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Research Paper

Is the Human Body Different from a Machine?

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ABSTRACT

You must have heard people comparing the human body to a machine! True, it has common features, and its operation closely resembles that of a machine. But does it differ from a machine?

This paper examines this aspect.

Humans do have all the characteristics of a machine, but they possess many more constituents that a machine.

We shall discover that humans are far superior to machines many respects including empathy, emotional intelligence, creativity, and moral judgment.

Keywords: *Human Body, Machine, Similarity Between Machine and Human Body, Difference between human body and a machine*

Our human body is a wonderful machine!! We have still not uncovered all its mysteries!!!

Its operations are so intriguing that we try to emulate them by developing ***Robots.*** Today, robots can perform all the mechanical functions that the human body does. Not only that, but we are instilling programming in them to emulate human emotions in a situation. It can be made to cry when rebuked, can be made to laugh at a joke, can be made to make a grim face on hearing sad news and so on…

Human robots are, indeed, machines, but are human bodies also machines? This is a question for which we shall be seeking an answer in this paper.

Let us first understand what machines are and why the thought arose that the human body could be a machine.

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What is a machine?

A machine eases human effort and is used in all spheres of human life. When we visualise a machine, we think of an automatic working system that works speedily, at least faster than human manual capacity.

An apt definition of a machine is provided below:

> *"A machine is a device that augments or replaces human or animal effort to accomplish physical tasks. It can transform chemical, thermal, electrical, or nuclear energy into mechanical energy, or simply modify and transmit forces and motions."*
> *(Source: https://www.britannica.com/technology/machine)*

If you visualise a machine, it seems to have the following parts:

- A structural frame or body,
- A switchboard or a processing unit—the brain of the machine
- Wiring or the motherboard, which connects different parts of the machine
- Electricity or some form of energy which flows through the wiring or motherboard and makes the parts function
- Output display unit

It works as per the command given by humans. It needs fuel or energy to function and has to undergo routine maintenance. It meets occasional breakdowns and needs repairs, and a time comes when it is irreparable and has to be discarded.

Putting the above facts in a proper perspective, we can say that all machines have a control unit, which converts input into output. To do this, it uses energy and a fuel delivery system to convert the energy into desired outputs; e.g., a car uses petrol and electricity to set the car into motion. A machine needs a Skeletal System, i.e., a frame and moving parts. A machine also needs a communication network that enables it to perform the desired actions and includes built-in safety systems. All constituents in the machine get coordinated through a built-in programme so that it performs flawlessly. Examples of machines include simple devices such as the inclined plane, lever, wedge, wheel and axle, pulley, and screw, as well as complex mechanical systems such as the modern automobile. Certain machines, like waterwheels and windmills, receive energy from natural sources, while others use fuel or electricity to work.

If you think and visualise whether our body also has the above features of a machine, you will be startled to find that it does!! The human brain is the processing unit, food the fuel, body the frame and so on….
But is the human body a machine?

Is the human body a machine?

Dr Anuradha Kumawat[1] finds a lot of similarities between a machine and the human body:

> *Just like any advanced machine, the human body is made up of many systems, and each system has a specific role. What makes it amazing is that none of these systems works alone—they constantly communicate and cooperate to keep us alive, active, and healthy.*

Let's understand how the human body works like a perfectly coordinated machine.

1. Muscular & Skeletal System: Structure and Movement

A machine needs a frame and moving parts. It has a skeleton = strong framework, muscle motors that create movement, and muscles work only when the brain sends signals. Bones provide support.

Lifting your hand may feel simple, but it involves the brain, nerves, muscles, bones, and blood all working together.

2. The Brain: The Control Centre

The brain: It sends signals to all body parts, controls thinking, emotions, and memory, and regulates breathing, heartbeat, and movement. Every machine needs a control unit. In the human body, that role is played by the brain.

The brain works closely with the nervous system, which acts like electrical wiring, carrying messages throughout the body in milliseconds.

Without the brain, the body would be like a machine with no control unit, software or motherboard.

3. The Heart & Circulatory System: The Transport Network

Just like machines need fuel delivery systems, our bodies need a way to transport Oxygen, nutrients, and hormones. This is done by the circulatory system. The heart works as a powerful pump, pushing blood through Arteries, Veins, and Capillaries. Blood carries oxygen from the lungs and nutrients from food to every cell. At the same time, it removes waste like carbon dioxide.

If this system stops even for a few minutes, the entire machine shuts down.

4. The Respiratory System: Oxygen Supplier

No machine can run without energy, and our cells need oxygen to produce energy. The respiratory system allows us to breathe, supplies oxygen to the blood, and removes carbon dioxide.

Lungs work together with the heart. Lungs oxygenate the blood; the heart circulates it to the body. This teamwork keeps every cell powered.

