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AI Recruiting Tools at ShipIt2Me.com

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Abstract:

In recent years, we have seen a dramatic increase in business interest in artificial intelligence (AI) and the number of companies that implement AI-related technologies. Thus, current and future employees need understand AI. In this paper, we present a teaching case based on a fictitious company for information systems or business courses at the undergraduate or graduate level. The case introduces students to ShipIt2Me.com ("ShipIt2Me"), a fictitious American e-commerce company that developed an AI human resources recruiting tool to help it hire cloud computing talent. The teaching case summarizes AI concepts and the opportunity for students to examine the advantages and disadvantages of using AI tools in human resources recruiting.

Keywords: Artificial Intelligence, AI-based Video Interviews, Bias, Teaching Case.

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1 Introduction

Shiplt2Me.com (“Shiplt2Me”), which has its headquarters in Alexandria, Virginia, in the United States (US), constitutes the fourth largest e-commerce company worldwide¹. With 8.5 percent of global e-commerce gross merchandise volume (GMV), Shiplt2Me trails just behind the three leading companies: 1) Alibaba’s Taobao.com, which has 15 percent of global e-commerce GMV; 2) Alibaba’s Tmall.com, which has 14 percent; and 3) Amazon.com, which has 13 percent (Activate, 2020). Following Amazon’s lead into cloud computing (in which a company rents information technology (IT) infrastructure, software applications, and other IT resources on demand), Shiplt2Me Founder and Chief Executive Officer (CEO) Marina Cruise plans to launch a cloud unit dubbed “Red Sky Cloud” to compete with the market leader and its closest competitor, Amazon’s Amazon Web Services (AWS) and Microsoft’s Azure, respectively (Mattioli & Tilley, 2020). Shiplt2Me (see Figure 1 for its logo) plans to offer IT infrastructure cloud services such as storage, databases, servers, networking, and software.



Figure 1. Shiplt2Me’s Logo

Shiplt2Me views efforts to develop its cloud computing services to leverage its growing IT infrastructure as a strategic priority to ensure it succeeds in the future. While the cloud market has grown quickly (Mattioli & Tilley, 2020), so has competition. Many companies see market leaders Amazon and Microsoft as general-purpose providers that can support a broad range of services. Alibaba Cloud, third in terms of global market share (Mattioli & Tilley, 2020), offers neither full capabilities internationally as it does in China nor the feature depth of its major global competitors. Google remains a distant fourth, and all other cloud providers focus on regional dominance or niche services (Mattioli & Tilley, 2020).

2 The Cloud Computing Market

CEO Cruise has extensively researched the cloud market. In 2006, she watched as Amazon introduced its cloud unit and saw it achieve early success. Amazon’s US\$15.5 billion in cloud-service sales in 2018 (Loten, 2019) represented about half of total revenue for the cloud computing market in that year. Meanwhile, Microsoft’s cloud-service sales represented about 15 percent of total revenue for the cloud computing market (Tilley, 2019). CEO Cruise noted that cloud computing drove Amazon’s profit. Indeed, some sources expected that the company’s revenue would reach US\$35 billion in 2019 (Mattioli & Tilley, 2020). Microsoft experienced an 89 percent increase in revenue from Azure in fiscal year ending 30 June, 2019 (Tilley, 2019). CEO Cruise is familiar with Microsoft’s efforts to expand its offerings to target customers interested in hybrid cloud systems, which Microsoft executive Scott Guthrie regards as “a differentiator for us” (Tilley, 2019). Competitor IBM wants to dominate the hybrid cloud market segment. To that end, it purchased open-systems software company Red Hat, an event that IBM CEO Ginni Rometty regarded as “a defining moment in IBM’s cloud journey” (Tilley, 2019). Oracle, another competitor, has made hybrid cloud a priority and increased its cloud computing staff (Tilley, 2019).

¹ Shiplt2Me.com is a fictitious company. The data that we report about it in this paper is fictitious. Any resemblance to an actual company is purely coincidence. To our knowledge, the company name “Shiplt2Me” is not currently a registered business name according to the National Business Register at <https://www.start.biz/>.

In Figure 2, we depict the cloud infrastructure renting market's global revenue and individual companies' market share in 2018. According to research firm Gartner the cloud market overall should generate US\$266 billion in revenue in 2020, an estimated 246 percent increase from the previous decade, and increase another 30 percent before 2023 (Mattioli & Tilley, 2020). IBM's senior vice president (SVP) for cloud services, Arvind Krishna, expects hardware and software products for hybrid cloud services to represent a US\$1.2 trillion business opportunity in total (Tilley, 2019). The *Wall Street Journal* expects total worldwide spending on enterprise IT to increase to US\$3.8 trillion in 2019 (up 3.2 percent from 2018) due to cloud-based software subscriptions (Loten, 2019). As a result, Shiplt2Me CEO Cruise has committed to rivaling competitors by appealing to international customers that range from startups to large corporations and, eventually, by offering a full range of cloud services.

