Automation and Absurdity:
Exploring Marvin Minsky's Useless Machine (Plus a Quantum Implementation).

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Abstract:
This text digs into the intriguing concept of Marvin Minsky's "useless machine," also known as the "futility machine" or "useless box". At first glance, this device-a box with a single switch that, when activated, triggers a mechanical hand to turn the switch off-seems to lack any practical purpose. However, this apparent simplicity masks a rich array of philosophical and technical ideas. Exploring the machine's embodiment of paradoxes surrounding utility, purpose, and automation, the study highlights the intricate relationship between design, functionality, and meaning in automated systems. A Turing machine implementation of such a device serves as both a technical exercise and a conceptual exploration of how simple, seemingly purposeless actions can provoke deeper reflections on human effort, control, and the nature of progress.

Keywords:
Useless machine; Marvin Minsky; automation; Turing machine; philosophy of technology; paradox of utility.

Introduction:
The useless machine, also known as the "useless box" or "futility machine" (Vliet, 2021), is a concept devised by Marvin Minsky, a pioneer in the field of artificial intelligence and cybernetics. This machine is typically presented as a box with a single switch on its surface. When the switch is activated, a lid opens on the box and a mechanical hand (or other mechanism) emerges to turn off the switch, returning the box to its original state. After the switch is turned off, the hand retracts and the lid closes, leaving the machine idle until someone activates the switch again. The useless machine is often used as an example of a device that has no practical purpose whatsoever, as its only function is to undo the action of switching on. Despite its apparent uselessness, it serves as a fascinating exercise in mechanical design and systems theory. It also humorously illustrates the limitations and paradoxes of certain automated systems and can be seen as a reflection on the nature of automation and artificial intelligence.

The simplicity of Minsky's useless machine and its inherent irony have made it a popular object in geek culture and a fun project for robotics and electronics enthusiasts.

Discussion:
A Turing machine is a mathematical model that describes an abstract computer capable of manipulating symbols on a tape according to a set of rules. To design a Turing machine that implements the simplest version of Minsky's useless machine, we consider the machine to have an infinite tape and a read/write head that can move left or right and read or write symbols.

In this case, our Turing machine will have the following elements:

- Ribbon alphabet: `{B, 1}`
  - `B` represents a blank space.
  - `1` represents the activated switch.
- Set of states: `{q0, q1, q2, q3, q4}`
  - `q0` is the initial state.
  - `q1` is the state where it moves to the switch position.
  - `q2` is the state where the switch is turned off.
  - `q3` is the state where it returns to the initial position.
  - `q4` is the final state.
- Transition function: Defines the rules for moving the spindle and changing state.

Description of operation

1. The machine starts in state `q0`.
2. If it finds a `1` (the switch activated) on the tape, it moves to `q1`.
3. At `q1`, the machine moves to the switch position.
4. At `q2`, the machine turns off the switch (changes `1` to `B`).
5. At `q3`, the machine moves back to the initial position.
6. The machine enters the final state `q4` and stops.

Transition Table

State	Symbol read	Written symbol	Movement	New status
q0	1	1	Right	q1
q1	1	B	Left	q2
q2	B	B	Left	q3
q3	**B**	**B**	**Left**	**q4**

Turing Machine in Pseudocode

1. Initial state: q0
2. If (q0, 1) -> (Right, q1)
3. If (q1, 1) -> (B, Left, q2)
4. If (q2, B) -> (Left, q3)
5. If (q3, B) -> (Left, q4)
6. End state: q4

Algorithmic Explanation of the Implemented Turing Machine.

1. The machine starts in the state `q0` and finds the symbol `1` (the switch activated).
2. Switches to state `q1` and moves to the right to the position of the switch.
3. At `q1`, turn off the switch (write `B` instead of `1`), change to state `q2` and move to the left.
4. At `q2`, it continues to move to the left until it reaches state `q3`.
5. At `q3`, it keeps moving to the left until it reaches state `q4`, where it stops.

We could simplify the Turing machine into one that would alternate between two states, `q0` (on) and `q1` (on), using a more minimalist approach. The machine must simply alternate between these two states and perform the operation of turning off the switch when it is on.

