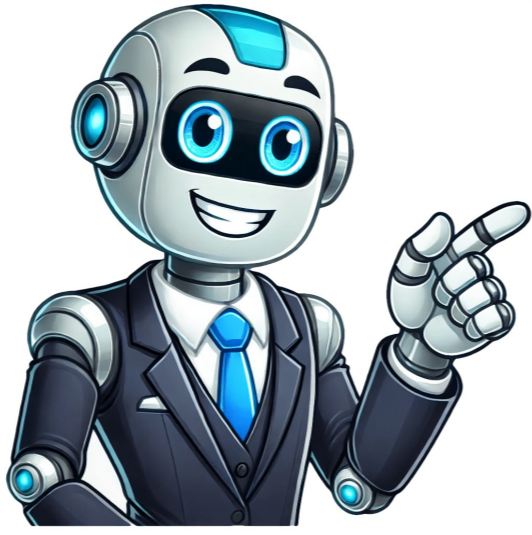


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intelligent and prevent fraud. By employing these detection techniques, they ensure that only genuine coins are accepted, providing a fair and reliable service to customers. Ever since the 19th century, vending machines have been bugging us with one question—can vending machines detect fake money? Perhaps as a kid, we all have tried answering that question by putting fake objects into the machine but were seldom successful in tricking it into believing that they were real money! A vending machine is anything but stupid—it can actually tell fake money from the real and reject it. As a child, we often wondered at the amazing quality of the machine to tell a one-dollar bill from a five-dollar one. Even more eerie was its ability to detect fake money and refuse to give us what we want until we fed it with the real one. But as we grow older, we realize that there is nothing uncanny about how a vending machine works, but there is just a simple yet effective technology behind it. A Brief History of Vending Machines Believe it or not, but Heron of Alexandria designed the first-ever vending machine in the 1st century AD. The machine was the product of his frustration with the churchgoers spending too much holy water! So, he designed a machine that would dispense the liquid only when a token tossed inside presses down a lever opening the spigot and stop the flow as soon as the token fall off the lever inevitably. However, the idea soon faded with the flow of time but eventually emerged again in the late 19th century in vending machines introduced in England to dispense postcards. Soon, New York introduced their gum-dispensing vending machines. And over time, vending machines established itself as the machine that could produce anything from a snack to a bus ticket! The modern generation vending machines are way too sophisticated than those invented years back or even those launched in the 19th century. However, they still operate on the same principle that Heron invented. All the machines require a person to put something in to get their desired item out. In the 1st century, it was just a token that changed to coins and paper money in the later centuries. Also, the vending machines of the 19th century required a person to put in the exact amount needed to purchase an item. Still, the currency-detecting vending machines of today's can read the money and return the change. Can vending Machines Detect Fake Money? Vending machines use optical scanning, light sensors and magnetic scanning to read money, identify bills and detect fake ones. There are tiny photocells that are programmed to look for patterns in the notes or coins to identify the authenticity and the exact value of the money. In coins, the vending machine concentrated on the physical attributes like the thickness, diameter and side ridges to identify its denomination using its optical sensors. Moreover, the machines are equipped with electromagnetic sensors to detect the metal that manufactured the coin. So, you cannot simply throw in any metal shaped like a coin to fool the machine into believing that it's real money! The introduction of the magnetic system in the vending machine also made it possible to accept bills. The notes are either printed in magnetic or fluorescent inks, both of which have iron in them. From the type of inks used in the money bills, the magnetic scanner of the vending machine identifies the type of the bill and checks the denomination from the iron in ink. However, many counterfeit notes began using magnetic ink to produce bills that the vending machine would read as real money. So, the vending machines had to become more sophisticated later to be more effective in detecting currency. Therefore, it began using an internal light to illuminate the bill that allowed a digital camera to scan it, looking for certain specific patterns unique to each note. The machine was also programmed to detect the infrared strip incorporated in the real bills but absent in counterfeits. The vending machines also use their ultraviolet light to look for the mylar woven into the bills above two dollars. The vending machines can also check the image and the magnetic ink to confirm that the note is made from the right papers used only in the authentic government mints. With so many pro-active technologies at work to identify real money, it is almost impossible to trick a vending machine now with a coin-shaped metal or even a fake note. Why do Vending Machines still Refuse your Money? A vending machine is sure to detect and throw fake money out of its system. But at times, it may so happen that the machine refuses to take your money even if it's not counterfeit in the least. It's truly wearisome when a vending machine rejects your money through no fault of yours. But then, it's just a machine programmed to 'read' the money and not just see it as a human cashier would. It means that the vending machine has a huge responsibility to put its high-tech equipment to use and detect your money. And many things may go wrong in the process. You may not be using fake money, but your note might be crumbled or dirty. In the case of crumbled bills, the specific pattern that makes it unique is distorted, and hence the vending machine cannot read and identify it as accurate. In the event of producing dirty bills repeatedly, the dirt gets accumulated on the validator of the vending machine. Hence, the photocells are prevented from scanning and reading the bills. Apart from these, two technical difficulties can force a vending machine to refuse your money. One is its worn-out belts and another insufficient change. A vending machine incorporates many small parts to operate effectively, including a belt that grips your bills and pulls them through. So, just like we get tired after hours of hard work, the belt gets worn out over tons of usage with time. And when that happens, the machine cannot accept your money. The vending machine will also refuse to accept your money if you insert a money bill for an amount that requires a change that the machine doesn't have. You will then have to insert the exact amount of the item you want to purchase if you wish the vending machine to respond. It can be frustrating at times, but at least the vending machine is honest enough not to steal from you! With the end of this article, you probably have your greatest query answered—can vending machines detect fake money? And the most obvious answer is that it definitely can! Also, we have the greatest mystery of the childhood predicament solved—how exactly does a vending machine read the money you put in and tell the fake one from the rest? It's a pretty simple but amazing work of technology. We also addressed a few other reasons that force a vending machine to refuse your money even when it's not a counterfeit. It's frustrating, but you might afford to forgive it because it's just a small machine with too many responsibilities and should be allowed to mess up once in a while!