5. The Digestive System: Fuel Processing Unit

Food is the raw material, but the body can't use it directly. The digestive system breaks food into nutrients, absorbs vitamins, minerals, and glucose and sends nutrients into the bloodstream. The energy produced from food is then used by muscles for movement.

Just like petrol must be refined before use, food must be digested before the body can use it.

6. The Nervous System: Communication Network

This system is like high-speed internet inside your body.

It sends messages from the brain to the body, receives information from eyes, ears, skin and reacts instantly to danger (reflexes)

Example:

Touch something hot → nerves send signal → brain reacts → hand pulls back instantly.

No delay, no confusion—pure efficiency.

7. The Immune System: Security System

Every advanced machine needs protection.

The immune system detects harmful bacteria and viruses, fights infections, and remembers past diseases. White blood cells act like soldiers, protecting the body from internal threats.
Without this system, even a small infection could shut down the machine.

8. How All Systems Work Together

The real magic is not in individual systems—but in their coordination.
For example, during exercise, the brain decides to move, the muscles contract, the heart beats faster, the lungs take in more oxygen, the digestive system supplies energy, and blood carries nutrients! All of this happens automatically.
That's why the human body is considered the most advanced machine ever created.
The human body is not just a collection of organs—it is a perfectly synchronised machine. Each system depends on others, and even a small imbalance can affect the whole body.

Indeed, there are many similarities between the human body and a machine. The human body is supported by a frame, i.e., its skeleton, just like a machine has a frame. The human body is governed by the brain as a machine is governed by its control panel or processor. Like a machine, the body has many parts (organs, tissues, cells) that work together to perform specific functions. Each part has a role, similar to machine components working in harmony. The body uses systems (nervous, circulatory, digestive, etc.) to coordinate actions, just as machines use control systems. Processes like heartbeat, breathing, and movement are regulated precisely, similar to how machines are programmed. The body can heal itself and maintain balance (homeostasis), much like machines need maintenance and repairs to function well. The body converts food into energy to power activities, similar to how machines use fuel or electricity. The body is highly efficient in using resources and adapting to changes, just like a well-designed machine.

The comparison highlights how the human body is organised, coordinated, and efficient, with different parts working together to keep us alive and healthy, much like the parts of a finely tuned machine.

The human body perishes and is disposed of as does an irreparable machine.
The striking similarities prompt a belief that the human body is nothing but a complex machine. Randolph Nesse[2] posits that the greatest advancement in the history of medicine was recognition that bodies are not products of supernatural creation; they are machines assembled entirely from material substances:

> *The bones and muscles are just fancy systems of levers, ropes and pulleys. Nothing mysterious, just things. It was the French philosopher René Descartes (1600AD) who argued to replace vitalism with scientific materialism and attempted to convince the world that the body is a machine. He got into plenty of trouble for proposing the radical concept of the body as a machine.*

René Descartes

> *As the industrial revolution transformed society, the metaphor of body as machine became increasingly influential. By the start of the 20th century, the idea dominated thinking in biology and medicine, probably because it was so useful. It has improved our lives by encouraging detailed analysis of the body's mechanisms at all levels, from the details of anatomy to understanding how hormones like insulin regulate chemicals like glucose. It encouraged reductionism, the idea that everything large could be explained by analysis of smaller things. We are now down to genes, molecules, and atomic forces. What an extraordinary bounty we have reaped from a metaphor! The metaphor of the body as a machine provided a ladder that allowed biology to bring phenomena up from a dark pit of mysterious forces into the light, where organic mechanisms can be analysed as if they were machines.*

Thus, we see that it is not now that we got an idea that the body is a machine, but it has been lingering in the minds of thinkers for quite some time, and this thinking provided a ladder for biology to bloom into light and culminate in the analysis of this machine to genes, molecules and atomic forces.

Antonio Parente Jr.[3] adds a new dimension to the thought by adding that as the machine functions best at its design point, so does the human machine!!:

> *At 30 thousand feet and 900 km/h, the aeroplane is in the cruise phase, every engine part — compressor, combustion chamber, turbine — is working at its best. It is a beautiful symphony.*
>
> *In engineering jargon, we say the engine, when in cruise, is operating at its* ***design point*** *— a set of conditions where a machine delivers* ***optimum performance****.*
> *The human body also has a design point when it operates optimally under the following conditions:*
>
> - *Scarce food*
> - *A diet comprised of what could be hunted or gathered*

- *Long walks (in search of food)*
- *Short bursts (to* not become *food)*

> *This, to keep our analogy, is our cruise condition — our design point.*
> *I can choose to operate **far from my design point**, having ice cream and doughnuts while binge-watching series after series after series. This will, as you now know, result in poor machine performance. Disease, obesity, lack of energy, you name it. This is **surviving**.*
> *Or…*
> *I can choose to operate **close to my body's design point**, exercising daily and eating adequate quantities of stuff like broccoli, sweet potatoes, and eggs. What will I get? A healthy, lean, energised body. This is **thriving**.*
> *Now, it's up to you. Choose.*
> *But remember: a machine delivers optimum performance when operating at its design point.*

So, the human body is a machine that works optimally at its design point. The body can only survive when it operates far from the design point, but it thrives at its best when it operates at the design point, as is the case with a giant machine, the aeroplane.