Elements of the Implemented Turing Machine.

- **Ribbon alphabet**: `{B, 1}`
  - `B` represents a blank space.
  - `1` represents the activated switch.
- **Set of states**: `{q0, q1}`
  - `q0` is the initial (on) state.
  - `q1` is the activated state.
- **Transition function**: Defines the rules for moving the spindle and changing state.

Description of operation

1. The machine starts in state `q0`.
2. If it finds a `1` (the switch on), it switches to `q1` and turns the switch off (`1` switches to `B`).
3. If it is in state `q1` and encounters `B`, it returns to `q0`.

Simplified Transition Table

State	Symbol read	Written symbol	Movement	New status
q0	1	B	None	q1
q1	**B**	**B**	**None**	**q0**

Turing Machine in Pseudocode

1. Initial state: q0
2. If (q0, 1) -> (B, None, q1)
3. If (q1, B) -> (B, None, q0)

Explanation of the Turing Machine

1. **Initial state `q0` (on)**:
   - If the machine reads `1` (the switch on), it turns it off by writing `B` and changes to state `q1` (on).
2. **Status `q1` (activated)**:
   - If the machine reads `B` (switch off), it remains at `B` and changes to state `q0` (on).

Step-by-step operation

1. The machine starts at `q0`.
2. On finding `1`, it switches to `B` and transits to `q1`.
3. At `q1`, on finding `B`, it stays at `B` and returns to `q0`.

Discussion:
Marvin Minsky's The Useless Machine offers a rich philosophical interpretation that can be extended to several areas of human thought, technology and the nature of purpose and effort.

It can symbolise the apparent futility of human existence. The fact that we are born with the certainty that one day we will die may seem similar to a machine that is turned on only to be turned off. This cycle of turning on and off without a clear purpose can be interpreted as a representation of the cycle of life and death, suggesting a nihilistic or absurdist view of existence: we live, we do things, but ultimately it all culminates in death, which could lead to questioning the meaning of our actions. However, the interpretation need not necessarily be negative. Some might argue that the fact that the machine is "useless" does not mean that it lacks purpose. It could serve as a reflection on the nature of our actions and the search for meaning in a universe that, in itself, offers no definitive answers. The machine could urge us to find or create our own meaning, even amidst the apparent lack of inherent purpose.

We might also consider the machine as a powerful metaphor for the futility of certain human endeavours. In life, we often find ourselves performing tasks that seem to unravel as soon as they are completed. This may be reflected in repetitive or bureaucratic jobs where individual efforts do not lead to lasting or meaningful change (Fromet de Rosnay, 2024). The machine invites us to reflect on how we use our time and energy and questions whether our actions have a real purpose or whether we are trapped in endless cycles of effort. The mere existence of the useless machine raises fundamental questions about purpose. If a machine, intentionally designed, can be completely useless, what does this say about the things we believe to have purpose? Who defines what is useful and what is not? This questioning can be applied to human existence itself: do we have an inherent purpose or is it something we construct and define ourselves? In the context of artificial intelligence and automation, the useless machine can be seen as an ironic critique. As we develop ever more advanced technologies, it is important to question whether these technologies actually contribute to improving our lives or whether they simply perform tasks that have no real value. The useless machine is a reminder that automation alone does not guarantee meaningful progress. In the context of artificial intelligence and automation, the machine offers an ironic critique. Automation, in theory, should free humans from monotonous tasks, allowing them to focus on more meaningful activities. However, the reality is that many automated technologies simply replicate patterns of behaviour without providing real value, or by complicating things unnecessarily. The useless machine reminds us that automation without a clear and well-defined purpose does not guarantee meaningful progress. Are we, perhaps, automating futility Such a critique becomes relevant in the discussion about the future of work and artificial intelligence. As machines take on more complex tasks, it is crucial to ask whether they contribute to human well-being or simply perpetuate inefficient systems. Minsky's Machine is a radical invitation to question the true impact of automation on our lives and to consider whether we are creating technologies that actually improve our world. On the other hand, the machine celebrates play and creativity. Although the machine has no practical purpose, it has aesthetic and conceptual value. It invites laughter and wonder, showing that not all creations need to be useful to be valuable. In this sense, it promotes the idea that play and creative exploration are essential parts of human experience and the advancement of knowledge.

