

The economic exploitation of children by mining bots

الاستغلال الاقتصادي للأطفال من قبل بوتات التعدين

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Abstract:

The rapid advancement of technology—especially in artificial intelligence, cryptography, and the TON ecosystem—has led to the rise of mining bots, particularly on Telegram. These automated programs perform complex tasks and reward children with points through airdrops, which have real monetary value on global exchanges. However, such bots exploit children economically by violating labor regulations like minimum age and rest rights, while also harming their financial interests. This paper explores the nature and mechanisms of these bots, their impact on children's rights under Algerian labor and civil laws, and proposes legal and technical solutions to combat this form of digital exploitation.

key words:

Mining bots - Economic exploitation of children - Global exchanges - Airdrop - Token-

الملخص:

عرفت الساحة التكنولوجية العديد من التطورات أبرزها الذكاء الاصطناعي وعلم التشفير وبيئة التون، وهو الأمر الذي أدى إلى ظهور ما يسمى ببوتات التعدين لا سيما المشتغلة في تطبيق تليغرام، وهي عبارة عن برامج آلية تنفذ مهام محددة ومتكررة وبدقة تتمثل في حل معادلات رياضية بالغة التعقيد وكل ذلك مقابل مكافأة الأطفال في نهاية المطاف بنقاط في عملية تسمى بالإسقاط الجوي ويكون لها مقابل مالي في البورصات العالمية، هاته البوتات تستغل الأطفال اقتصاديا من خلال انتهاك الأحكام التنظيمية المتعلقة بالعمل كالحدا الأدنى للسن والعطل وكذا تتسبب في إلحاق أضرار بالذمة المالية للأطفال. من خلال الاستغلال بين ما يدفعه الطفل من أموال وما يحصل عليه من نقود أو أضرار، ولهذا تحاول هذه الورقة البحثية استعراض ماهية هذه البوتات المستجدة وتقنية وآلية عملها وكيف تؤثر على الحقوق التي أقرها المشرع الجزائري للأطفال سواء تلك الواردة في قانون العمل، أو في القانون المدني ومحاولة إيجاد حلول لوقف هذا الاستغلال في الوسط الرقمي .

الكلمات المفتاحية :

بوتات التعدين - استغلال اقتصادي للأطفال - بورصات عالمية - التوكن.

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Introduction:

Milton Friedman once said that the Internet would be one of the major forces in reducing the role of government. He added that the only thing missing—and soon to be developed—is a reliable electronic form of money¹. This statement was no exaggeration, as it was realized by an anonymous individual under a pseudonym. This person, known as Nakamoto, announced the creation of a white paper called Bitcoin², a system based on peer-to-peer technology that allows payments without the need for a third party, particularly governments.

By the year 2023, the digital space witnessed the emergence of a new actor: artificial intelligence. With the arrival of 2024, the integration of AI into Telegram’s mini-games—especially those based on “press-to-earn” or “play-to-earn” mechanisms—seemed imminent³. One of the latest examples is the game bot PlanetX, launched in January 2025⁴. This is particularly significant considering that Telegram has surpassed three billion users.

The convergence of the Internet with recent developments in artificial intelligence applications and cryptography has led to the rise of what is known as digital mining. This phenomenon has sparked global divergence—some countries have welcomed it, while others have rejected it. It goes without saying that the Algerian legislature has explicitly and entirely prohibited digital mining and any dealings related to it⁵.

However, despite this prohibition, a significant number of children have become involved in this dangerous phenomenon⁶, which now poses a real threat to this vulnerable group—especially given how easily children can access digital devices and the internet.

Undoubtedly, the Algerian state has made significant efforts to protect children, addressing all areas of concern. It has ratified most of the conventions and treaties concerning child protection, including the Convention on the Rights of the Child of 1989 and the African Charter on the Rights and Welfare of the Child, both of which include provisions that oblige the state to protect children from economic exploitation.

