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Distinguish Features of Dinar/IRAQ and Dollar/USA using the Naked Eye and Visible-Light Microscope

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Abstract:

Protecting the currency from counterfeiting or manipulation is one of the most important requirements necessary to maintain the safety of society. Therefore, the countries of all the world spend a lot of money and efforts to obtain and achieve this goal. In this study, we chose Iraqi dinars in the denomination of 50,000 dinars and the US dollar denomination in the one-hundred-dollar denomination because they are the two categories most vulnerable to fraud. The study relied on highlighting the most important manifestations or symbols that can be observed with the naked eye, as well as symbols that can be observed through a microscope, which used visible light.

Keywords: Dinar, Dollar, microscope, visible light, counterfeiting.

Introduction:

Counterfeit is the illegal, purposeful action to make an exact image of something of superior value with the intention of defraud. Since the end of the last century until now it has suffered assemblies in general terrorist attacks, some targeted human life, and a section of it was intended to destabilize social and economic life when weapons failed to achieve that. One of these means was counterfeiting paper currency and goods [1-2], which is important income for finance and investment criminal groups, when the legitimate supply chain was able to infiltrate. The method depended on establishing companies or bank accounts and regularly bogus invoices [3-4].

A counterfeiter aims to produce the best reproductions when appalling security features, which are mostly classified into three types: starting with detectable parts by human senses and disappearing normal view from human senses. The second type can be detected by magnifying glass or (UV) light, while the last identified was represented by manufactured and interacted raw materials [5].

Some factors were responsible for damaging currency due to the weather, and that made inspection more complicated; for example, ink on some currency areas on paper currency may more rapidly wear than on others, and that gave an excuse to change some parameters of currency

paper. The change in identifications was witnessing a higher influence in warmer climates as compared with cold climates.

All of these physical parameters represent a typical advantage for counterfeiters to dirty specific areas of currency, which makes it inconspicuous to distinguish with more troublesome detection. The falsification of currency such as dollars in Iraq had and still forced competent authorities to look for more efficiency and sophisticated security [6-7]. The new development was represented by micro printing, which uses inks with fluorescent behavior and manufactures special paper made from plastic or cotton in addition to being enhanced by reactive materials with UV and IR.

The literature reported many techniques that succeeded in identifying fraudulent currency, such as image analysis [8], intelligent recognition X-ray fluorescence, near-IR, and Raman spectroscopy [9–10]. In this work, we used a technique which non-destructive simultaneous identification of few visible and hidden signs results in or is drawn by special inks. The LCD microscopy with magnificent 1200 X, which is active in visible light, was used to analyze the images that could be obtained from the two currencies, the Iraqi dinar and the American dollar.

Anti-counterfeit measures

identity currency, which contains security that mostly includes protection samples against counterfeits, represents variance and unstable challenge-causing. year more year required development more security features. The developments behave as designs, fraudsters, and impostors [2, 6], and that could be used alone, single, hybridized, two, or all of it together.

The first aims of security are that people can easily recognize and diagnose the specially designed with all characteristics. may be tilted and looked at with a feeling that the process of recognizing the currency would be [11] easy, and that required touching and observing the document with examining the security printed ink at different angles. The security features or any systems that were used to save the currency are designed to resist or at least complicate the deterioration.

1-The virtual check of the currency

From figure 1, it is clear to show the general appearance of the two denominations used in this work, as it gives an appearance to the most important features that can be seen with the naked eye without use of examination devices. Actually, the four parts of Figure 1 show that the currency contains the most important, or in fact, all the features of the currency that pertain to that country.



Figure 1: An image showing at the top the Iraqi currency of 50 thousand dinars; on the right, the front image; on the left, the back image; and at the bottom, a picture of the US dollar currency in the denomination of 100 dollars; on the right, the image from the front; and on the left, the image from the back.

As shown in figure 2,3, it is the Iraqi currency with dimensions of length greater than the American currency, and it is almost equal in width. There is an internal dimension for the US currency frame of 0.4 cm; this was not noted in relation to his currency, the Iraqi dinar.

