary news source although newspaper readership continues to drop. During the COVID-19 and the Australian bushfire crises, television news services and online sources experienced a surge in demand, with more people identifying television as their primary source of news. That said, increasing numbers of Australians are using mobile phones to access news, widening the use gap between mobiles and computers. Reportedly only 6% of Australian audiences use Commercial FM radio to source news. (Reuters 2020).

Since 2017 cuts have decimated mainstream Australian newspaper operations. News institutions such as Fairfax Media have lost staff, while the national news agency Australian Associated Press (AAP) shut down incurring 500 job losses in March 2020. Such cutbacks, closures and reduction in news coverage reflects a global reduction in the customers who will pay for news content when they can access free news from Google or Facebook (Reuters 2020). This leads to the question - what are the job implications for those journalists who remain employed in the field?

In 2019, *Journalism and Mass Communication Quarterly* reported on a special forum on the use of AI in journalism. Several challenges were identified by participants in relation to the use of artificial intelligence as a news-gathering tool (Broussard et al. 2019). Journalists stated that while they perceived AI as a tool that can enhance and augment professional reporting processes it was not perceived as a suitable replacement for journalism. Often journalists are confronted by huge volumes of text in the form of reports and government or civil documents such as court or media archives and records. Journalists may use AI to analyse and process data within such a massive range of documents to find story leads and relevant data. The Australian software company Nuix provides software and data analytics for the analysis of unstructured data in email, phone calls and other daily traffic. The AI can pinpoint data with forensic accuracy (Nuix 2020).

The Nuix software company has grown from a one-person company to a global operation with 2000 customers in 75 countries, and will earn around $200 million in 2020 (Boyd 2020: 40). Nuix provides a program which is used globally “to uncover fraud, protect personal data, meet regulatory compliance obligations, win complex legal cases and to catch criminals” (Boyd 2020: 40). It was used by the International Consortium of Investigative Journalists to review documents from the Panamanian law firm Mossack Fonseca. The documents were leaked to the German newspaper *Suddeutsche Zeitung* and then shared with journalists around the world who used them to uncover a massive tax evasion racket (Boyd 2020).

According to Thurman et al. (2017), the availability of sophisticated data feeds, and the increased demand for more news, is leading to an increase in the prevalence of automated news systems. The authors interviewed journalists from the BBC, CNN and Reuters which used robot-news writing software to construct stories (Thurman et al. 2017: 1245). The journalists interviewed in this study stated that automated journalism would increase "the depth, breadth, specificity, and immediacy of information available" (Thurman et al. 2017: 1245). However, the journalists also raised ethical and societal issues emphasising "the need for skills—news judgement, curiosity, and scepticism—that human journalists embody" (Thurman et al. 2017:1252).

Meanwhile, Reuters published a 2020 global survey of publishers whose responses suggest that they are planning to invest more to harness the potential of Artificial Intelligence and Machine Learning – but not at the expense of editors and journalists. The publishing respondents considered that both investment in AI (78%) and more journalists (85%) are needed to help meet future challenges – but with their most robust preferences heavily stacked in favour of humans (Reuters 2020: Section 2.3).

The Reuters 2020 report also set out the different ways that AI is being used in (1) newsgathering, (2) production (including various kinds of newsroom automation), and (3) distribution/recommendation. In western newsrooms, AI is used to create more effective recommendations; to target potential subscribers and optimise paywalls to drive greater efficiency in the newsroom. AI can be used to assist with sub-editing or improve the consistency of tagging, which allows information to be located and stored with accuracy. (Reuters 2020: section 1.6). Some jobs which involve investigation, content production, robo-writing, and distribution are now automated by systems which have been in place since the 1990s within the fields of sport, medicine and financial reporting. These automated systems are an extension of automatic text summaries that were first used in weather forecasts in the 1960s. (Lemelshtrich Latar 2019: 42).

