In order to realize the security of prison perimeter, a prison perimeter intelligent monitoring system based on cloud intelligence technology is designed. Based on the multisupply chain collaboration framework, the prison network interface submodule and sniffer monitoring structure are connected on demand to complete the hardware execution environment of the prison perimeter intelligent monitoring system. Analyze the specific service mode of the cloud smart technology host, set the necessary cloud smart technology service monitoring protocol, judge the processing information parameters, select the prison perimeter remote communication port number, set the prison perimeter network IP address and password program, complete the construction of the software execution environment of the monitoring system, and intelligently monitor and track the abnormal conditions around the prison; combined with the relevant hardware and software structure, the design of prison perimeter intelligent monitoring system based on cloud intelligence technology is realized. The experimental results show that the DPI index of the designed system has an obvious upward trend, and the processing results are close to the original image results to avoid the impact caused by the change of monitoring scene.

1. Introduction

With the acceleration of the economic pace of various countries, social crime management has also been developing towards science and technology and specialization, which has brought unprecedented difficulties to the detention management of public security departments. Some terrorists and violent terrorists pose a threat to society, so prisons need to detain them. The existing information construction of the whole prison system is a very important link [1]. Prison is the place where prisoners are detained and reformed, and it is the place with the highest requirements for the protection level of the monitoring system [2, 3]. In prison, intelligent monitoring system is one of the important components [4, 5]. Generally, intelligent monitoring system includes video monitoring, perimeter alarm, access control, monitoring intercom, prison security inspection, fence power grid prevention, patrol, emergency alarm, and interview recording. For a long time, the prison perimeter intelligent monitoring system only plays the role of monitoring and control and cannot play a better role in preventing potential security threats and emergencies [6]. Each subsystem operates independently, forming an information island. In case of emergency, each system cannot or cannot be linked in time, cannot effectively play the role of early warning and prevention, and it is difficult to find and check relevant information afterwards, resulting in the waste of management efficiency and human resources [7].

Among them, prison perimeter intelligent monitoring has become a key issue in the field of monitoring and tracking, which has attracted the attention of many scholars. Reference [8] takes the experience and lessons learned from the practice of the United Kingdom and the Republic of Ireland as the object and puts forward the prison health supervision model. Compared with the community, the burden of physical, psychological, and social health needs of the prison population increases, which is further affected by the prison environment. The lack of a monitoring system to monitor trends in prison health and well-being poses a challenge to service planners and decision makers. Reference [9] proposes to implement the safety index of a mixed method specified in the prison, use the prescription safety index to...
check the potential danger in the prison environment, and explore its implementation and use in practice. Pharmacists at two prison locations deployed using search protocols in electronic health records. A semi-structured interview was conducted with 20 prison health workers in England and Wales to explore the feasibility of deploying and using mixed approach security indicators in prison environment. People in prison are limited by their own conditions. When abnormal conditions happen to prisoners, the randomness of people’s movement is large and there is a strong rapid mutability in prison. Therefore, the extraction and tracking process of the image features of people in prison must meet the needs of rapid changes. In the area of abnormal conditions of personnel in the prison, the application of traditional intelligent monitoring of prison perimeter cannot avoid the loss of tracking image caused by rapid regional conversion due to the rapid movement of personnel in the prison. At the same time, it can not greatly simplify the tracking process, resulting in fuzzy monitoring image and real-time and accurate intelligent monitoring and tracking of personnel in the prison. In order to avoid the above problems, a prison perimeter intelligent monitoring system based on cloud intelligence technology is proposed, a multisupply chain coordination framework is designed, the prison network interface submodule and sniffer monitoring structure are connected as needed, and the hardware execution environment is built. Analyze the specific service mode of the cloud smart technology host, set up the prison perimeter network IP address and password program, build the software execution environment, and design the prison perimeter intelligent monitoring system based on cloud smart technology through the intelligent monitoring and tracking of abnormal conditions around the prison perimeter, combined with relevant hardware and software structures. The DPI index of the system finally rises gradually, and the processing result is close to the original image result, which has good performance.