In line with these international commitments, Algeria has enacted a specific law for children. Article 2 of this law defines economic exploitation, while Article 139 provides a general criminal provision aimed at combating the economic exploitation of children⁷. Additionally, several other legal texts reinforce this protection, such as labor laws concerning employment relationships and the Civil Code under general legal principles.

All of this prompts us to study this very recent and emerging topic by raising the following research question:

What are mining bots, and to what extent can they economically exploit children, particularly in the fields of labor and financial liability?

In our study, we adopted both the descriptive and comparative analytical methods, aiming to analyze legal texts in order to highlight the impact of mining bots on the rights guaranteed to children.

To answer this research question, we will begin by explaining the concept of digital mining bots, including their definition and types. We will then explore how they economically exploit children and highlighting the various aspects of such exploitation.

Section I: The Nature of Mining Bots

By "the nature of mining bots," we mean defining what mining bots are, as well as explaining their types and how they operate. We will conclude with the foundations of mining — that is, the essential elements required for this process — including the human framework, represented by children, and smart devices.

A) Concept of Mining Bots:

According to the renowned cybersecurity company Kaspersky, the word "bot" is a shortened form of "robot." It refers to a program that performs automated, repetitive, and pre-programmed tasks. These bots usually simulate or replace human behavior but operate much faster due to their automated nature. Bots can be used for beneficial purposes such as customer service or search engine indexing. However, they can also be malicious software used to gain complete control over a victim's computer⁸.

As for mining, in its traditional sense, it refers to the extraction of mineral veins from the geological formations in which they are found⁹. However, the mining we are discussing here differs from traditional mining. While it shares a conceptual foundation, it occurs in a completely different environment — one in which bots mine via computers and mobile phones by solving complex mathematical equations. These bots rely on the computational power of the devices they operate on, as well as internet connectivity. Each bot is typically managed remotely by an individual located in a specific country.

Mining bots generally fall into two main categories:

1- Click Mining Bots:

These bots often take the form of Graphical User Interface (GUI) games that allow users to interact with the application directly through input devices¹⁰. The games are programmed with multiple levels, where users (often real people) complete tasks within the game. Users — often children — repeatedly tap the screen to earn tokens¹¹, which usually have a predefined value, starting with one token and increasing with each level completed or with any upgrades made within the game, whether for free or via in-app purchases.

There are various bots of this kind, such as:

- Blum with over 31 million users,
- Seed with 6,848,781 users¹²,
- X Empire, launched by Elon Musk, consisting of 30 levels¹³,
- Trump's Empire, associated with former U.S. President Donald Trump¹⁴.

One of the most popular click-based bots is Hamster Kombat¹⁵, which was launched in March 2024, according to its official website¹⁶. It has attracted more than 210 million users worldwide, including many in Algeria, most of whom are children seeking

to earn tokens to later convert them into cryptocurrency. The first airdrop (distribution of points to the players' wallets) has already been launched, with listings on major crypto exchanges. A second airdrop is expected in Spring 2025. According to the latest data from the global crypto trading platform Binance, the market capitalization of the Hamster token has reached \$178.73 million¹⁷.

2- Cloud Mining Bots:

Cloud mining can be described as the process of mining cryptocurrencies via remote data centers, where mining power is shared among users. This setup allows individuals to participate in mining without needing to buy or maintain physical hardware¹⁸. As Alan James put it: "Cloud mining allows you to take part in the mining process without owning or operating any physical equipment. Think of it as renting processing power from a specialized provider who owns and operates large-scale mining farms¹⁹."

This concept has been adapted for use in digital bots, where the child can purchase mining capacity provided by the bot. This is done by assigning an account with a specific Hash rate — the unit that measures mining power²⁰.

Some bots falsely present themselves as cloud miners, pretending to mine using cloud-based devices, when in reality, they exploit the resources of the user's device — whether it's a computer or a smartphone — as long as the app is running and connected to the internet.

B) Pillars of the Mining Process through Bots:

By this, we refer to the main actors involved in the bot-based mining process in the digital space, which we examine through two frameworks: the human framework—represented by the child—and various types of smart devices.