However, AI is about much more than glorified word processing or text recognition. The proliferation of 'fake news' online increasingly affects our ability to make informed choices; threatens the public's trust in the media; and interferes with the functioning of democratic processes. Upon the closure of the Australian Associated Press, the former chairman Campbell Reid warned that "professional information… is being substituted with the unresearched and often inaccurate information that masquerades as real news on the digital platforms" (Khadem and Pupazzoni 2020: 2).

The use of AI to organise and access human records raises many complex problems around intellectual property, the privacy of information, and the protection of journalistic sources. Ethical guidelines, special filtering or further research may be required in future to detect and disclose biases that may be inherent in the processes of machine learning that are the foundation of many AI procedures (Broussard et al. 2019: 678).

In his book, *Automating the News, how algorithms are rewriting the media,* Nicholas Diakopouos asserts that computer algorithms, machine learning and data

mining are changing the fundamental structures of how news is created, disseminated and received. (Diakopoulos 2019:6). Diakopoulos gives the example of newsbots which communicate with social media audiences to distribute and comment on stories with online media, and suggests that journalists may be challenged by such new workflows and publication strategies to tell stories that may compromise their journalistic principles. He insists that AI will not replace journalists but should be seen as an augmentation of the human processes of journalism and advocates for more study of the process of "hybridisation: of people and computers" (Diakopoulos 2019:8). It seems clear that journalists need to be proactive in shaping the way AI is deployed in their industry (Broussard et al. 2019: 673).

Clearly AI will allow journalists to do more work that constitutes journalism and less data processing which can be more effectively undertaken through automation (Lewis et al. 2019). In the case of automated journalism, the software assumes a news-writing role that has, until now, been a human domain (Lewis et al. 2019: 409). Despite disruption by AI automation, the Australian Government Job Outlook (2020) report suggests that employment prospects show strong future growth for copywriters, technical writers, editors, journalists, bloggers and journalists for print, radio and television.

The next section outlines how AI is also augmenting and supplanting human craft activity in the screen industries, which are using increased automation to control production elements such as the scripting, shooting, post-production and distribution of media materials.

Artificial Intelligence and Screen Production

The companies holding the largest market share in the Motion Picture and Video Production in Australia industry include NEP-GTV Holdco Pty Limited, Endemol Shine Australia Holdings (producers of *Big Brother*) and Freemantle Media Australia. According to an industry market report, the Australian Film and TV industry has a market size of around AU$2 billion, with approximately 5800 businesses employing 11,000 people (Ibis World 2019: 1). This industry has displayed significant volatility over the past five years. The Federal Government's financial incentives include cost rebates for domestic and international film and TV producers. These government rebates have encouraged overseas producers to shoot several large projects in Australia during 2015–2020, including *Thor: Ragnarok* and *Aquaman*. However, the project-based nature of film production means that industry revenue can fluctuate from year to year. Overall, industry growth has declined by 3. 1% from 2015–2020 (Ibis World 2019:1).

The Australian Government Job Outlook suggests that Film TV, Radio and Stage directors have moderate future growth prospects as do artistic directors, media producers and presenters (Job Outlook 2020). Technicians who work alongside producers and directors also show only moderate future growth prospects: camera operators; sound and lighting technicians; make-up artists, and transmitter operators

(Job Outlook 2020). The industry is expected to experience substantial revenue declines in 2019–20. Film and television production activity has largely been delayed or postponed due to public health measures implemented to curb the COVID-19 outbreak (Chapman 2020). Any drop in revenue may further compromise the industry, where wage costs are relatively high as a share of the revenue (Ibis World 2020b). Australian film producer Tim White remarks that despite industry contraction, the industry remains optimistic – "people who are talented and dedicated will ride through this" (Siebert 2020: 3). Nonetheless, some may experience lean times before recovery. Australian screen industry advocates like the *Make it Australian* Campaign espouse the need to reinstate Australian screen content quotas, to prevent Australian viewers being swamped by overseas content on large AI-driven streaming platforms like Netflix, Amazon Prime and Stan (Make it Australian 2020). Advocates from the Screen Producers Association of Australia, the Media, Entertainment and Arts Alliance; and the Australian Directors and Writers Guilds, suggest that up to 15,000 jobs are at risk and advocate government tax support for small screen production businesses, especially after COVID-19 (Make it Australian 2020).