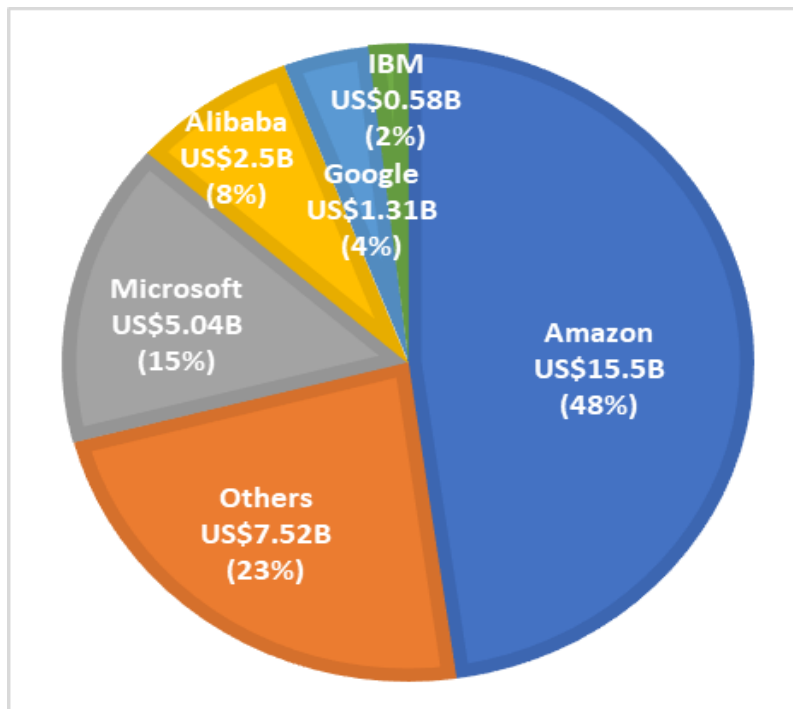


Figure 2. 2018 Global Revenue for Renting Out Cloud Infrastructure (Mattioli & Tilley, 2020)

3 Background on Shiplt2Me

Marina Cruise founded Shiplt2Me in 2010. The company employs 322,000 workers. As primarily a business-to-consumer (B2C) e-commerce company, Shiplt2Me sells goods and services over the Internet, but it also sells to other businesses (B2B). Its 10 million offerings include physical items such as electronics, clothing, and home goods; digital items such as music and movies; and services such as online banking, electronic payment, and email.

To combat its major competitors Alibaba and Amazon, Shiplt2Me has begun expanding outside retail. In April, 2016, Shiplt2Me acquired consumer finance company Armada Card to grow its financial service businesses. The company began offering an Armada credit card later that year. By 2017, Shiplt2Me derived nearly one-third of its revenue from financial services via operating Regatta Banking, an Internet bank, and Yougotta Regatta Pay, an application-based smartphone payment system, in addition to the Armada Card a credit company. The success Shiplt2Me saw from its financial service business enabled it to invest in logistics and other efforts to compete against Alibaba and Amazon.

Three years ago, the company enhanced its proprietary warehouse management system to accommodate robotics, on-demand packaging, and other state-of-the-art technology to maximize efficiency and accuracy while controlling costs. Robotic technology increased efficiency in various warehouse operations, such as receiving, picking, packing, and fulfillment accuracy. Shiplt2Me also developed a product recommendation system similar to what Amazon uses to enhance the customer shopping experience. This artificial intelligence (AI) application recommends products based on factors such as what a customer has

previously purchased, which items exist in their virtual shopping cart, items they have rated, and what other customers have viewed and purchased.

The company has also begun to develop additional AI applications, such as an AI recruiting tool to hire new employees. Shiplt2Me's Human Resources (HR) Director Sam Schooner commented:

My recruiting staff spends their days scanning LinkedIn.com, Monster.com, and Dice.com looking for job candidates with specific skills and then sends hundreds of canned emails to unsuspecting professionals each week. HR employees look to AI for use in recruiting efforts because of its potential to improve productivity and efficiency, and lower cost. Most importantly, we think AI can help us identify diverse candidates, eliminate our recruiters' unconscious biases, and improve our hiring pipeline. According to a survey of U.S.-based HR managers, almost 15 percent of respondents already see AI becoming a regular part of recruiting and 55 percent say it will be in the next five years².