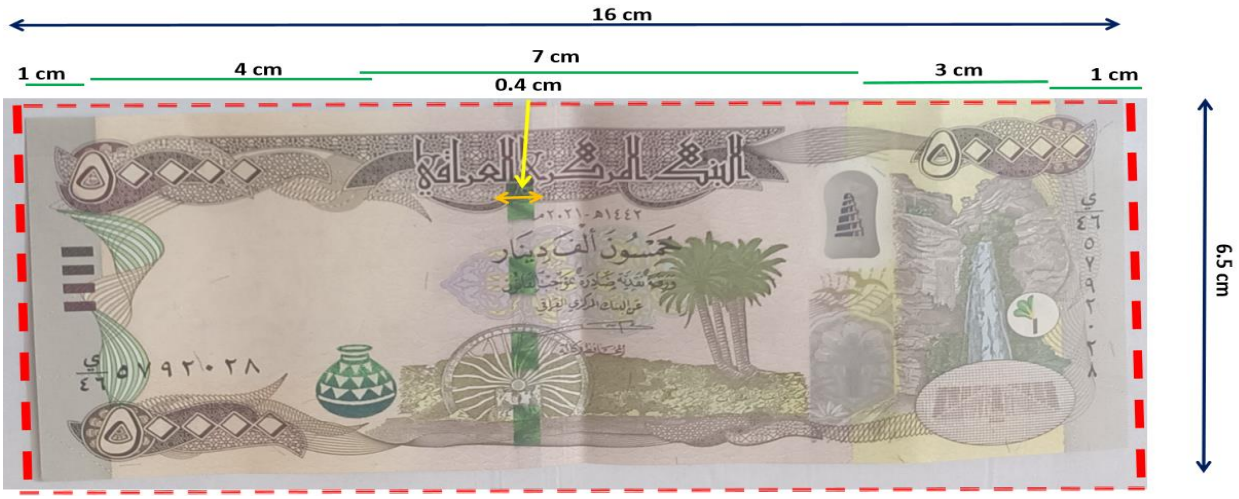


Figure2: shows the dimensions of the Iraqi currency in the denomination of 50 thousand dinars

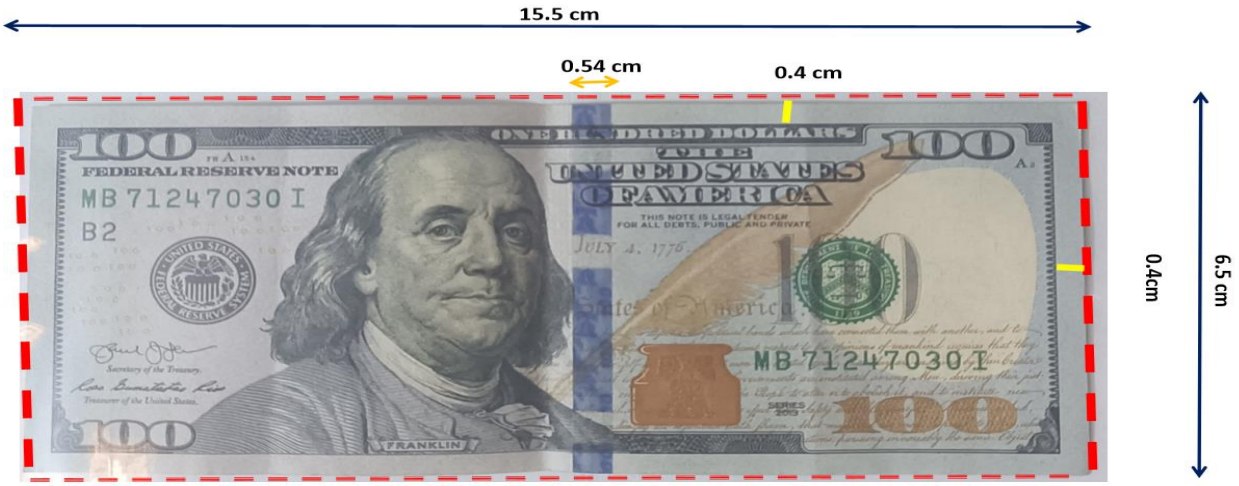


Figure3: shows the dimensions of the American currency in the denomination of 100$.

2-Microscopic examination of currency

Figure 4 and Figure 5 include microscopic images for the currency, which report many details. In figure 4 through details, there are many signs that distinguish this currency. It gives details that do not appear except with the presence of a magnifier, including an indicator of many blue and red lines distributed randomly on paper. In addition to that, it can be noticed the presence of distinct lines on both sides of the left and right near the serial number of the currency, which is present and proven as a distinctive characteristic of my credibility or evidence of whether this currency is fake or real.