AI and Libraries, Authorship, Music and Literary Rights Management

Australian librarians, who develop, organise and manage collections and services show stable job prospects; while those of the library assistants, who handle and maintain the shelves and records for books and items, are in decline (Job Outlook 2020). One reason for this decline is that sophisticated computer algorithms are dedicated to managing the public library E-lending landscape. A study by Giblin et al. (2019) investigated the availability of e-books in five countries and analysed the licence terms and prices for 100,000 titles and 388,000 e-lending licenses across Australia, New Zealand, Canada, the United States and the United Kingdom. The investigators created a dataset using the aggregator "Overdrive", which is a global distributor of E-books with a focus on libraries, schools and those with special needs. It provides an example of how AI can help manage intellectual property and licenses, thus making human librarians and assistants redundant (Overdrive 2020).

Screenwriting is another skilled occupation that is being disrupted by AI. The Australian government supports local and overseas screen productions through eight federal, state and local funding agencies: Film Victoria, Create New South Wales, Screen Queensland, ScreenWest, The South Australian Film Corporation, Screen Territory, Screen Canberra and Screen Tasmania. (Australian Government 2019c). One of these government agencies, Screen Queensland, is using AI to find script ideas that will resonate with audiences. Screen Queensland producers are collaborating with an artificial intelligence and machine learning platform called *Wattpad* to determine what audiences want from a story (Quinn 2020). The platform

is driven by AI and boasts a readership of 80 million, distributed across the Asia-Pacific, USA, South America and Europe. Authors post material regularly on the platform; engaging an audience, inviting suggestions and responses about the writing (Wattpad 2020). The Wattpad company uses AI to collect around a billion points of data a day using "Story DNA" analytical software to calculate which story elements resonate with readers (Quinn 2020). Screen projects based on literary properties developed on the platform include Emmy-winning TV Series and hit Netflix releases (Quinn 2020). This joint Australian government-industry project means that the Screen Queensland production agency will use AI to find a pathway to their global audience, as a way of ensuring a return on production investment funds.

In this example of AI the author, publisher or distributor are involved in a more intimate relationship with an audience or reader. Audience responses are invited and then harvested as data which can further develop the property or the license, extending its reach across ever broader platforms. AI and interactive social media platforms can also be used to activate audiences who gather around specific online documentaries which may have a social activist objective related to climate change or democratic expression. AI can potentially focus the interaction of media producers with an audience in a way that fosters community-building, where audiences or readers can form groups around special interests such as sustainable development goals for people and the planet (Griggs et al. 2013).

In another example of literary experimentation, concerns the integration of automation and AI in the creation or generation of content across text and photographic imagery. Two Melbourne authors, Donnachie and Simionato (2018) used machine learning to train a "reading machine" which was on display at the Melbourne Art Book Fair in March of 2020. The *Library of Nonhuman Books Reading Machine* uses a combination of optical character recognition and computer vision to "read" books and then uses machine learning and natural language processing to recombine these words in the form of poetry. The machine also illustrates the text it generates by searching Google image files for an image to match the text, before packaging the entire production using an online printing service.

Donnachie and Simionato (2018) have used their "reading machine" to reinterpret twelve major works of literature. According to one reviewer, the results were occasionally puzzling, often engaging, at times hilarious and intensely poetic (Quin 2020). The programmer Donnachie, stated this is an "attempt to grapple with the future of the book, an object we've had around us for so long and…that's changing so fast" (Quin 2020: 4). The author/programmers remind us that chance and imperfection within literature and art have a definite role in a world mediated by algorithms as they are "what makes us human and what often delights us in art" (Quin 2020: 5). The author/programmers suggest that their work demonstrates how technology may need to embrace aspects of uncertainty as a creative choice. They received the Tokyo Type Directors Club award for the project (Quin 2020: 3).