4 Talent for the New Strategic Initiative: Cloud Computing

Based on the cloud computing market's size and growth and the potential for a new revenue stream, Shiplt2Me envisions cloud computing services as a key profit driver similar to that of rivals Amazon and Microsoft. HR Director Schooner observed:

Our new strategic initiative requires recruiting 1,000 new employees with cloud computing skills and expertise who can be productive immediately. However, demand for such expertise continues to increase exponentially.

Shiplt2Me's headquarter location (Alexandria, VA) leads the top metro areas in the United States with the most open positions for cloud computing professionals (Columbus, 2018). Further exacerbating the competition to attract qualified candidates, Shiplt2Me seeks those with the most in-demand cloud computing skills such as Java, Linux, AWS, software development, DevOps, Docker, and infrastructure-as-a-service (IaaS) (Columbus, 2018).

HR Director Schooner remarked:

When there's a high-stakes project and hiring appropriate talent is critical, we need to hit the ground running and find our cloud computing staff fast. But, we need a careful screening process and detailed skill assessment to identify the best candidates who are a good fit for the company and technical requirements of the job. With the ever-increasing pace of technological innovation, we need employees who can keep pace with changes through their learning ability, curiosity, and motivation.

5 Creating an AI Recruiting Tool to Hire Cloud Computing Talent

Consistent with its expansion into using AI for recruiting, HR Director Schooner met with Chief Information Officer (CIO) Casey Catamaran to explore using the AI recruiting tool currently under development to streamline the upcoming recruiting process for cloud computing talent. HR Director Schooner insisted:

Advanced cloud skills are in higher demand than ever before, while there is a significant lack of qualified, skilled cloud professionals³. To meet our goal of expanding into offering cloud computing services, we need to move quickly to modify the AI tool to identify top cloud computing talent in particular and snap them up before other companies hire them.

CIO Catamaran concurred:

I agree that we can modify the development of our AI tool to identify job candidates with cloud computing skills. This change in direction to focus the AI recruiting tool on cloud computing skills will help us to rapidly crawl the web to spot candidates worth recruiting, thereby helping you and your staff to improve efficiency in recruiting.

HR Director Schooner responded:

² Information from CareerBuilder (2017)

³ Information from Sayegh (2020).

In this competitive market for cloud computing talent, we need to move quickly to hire the best in the field. If my staff is to use this tool in next to no time, I need to understand AI capabilities, benefits, and possible downsides.

CIO Catamaran offered:

Chief AI Officer (CAIO) Chris Clipper is deeply knowledgeable about AI. As CAIO, Clipper's main responsibility is to identify areas appropriate for the application of AI across the entire company to add value in meeting business goals and objectives. I'll call Clipper in on this meeting to explain the capabilities of AI.

6 What is AI?

CAIO Clipper began by explaining:

The term AI was first coined at The Dartmouth Conference, organized by mathematician John McCarthy, in the US in 1956. There is no commonly accepted definition of AI because the definition has changed as this technology has evolved. AI is a broad field now encompassing areas such as robotics, natural language processing (NLP), vision and sensory systems, and expert systems. Generally, AI refers to the ability of a machine to learn from experience, adjust to new inputs, and perform human-like tasks. At Shiplt2Me, we generally agree with Gartner's (2019b) definition of AI: a computer-based system that "applies advanced analysis and logic-based techniques, including machine learning, to interpret events, support and automate decisions, and take actions".

CAIO Clipper remarked:

As a tool for recruiting, AI can perform a more targeted and relevant candidate search compared to manually screening recruiting websites for data—data which is constantly updated. It's a high-frequency data stream. Rather than deciding what candidate data is relevant, what's not, what's out of date, what information is about the same person, and make inferences about that data, we can use AI to speed up the process and make it more efficient and easier to find diverse candidates at top of the hiring pyramid. I'll form a new AI team to get underway with the development of a recruiting tool for cloud computing talent.

6.1 What has Contributed to the Current Growth in AI Applications?

CAIO Clipper continued: "In the decades since 1956, AI has waxed and waned; however, since about the late 1990s, AI has been revitalized". Several things have contributed to the current growth in AI applications, such as:

- Improved machine learning algorithms
- Increased computing capacity to train more complex AI algorithms
- Vast amounts of data available to train AI algorithms, and
- Cloud computing, which has made it possible to collect and store vast amounts of data in real time (Manyika & Bughin, 2018)

6.2 What is Machine Learning?

Machine learning stands at the forefront of the current expansion in AI applications (van Duin & Bakhshi, 2017). Gartner defines machine learning as an AI subfield that "solves problems by using statistical models that can extract knowledge and patterns from data" (Gartner, 2020, para. 3). Machine learning algorithms rely on artificial neural networks, which loosely model the way that neurons interact in the human brain. Neural networks are structured in layers that comprise a network of interconnected neurons. The simplest structure has two layers: an input layer and an output layer. One may extend the structure to multiple layers: an input layer, one or more hidden layers, and an output layer. Each layer attempts to detect patterns from large data sets or big data.