As for the human framework, the natural person is a party in the mining process. In the context of this article, we specifically refer to the child as defined by the Child Protection Law in Article 2, namely, any person under the age of 18. Typically, the child searches for one of the already mentioned mining bots, registers on it, and creates an account. Alternatively, they might receive an invitation via referral from a friend. In other cases, the link may be sent by a random account on any social media platform as part of what is known as spam.

Moreover, smart devices are portable electronic tools that allow their users to access a wide range of local and remote services. Standard examples of smart devices include smartphones, tablets, smartwatches, etc. These devices can connect and interact with other devices via wireless protocols and are often equipped with advanced components²¹ such as CPUs and RAM²².

Essentially, the mining process and its outcomes depend on the quality of the device used by the child. The higher the capabilities of the device, the faster it can process and solve mathematical operations. The same applies to internet bandwidth—higher

speeds ensure quicker synchronization between what is processed on the device and what is recorded in the bot's database.

In practice, two main types of devices are used: computers (both desktop and laptop) and smartphones, regardless of their operating systems. All operating systems support digital mining, whether Windows and Linux for computers or Android and iOS for smartphones and tablets.

Section II: 2: Aspects of the Economic Exploitation of Children by Mining Bots

This section explores the rights granted to children under the law, focusing specifically on the rights provided by labor law and civil law as a general legal framework. We highlight how these rights are violated by mining bots, ultimately constituting economic exploitation of children.

A) Economic Exploitation of Children Through Violation of Labor Law Protections:

Work schedules are primarily determined by production requirements, within the framework of legal limits on weekly working hours — 35 hours in France²³, or 40 hours in Algeria as stipulated in Article 2 of Ordinance 97-03²⁴. The violation becomes evident when these bots are available continuously — 24 hours a day, 7 days a week, 365 days a year — thereby exceeding the legal weekly working limit.

Further violations involve night work. Algerian labor law prohibits employing children at night under Article 28. It also protects children's right to rest during weekends (Fridays and Saturdays) and on religious and national holidays as defined by law.

Exceptions occur only in specific circumstances, such as bot maintenance, system updates, seasonal suspensions, profit calculations, the filtering of users suspected of cheating (commonly known as “burning²⁵”), or force majeure. Outside of these cases, bots remain constantly active.

Setting a legal minimum age for employment is crucial for protecting children — not only to ensure they complete compulsory education but also to safeguard their psychological and physical development²⁶. Algerian law prohibits employing anyone under the age of 16²⁷. This regulation is easily violated through the account creation process, as bots do not require age verification or documentation before allowing access.

The 2020 Constitutional Amendment further reinforces this prohibition through Article 66, which categorically bans child labor with no exceptions²⁸.

Moreover, bots do not verify whether users meet the minimum age even when distributing rewards to users' wallets. This encourages children — especially those under the age of 16 — to participate, particularly since the bots often appear as enticing games.

In addition, the TON environment within Telegram does not require users to verify their age when creating wallets, which poses a serious risk.

While a few bots, such as Boinkers, include disclaimers (e.g., Clause 2.5 “Children under 18”) stating:

“This service is intended only for responsible adults and is not targeted at children. If you are under 18, please do not use the service or attempt to register. By registering or using the service in any way, you confirm that you are 18 or older and that you understand and agree to these terms of service²⁹.”

This disclaimer, in our view, serves primarily as a waiver of liability.

In traditional employment settings, child labor violations can be reported to national authorities like the Labor Inspectorate, which has the power to investigate and impose sanctions. However, interactions between children and bots fall outside the jurisdiction of these agencies, as these bots operate outside national borders. There is also a complete legal vacuum concerning this emerging type of “employment,” making enforcement impossible.

B) Economic Exploitation of Children Through Their Financial Liability:

The Civil Code does not provide a definition of legal patrimony (financial capacity), but according to the classical definition, it is the set of rights and obligations that can be monetarily evaluated³⁰. Legal patrimony is granted to a child from the moment they are born alive.

