# Blender Assembled Fetch

![A picture containing floor

Description generated with very high confidence]()

# DH Dimensions

A close up of a device

Description generated with high confidence

A picture containing indoor

Description generated with high confidence

# Dh Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Θj | dj | aj | αj |
| Q1 | 0.06 | 0.1170 | π/2 |
| Q2 | 0 | 0 | -π/2 |
| Q3 | 0.352 | 0 | π/2 |
| Q4 | 0 | 0 | -π/2 |
| Q5 | 0.3215 | 0 | π/2 |
| Q6 | 0 | 0 | -π/2 |
| Q7 | 0.3049 | 0 | 0 |

End effector not pictured, all length dimension in meters, all angles in radians.

# Kinematic List

The transform of a joint, j, relative to the previous can be given by the following transformation matrix:



Aj follows the DH transformation rule:

Therefore, the transform of a joint, j, in the relative to the base can be given by the following transformation:

Also, it can be expressed more simply as:

In words, the transform of joint, j, can be expressed by the product of all the previous transformation matrixes.

For Fetch, which has a 7DOF arm, the transform of the end effector can be expressed simply with the following:

Also, given an initial an initial XYZ location and:

The base rotation can be expressed by:

The base position can then be expressed as:

Where:

Finally, we can say that the position of the end effector relative to the world frame can be given by:

# “Robots are increasingly impacting industry, our job and our daily lives in both positive and negative ways”

Unfortunately, when we look at the direction that robotics is taking we see a very bleak picture, particularly when we look at the effects that robotics has already had on society. We can see, particularly when looking at the US labour markets, a decline in employments and a reduction in total wages as more and more repetitive tasks are being automated (Acemoglu and Restrepo, 2017). As this is a continual trend we can expect that this amount of reduction of jobs will not only continue but increase in rate as technology grows exponentially.

However, the future doesn’t need to be that bleak. We currently from a world which didn’t have this level of technology, we come from a time of great change where we went from no TV’s to a world completely connected with the internet. This could be causing the fears and expectations of AI that we currently have. The new generation will grow up with all the wonders of modern technology. By Raising them to become AI literate we can expect them to better tackle all the issues that we are facing today in terms of AI. They will fear the technology less and be able to tackle it with a clear mind and come better equipped to deal with issues that arise with AI (Kandlhofer et al., 2016).

One aspect that the current and future generations will have to deal with is morality within technology. Something recent that will need to be dealt with is morality in autonomous vehicles. “If motor vehicles are to be truly autonomous and able to operate responsibly on our roads, they will need to replicate—or do better than—the human decision-making process” (Lin, 2016). Vehicles will need to make human decision based in morality, if someone must die, how do you decide? This will see an increase in morality considerations made by programmers and engineers. Moving from purely quantitative decision make to qualitative coupled with a deeper understanding of morality to allow systems to make life or death decisions.

Even with these grim considerations, that if dealt with properly will lead to much higher standards of living. We can see in the field of medicine an increase in surgical robots. These do not take over their human counterparts but add to their skills and capabilities. They have been able to improve operation success rates, reduce recovery time and reduce mistakes (Merrifield and Taylor, 2017). Overall, they have improved surgery and paint a bright future where robots work alongside humans improving their lives.

We have seen that the impact of robotics can be grim and there will be many hurdles that future designers will need to consider. But considering them early and not shying away from the issues will allow us to solve these problems. Humans have always had innovation at their door, we have always seen things relatively and have always striven for more. We have always wanted technology to improve and we have adapted to that technology. The same will happen with robotics and AI, we will adapt (Cueni, 2017). When we do, we can see a new era of prosperity and increased standard of living, leading to very positive changes because of robotics.

# “how my job may require me to create/integrate/install robots which may result in other people no longer being required to work due to no fault of their own”

Robotics is a fast-growing field that has the potential to do great, but it is already responsible and will continue being responsible for the loss of jobs. Robotics and AI are inherently skilled at doing a singular task very well, as such creative work has been untouched by robots. With the advances in machine learning we can expect robots to take over even those fields. We can see even in manufacturing, the use of robots has already taken jobs, but the act of programming a robot to do a task has been still left to a human worker. Gu ́erin et al show us the advances in manufacturing techniques that lead to robots learning and developing on their own. Essentially kicking out the human worker. As my field centres around robotics I can expect to use techniques as the one expressed by Gu ́erin et al to develop systems that will not require a human touch down the line.

Particularly in the field that I will be moving into, military, we see robotics integrating into the military as well. There has been a shift in the capabilities of robotics and as such has already reduced the operator to robot ratio (Jacoby and Chang, 2008). This is a welcome change as it will reduce the number of war fatalities, at least that of our soldiers. It will however displace a lot of the combat personnel, this is something that I will have to consider down the line. Developing robots that will take these jobs will save lives, but I will be taking jobs from people, can I justify it for the greater good. This is further reinforced by Sharkey (Sharkey, 2008), where particularly America is further expanding its robot combat force. With new and improved systems that will allow them to make kill decisions themselves. Other than the terrifying thought of killer robots, this further shows that even the military isn’t safe from automation.

Automation is taking over all aspects of the market, they are starting to infiltrate all aspects of manufacturing, design and creative works (Piva et al., 2017). No matter where you turn robotics and automation will play hand. It is inevitable that every job will be one day automated. This is where our roles play a big part. We are the primary developers of automated products. My field will see me taking jobs in whatever field I end up working in.

Frey and Osborne (Frey and Osborne, 2017) show us the potential different jobs have of being computerised, aka automated. The list is extensive and to no one’ surprise, telemarketers are ranked as the most likely to be automated. However, this list has a frightening amount of jobs that have more than 90 % chance of being automated (around 170 fall in this range) and the total amount that are more than 50% likely, 403. This is a staggering amount of potential computerised jobs, one of which being hospitality. Most developed nations move towards service type jobs, which is where we sit. Given the high probability of the hospitality industry being computerised, I can expect to play a role in the reduction of hospitality jobs and the eventually replacement of those already hired.

Given the large potential for automation in almost all field, we can further expect this list to grow and to have even more jobs fall under potential and actual computerisation. No job is safe and they will all fall to automation sooner or later. With that, it is inevitable that one day I will be responsible for the loss of someone’s job, through no fault on their own, due to something that I had created. It is inevitable that one day I will take jobs with my designs regardless of what field I work under.

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