Based on data input, neural networks essentially work on a system of probability to make statements, decisions, or predictions with a degree of certainty (Marr, 2016). A weight value denotes a connection's strength, either excitatory or inhibitory, with an input value. A neuron may receive input from many neurons but produces a single output communicated to other neurons. While the path is usually uni-

directional, it may be bi-directional if it includes another path in the reverse direction. Including a feedback loop enables learning. Learning refers to the process by which the neural network adjusts connection weights' value to strengthen or weaken a connection. When the neural network detects a pattern, it activates the next hidden layer and so on to learn to classify data in much the same way a human brain does. By sensing or being told, through data input, whether the decisions are right or wrong, the neural network modifies the approach that it takes in the future (Marr, 2016). The resulting model, a structured set of complex relationships, can perform actions under conditions it has never encountered before (Bleicher, 2017).

6.3 What is Deep Learning?

The term deep learning (also known as deep neural networks (Gartner, 2020)) refers to learning by artificial neural networks with many ("deep") layers of interconnected neurons. While earlier neural networks had only three to five layers and dozens of neurons, deep learning networks may have ten or more layers with millions of neurons (Manyika & Bughin, 2018). Deep neural networks constitute a key technology that drives AI advances (Bleicher, 2017; Manyika & Bughin, 2018). Deep neural networks form the basis for most recent advances in AI because they can process complex data such as video, image, speech and textual data more efficiently to extract higher-level features. (Gartner, 2020). CAIO Clipper commented:

These mind-bogglingly complex deep neural networks can find patterns in huge amounts of data, but are opaque in terms of explaining how they arrive at their conclusions. The more complex the algorithm, the more accurate the results, but the harder it is to explain the rationale for the results. While deep learning is the not-so-secret sauce of the current AI boom, explainability has now become a critical requirement for these 'black box' systems⁴.

6.4 Explainable AI

Due to the need for explainability, the explainable AI (XAI) research area focuses on determining how to make algorithms explain how they make decisions (Bloomberg, 2018). The term XAI refers to "the movement, initiatives, and efforts made in response to AI transparency and trust concerns, more than to a formal technical concept" (Adadi & Berrada, 2018, p. 52140). XAI aims to "produce more explainable models, while maintaining a high level of learning performance (e.g., prediction accuracy); and] enable human users to understand, appropriately trust, and effectively manage the emerging generation of artificially intelligent partners" (Gunning, 2017, p. 7). Thus, AI applications should explain the decisions they make just enough to help build trust in their decisions. Full explainability is neither possible nor desirable (Gartner, 2019d). However, a solution remains "years away" (Bleicher, 2017).

One can categorize current research that focuses on developing XAI according to 1) the scope of explanations, 2) the methodology behind the algorithms, and 3) the explanation level or usage that helps build trustworthy, interpretable, and self-explanatory tools to explain an AI application's inner working (Das & Rad et al., 2020). The first research category focuses on developing XAI tools to understand the decisions that an AI application makes as a whole or just a single instance of input data. The second research area focuses on developing tools based on different algorithmic approaches. The third research area focuses on developing tools that one can use with any AI application in general or only with a specific one.

Some tools exist that can determine which inputs determined a resulting prediction (Bleicher, 2017; H2O, 2017; Ribeiro, Singh, & Guestrin, 2016; Roselli, Matthews, & Talagala, 2019). Also, a qualified human judge could validate such predictions by using the same inputs. Comparing a judge's and the AI's predictions could both validate and provide explanations for predictions (Roselli et al., 2019). The difficulty arises when the judge's and the AI's predictions differ; in which case, one cannot easily determine why AI made a particular decision.

⁴ Information from Bleicher (2017) and Bloomberg (2018).

7 Development of the AI Recruiting Tool

The development team for CAIO Clipper's AI recruiting tool comprises nine employees who serve in various roles (e.g., AI team leader, data engineer, machine learning specialist, business analyst, and HR recruiters). We present the roles, responsibilities, skills, and team members in Table 1.