2. Design of Prison Perimeter Intelligent Monitoring System Based on Cloud Intelligence Technology

Cloud intelligence technology refers to a hosting technology that unifies a series of resources such as hardware, software, and network in WAN or LAN to realize data calculation, storage, processing, and sharing. It can form a resource pool, which can be used on demand. It is flexible and convenient. Cloud intelligence technology is an important supporting technology. The background service of technology network system needs a lot of computing and storage resources, such as video websites, picture websites, and more portal websites. With the high development and application of the Internet industry, in the future, each item may have its own identification mark, which needs to be transmitted to the background system for logical processing. Different levels of data will be processed separately. All kinds of industry data need strong system support, which can only be realized through cloud intelligence technology. Cloud smart technology provides dynamic, scalable, and often virtualized resources to serve users through the Internet. Users do not need to have relevant knowledge, expertise, or control to support their cloud smart technology architecture. With the support of cloud intelligence technology, the prison perimeter intelligent monitoring system is designed as follows.

2.1. Hardware Design of Prison Perimeter Intelligent Monitoring System. The hardware execution environment of prison perimeter intelligent monitoring system is composed of multisupply chain cooperation framework, prison network interface submodule, and sniffer monitoring structure. The specific design methods are as follows.

2.1.1. Multisupply Chain Collaboration Framework. The multisupply chain collaboration framework is the foundation of cloud intelligence technology. In the prison perimeter intelligent monitoring system, with the increase of the connection number of supply nodes, the length level of the whole collaboration mode chain is also gradually increasing. At this time, the application ability of the system database host is stimulated and can spontaneously transfer the scattered information parameters in the Internet environment; under the function of ciphertext template, these data information can be generated into long-term memory files. The specific framework diagram is shown in Figure 1.

In the multisupply chain collaboration framework, the intelligent monitoring host has the ability to query data information transmission behavior, storage behavior, and coding behavior at the same time, and the monitoring instruction reply file output by the host element will be different according to the different query instructions [10, 11]. Subordinate application elements such as prison network interface submodule and sniffer monitoring structure can be directly connected with multisupply chain coordination system. For prison perimeter intelligent monitoring system, each type of application element can only maintain a direct corresponding relationship with one supply node [12]. In the case of stable transmission of Internet data information, the more hierarchical categories of supply nodes, the more hardware application modules that can be connected to the collaborative framework as direct components. If the cloud platform system is simply used as the system application environment, it can be considered that the connection stability of the multisupply chain collaboration framework will directly affect the practical value of the whole prison perimeter intelligent monitoring system [13].

2.1.2. Prison Network Interface Submodule. In the prison perimeter intelligent monitoring system, the prison network interface submodule is a subordinate connection structure belonging to the multisupply chain collaboration framework [14]. When the network information ciphertext template file is known, the Internet data information transmission instruction can be fed back to the rule analysis submodule, association rule query submodule, and other application structures. On the one hand, it saves a lot of data information storage and processing time; on the other hand, it can also meet the needs of compiling and transcoding of
monitoring and running instructions. The intelligent monitoring host can set the lower level user objects according to the closure and disconnection of the user interface. Generally speaking, when the user interface is completely closed, the number of user objects accessed in the intelligent monitoring host is the largest. When the user interface is completely disconnected, there is no connectable user object in the intelligent monitoring host [15]. Due to the existence of multisupply chain synergy mode, the setting behavior of Internet security zone must follow the implementation status of data information encryption service, and when the queried monitoring information can match with the prison network interface submodule [16], the cloud platform host can switch the monitoring instructions independently. The specific module connection form is shown in Figure 2.

For the cloud intelligence technology application platform, each type of execution instruction in the prison network interface submodule can only maintain a corresponding connection relationship with one hardware structure element.

