Annotated Bibliography

Crawford, K. & Whittaker, M. (2016). Have we given artificial intelligence too much power too soon? Retrieved from http://qz.com/787302/artificial-intelligence-holds-growing-power-over-our-everyday-lives-but-we-have-no-idea-how-well-it-works/

Crawford and Whittaker (2016) analyze the effects artificial intelligence (AI) has on society. They opened with "AI systems are already making problematic judgements that are producing significant social, cultural, and economic impacts in people's everyday lives", which helps support the idea that relying on AI too much could mean trouble (Crawford and Whittaker, 2016, para. 1). They discuss a beauty contest in which the winners were selected by AI and continued on by saying that a simple beauty contest could turn into who to hire, who to recruit to universities, or predict which babies will be criminals in the future (Crawford and Whittaker, 2016, para. 5). They highlight that fallible AI systems are being produced and dispersed among our society. They state "there are no agreed-upon methods to assess the human effects and longitudinal impacts of AI as it is applied across social systems", implying that there is no way to determine that AI is guiding our society in possibly the wrong directions. They conclude by saying that overall AI decision making isn't better than human decision making. The audience that the article is aimed for is popular. The article is useful because it brings a heavily opinion-based aspect to AI. The opinions are directed towards the overuse of AI in our society which will prove to be crucial.

Davis, E., & Marcus, G. (2015). Commonsense Reasoning and Commonsense Knowledge in Artificial Intelligence. Communications of the ACM, 58(9), 92–103. https://doi.org/10.1145/2701413

Davis and Marcus (2015) discussed the processes and challenges of teaching artificial intelligence (AI) commonsense. Davis and Marcus described what commonsense is based on the human mind. They described commonsense as being able to make inferences due to prior knowledge. They stated "The importance of real-world knowledge for natural language processing…" which shows that real-world knowledge has a direct impact on commonsense, therefore if AI understands the world then AI will hopeful retain some commonsense (Davis and Marcus, 2015, para. 4). Thus, they pointed out where challenges that arise with giving real-world knowledge. AI struggles understanding pronouns without prior knowledge of sentence structure and grammar. They also stated that in computer vision, AI struggles to recognize objects based off inference, such as location, size, and color. Computer vision does also struggle with limited visibility. Davis and Marcus also focused on the successes of AI including categorizing, sense of time, qualitative reasoning, and acting and change. Continuing Davis and Marcus listed many different techniques used to approach tackling the feat of commonsense in AI. They believed that there should be some integration of techniques to make commonsense in AI successful. The article is aimed towards audiences with interests in AI, leaning towards computer science related fields. The article is useful because it provides us with a basis of what AI has come to "know" as a matter of commonsense and the algorithms and techniques used. Although Davis and Marcus focused more heavily on the challenges, the successes they describe give good support for the topic of too much AI in humanity.

Dietterich, T. G., & Horvitz, E. J. (2015). Rise of Concerns about AI: Reflections and Directions. Communications of the ACM, 58(10), 38–40. https://doi.org/10.1145/2770869

Dietterich and Horvitz (2015) outlined the direction and risks of artificial intelligence (AI) in the world today. They stated “over the longer-term, advances in machine intelligence will have deeply beneficial influences”, which implies that the risks and challenges that retain to AI aren't going to be resolved in a small amount of time. Dietterich and Horvitz focused on the risks that are associated with relying on AI too much. They stated the daily encounters we have with AI, such as GPS, Siri, Cortana, Google Now, and Facebook (para. 1). Dietterich and Horvitz categorized five sets of risks, 1) errors in programming, 2) vulnerability to cyberattacks, 3) perception of words, 4) real-time switching between human and AI, and 5) the influences on socioeconomics and wealth (p. 39-40). They stated that these set of risks need attention for AI to be independently safe and successful in the world. The article is directed towards an audience that is interested in the field of AI. The article is very useful because it highlights five important risks that AI has yet to overcome. Dietterich and Horvitz have provided specific scenarios where AI could fail under crucial circumstances. This helps support why humans shouldn't be so heavily dependent on AI.

Ghahramani, Z. (2015). Probabilistic machine learning and artificial intelligence. Nature, 521(7553), 452–459.