Table 1. The AI Recruiting Tool Development Team

AI team roles	Responsibility	Skills	AI team members
AI team leader	Responsible to the CAIO for delivering business value in recruiting with AI, machine learning, data science, data analytics capabilities and solutions	Project management skills to guide the project from start to finish	Sergey Shipwright
Data engineer	Gets the right data sets in the right format to train and use the AI system	Understands: <ul style="list-style-type: none"> • Where data comes from • Data's quality • How one should handle data to preserve security and trust 	Marc Mariner Reed Regatta
Machine learning specialist	Develops artificial neural networks using a training data set	Understands: <ul style="list-style-type: none"> • Machine learning • Deep learning • Statistics • Forecasting • Analytics 	Michael Mast Steve Spinnaker
Business analyst	Determines the requirements for the AI system based on recruiting needs	Possesses skills such as: <ul style="list-style-type: none"> • Critical thinking • Analytical thinking • Problem identification • Problem solving 	Bill Barge Larry Leeward
HR recruiter	Provides business expertise regarding how hiring decisions are made	Understands the business domain	Jeff Jetty Mark Maritime

The development team had already trained the AI system under development using resumes that Shiplt2Me had received over a ten-year period. The team trained the machine learning algorithms to identify candidates by recognizing terms on past Shiplt2Me job applicants' resumes. Machine learning specialists Michael Mast and Steve Spinnaker spent considerable time identifying and labeling the potential variables of interest (also known as key terms or features). Based on about 50,000 key terms in the resumes, the team developed 500 computer models focusing on specific job functions and geographic locations to recognize patterns in qualifications and, thereby, score the job candidates. AI Team Leader Shipwright commented that the scores ranged from one to five "similar to the one to five star product ratings that shoppers provide on items that they purchase on Shiplt2Me". The system then ranked job candidates from resumes considered and suggested the top applicants. In the next step, Data Engineers Marc Mariner and Reed Regatta used a Web-scraping tool to collect resumes from LinkedIn.com, Monster.com, Dice.com, and publicly available social profiles across the Web. Data Engineer Mariner remarked: "Crawling the Web to capture potentially suitable candidates allows us to screen hidden gems who might never have applied to Shiplt2Me".

7.1 Change in Direction: Focus on Cloud Computing Skills

CAIO Clipper and HR Director Schooner met with AI Team Leader Sergey Shipwright along with the other development team members to guide a change in direction by focusing the AI recruiting tool on cloud computing skills. HR Recruiters Jeff Jetty and Mark Maritime mentioned the specific hard skills that they desired cloud computing recruits to have, such as experience with Java, Linux, AWS, software development, DevOps, Docker, and IaaS, to machine learning specialists Michael Mast and Steve Spinnaker. Mast edited the system to include these particular terms among the approximately 50,000 key terms. Machine Learning Specialist Mast noted:

The goal is to tweak the system so that it suggests top cloud computing candidates in particular from resumes of tech workers that our Data Engineers Mariner and Regatta scrape from online sites. We can then rank potential candidates based on that data and how relevant it is to the

particular search parameters, such as experience in cloud computing skills required based upon the job description.

8 Shall We Also Use AI-Based Video Interview Software?

Machine Learning Specialist Spinnaker interjected to say:

CognitionX, a consulting company which provides advice on the adoption of AI for HR, identifies recruiting areas supported by AI-based tools, including talent sourcing, assessment, interviewing, and onboarding⁵. We could use AI to support each of these four areas. For sourcing, which is the search for potential hires, we are scraping candidate data from employment websites and publicly available social profiles. Then, we have our in-house developed AI recruiting tool pre-screen candidates with cloud computing skills that match the roles we are seeking.

Spinnaker added:

Once our tool produces the list of ranked cloud computing job candidates, we can make quicker decisions about whom to shortlist by screening those candidates for soft skills by interviewing them with AI-based video interview software. Candidates can be invited to interview on their own time by recording answers to interview questions using this video interview software. Candidate interviews are analyzed by the software!

Machine Learning Specialist Spinnaker continued:

Mannerisms, facial movements, eye contact, word choice, voice tone, speech rate, perceived enthusiasm or nervousness, and more, can all be analyzed to calculate an “employability” score to categorize applicants according to high, medium, and low “likelihood of success”⁶. And, we can start right away with this automated screening software. There are so many vendors such as ConveyIQ, EASYRECRUE, HireVue, Montage, myInterview, SonRu, Spark Hire, Talview, VCV, Wepow, and Yello⁷. For example, using HireVue for a standard 30-minute interview, with a half-dozen questions or so, produces a score based on up to 500,000 data points⁸. The score includes soft skills such as “willingness to learn”, “conscientiousness and responsibility”, and “personal stability” in dealing with prickly customers or coworkers.

HR Recruiter Jetty chimed in:

When hiring, it’s important to identify tech talent that can learn quickly. IT changes so fast that hard skills are not so hard a few short years later⁹. So, we could readily identify candidates willing to learn!