Similar experiments related to music composition during 2020 were observed in relation to the inaugural Artificial Intelligence Eurovision Song Contest. In May 2020 the global competition was won by an Australian group "Uncanny Valley" who wrote their song *Beautiful the World.* Organised by the Dutch broadcaster

VPRO, this event invited global contestants to use algorithms to compose original music. The competition was judged by an expert panel and public votes. The Australian team won by using an AI system that was trained with audio samples derived from native Australian animals; koalas, kookaburras and Tasmanian devils.

These examples demonstrate that the use of AI in film, literature and music may be about to emerge from the experimental avant-garde to become mainstream (Fildes 2020: 34). The next section investigates the impact of AI on jobs in the TV production industry.

AI and TV Production

The Australian screen industry includes many small independent boutique production houses such as Jumpgate, Ignition Immersive, Liminal VR, Phoria, Opaque Media, StaplesVR and VRTOV. These virtual-reality (VR) and 360 video production studios combine traditional narrative with ground-breaking VR content that is produced using sophisticated data analytics (Film Victoria 2020). In mainstream TV production, AI-driven automation has already totally changed the workflows around camera operation and switching. For example, *Viz Mosart* software is typical of the AI systems used to control TV production equipment to mix vision, sound, effects, graphics, cameras, microphones, lighting and all screen functions. The system may receive news reports from international and local sources, via satellite, internet or local reporters. With the introduction of 24-hour news cycles, the automated control system allows studios to reduce personnel costs while maintaining quality and reducing human error (Vizrt 2020).

Previously in TV Studio workflows, the control room would include a camera control operator, a sound operator, director, vision mixer and computer graphics operator. Also, a studio manager, floor manager and assistant director, lighting, sound and camera people would share information about various camera angles, microphones, and the position of acting talent which need to be aligned for a particular shot or sequence. Nowadays, fully automated systems allow the running of a live-to-air program using only two staff; the director and one technical assistant. Before broadcasts occur, other news reporters and graphics staff shape the packages using the systems which are then loaded into the computerised system by the director before going to air. An automated studio control system picks up and saves the metadata about various shots which are then automatically executed by automated studio components, including robotic cameras: no humans required.

The traditional TV news studio evolved as a combination newsroom and film studio. The crew worked holistically to coordinate production processes which are now managed by an automated system. The action focused on the integrated teamwork of a crew who, while they collaborated, were each specialised in various crafts. The directors who spruik the Viz Mosart software on company YouTube promotions seem very happy with their now deserted studios. However, images of the director in a silent, fully automated studio depict an individual alone in a high-tech

bunker; a lonely technocrat whose studio crew has been replaced by robotic cameras, lighting and sound instruments (Vizrt 2020). As a result, the film and television industry is in a state of flux, due to the disruptive advent of AI systems. Consequently, we need to envisage retraining and job redesign programs that use AI to augment rather than eliminate human input.

It is clear from this brief survey of the AI and media industries that those who previously worked within complex workflows have now been superseded by digital production processes. These may include commissioning media editors, journalists, creative writers, camera operators, library assistants or media producers. Such workers may benefit from further specialist training in aspects of digital production that can enhance their digital literacy. This is not to suggest that they have abandoned their vocations, but to point out that they need to boost their skills with some basic training in programming, data analytics, virtual or 360 production skills, web or software design. Any such upskilling would enhance a worker's digital literacy enabling them to talk to other teams and comprehend the new workflows. Further, this upskilling may allow media workers to be less dependent on information technocrats and technicians who may otherwise tend to over-determine the direction of evolution in the field.

