

SIMPLE OPTICAL TOKEN ACCEPTOR

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The first coin acceptor was described in the first century, was completely mechanical and worked as part of a holy water selling machine.

Coin and token acceptance systems similar to modern ones originated in the mid-19th century and have been continuously evolving.

Today we meet different token acceptors everywhere in our life: in metro, vending machines, parcel terminals and etc. All of them have a complex system of optical, magnetic and weight sensors inside [1].

With their help it is possible to determine the type of received token/coin with an accuracy about 95% [2].

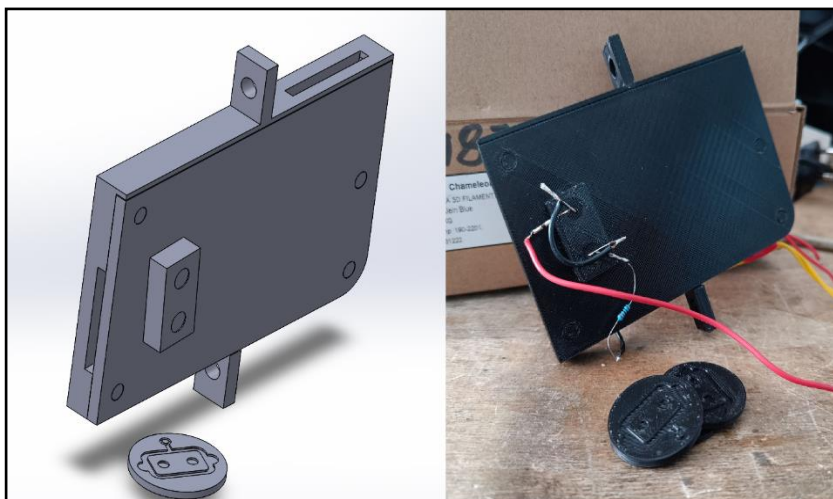


Figure 1 – 3D model of token acceptor and tokens (left) and finished prototype (right)

When I started to learn the information on topic of token acceptors, I became interested in how advanced can be a token acceptor that works

only on one optical sensor, without other types of token detectors. Of course, such token acceptor is not capable of determining the geometric and weight parameters of the token. This is the problem I have to solve. To begin with, I made a token acceptor case on a 3D printer and placed the optical sensor in it so high that not a single Belarusian coin could make it react when it got inside (Fig.1).

Sensor will work only with tokens more than 30 cm in diameter. In my case, the incoming signal is processed by the Arduino Uno board based on Atmega 328 processor.

When the sensor is blocked by a token, the board triggers an interrupt [3] and adds +1 to the variable of the number of received tokens. I can connect mechanism of issuing goods, electronic lock or anything like that to my board and when user press the button or use other input device, Arduino will check if variable of tokens value is greater than 0. If it is true, Arduino activate necessary module and adds -1 to tokens variable.

That is my very simple token acceptor and its algorithms of working. Now I work on new version that will work on two optical sensors and check the average speed of the coin by measuring the time it takes to travel from one sensor to another.

Also in future I plan to add a servo motor that will open the passage for the token when the sensor is triggered, and the rest of the time it will block the path so that all objects less than 30 mm in diameter will return back.

Moreover, in the next month my token acceptor will become part of a vending machine with audio accomplishment based on Arduino. And it is quite possible that you, my dear reader, will be able to see it in action at one of the robotics exhibitions in Minsk.

References

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