Machine Learning Specialist Spinnaker replied:

Some of these tools even have gamified assessments to measure soft skills with games or game-like elements layered in. I even heard of virtual reality simulations being used by ActiView to make assessments feel more “real” to candidates. ActiView can measure cognitive abilities, personality attributes, and work methods such as time management, attention to detail, and tenacity¹⁰.

We show an example video interview start screen in Figure 3.

Machine Learning Specialist Spinnaker continued:

Underlying the assessment capabilities of this software is NLP, a subfield of AI that extracts meaning from human language to make decisions based on that information¹¹, coupled with facial analysis (also known as facial expression analysis, facial expression recognition)

⁵ Information from Jeffery (2017).

⁶ Information from Harwell (2019).

⁷ Information from Gartner (2019a).

⁸ Information from Harwell (2019).

⁹ Information from Council (2020).

¹⁰ Information from Schellmann (2020).

¹¹ Information from Gartner (2020) and Marr (2019).

software, a subfield of AI that analyzes facial expressions, facial movements, and body language to detect emotion and other traits¹².

HR Recruiter Jetty concluded:

We could gain so many insights about candidates! And, at the same time, save so much time, by not coordinating schedules with candidates, and money, by not paying candidate expenses to travel here for an interview. It will be great!

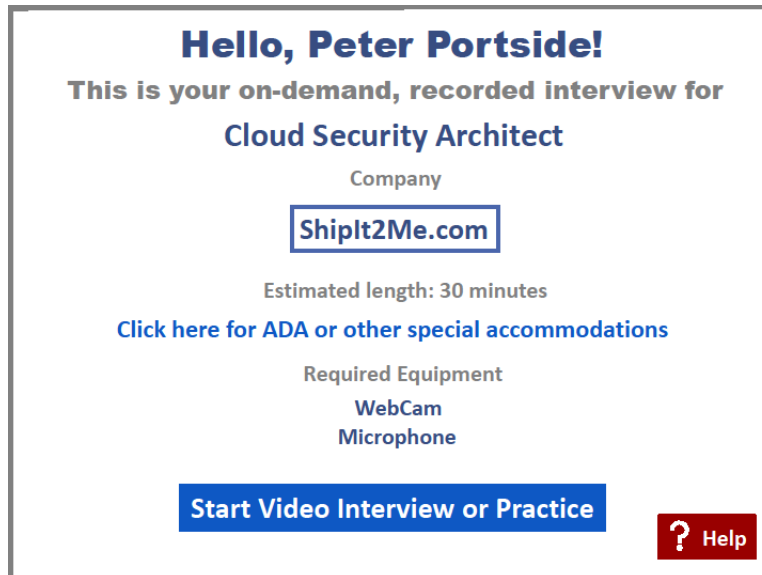


Figure 3. Video Interview Start Screen (Based on Feloni, 2017)

9 Using the AI Recruiting Tool

HR recruiters began the cloud computing talent recruiting process by using the AI tool to vet 50,000 resumes to quickly generate a ranked list of recommended cloud computing candidates that the tool considered the best possible applicants with a “five-star” rating. We present the resulting output in Table 2.

Table 2. Output: Ranked List of Recommended Cloud Computing Candidates

ID #	Years of IT exp.	Java	Linux	AWS	Software dev.	DevOps	Docker	IaaS	Home address zip code	Gender	Rating
24574	5	Y	Y	N	N	N	N	N	95014	Male	5
00281	2	Y	Y	N	Y	Y	N	Y	95112	Male	5
08336	10	N	N	N	Y	Y	N	Y	95050	Male	5
11490	1	N	N	N	Y	Y	N	N	95110	Male	5
21653	7	N	N	N	N	N	N	N	95116	Male	5
00744	5	N	N	Y	N	N	N	N	95114	Male	5
35537	3	N	N	N	N	N	N	N	95051	Male	5
03319	8	N	N	N	N	N	N	Y	95050	Male	5
49432	5	Y	Y	N	N	N	N	N	95054	Male	5
05864	1	N	N	Y	Y	N	N	Y	95129	Male	5

¹² Information from Gartner (2019c), Harwell (2019), and Reibenspiess, Jaeger, and Eckhardt (2018).

HR Director Schooner called CAIO Clipper to ask: “Based on the recommendations output, should the AI tool be used in an official capacity by my recruiters to evaluate candidates?”. CAIO Clipper replied: “Let me consult with the AI development team and get back to you”. CAIO Clipper conferred with the AI development team and concluded: “Characteristics of the candidates other than the desired cloud computing skills may have come into play”. AI Team Leader Shipwright called HR Director Schooner to discuss the use of the AI tool in an official capacity and said:

Resume screening should avoid false negatives—that is, wrongly disqualifying potentially strong candidates. Apparently, the neural networks learned to recognize patterns in the data by weighting different characteristics of the job applicants than we expected, while discounting others.