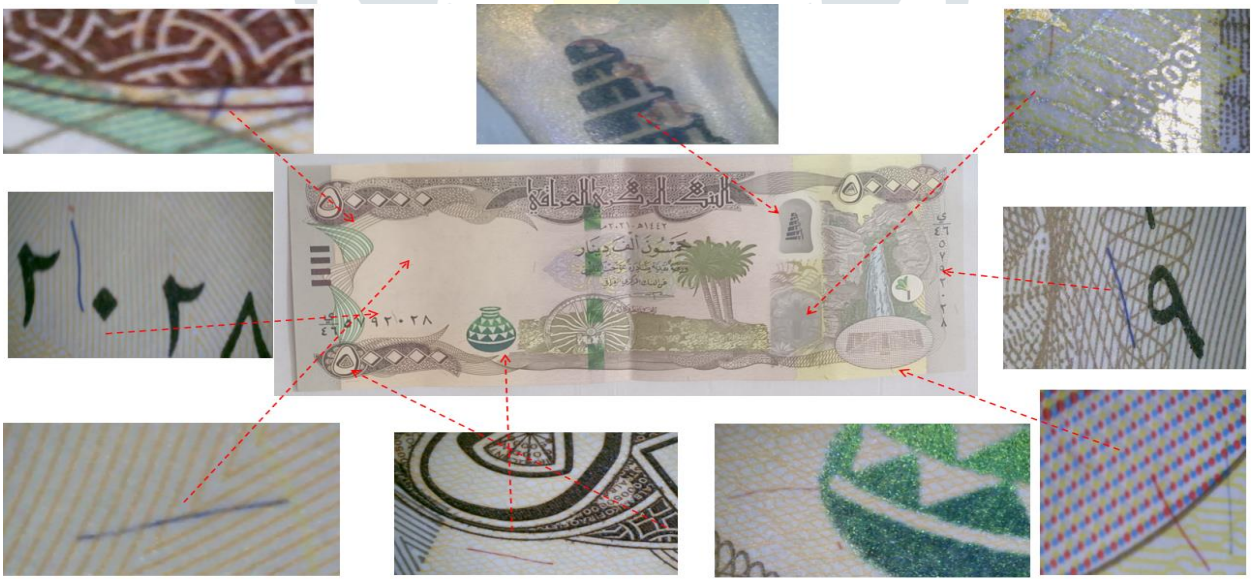


Figure 4: Enlarged photo clips of parts of the Iraqi dinar 50,000 showing the most important features that can be seen with a light microscope 900X

