

Robots are machinery or devices that are designed to make tasks originally performed by humans easier to do, or in many cases remove the need for humans in that role[1]. This can be achieved in a variety of ways from autonomous manufacturing robotics that can perform monotonous tasks with higher precision than humans to exo-skeletal suits that enhance the users strength and endurance. Robots or more precisely robotics have had a massive positive effect on society, allowing us to develop technologies more advanced than previous generations. They allow us to have a standard of living far greater than we have had at any time in our history, as all of the convenient devices such as TVs, mobile phones, kitchen appliances and even some houses have been put together at least in some part by robots, often completely manufactured by robots.

One aspect of robotics in particular that has encouraged massive growth of the human race is the automation of manufacturing. Due to this automation we have been able to be more efficient and precise with how we construct automobiles, enabling us to make more cars that are safer more economic to make and put less strain on worker. This does have a downside as with automation there are losses in jobs and it is up to companies to transition the workers from their previous role to another new role.

Robotics has enabled humans to:

- Send robots into space to explore other the other planets in our solar system. [2]
- Streamline manufacturing processes by utilising robots to perform repetitive tasks that would be unable to be completed by humans.[3]
- Entertain themselves with completely customised battle bots fighting for glory[4] to high speed, high adrenaline drone racing.[5]
- Create autonomous robots to even further revolutionise many industries.[6]
- Teach and encourage youth to enter the STEM fields.[7][8][9]
- Regain control of their lives through robotic prosthetic limbs allowing previously disabled people to have relative autonomy.[10]
- Allow humans do perform superhuman feats of strength, endurance and speed. Further more allowing us to create and innovate in new directions.[11][12]

These are just a few of the many benefits that robotics has brought to society and I see the robotics industry changing the way live our lives. We could have in house robotic cleaners(think Roomba[13] but able to do much more than just clean the carpet and give rides to curious cats[14]) that free up time for us to innovate in other ways or bipedal robots that roam through disaster zones looking for survivors.

The timeline on when these technologies will be commercially viable is difficult to predict. If we are to follow previous trends, it took the mobile phone 96 years from being on business class airline flights in 1926 to the powerful slim devices we have in our lives now. Robotics and robots will be continuing to evolve interweaving different technologies. Artificial intelligence could be incorporated into packing robots to eliminate the human error element of the packing and shipping industry, which can cost companies millions of dollars.[15][16]

I believe the robotic industry could benefit from open sourcing patents similar to what Elon Musk has done with Tesla's patents.[17] Patents are designed to protect someones work, while I see the benefit of patents I find when they are used to block companies through lawsuits and legal action[18] they halt progress and delay or stop life altering technology from coming to market. The technological developments that are limiting this technology at the moment are resources. Almost all robots use electricity to control their systems and being quite complex devices they use quite a lot of it, if batteries where developed and released that were cost effective and more electrically efficient then the robots of the future wouldn't have to rely on a power grid so much and could be deployed into remote areas or third world countries that don't have reliable power grids.

If an open source mindset were adopted in the robotic industry I would speculate that it would promote creativity and rapid progression with technologies. If you look at some of the huge names

in tech like Google, Facebook, Github, Twitter, Redhat and Samsung. These companies have all benefited from open sourcing some of their work[19]. This open sourcing of software allows anyone around the world to collaborate, tinker, change, develop, etc and effectively expand a companies resources to employ everyone in the world who wants to participate. I speculate that this method of collaboration could allow robotics to be improved by anyone at anytime making better, safer and cheaper robots.

If we look at how the main power source behind a lot of mobile robots, batteries, we are limited by our current technologies. Lithium Ion batteries are one of the most efficient and common battery types for consumer products but they have drawbacks one being that lithium is very expensive to mine and refine. There are however exciting technological advancements that claim to allow large batteries to charge in under 5 minutes, be able to charge via Wifi, solar or ultrasound[20]. Other companies are researching how utilise triboelectric nanogenerators(TENGs) to charge devices, TENGs to my understanding are a device or material that sits on the surface of another material that utilises the electrons separating between the two layers as a means of energy generation. If you extrapolate this technology, it is not hard to imagine a robotic exo-skeletal suit that relies heavily on this technology to power itself meaning you would have to carry smaller batteries as you are harvesting energy from your own movement.

These technologies will always be disruptive to the industry that they are being implemented in, but this doesn't always have to be a bad thing. The automotive car industry has been revolutionised due to the fact that robots have replaced humans, what needs to happen is for those people that have lost their jobs be given the opportunity to retrain into another role, or in a Utopian world view, no one works and everyone shares and uses their skills to create and innovate. I see robots affecting everyone, from CEO's who reap(and hopefully share) huge profits from automation and streamlining their businesses to people in disaster zones that rely on airborne robots to deliver aid and rescue.[22]

Personally I think advancements in robotics will affect me in wondrous ways, from being able to call an autonomous taxi to my door removing the need to own my own vehicle, to being able to shop confidently online with out the risk of getting my order sent somewhere else, have the wrong product shipped to me, or just damaged due to human error.

I feel it is too early to really predict where this industry is going specifically but my optimistic outlook leads me to believe that the human race is going to benefit in all areas of life, even being able to get out into nature away from technology for people with paralysis. I have high hopes that by the time my newborn is my age we will be able to travel all over the world at a fraction of the economic and environmental cost that we have in these times. She will be able to recover from disease or illness far quicker due to medical nanobots so tiny that you can only see them with a microscope[23]. I have high hopes that robotics combined with other areas of information technology will provide the highest standard of living not only to my child but to every single child in our solar system(and possibly others?). I have reasonable confidence that we will see these advancements within a decade as this industry is only growing bigger by the year.

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