

# When Worlds Collide

## Applying Art and Design to Robotics

For as long as there have been robots, creative individuals from the art and design world have used them as inspiration to create great works. It is only recently that individuals from the robotics world have used art and design to create great robots. The objective of this paper is to explore and analyze the role of Industrial design in consumer robotics. Consumer Robotics is an area of robotics where design and specifically industrial design (I.D.) may be utilized to create innovative and unique products that are functional, aesthetically pleasing, and have a strong human interface component. Because of the different problems presented in consumer-driven robotics the application of a different formula is needed. This paper will explore the role of I.D. application within consumer robotics, and thereby creating a greater acceptance of robots within the consumer field.

Robotics design by nature is usually based on the function of the robot being designed. For example if a robot's purpose is to lift a door and fix it to the frame of a vehicle, engineers will create a robot that will perform this task repetitively, efficiently, and at the lowest cost possible. Robotics in the private or military sector are usually purely utilitarian. It would be nice if all robots looked polished and impressive and were fun and interactive. However most of the time it is not financially or functionally practical. There are however exceptions to this norm and consumer robotics is one of these exceptions.

Robots for the consumer are used for entertainment, education, as tools to complete a domestic task, toys, etc. Ultimately, my results found that with better user interface, reduced construction costs, improved functionality, and aesthetics that were marketable to a wide consumer base, there tended to be a positive correlation between the utilization and acceptance of robotics by the consumer. Until recently most consumer robots have been, for a lack of a better description, mundane and highly expensive. An average American consumer will not invest his or her money into a product unless it meets or surpasses the standard to which they have become accustomed. In other words, a product will not succeed unless it is reliable and functional, easy for an average person to operate and interface with, and falls within the budget of an average person's wages. A truly successful product should be unique and aesthetically impressive (or at least more impressive than the competition).

In order to create a viable and successful piece of consumer robotics, I was determined to apply the principals of industrial design through my own research and observation. After a review of popular robotics, I found a lot of consumer fanfare in "pod" type robots, specifically hexapods. A conventional hexapod robot consists of about 18 standard servos, a power source, and micro controllers all wrapped in a lightweight frame made of usually aluminum and or wood. From the standpoint of a consumer hexapods share some of the qualities needed in a successful product. However there are many factors holding these bots back from becoming major household items, such as expenditure, distinctness between products, functionality, and aesthetics. Using the potential of the hexapods within my own creation of the X-9 Minion, I solved these factors, creating a more user friendly robot.

As an Industrial Designer, many different aspects are taken into consideration from the beginning of the design phase. After exhausting different ideas and configurations for my “pod”, I ultimately ended upon a tripod design. A tri-pedal design is unique in the fact that most pods have six legs for stability when walking. While a tripod would present some design challenges it offered an opportunity to create an appealing design that would cut the cost down for the consumer. Having only half of the legs, allowed for the opportunity to half the materials and need for programming. It was also important to create something that was engaging and interactive while keeping with an aesthetic design language that would be appealing to a wide consumer base. Aesthetically I wanted the design language of X-9 to convey something lurking and menacing to compliment the creeping stalker- like motions that X-9 would execute to move from place to place. Keeping this design language presented a challenge when attempting to incorporate the electronics and mechanical components into X-9. Most pod type bots are very open with most of the “guts” of the robot exposed. I wanted to create a closed environment for my electronics while incorporating things like hardware mounts into the robots frame while at the same time keeping the frame light weight.

After about a year of researching, designing, fabricating, and programming I now have a working prototype, the X-9 Minion. Although the X-9 Minion is only a prototype and not a product, it is an excellent example of how the principles of Industrial Design can and should be applied to a consumer robot.



# X-9 MINION