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Socio-Technical Synthesis

My technical project focused mainly on the application of computer vision towards culinary innovations, whereas my STS research focused on the failure of artificial intelligence in the healthcare industry. While these two topics are not closely related, they both have one point in common: they are both centered around emerging computing technologies in industry. The applications of computer vision reach far beyond luxury kitchen appliances, the same way that the applications of artificial intelligence reach way beyond medicine. These cutting-edge technologies are widely-applied in the modern day to produce ground-breaking innovations, which is why a fundamental understanding of each one is vital for a computer engineer such as myself. Comprehending the application of computer vision in products such as the pancake printer proposed in my technical work allows me to gain a better understanding of the uses of artificial intelligence in products like medical diagnostic tools from my STS research. As such, while these technologies may be distinct from one another, a good comprehension of both technologies is essential for the future of my field.

My technical project investigated ways to make pancake art faster and easier using computer vision and inexpensive computing devices to automate the process. The resulting innovation was called the Pancake Printer, an appliance that translates digital art into edible pancake designs for household and professional use. For ease of operation, users can upload a desired image to a connected mobile application. The image is then processed with computer

vision in order to identify crucial edges and translate the image into line art. Using path decision algorithms, the line art is then converted into a set of instructions for tracing the outlines present in the image. A pancake batter dispenser is mounted on a two-dimensional carriage system and follows the instructions to dispense batter tracing the line art onto a hot griddle. Once the designs have darkened on the griddle, the dispenser fills in the remaining parts of the image to create comprehensive pancake art. The completed Pancake Printer serves as a working proof of concept for medical applications requiring the production of 3-D-printed organic materials based on imaging of patients.

In my STS Research paper, I investigated the morality of actions taken by IBM employees during the engineering and marketing of Watson Health products. By applying the theory of deontological ethics to this case study, I demonstrated that these actions were in fact morally responsible, as they followed two of the fundamental rules from the code of ethics proposed by the National Society of Professional Engineers (NSPE): hold paramount the safety of the public, and perform services only in areas of competence. In the end, I proved that even though IBM overpromised on what they could deliver, ultimately the company handled the failure of the project in a morally acceptable way.

Working on these two projects at the same time helped me better understand how the field of computer engineering is advancing into the future. Now, I not only understand how computer vision works, but how artificial intelligence works as well. These two cutting-edge technologies will help pave the way for significant computer engineering inventions, so learning them in tandem allowed me to gain an edge in my field. Moreover, investigating the varied applications of these technologies caused me to reconsider how I perceived them, broadening my horizons on what I could apply them to.