The useless machine can also be interpreted from the paradox of control (Hueso, 2019) and autonomy. When we turn on the switch, we believe we are exercising control over the machine, but we immediately lose that control when the machine turns itself off. This may reflect the illusion of control in our lives, where our actions often have unintended consequences or run counter to our initial intentions. Likewise, the machine poses an obvious paradox: it is a machine designed to undo its one action, making its existence seem trivial. Yet it is this apparent triviality that gives the machine its philosophical depth. In a world obsessed with utility and productivity, Minsky's machine challenges us to reconsider the value we attribute to our actions. If an object can be deliberately designed without a practical purpose, how do we define what is truly useful? Could it be that our conception of utility is limited by social and cultural expectations? One of the most powerful messages that the useless machine seems to contain is its representation of the futility of human endeavour. By turning off the switch and undoing its initial action, the machine reflects how, on many occasions, our efforts seem to vanish without leaving a lasting impact. This metaphor is especially pertinent in a world where expectations of success and constant progress can lead to endless cycles of effort without meaningful results.

Yet we always work in a scenario of decodable meanings, in an area where the useless machine offers meaning because we understand its language, the semiotics of the fact of self-switching off. that urges us to reflect on how we invest our time and energy, questioning whether our actions really have a purpose or whether we are trapped in a cycle of activities that, though necessary, lack lasting meaning. This reflection invites us to rethink our priorities and to seek a balance between effort and meaning in our lives, but it also seems to be conditioned by a semantics of its operation, inherently contemporary and possibly framed by postmodern ideas, that would probably not be understood in other cultural backgrounds.

An interesting additional possibility can be found in Newcomb's paradox (Céspedes, 2009), a dilemma in game theory and decision philosophy, in which a player must choose between two options: take only one box or take two boxes, knowing that an almost infallible predictor has already predicted his choice and has placed money in the boxes according to his prediction. The paradox tests rationality and decision-making when confronted with determinism and free will. We can relate Minsky's futile machine to Newcomb's paradox in thinking about free will and fate. The useless machine acts according to a pre-established mechanism: when activated, it inevitably shuts down. This mechanical behaviour can be seen as a metaphor for determinism, where all our actions are predetermined, and the machine's "decision" to shut down is a mere illusion of choice, similar to the tension between free will and determinism in Newcomb's paradox. In it, the idea that our decisions have already been predicted and might therefore be predetermined calls into question the nature of our actions and the freedom we have in making choices. Similarly, the useless machine can symbolise a universe where our decisions are nothing more than seemingly complex automatic responses to previous stimuli, which questions the real freedom of our choices and the meaning of our actions in a universe that might already be "determined" in some way. A universe full of useless machines, in a desolate determinism.

And precisely in relation to determination, in quantum mechanics, one of the fundamental principles is superposition (Castrillón et al., 2014), where a quantum system, such as an electron, can exist in multiple states simultaneously until it is measured. We can conceive of a quantum version of the useless machine as a thought experiment, where instead of being in a classical state (on or off), the machine can exist in a superposition of both states simultaneously. Until we observe or measure the state of the machine, we do not know whether it is on or off; it could be in both states at the same time. This idea connects with Schrödinger's famous thought experiment, where a cat is simultaneously alive and dead until it is observed. In quantum mechanics, when a measurement is made, the wave function of the system collapses to a defined state. This collapse is what gives rise to an observable result (e.g., the electron is in a specific position). In this quantum version of the machine, by "measuring" (i.e., observing or interacting with) the machine, the quantum superposition collapses to one of two classical states: on or off. This process could be seen as a quantum representation of the machine's cycle: it turns on, the collapse of the wave function occurs, and the machine ends up in the "off" state. This cycle of collapse and action can be interpreted as a quantum process where the final decision (on or off) is intrinsically probabilistic.