Challenges & Opportunities

We have seen that in some aesthetic endeavours, such as in media related to poetry and music, AI programs already achieve a tolerable simulation or simulacrum of human agency. In other fields, such as news journalism and studio production, AI-driven processes can achieve a high level of technical precision and organisation which promises a positive future for AI processes as augmenting agents which assist the work of humans in the field. The examples of AI use in film, literature and music discussed here suggest that AI may be used increasingly as a tool to augment the work of creative humans in the composition of artistic and cultural products. For some, AI will be considered a friendly companion. For others in more regimented environments, it may represent an onerous system which requires more IT and administration skills than creativity. In the film industry example, AI may be used to gather data and identify global audience responses to a story or theme. That said, it is not clear that consulting a multitude of user opinions on the progress of a story will guarantee a better or more coherent story. It is perhaps just as likely to produce that well-known literary euphemism for messy confusion - an "elephant designed by committee".

These examples of AI use in literary and music rights management illustrate the use of AI as a means of managing multiple sets of data about users, IP rights and literary or media properties from diverse locations, diverse authors, sources and audiences. In each case, AI helps to organise a coherent view not only of audience location but also audience engagement and preferences. However, not all agree that the AI future is rosy. The examples covered in this chapter demonstrate that, while

media professionals such as TV producers and journalists, may not program the computers that govern their daily activities, they contend with increasingly complex interfaces where the input and output of data and the management of files and interfaces require unique skillsets.

Human operators will need the right employee skills to achieve the right effects with the machines in their studios. Aside from cost-cutting, what are the benefits for human craftspeople in handing over their hard-earned skills to an inanimate workmate? In many contexts, human operators become programmers and machine minders. As such will they retain their pride and passion in their work when programming tasks replace their ability to exercise methods and techniques of a profession or craft?

As the editors of this volume point out, employee-readiness in the current work environment relates to the ability of humans to develop and apply automated solutions. In the examples of automated journalism, it seems that the journalist's existing jobs of investigation would expand into the realms of data analysis. In screen production, the use of automated studio systems already reduces the number of specialists in the workflow process. The professional camera operator is simply eliminated and replaced outright by a fully automated camera and AI lighting. In other parts of the same studio, remaining workers will need to take on new skills to adapt to the processes of graphic arts, editing and sound engineering to automated, AI-driven systems.

In the film industry, we see AI being used to augment the process of deciding which films to commission. This example also signals the use of audience data in a more collaborative or participatory way. Audiences can contribute creatively to the outcome of stories, not just consume them passively. However, the Cambridge Analytica scandal illustrates that there is a human tendency to enter a bubble or bell-jar of reductionist thinking, where editors may choose to give us more of what we already like and know, rather than extend our intelligence through exposure to challenging or "foreign" ideas. Surely it is this process of expanding the known universe which helps the species evolve? Thus a question remains - how can serendipity and aspects of both the feared and the unknown be considered if the system is programmed within predictable or the same boundaries?

Putting AI at the centre of our media and communication industry recalls what Seyfert and Jonathan Roberge (2016:2) termed as algorithmic cultures which are "the product of a specific approach to the world (which) frames reality, while at the same time organizing how people think about society". It seems clear that creative media professionals such as authors, composers, journalists and other media professionals may benefit from their ability to collaborate with software and hardware designers, programmers and manufacturers, using human-centred design processes. This kind of collaborative design process may ensure that media workers can directly access the technology to assess how AI can best assist with the development of editorial processes and policy. Further, industry and user/audience groups may advocate that the already well-developed ethical codes of twentieth-century journalism are carried over into the new regime. Within a utopian vision, such

collaborations could focus on the use of interaction design and user-profiling that encourages the sustainable development goals for people and planet (Griggs et al. 2013).

We have seen how the use of AI to organise and access human records raises many complex problems around intellectual property, the privacy of information and the protection of journalistic sources. Ethical guidelines will be needed to guide journalists in the ways that data can be used. Further, while jobs may be lost as a result of automation, new jobs will arise. For example, analysts and machine trainers may be needed to ensure that special filtering is used to detect and disclose biases that may be inherent in the processes of machine learning, the foundation of many AI procedures. Nicholas Diakopoulos insists that AI should be seen as augmenting the human processes of journalism, and advocates more study of the process of "hybridisation: of people and computers" (Broussard et al. 2019: 678). Michael Dupagne and Ching-Hua Chuan argue that journalists need to be proactive in shaping the way that AI is deployed inside their industry (Broussard et al. 2019: 673).