As previously mentioned, digital mining operations are carried out using smart devices and over the internet. All these aspects fall within a person's legal patrimony. Interference occurs when the device's resources are exploited for complex mathematical operations, which often leads to performance issues such as freezing, sudden shutdowns, unusually fast battery drain, or overheating—ultimately resulting in device damage. This harms the child user, who then finds themselves forced to repair the device at a financial cost or even buy a new phone as a last resort³¹.

Moreover, the Telegram environment has seen the spread of scam bots. After a moderate or relative period of time, these bots prompt the child user to deposit a sum of money in order to complete a withdrawal process. Many children—and even adults—have fallen victim to this, as seen in the case of the Farmix bot, which defrauded numerous users. Since there is no system to verify the legitimacy of a bot, the only limitation to their spread is user reports. Once Telegram confirms that the bot is indeed a scam, a red warning label appears upon entering the bot, stating: “Scam – many users have reported this account as fraudulent or fake. Please be cautious, especially if it asks you for money³².”

In addition, digital mining through Telegram bots is based on elements that have monetary value. This includes subscribing to an internet package, as children are often compelled to purchase recharge cards and convert them into internet bundles to keep the bots running—since these bots require a constant connection to the internet. This significantly increases the child's expenses, while the returns remain minimal.

There are also bots that encourage children to invest money to increase their points or tokens. This process involves topping up accounts through trading platforms such as Binance or Bybit. The child then transfers the funds into a digital wallet created on

Telegram and converts them into Telegram Stars to exchange for offers that boost token accumulation.

For example, the bot boinkers offers to double the points for \$1.69 for a period of 80 minutes or 80 stars. The cost of 100 stars is 31,900 Algerian Dinars (DZD). The exploitative nature becomes clear when someone purchases the largest package—priced at 31,999.00 DZD—and invests it into the bot, only to discover that the value of their accumulated points is barely 1 DZD when the token is listed on international exchanges. This results in significant damage to the child's patrimony. It is also important to note that the amounts paid by the child are often higher than the official price, as they recharge and convert money through the black market.

The same situation applies across all bots. The core mechanism remains the same: converting money into Telegram Stars to buy packages, regardless of how the offers are presented—whether for an unlimited or limited duration. The child might pay money to increase mining capacity either permanently or for a couple of hours. In the end, however, the tokens earned rarely cover the expenses the child has borne.

Conclusion:

What can be concluded is that the digital space has undergone numerous successive developments, which have ultimately led to the emergence of software bots that carry out a process known as digital mining. This process involves solving highly complex mathematical equations by exploiting children's various devices—such as computers, smartphones, and tablets. This results in the depletion of children's financial assets. Even more seriously, these bots economically exploit children by violating the set of rights granted to them by the legal system, particularly in the field of labor. This includes breaching the minimum legal age for employment, infringing on legal working hours, rest periods, national holidays, and religious celebrations.

We have also found that this type of mining is punishable under Algerian finance laws. Moreover, due to the fact that these bots are operated from outside the country, regulatory authorities cannot extend their jurisdiction over them, making it impossible to enforce protective measures for children.

Based on all of the above, we propose the following recommendations:

Establish a preventive electronic observatory tasked with monitoring existing bots and any future ones, and notifying the relevant authorities accordingly.

Organize awareness-raising training sessions for various judicial and semi-judicial authorities, such as the police, gendarmerie, and judiciary, about the dangers this issue poses to children.

Criminalize the act of creating or operating a digital mining bot.

Criminalize advertising or recruiting children to engage in digital mining applications.

Ban the Telegram platform in order to protect children from economic exploitation, as it serves as an active medium for digital crime and child exploitation—

following the example of several technologically advanced countries, such as China and Russia.

Promote a culture of cybersecurity awareness in society, and raise awareness about the dangers of economically exploiting children, especially through apps that incorporate digital mining bots.

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