In response, HR Director Schooner asked: “Upon what characteristics of the job applicants was the ranked list based and why?”.

10 Questions

Please develop detailed written responses to each question below. You will need to conduct additional research regarding AI and its application to HR recruiting to adequately respond to each question. Please include references for your research in your responses and state any assumptions that you make.

- 1) Organizations across all economic sectors and multiple business functions—from consumer applications in marketing to supply chain operations—have increasingly begun using AI applications. Find and describe three example AI systems used in business and explain how the systems assist specific business operations. Be sure to include references for the sources you consult.
- 2) Does developing an AI recruiting tool to hire cloud computing talent align with the Shiplt2Me’s business strategy? Please explain your response in detail.
- 3) Identify and define the responsibilities that the CAIO or AI VP positions have. To whom do these positions generally report?
- 4) Refer to the AI recruiting development team’s roles, responsibilities, and skills for Shiplt2Me (see Table 1). In general, what responsibilities does the AI development team have to the organization as a whole and to society? Would you recommend any other additional roles or responsibilities?
- 5) Should Shiplt2Me rely on the AI recruiting tool’s recommendations? Why or why not?
- 6) Would you place greater trust in recommendations from AI systems than from human experts? Why or why not?
- 7) Can AI systems be biased?
 - a) How are AI systems biased? That is, what about developing and using AI systems that could introduce bias?
 - b) Find and describe three examples of AI systems that reportedly contain bias. Be sure to include references for the sources you consult.
 - c) What could a development team do to mitigate or manage bias in AI systems?
- 8) If you received an interview offer as a job candidate, would you be comfortable taking an online video interview? Why or why not?
- 9) Discuss the impact that cultural/ethnic differences or disability limitations in the candidate pool have on how an AI would analyze a video interview.
- 10) What is natural language processing (NLP)? Please provide an example of how it is or could be used in business in your response.
- 11) What is facial analysis (also known as facial expression analysis, facial expression recognition) software? Please provide an example of how it is or could be used in business in your response.

Acknowledgment

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References

- Activate. (2020). E-commerce market share of leading e-retailers worldwide in 2019, based on GMV [graph]. *Statista*. Retrieved from <https://www.statista.com/statistics/664814/global-e-commerce-market-share/>
- Adadi, A., & Berrada, M. (2018). Peeking inside the black-box: A survey on explainable artificial intelligence (XAI). *IEEE Access*, 6, 52138-52160.
- Bleicher, A. (2017). Demystifying the black box that is AI. *Scientific American*. Retrieved from <https://www.scientificamerican.com/article/demystifying-the-black-box-that-is-ai/>
- Bloomberg, J. (2018). Don't trust artificial intelligence? Time to open the AI "black box". *Forbes*. Retrieved from <https://www.forbes.com/sites/jasonbloomberg/2018/09/16/dont-trust-artificial-intelligence-time-to-open-the-ai-black-box/#ec52c183b4a7>
- CareerBuilder. (2017). *More than half of HR managers say artificial intelligence will become a regular part of HR in next 5 years*. Retrieved from <http://press.careerbuilder.com/2017-05-18-More-Than-Half-of-HR-Managers-Say-Artificial-Intelligence-Will-Become-a-Regular-Part-of-HR-in-Next-5-Years>
- Columbus, L. (2018). Where cloud computing jobs will be in 2019. *Forbes*. Retrieved from <https://www.forbes.com/sites/louiscolombus/2018/11/27/where-cloud-computing-jobs-will-be-in-2019/#6930acd66add>.
- Council, J. (2020). Target and Lowes tech execs credit talent, culture for insourcing success. *The Wall Street Journal*. Retrieved from <https://www.wsj.com/articles/target-and-lowes-tech-execs-credit-talent-culture-for-insourcing-success-11578963955>
- Das, A., & Rad, P. (2020). Opportunities and challenges in explainable artificial intelligence (XAI): A survey. *arXiv*. Retrieved from <https://arxiv.org/abs/2006.11371>
- Feloni, R. (2017). I tried the software that uses AI to scan job applicants for companies like Goldman Sachs and Unilever before meeting them—and it's not as creepy as it sounds. *BusinessInsider*. Retrieved from <https://www.businessinsider.com/hirevue-ai-powered-job-interview-platform-2017-8#larsen-showed-me-what-a-recruiter-would-see-when-analyzing-my-answers-8>
- Gartner. (2020). *3 types of machine learning for the enterprise*. Retrieved from <https://www.gartner.com/en/documents/3980239/3-types-of-machine-learning-for-the-enterprise>
- Gartner. (2019a). *Vendor rating: Amazon*. Retrieved from <https://www.gartner.com/en/documents/3900303/vendor-rating-amazon>
- Gartner. (2019b). *Define artificial intelligence for your organization to streamline for success*. Retrieved from <https://www.gartner.com/en/documents/3934017/define-artificial-intelligence-for-your-organization-to->
- Gartner. (2019c). *Top 10 strategic technology trends for 2020*. Retrieved from <https://www.gartner.com/smarterwithgartner/gartner-top-10-strategic-technology-trends-for-2020/>
- Gartner. (2019d). *5 myths about explainable AI*. Retrieved from <https://www.gartner.com/en/documents/3978368/5-myths-about-explainable-ai>
- Gunning, D. (2017). Explainable artificial intelligence (XAI). *DARPA*. Retrieved from [https://www.cc.gatech.edu/~alanwags/DLAI2016/\(Gunning\)%20IJCAI-16%20DLAI%20WS.pdf](https://www.cc.gatech.edu/~alanwags/DLAI2016/(Gunning)%20IJCAI-16%20DLAI%20WS.pdf)
- Harwell, D. (2019). A face-scanning algorithm increasingly decides whether you deserve the job. *The Washington Post*. Retrieved from <https://www.washingtonpost.com/technology/2019/10/22/ai-hiring-face-scanning-algorithm-increasingly-decides-whether-you-deserve-job/>
- H2O. (2017). Interpreting a model. *H2O*. Retrieved from <https://www.h2o.ai/wp-content/uploads/2017/09/driverlessai/interpreting.html>
- Jeffery, R. (2017). Would you let AI recruit for you? *People Management*. Retrieved from <https://www.peoplemanagement.co.uk/long-reads/articles/recruiting-algorithms>