Maleki (2020) argues that the challenge in media industries is to design AI systems that are personal and humane, suggesting that researchers need to focus on what AI should do, not what AI can do. For example, when we discuss human-centred AI, we need to ask: which humans? Who is doing what? And who may be marginalised as part of this process? Thomas (2018) expresses concern that digitisation may cause increased inequality and exclusion, which he considers to be a complex and evolving issue of critical importance in Australia and beyond. Research shows that those Australian citizens who are either elderly, lowly-paid, in precarious employment, or lacking tertiary education, are less likely to be "digitally" included than their counterparts (Wilson et al. 2019).

So how can future iterations of AI design ensure that the end-user is placed at the centre of the design equation, and not be treated merely as a point of purchase within a larger industrial system? Concerns about the use of AI to promote "surveillance capitalism" is a prominent issue in this context (Zuboff 2019). Zuboff (2019) defined this late phase of capitalism as "instrumentarian power that challenges market democracy with a collective order that expropriates critical human rights… that claims human experience as free raw material for hidden commercial practices of extraction, prediction and sales" (p. 1). This raises a few important questions. How are we to prevent business managers from chasing fast results apparently offered by data platforms that convert behavioural data into sales? How are we to prevent the exploitation of workers and citizens who may be lulled into false comfort by the colourful and fast-moving allure of such platforms? The final section examines some ethical options for managing these future challenges.

Conclusion

This chapter suggests that AI technology may augment the creative, knowledge-based work undertaken by higher-skill workers in media industries, improving their productivity and increasing the demand for such workers. A 2018 discussion paper by the Australian Institute of Machine Learning states that increased AI and automation will lead to both job losses and job creation - those industry sectors which invest in 'skills development and technical competence in AI will benefit' (Australian Institute of Machine Learning 2018:1). The report concludes Australia urgently needs a 'formal, national strategy for Artificial Intelligence" to ensure they are "beneficiaries and not…powerless recipients' of AI technology (Australian Institute of Machine Learning 2018:1).

As with many debates around the future of technological development, the discussion of Artificial Intelligence implies a spectrum of utopian and dystopian potentials for industry. The dystopian vision has become more prevalent due to our sense of responsibility (and helplessness) around the threats of global warming and viral pandemics. A human-centred approach may encourage system designers to recalibrate their thinking, discarding old values of the first industrial revolution (competition, maximised profits). System designers may move toward values where human fulfilment and satisfaction are considered through a lens of inclusion, diversity and the equitable distribution of resources.

The Australian Government Department of Industry, Science, Energy and Resources (DISER) engaged with industry, academia and business in a 2019 public consultation. The goal was to formulate an ethical framework for Australia to realise the benefits of artificial intelligence (Australian Government 2019d). Its first principle is that the public needs the ability to trust that any AI application is safe, secure and reliable. The report further emphasises that AI systems need to benefit individuals, society and the environment; should respect data privacy; should be fair and inclusive (Australian Government 2019d).

These large scale industrial AI systems must provide transparency and disclosure to ensure that people know when they are engaging with an AI system. This means those responsible for 'different phases of the AI system lifecycle should be identifiable and accountable for the outcomes of the AI systems' (Australian Government 2019d:1). Finally, such systems should be overseen by humans. The Australian Consumer and Competition Commission emphasises this need for transparency in its 2020 inquiry into the impact of Google and Facebook and their use of AI to organise user data for commercial purposes (Karp 2020). Inquiries like this will shine welcome light on the use of AI and data analytics in the Australian and global media industries. Scrutiny of AI and automation in media industry workflows is particularly relevant to the supply of news and the implications for media content providers, advertisers and consumers.

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