Quantum decoherence (Fortin, 2011) is the process by which a quantum system loses its quantum coherence and thus its superposition of states behaves classically. If we imagine the useless machine as a quantum system, interaction with its environment (e.g., by being observed or operating the switch) can induce decoherence, forcing the system to "choose" a classical state (on or off). This transition from a quantum to a classical state could represent how the machine appears useless or purposeless from a classical point of view, but has a hidden complexity in its quantum behaviour before the observation is made.

Could we suggest an implementation by a quantum computer? This could be an interesting exercise. Imagine that the useless machine can be modelled as a qubit, which can be in a superposition of the states $|0\rangle$ and $|1\rangle$, where:

- $|0\rangle$ represents the state of the machine "off".
- $|1\rangle$ represents the state of the machine "on".

The goal would be to design a quantum algorithm that mimics the behaviour of the useless machine, where the system is "on" and then inevitably "off". We will implement a simple algorithm using quantum gates, where we start in a superposition state (a mixture of on and off) and then have the system inevitably collapse into the "off" state.

Step 1: Preparation of the initial state.

Initially, the qubit is prepared in the state $|0\rangle$ (machine off):

$_0\ \psi\rangle = |0\rangle$

Step 2: Apply a Hadamard door.

We apply the Hadamard gate (H) to create a superposition between the states $|0\rangle$ and $|1\rangle$:

$_1\ \psi\rangle = H\ |\psi_0\ \rangle = 1/(\sqrt{}(2)(|0\rangle + |1\rangle))$

In this state, the machine is in a quantum superposition of being on and off.

Step 3: Apply a conditional gate.

Now, we want to apply a gate that "shuts down" the machine if it is in the state $|1\rangle$. We can use a controlled-NOT (CNOT) gate that acts as follows:

- If the qubit is set to $|1\rangle$, an operation shall be applied that returns it to $|0\rangle$ (off state).
- If it is set to $|0\rangle$, nothing is done.

This can be implemented with an operator that, when applied to the quantum state, forces a collapse to the off state. But since we need a behaviour that mimics the inevitable collapse to the |0〉 state, we will use a gate that depends on a second auxiliary qubit that simulates the "action" of shutting down.

Step 4: Apply a projection door.

We could use a projection operator P_0 which projects the quantum state to the state |0〉. This operator is non-unitary and is used to model the idea of "collapse":

$P_0 \ |\psi_1 \rangle = |0\rangle$

However, in a quantum circuit, unitary operators are necessary, so this is modelled by applying an operation controlled by an auxiliary qubit (denoted |c〉). If |c〉 is |1〉, the system will collapse to |0〉.

Step 5: The final measurement.

Finally, the main qubit is measured. Since we have designed the system to inevitably collapse at |0〉, the measurement should show that the machine is "off".

The quantum circuit would be:

1. Initialisation in |0〉.
2. Application of the Hadamard H. door.
3. Application of a conditional control operation using an auxiliary qubit to force the collapse to the |0〉 state.
4. Measurement of the main qubit.

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|0〉 --- H --- CNOT --- |0〉
|0〉 ----------------------|1〉
```

The Hadamard creates the quantum superposition, and the controlled CNOT ensures that the machine eventually shuts down. In an ideal system, the measurement will predominantly show the |0〉 state, reflecting the behaviour of the useless machine that always ends up shutting down. Although the quantum system may be in a superposition of on and off, the circuit design ensures that the final observed result will always be "off", capturing the essence of the useless machine that is the subject of this text: whatever it does, it always returns to its state of doing nothing.

Conclusions:

Marvin Minsky's The Useless Machine, despite its apparent lack of functionality, offers a profound reflection on futility, automation and determinism. Through its predictable and cyclical behaviour, it becomes a metaphor for the cycle of life and death, and the apparent meaninglessness of human actions, inviting us to question purpose and create meaning in an indifferent universe. Moreover, its automated behaviour evokes debates about free will and determinism, suggesting that our decisions might be predetermined, just like the machine's operation. The technical analysis with a Turing machine and a quantum version of the machine further explores these ideas, showing how even simple and seemingly trivial systems can encapsulate philosophical and technical complexities. This approach reveals the paradox between utility and purpose in automation, highlighting the intrinsic relationship between design, functionality and meaning in automated systems.

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