Definition of a simple machine

Imagine a machine with a full range of human emotions, says Dr Will Caster. Its analytical power will be greater than the collective intelligence of every person in the history of the world. Caster is not a man or a machine: He is actually the latest in a long line of Hollywood fictional characters – Johnny Depp plays him in the recent sci-fi film Transcendence – designed to make you feel simultaneously elated and frightened about the future. The world of information has surpassed people's cognitive powers, and that means machines have to help us make decisions. By the time Hollywood projects what it thinks artificial intelligence will look like, we're already starting to coexist with real learning machines. And instead of waiting for AI's Godot – a machine we can talk to – what we really need are ways to use machine intelligence to increase our ability to understand our increasingly data-rich and complex environment. The world of information has surpassed people's cognitive powers. More than 100,000 tweets and nearly 250,000 Instagram photos are shared per second. Now add sensor data from accelerometers, gyroscopes and the like. It's not really just the human world, says Sean Gourley, co-founder and CTO of Quida, a data insight company in San Francisco.Think about what happens when you visit a website. It may take 800 milliseconds to load, but about 20% of that time is dedicated to an algorithm that takes everything it knows about you, visits online ad exchange, offers a place to bidders and serves it. In 160 millisecules. No man could do that. Yes, that ad is likely to annoy you, but that doesn't mean we don't need machines to make correlations between terms, feelings, events, and entities and offer to help make decisions. Google Now and Apple's Siri may possess the rudimentary intelligence of a six-month-old baby, but at least they take information around us and put it in a story that's easy to understand for average people like you and me. Less heralded, but telling an example is Jetpac, a San Francisco-based app launch. The company takes all publicly available Instagram photos and analyzes them up to pixels, as well as all tags and location data, to create automatic city guides based on what it's been able to learn. Jetpac algorithms can look at, say, the bottom half of any face they discover in photos, and if a lot of painted lips come out of one location, it can be classified as a glamorous bar or nightclub. If there seems to be a lot of mustaches, you could call yourself a hipster bar. Jetpac can draw the conclusions of photographers and their family names, and can distinguish between locals and tourists by seeing how often they check into a place in a particular city. It can even discern the difference between leisure and business travellers by Photos. As intriguing as an app like Jetpac is, the future outside of it looks something like Google's self-driving car. While still many years away from commercial production, Google's car is a good showcase for machines that take real-time data from our physical environment and map it to what's already stored in the machine. Instead of waiting for us to come up with it, he makes intelligent decisions. Eventually, Google will take what it learned from its automotive project and apply it to other information it knows about us - data flows from our Android phones, Nest devices and Google Glass - creating a hybrid human-machine experience. This leads to many moral and sociological questions: What will happen to serendipity and the joy of discovery? If we as people are fighting Google Glass, how are we going to fit into this society? As Transcendence asks, is it all really worth it? That's one question that people, not the machine, will have to solve. The work is carried out using force at a distance. These six simple machines generate greater output force than the input force; the ratio of these forces is the mechanical advantage of the machine. All six simple machines listed here have been used for thousands of years, and the physics behind several have been quantified by the Greek philosopher Archimedes (ca. 287–212 BCE). When combined, these machines can be used together to create an even greater mechanical advantage, as in the case of bicycles. A lever is a simple machine consisting of a rigid object (often some kind of tape) and a fulcrum (or pivot). Applying force to one end of a rigid object causes it to spin about the fulcrum, causing force to increase at the other time along the rigid object. There are three classes of levers, depending on where the input force, exit force and fulcrum are in relation to each other. The earliest lever was in use as a balance scale until 5000 BC. Archimedes is credited with saying, Give me a place to stand and I'll move the ground. Baseball bats, seesaws, points and levers are all kinds of levers. The wheel is a circular device that is attached to a rigid bar in its center. The force applied to the wheel causes the axle to rotate, which can be used to increase force (by, for example, having a rope wind around the axle). Alternatively, the force applied to ensure rotation on the axle turns into a wheel rotation. It can be viewed as a type of lever that revolves around the central fulcrum. The earliest known combination of wheels and axles was a toy model of a four-wheeled trolley made in Mesopotamia around 3500 BC. Ferris wheels, tires and rollers are examples of wheels and axles. The tilted flat plane surface is placed at an angle to another surface. This results in the same amount of work applying force over a longer distance. Most tilted planes is a ramp; this requires less force to move the ramp to a higher altitude than to climb to that height vertically. No one invented the tilted plane since it occurs naturally in nature, but people have used ramps to build large buildings (monumental architecture) as early as 10,000-8,500 BC. Archimedes' On Plane Equilibrium describes the centers of gravity for different geometric plane figures. The wedge is often considered a double-tilted plane — both sides are prone — that moves to exert force along the lengths of the sides. The force is perpendicular to the tilted surfaces, so it pushes two objects (or parts of one object) separately. Axes, knives and chisels are wedges. The common door wedge uses force on surfaces to provide friction rather than separate things, but it is still basically a wedge. Wedge is the oldest simple machine, made by our ancestors Homo erectus for at least another 1.2 million years to make stone tools. A screw is an axle that has a tilting groove along its surface. Rotating the screw (by applying torque), the force is applied perpendicular to the groove, thereby turning the rotational force into linear. It is often used to fasten objects together (as a hardware screw and screw does). Babylonians in Mesopotamia developed a screw in the 7th century. This machine will later be known as the Archimedes screw. A colossus is a wheel with a groove along the edge, where a rope or cable can be placed. It uses the principle of applying force over a greater distance, as well as tension in a rope or cable, to reduce the size of the required force. Complex systems of gouania can be used to greatly reduce the force that must be applied initially to move the object. Simple crushing was used by the Babylonians in the 7th first complex (with several wheels) invented by the Greeks around 400 BC. Archimedes has perfected existing technology, making the first fully realized block and tackling it. The first use of the word machine (machina) in Greek was used by the old Greek poet Homer in the 8th century. Greek playwright Aeschylus (523–426 BCE) is credited with using the word in relation to theatre machines such as deus ex machina or the god of the machine. This machine was a crane that brought actors playing gods on stage. Bautista Paz, Emilio, et al. A brief illustrated history of machines and mechanisms. Dordrecht, Germany: Springer, 2010 Print.Ceccarelli, Marco. Contributes archimedes to mechanics and design mechanisms. Machine Mechanism and Theory 72 (2014): 86-93. Print.Chondros, Thomas G. Archimedes' life's work and machines. Mechanism and machine 45.11 (2010): 1766–75. Print.PIsano, Raffaele and Danilo Capecchi. Archimedes roots in Torricelli's mechanics. The genius of archimedes: 23 centuries of influence on mathematics, science and engineering. Eds. Paipetis, Stephans A. and Marco Ceccarelli. 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