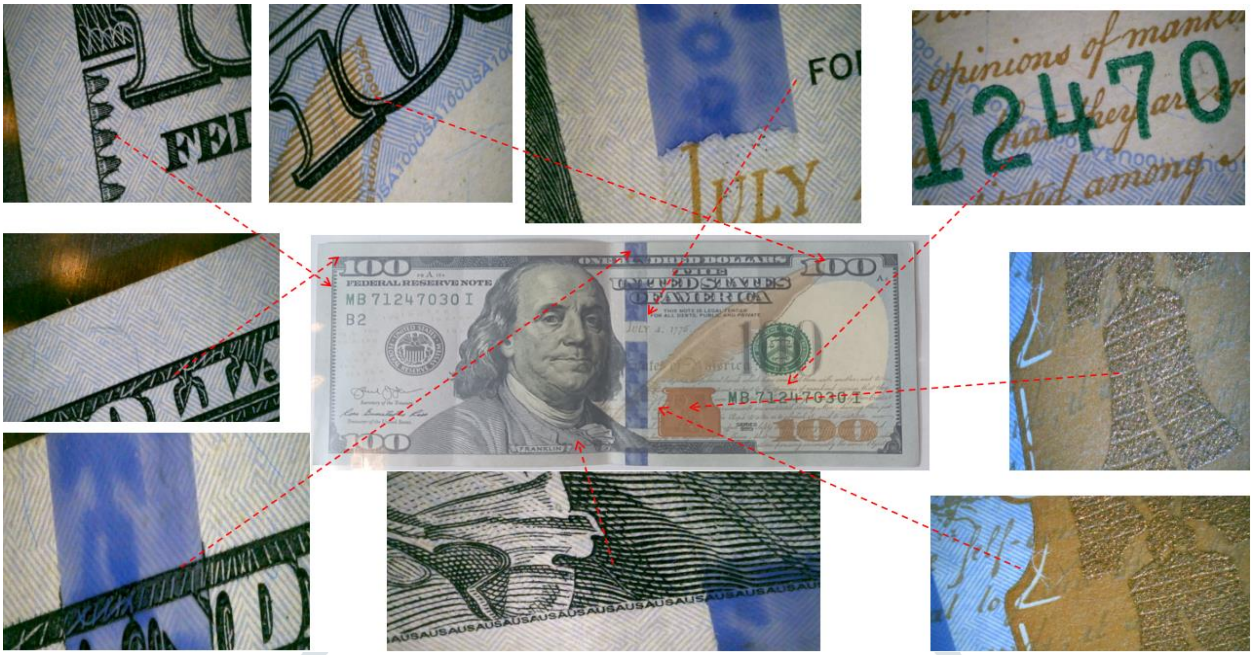


Figure 5: Images for different parts of the 100$, which show parts that do not appear except through a light microscope, and we used 900X

According to figures 5 and 6, it appears that the number of symbols that were placed in ensuring the safety of the American currency is more than what is found in the Iraqi currency in spite of Iraqi currency containing a variation or gradation in color, which is what was shown in the previous figure 2.

As figure 6, which was taken by the back side of the dollar currency, showed, it showed the presence of many lines distributed approximately on separate areas of the paper and more than the front side, which was not noticed in the Iraqi currency in this study.

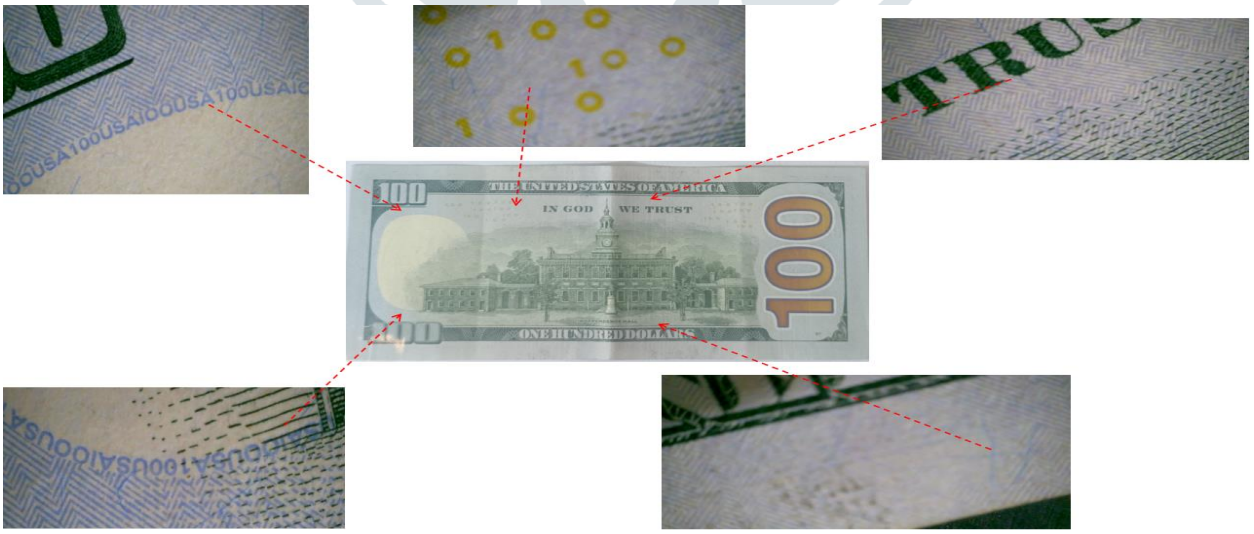


Figure 6: An enlarged picture (900x) of the most important features of the US dollar from the back

Conclusion;

Through what has been discussed in this study, it is clear that the use of symbols is very important to preserve the sobriety and integrity or counterfeit of the currency and protect it from being exposed to forgery. The method used in placing the symbols and how they are distributed on both sides of the currency, in the front and in the back, and the quality of the inks used, in addition to the position where the symbol is installed, play an important role in preventing counterfeiting or attempting to fake the currency. Therefore, through the foregoing, developing the quality of the method for distributing symbols that do not appear with the naked eye can produce an activity that is very difficult to be exposed to the registration or counterfeit.

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