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Major Paper 2

Inquiry: In the past century, has Computer Science revolutionized the world?

With the recent boom in Computer Science, many engineers continue to produce remarkable inventions and algorithms. From self-driving cars to Amazon Echo, we continue to interact with this field on a daily basis. As we enjoy these luxuries — that we often times take for granted — we forget where and how it all started. In 1936, Konrad Zuse blessed humanity with the first programmable computer. Quickly there, computers quickly advanced, and so did Computer Science — with the first programming language being FORTRAN. From the first programming language, it opened up doors to more efficient, effective, and robust languages, that are used today — from Python to C++ and Java, they dominate today's world. From mere letters, the industry has contributed towards the advancement of other fields. I do believe that Computer Science has made its mark on the universe, by propelling human boundaries and providing an innovative solution towards the never-ending problems. From using machine learning to diagnose diseases to creating the software in that phone in your pocket, Computer Science has drastically transformed the world in a way where we cannot turn back.

One field where Computer Science made an everlasting effect on was the medical field. Before, the process of discovering potential cures required a human to manually test various combinations. Now, neural networks are able mix and match functional groups and active sites quicker as well as autonomously. It has also made

detecting potential diseases more accurate, efficient, and effective through disease detecting algorithms. From simply entering a database full of various pictures of diseases, the algorithm trains itself to understand specific patterns and symptoms, allowing for a consistent and accurate diagnostic, “Facial recognition software is being combined with machine learning to help clinicians diagnose rare diseases. Patient photos are analyzed using facial analysis and deep learning to detect phenotypes that correlate with rare genetic diseases” (Emerj). Computer Science has allowed for incredible discoveries — from the valuable cures to assistant machines in the surgery room — and has continued to rapidly grow. It has incorporated efficient, effective, and innovative solutions and has forever left an imprint in the medical field.

In the 21st century, Computer Science has stormed the gaming industry, furthering it to greater heights. Specifically, it has contributed towards a gaming project known as Virtual Reality, where an individual is immersed into a computer simulated environment. The field is fairly new, allowing room for further advancement in terms of technology and in affordability. From a simple Virtual Reality machine, it's able to let people explore foreign environments and battle through phobias, “The benefits of VR are still being calculated because certain proposed ideas, such as therapists using VR to help patients overcome phobias, have not yet been tested. As illustrated below, VR technology provides intuitive ways for users to explore new environments and master new skills” (ComputerScienceDegreeHub). Computer Science was able to combine the various sensors, screens, and audio in order to immerse the individual into an environment. By doing so, the person is able to perform intense simulations almost first

hand — such as surgeries or chemical labs — and without being in any potential danger. Small inventions like these are able to drastically impact the way we interact with the world.

With a certain field of study — Artificial Intelligence — Computer Science has even seep its way to the car industry through self-driving cars. The automotive AI market is expects the value of AI in automotives to be at \$11 billion in 2025, and the IHS Markit also predicts the installment rate of AI based systems to rise up to 109%. Cars are now implementing the necessary technology for Artificial intelligence, “Autonomous vehicles are being fitted with cameras, sensors and communication systems to enable the vehicle to generate massive amounts of data which, when applied with AI, enables the vehicle to see, hear, think and make decisions just like human drivers do” (Medium). Through the technology, it allows the car to be alert like a human, however, its awareness does not seize to fail out of fatigue. With the incorporation of AI in cars, it creates a system where traffic and human-driving is eliminated, increasing efficiency as well as lowering human-accidents. Entrusting everything to a robot that’ll reroute you through the most efficient route is unorthodox but incredible. By doing so, you trust your life in the hands of the programmer that designed, created, and tested the AI system. This is just another step proving our undying reliance to the technology surrounding us — technology that programmers develop algorithms for.

However, Computer Science has even revolutionized the way we approach the field. It has questioned human morals, potential devastating tools, and unforeseen events. From questions asking ‘Who’ll be responsible if self-driving cars crashes?’ and

'How can Artificial Intelligence be dangerous?', it makes you wonder possible answers to the complex question. As we continue pondering for a fair answer, a potential one was listed in the Seattle Times, "Currently, if two cars collide, either the drivers work it out, or police or insurers talk to the drivers and examine the evidence to make a determination of who's at fault." The idea would be perfect in an ideal scenario, however, there will always be circumstances where it continues being complicated — like the lack of evidence. The answer remains unclear, nevertheless, Computer Science has made us rethink certain policies that may soon be outdated. It has incorporated another contributing factor amongst accidental events, but has theoretically improved the car industry. As for questions surrounding the magnitude of danger Artificial Intelligence brings, it has made many wonder the ethics of the field. There are certain scenarios that researchers believe make Artificial Intelligence dangerous, "The AI is programmed to do something devastating... The AI is programmed to do something beneficial, but it develops a destructive method for achieving its goal" (FutureOfLife). There are numerous of scenarios that comes into mind when reading these conditions — like someone creating a robot aimed at destroying humans and an AI car preventing a car crash but instead runs over a human — all of which aren't urgently addressed. These are only some of the questions that reminds us the endless potential Computer Science holds, both in the good and bad spectrum. It furthers our way of thinking of certain policies that incorporates the innovative and advanced technology.

Computer Science has only been around the past century, and it has seeped into all fields. Being in the 21st century, the field has many room to advance in terms of

technology and theoretically — all of which providing an efficient, effective, and innovative method in various fields. In twenty-four hours, the amount of times the average citizen interacts with the field is extraordinary — from interacting with your phone, to any software application you open. Without the technology that many have become reliant on today, many human boundaries would remain as well as ineffective systems. As humans, we have become so accustomed to the software that programmers create, which is why it's impossible to turn back. From a simple computer, it has allowed for Computer Science to exponentially grow and leave its mark with the usage of texts.