2.1.3. Sniffer Monitoring Structure. The sniffer monitoring structure takes libpcap device as the core component, which can control the construction behavior of cloud information query list under the action of information security communication protocol. With the increase of data and information transmission of cloud smart technology, the system host can spontaneously start monitoring programs at all levels and can configure the data connection behavior in the network environment through initialization processing [17, 18]. When the prison network interface submodules are all closed, the information security communication protocol will be quickly connected to the libpcap equipment. At this time, the whole sniffer monitoring structure is in a relatively active connection state, and the strange information in the intelligent monitoring host can be quickly identified [19]. Based on this, the transmission behavior of data parameters can be driven on demand. When the prison network interface submodule is partially closed, the speed of information security communication protocol accessing libpcap equipment is relatively slow. At this time, the connection behavior of the whole sniffer monitoring structure is relatively slow. Although the strange information in the intelligent monitoring host can be identified, the overall identification speed is slow [20], and the connection principle of the complete sniffer monitoring structure is shown in Figure 3.

As the core application component of prison perimeter intelligent monitoring system, sniffer monitoring structure can determine the actual transmission direction of Internet data parameters and can cooperate with information security communication protocol to coordinate and plan these data files.

2.2. Software Design of Prison Perimeter Intelligent Monitoring System. With the support of the above hardware execution environment of the prison perimeter intelligent monitoring system, carry out the software development and design of the system and complete the construction of the software execution environment of the system according to the processing flow of cloud intelligent technology service monitoring protocol connection, remote communication port number selection, IP address, and password program setting; the combination of the two realizes the smooth establishment of prison perimeter intelligent monitoring system based on cloud intelligence technology [21]. In the cloud intelligent technology data information processing platform [22], build a cc2530f256 control protocol with
256 KB flash memory; the Zigbee protocol stack is used to control the output bus of the software environment security monitoring of the prison perimeter intelligent monitoring system. The output resolution of the system is set to 7 to 12 bits. The serial memory is used to guide the software program of the prison perimeter intelligent monitoring system software security monitoring, and the network transmission control is realized through the coordinator serial port and GPRS module; the software implementation flow of prison perimeter intelligent monitoring system is shown in Figure 4.

2.2.1. Cloud Intelligent Technology Service Monitoring Protocol. The network communication remote monitoring system includes four kinds of cloud intelligent technology service application protocols: TCP/IP, UDP, OSI, and RAM. Among them, TCP/IP protocol acts on the source port of the prison perimeter network. When the transmission length of data information is maintained between 16 and 31 bits, the connection of this type of protocol is completely unaffected by the action of other system equipment elements [23, 24]. UDP protocol acts on the far port position of the prison perimeter network, which is directly affected by the data information transmission length. With the change of the execution ability of the system hardware equipment, the connection strength of the protocol will also change. OSI protocol acts on the intermediate transmission position of the prison perimeter network. With the enhancement of the electronic output capacity in the peripheral circuit of the network chip, the connection scope of this type of protocol will be appropriately expanded [25]. RAM protocol acts on the data signal weakening area of the prison perimeter network and has strong practical application ability in information collection. However, under the action of cloud intelligent technology network, the actual action space of this type of protocol remains unchanged. The connection principle of cloud intelligent technology service monitoring protocol is shown in Table 1.