- Loten, A. (2019). Enterprise IT companies ride spending wave. *The Wall Street Journal*. Retrieved from <https://www.wsj.com/articles/enterprise-it-companies-ride-spending-wave-11573515075?mod=searchresults&page=1&pos=2>
- Manyika, J., & Bughin, J. (2018). The promise and challenge of the age of artificial intelligence. *McKinsey*. Retrieved from <https://www.mckinsey.com/featured-insights/artificial-intelligence/the-promise-and-challenge-of-the-age-of-artificial-intelligence>
- Marr, B. (2016). What is the difference between artificial intelligence and machine learning? *Forbes*. Retrieved from <https://www.forbes.com/sites/bernardmarr/2016/12/06/what-is-the-difference-between-artificial-intelligence-and-machine-learning/#396b4d252742>
- Mattioli, D., & Tilley, A. (2020). Amazon has long ruled the cloud. Now it must fend off rivals. *The Wall Street Journal*. Retrieved from <https://www.wsj.com/articles/amazon-has-long-ruled-the-cloud-now-it-must-fend-off-rivals-11578114008?mod=djemCIO>
- Reibenspiess, V. A., Jaeger, L., & Eckhardt, A. (2018). Unmasking emotions via facial expressions—first insights on the role of emotional valence for IS discontinuance. In *Proceedings of the European Conference on Information Systems*.
- Ribeiro, M. T., Singh, S., & Guestrin, C. (2016). Why should I trust you? Explaining the predictions of any classifier. In *Proceedings of the 22nd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*.
- Roselli, D., Matthews, J., & Talagala, N. (2019). Managing bias in AI. In *Companion Proceedings of the 2019 World Wide Web Conference*.
- Sayegh, E. (2020). The cloud talent drought continues (and is even larger than you thought). *Forbes*. Retrieved from <https://www.forbes.com/sites/emilsayegh/2020/03/02/the-2020-cloud-talent-drought-is-even-larger-than-you-thought/#64ff9b8958c0>
- Schellmann, H. (2020). How job interviews will transform in the decade. *The Wall Street Journal*. Retrieved from <https://www.wsj.com/articles/how-job-interviews-will-transform-in-the-next-decade-11578409136>
- Tilley A. (2019). Microsoft ramps up battle against Amazon in cloud war. *The Wall Street Journal*. Retrieved from <https://www.wsj.com/articles/microsoft-steps-up-push-to-dominate-hottest-segment-of-the-cloud-11572876001>
- van Duin, S., & Bakhshi, N. (2017). Part 1: Artificial intelligence defined. *Deloitte*. Retrieved from <https://www2.deloitte.com/fi/fi/pages/technology/articles/part1-artificial-intelligence-defined.html>

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