Ghahramani (2015) focused on the probabilistic approach to machine learning and the process taken towards creating artificial intelligence (AI). He stated that "probability distributions are used to represent all the uncertain unobserved quantities in a model…and how they relate to data", describing the probabilistic approach to machine learning by helping represent all the possibilities of a model (Ghahramani, 2015, para. 7). He continues describing the process (programming, optimization, and data compression) and mathematics behind probabilistic machine learning. He concluded that probabilistic machine learning offers a wide range of possibilities past the normal puzzle problems. The directed audience is professionals in the computer science field. This article is not useful because it is a research based article and goes to great lengths to describe each process in designing an AI system based on probability. In Ghahramani's perspectives at the end he shows opinion that will be of some use but overall the article is too heavy on research and design.

Gil, Y., Greaves, M., Hendler, J., & Hirsh, H. (2014). Amplify scientific discovery with artificial intelligence. Science, 346(6206), 171–172. https://doi.org/10.1126/science.1259439

Gil, Greaves, Hendler, and Hirsh (2014) focused on the role of artificial intelligence (AI) in scientific discovery. AI has made advances in scientific discovery based on 3 factors: "steady scholarly advances, Moore’s law and steady exponential increases in computing power, and exponential increases in relevant data in volumes never previously seen." (Gil et al, 2014). Search engines that are powered by AI can go past normal search limitations and even analyze videos and pictures. Gil et al. described AI being able to summarize scientific research by reading in large amounts of data from lab equipment then analyzing and sorting the data. The article is aimed at an audience with interests in scientific research or AI. The article is reliable because they describe the man different ways that AI is used to aid with scientific discovery. Crucial points made are the ability for AI to scan databases through search engines to find relevant material and the ability for AI to process large amounts of scientific data directly from lab equipment.

Jones, N. (2014). The Learning Machines. Nature, 505(7482), 146–148.

Jones (2014) described the steps taken towards machine learning in artificial intelligence (AI). Early on he talked about the early successes in machine learning. He later stated "deep learning has been proving useful for a variety of scientific tasks" and supported this statement with facts, proving his thoughts that AI is beneficial and has opportunity to flourish (Jones, 2014, para. 19). Deep learning, neural networks, are being used to map brain slices in three dimensions through an automated process. Jones declared that "deep learning seems to be the best way to automate", ranking it higher than its alternatives (para. 20). He concluded by describing other ways deep learning has been used such as Facebook, Google, and the Allen Institute for Artificial Intelligence in Seattle. The directed audience is popular with an interest in computer science or AI. The article doesn't seem all that useful because it talks about the history and the successes of machine learning. It may prove to be useful in the cases where Jones displays an overuse of AI in society.

Parkes, D. C., & Wellman, M. P. (2015). Economic reasoning and artificial intelligence. Science, 349(6245), 267–272. https://doi.org/10.1126/science.aaa8403

Parkes and Wellman (2015) focused on the impact of AI in economics and the studies behind it. They stated "AI strives to construct…a synthetic *homo economicus*, perhaps more accurately termed *machina economicus*", which highlights the thesis of the article, creating a rational AI of economics. They discussed the challenges faced when building *machina economicus*. If a system were of multi-agents, each agent would have to rationally respond not only to other agents but to humans as well. Parkes and Wellman say that they should not treat their relationship as a game where they react to actions upon them (para. 11). Rules and incentives are listed for the agent and it rationalizes between the options it is given to give the optimal output. They state that rational agents can't be hardcoded but are based on these rules and incentives. The audience that the article is directed towards is professionals in the computer science field. The article is somewhat useful in the sense that it points out the issues that may arise when constructing rational AI. Parkes and Wellman do provide some evidence of humanity relying on AI when talking in depth about the attempts and successes towards this AI system.

Schölkopf, B. (2015). Learning to see and act. Nature, 518(7540), 486–487.

Schölkopf (2015) described the concepts, ideas and process behind machine learning. Machine learning is an artificial intelligence (AI) system’s ability to process data and its surroundings and perform an action that results in the best outcome. AI systems are trained by the system designer to recognize a problem and optimize the solution with data that is provided from the design which is known as supervised learning (Schölkopf, 2015, para. 2). Schölkopf mentions Q-learning, cited in his article, which was used to learn 49 different vintage video games. The algorithm reads the pixels on the screen to and picks the next move based on achieving the highest score at the end of the game. Schölkopf states that AI being able to learn video games opens the door to real-world AI, whereas before AI was based on a few rules that limited what it could learn. The audience of this article is the professionals in the computer science field. The article is useful as it highlights a machines ability to beat world champions in different vintage video games. Schölkopf provides evidence that it is possible for a machine to go into deeper “thinking” than a human.