2.2.2. Selection of Remote Communication Port Number around the Prison. Generally, the selection of remote communication port number of the system follows the principle that each application layer corresponds to only one number node. Under the action of the principle of cloud intelligence technology [26], the monitoring protocol must maintain the corresponding identification relationship with the 16-bit application, and with the increase of the remote coverage area of the prison perimeter network, the farthest transmission distance accessible by the signal is gradually extended [27]. Suppose \( m \) represents the minimum troubleshooting serial number of the communication port number and \( n \) represents the maximum troubleshooting serial number of the communication port number. In the whole real value coefficient space, the larger the actual difference between the above two physical quantities, the larger the storage space range of the port number to be screened. \( A \) indicates the application coefficient of cloud smart technology. In the given network communication space, the actual performance of this parameter can affect the final selection result of port number. The selection result of prison monitoring remote communication port number of the system can be expressed as follows:

\[
Y = \frac{\lambda \times \text{Max } W}{\sqrt{\theta_1(A - 1) \times (x/y)^2}},
\]

where \( \bar{a} \) represents the average value of information transmission in the prison perimeter network, \( x \) and \( y \) represent the two different communication transmission conditions, \( \lambda \) represents the monitoring application coefficient, and \( \text{Max } W \) represents the maximum data transmission volume in the prison perimeter network environment.

2.2.3. IP Address and Password Program of Prison Perimeter Network. The preparation of IP address and password program of prison perimeter network is the disposal link of the design of prison perimeter intelligent monitoring system based on cloud intelligence technology. The data transmission destination is known, and the practical application connection between adjacent monitoring nodes is established, so as to improve the information carrying capacity in the prison perimeter intelligent network [28]. In the cloud smart technology environment, it is assumed that \( \theta_1 \) represents the minimum data information transmission coefficient, and \( \theta_2 \) represents the largest data-based information transmission coefficient. With the continuous clarification of \( Q_a \) and \( Q_b \) target IP addresses, the compilation process of cryptographic program can be gradually improved until the real value of data transmission coefficient \( S \) does not change, so as to realize a complete monitoring instruction operation process. The compilation results of the prison perimeter network IP address and password program are expressed as follows:

\[
B_b = \sqrt{\sum_{d}^{i} (Q_a + Q_b) \times Y \times E_i / R_i \times D_i},
\]

where \( E_i \) represents the source compilation coefficient of
cryptographic program, $R_r$ represents the communication execution parameters related to data transmission behavior, and $D_d$ represents the disposal authority of cloud intelligent technology.

3. Intelligent Monitoring and Tracking of Abnormal Conditions around the Prison

For the intelligent monitoring of the area where the abnormal situation of personnel in the prison is prone to occur, it is necessary to use the cloud intelligence technology to transmit the relevant images, judge according to the preset intelligent results [29, 30], select the COM1 port of the King-view equipment port, and associate the lower computer main control PLC (set the same address code, data bits, parity check, and communication rate); select PLC equipment from the "equipment name" dialog box of the upper computer Kingview and then select Modbus RTU communication protocol; complete the communication protocol setting; and then set the communication rate, data length, and verification method in the serial communication setting dialog box to complete the intelligent monitoring and tracking of personnel in the prison, so as to ensure the accurate and efficient transmission of data and instructions. The specific methods are as follows:

The distance between the remote monitoring camera and the monitoring area is $H_h$, the temperature scattering coefficient is $G_s$, the area of the monitoring area in the prison is $S_s$, the personnel body gray coefficient is $J_j$, and the interference spectrum coefficient under regional change is $F_f$. Equation (3) can be used to calculate the human body intelligent monitoring and tracking coefficient in the monitoring area.

$$O = \frac{S_s^2 - 1}{\sqrt{J_j + F_f + S_s}}.$$  \hspace{1cm} (3)

In order to measure the influence of scene change scattering on the attenuation of image intelligent monitoring and tracking signal, the attenuation coefficient of image intelligent monitoring and tracking signal in personnel monitoring area can be calculated by using the following formula:

$$p = \frac{H_k \times S_s \times |r_i - t_i|}{O - S_s^2 - t_i},$$ \hspace{1cm} (4)
where $r_i$ represents the monitoring interference frequency and $t_i$ represents the monitoring interference coefficient. The following formula can be used to calculate the attenuation coefficient of the intelligent monitoring and tracking signal in the personnel monitoring area to describe the attenuation degree of the image signal under the action of scene change.