The human body is, indeed, a machine because it operates very much like a complex, "fine-tuned" machine in several key ways: (quora.com[4])

- ***Energy Consumption:** Much like an engine burning fuel, the body digests and converts food into energy to power your cells.*
- ***System Coordination:** Internal organs, tissues, and cells work in harmony. The central nervous system serves as the wiring and control network, while the brain acts as the central processor or controller.*
- ***Automatic Regulation:** Functions like breathing, heart rate, and temperature are managed automatically by control systems like the autonomic nervous system.*

These are the mechanical parallels with a machine that lead us to think that the human body is also a machine.

Rajesh Bilotia[5] agrees that the human machine is a machine by giving the following submission:

> *The human body is a very complicated machine, or can we say it is a biological autonomous system that depends upon N numbers of parameters. It is a fully controlled machine which consist of many sub systems like input system (senses), output system, processor (Brain), memory, energy production system (digestion system+ respiratory system), hardware system (musculoskeletal system), signal transmission system (central nerves system), it has additional feature of reproduction system It has excellent ability to process and calibrate the input data and stored data through what is known as 'Thinking process'.*

Maintenance of a machine leads to a longer working life, and the same is true for the human body. Hamid Al-nazzar[6] expands this point:

> *In many cases, one can identify or find something similar between our bodies and machines. One of these situations is maintenance. By doing regular Preventive and Predictive maintenance according to a predefined plan, the system's life length will be prolonged. In the same way, if one does daily physical exercises and eats wholesome food, one can keep his/her body healthy and prolonging his/her life.*

The similarity between a machine and a body does not end only with maintenance for the two; both fall sick and get repaired with proper treatment, and once they reach an irreparable stage, both meet their death and get scrapped!!!

Taking the topic further, Nathalia ITS[7] not only finds a lot of similarities between a machine and the human body, but he also goes on to highlight some aspects which make the human body different from a machine:

> *Technology's blurring boundaries between biology and engineering, and now scientists and philosophers alike are re-examining one fundamental question: why is the human body compared to a fine-tuned machine?*
>
> *Is the human body essentially an organic machine, and what really separates biological intelligence from artificial intelligence?*
>
> *At first glance, brains and computers appear analogous; both convert energy, relay signals, and solve intricate problems. But beneath this mechanical veneer is an unbridgeable chasm: the human mind's alchemy of memory, intuition, and lived experience.*
>
> *With the latest technological progressions, affective computing could very well simulate empathy. Even if it's lacking sincerity, what it still cannot do is truly* feel *the sting of regret or the spark of inspiration that made humans bend reality.*
> *Such disparity between humans and machines is not technical; it's ontological.*
>
> *Both systems rely on complex, synchronized processes to perform tasks, whether firing neurons or moving mechanical parts. From weightlifting to computing, humans and machines show striking similarities. Just like machines, our bodies run on energy, store data, and execute functions through electrical signals.*
>
> *Our machines grow smarter, yet their consciousness will forever remain a ghost in the circuitry. With a poverty of viewing life as mere code, through the lenses of a machine.*
>
> *The similarities between humans and machines are undeniable, and we find ourselves asking: Are we really that different?*
>
> *While there are big similarities, the difference between humans and machines is in our ability to sense and think for ourselves. Whereas machines can*

> *calculate and work in accordance with order, emotions are something they lack, despite scientists' trials to embed human sense in them.*

The above paper opens newer horizons to the debate by putting forth a view that the human body is not mere machine but something beyond. I tend to believe this because, unlike machines, humans can think and emote.

The next section of the paper will elaborate on how the human body is much more than a machine:

How human body is much more than a machine

In view of the facts presented in the paper so far, one cannot deny that there are many similarities between the human body and a machine. Still, there are many characteristics possessed by the human body that are absent in machines.

Firstly, humans can think and emote on their own, whereas a machine is programmed to think and its horizon is limited. Humans have consciousness, have original thoughts, emotions, self-awareness, and free will, whereas the machines operate predictably based on pre-set rules and algorithms, lacking consciousness. The machines do not have the capacity to reproduce, whereas humans are biological entities which reproduce. Furthermore, the human body actively maintains and heals itself by regenerating cells and fighting off diseases, but machines cannot heal themselves; these require repairs by humans using external parts and maintenance to get restored to normalcy when these get a breakdown.

Radolph Nesse[2] posits some thoughts as to how humans are different from machines:

> *The body is not a machine. Machines are products of design, bodies are products of natural selection, and that makes them different in fundamental ways. The organic complexity of bodily mechanisms is qualitatively different from the mechanical complexities of machines. Machines have discrete parts with specific functions connected to each other in straightforward ways. Bodies have parts that may have blurry boundaries and many functions, and the parts are often connected in ways hard for human minds to fathom.*

S Prabhat[8] adds more differences between the human body and the machine:

> *Everyone knows that humans and machines are different.*
> *A machine is only a device consisting of different parts, and is used for performing different functions. They do not have life force, as they are mechanical. On the other hand, humans are made of flesh and blood and life is the driving force for their bodies.*
>
> *Humans have feelings and emotions, and they can express these emotions; happiness and sorrow are part of one's life. On the other hand, machines have no feelings or emotions. They just work as per the details fed into their mechanical brain. Humans can understand situations and behave accordingly. On the contrary, Machines do not have this capability.*
>
> *While humans behave according to their consciousness, machines perform as they are taught. Humans perform activities according to their own intelligence.*

> *On the contrary, machines only have artificial intelligence. It is a man-made intelligence that the machines have. The brilliance of the intelligence of a machine depends on the intelligence of the humans who created it.*
>
> *Another striking difference that can be seen is that humans can do anything original, and machines cannot. Machines have limitations to their performance because they need humans to guide them.*
>
> *Though machines are very sophisticated, they cannot perform anything original. Machines do not have original thoughts. Another thing that has to be noted is that machines are not superior to humans.*

Thus, we see that humans can do everything that a machine can do, but the machine is incapable of doing many things which humans can do!! This fact makes humans superior to machines.

One of the most important things that makes humans superior is the life force or the consciousness that humans have. Human consciousness—the capacity for subjective experience, self-awareness, and emotion—is what fundamentally separates us from machines. Humans don't just calculate; we *feel* the world through the consciousness that we have. Consciousness makes us experience the warmth of sunlight, the sting of pain, or the joy of a memory. Machines calculate and process sensory inputs and generate responses based on programming, but they do not experience the qualitative nature of those inputs.

Consciousness makes humans capable of intrinsic motivation, irrational desires, and free will. We can separate ourselves from our thoughts and override our programming, whereas machines operate strictly according to their code, and consciousness has no relevance to them.

Summarising we can say that human body is indeed a superior machine which has all the characteristics of a machine but has many more characteristics which a machine does not possess.

The differences between a machine and human body is well brought out in the following comparative table:

Machine	***Human Body***
Products of design-humanly made	Naturally evolved
Not capable of reproduction	Can reproduce
Needs external repairs even for minor breakdowns	Can self-heal minor ailments
Unable to think on its own, works on alogarithms and does not have free will	Can think independently and act of its own free will
Don’t have emotions	Humans emote
Has discrete parts	Has overlapping parts
One function per part	Multiple functions per part
No adaptability—The machines operate solely within their pre-set designs and constraints and cannot adapt to a new environment	Humans learn, create, and adapt to new environments.
Are mechanical and have no life force	Has vitality due to the life force in it

The machines can do what they are told to, and they lack originality.	Humans have originality, can innovate and can do new things.
Machines behave as they are taught to do.	Humans behave according to their consciousness
Machines work as per artificial intelligence	Humans perform activities as per their own intelligence
Understands only the algorithm fed to it and works as per it	Can understand situations and behave accordingly
Activation happens through an energy source e.g., electricity	Activation happens through consciousness

We have covered almost all the aspects that go on to prove that the human body is certainly different from machines; it will be more apt to say that the body is much more than a machine. Machines have their role to play for humans, i.e., making their lives easier, but they have simply no comparison with humans.

One last comment—the end of the human body, its death, is shrouded in mystery—is it really the end when the physical body stops functioning, or is there an afterlife? No one knows, but the end of the machine has no such stigma attached to it!!!! The human spirit prevails over technology!!!!!

I conclude the paper with a remark:
"Humans are far superior to machines in their capacity for empathy, emotional intelligence, creativity, and moral judgment. While machines excel at processing data and executing repetitive tasks, only humans possess the authentic consciousness and wisdom to truly understand the context and purpose behind their actions truly. No algorithm can duplicate our emotional intelligence, the very trait that makes us indispensable in life and work."
Remember, humans are more valuable than the smartest machines. And they always will be!!!.....

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