By introducing the image signal attenuation coefficient of the personnel monitoring area into the calculation process of the personnel body intelligent monitoring coefficient, the actual personnel body intelligent monitoring coefficient can be calculated according to Equation (5) to describe the actual personnel body intelligent monitoring situation.

$$D_{ab} = \sqrt{r_i^2 - t_i^2} \frac{P}{S_i - 1}. \quad (5)$$

In the process of human body intelligent monitoring, it is necessary to use image monitoring technology to transmit human body intelligent monitoring signal. As the scene change has obvious interference effect on the monitoring effect, this effect will cause the attenuation of image visual signal, thus reducing the accuracy of monitoring [31, 32]. According to Equation (3), the human body intelligent monitoring and tracking coefficient obtained under the influence of rapid regional change, such as rapid running, can be calculated. According to Equation (4), the attenuation coefficient of the image intelligent monitoring and tracking signal in the personnel monitoring area can be calculated. The rapid increase of the monitoring area will increase the attenuation coefficient of the image monitoring and tracking signal. According to Equation (5), the intelligent monitoring and tracking coefficient of human body after the attenuation of image monitoring and tracking signal caused by rapid regional change can be calculated. The increase of attenuation coefficient of monitoring image monitoring and tracking signal will reduce the intelligent monitoring and tracking coefficient of human body, so it is difficult to obtain accurate human body visual image.

In order to avoid the interference caused by the rapid change of the scene during the monitoring process, it is necessary to segment the visual image pixels in the area of abnormal conditions of the personnel in the prison and replace the traditional features with small features to meet the requirements of real time [33]. The method is as follows: according to the characteristic analysis of the intelligent monitoring and tracking image of the personnel monitoring area, the probability that a person’s body pixel in the image belongs to the background value [34, 35]. If $t$ is set at a certain time in the monitoring process, the pixel $(i, j)$ probability model of any pixel in the monitoring image can be described by the following formula:

$$V_{jj} = \sum_{n=1}^{N} p_n \times Y_{ij}, \quad (6)$$

where $p_n$ represents the high-frequency carrier transmission value of the monitoring image and $Y_{ij}$ represents the probability that the pixel $(i, j)$ belongs to the human body or the monitoring area at $t$ time.

According to the method described above, the dependency of human body pixels can be judged by using the pixel probability model, so that the human body image can be segmented, the problems caused by the scene change of human body image are solved, and an accurate data basis is provided for the feature extraction of human body image [36].

Using the above method, the human body texture features in the intelligent monitoring and tracking image can be extracted. The membership functions of each feature are as follows:

$$
\begin{align*}
V &= 1 - \frac{3}{(x + y + d)} \text{Min} (x, y, d), \\
K &= \frac{1}{3} (x + y + d), \\
I &= \begin{cases} 
\theta, & x \geq y, \\
360 - \theta, & x < y,
\end{cases}
\end{align*}
$$

where $V, K, I$ represent the vector of pixel texture features of human body image and $d$ represents the neighborhood feature value of pixel $(x, y)$. According to the above formula, the key features of the human body in the intelligent monitoring and tracking image in the monitoring area can be obtained, and the fuzzy recognition method can be used to complete the recognition of the human image in the

| Project               | TCP/IP protocol | UDP protocol | OSI protocol | RAM protocol |
|-----------------------|-----------------|--------------|--------------|--------------|
| Action position       | Of prison perimeter network source port | Of prison perimeter network far port | Of prison perimeter network intermediate transmission | Data signal weakening area of prison perimeter network |
| Connection capability | It is not affected by the action of other system equipment elements | The stronger the execution ability of the hardware device, the stronger the action strength of the protocol | The stronger the electronic output capability of the peripheral circuit, the greater the scope of the protocol | Complete collection of data and information |
| Restricted situation  | The transmission length of data information can only be kept between 16 and 31 bits | It is directly affected by the value of data information transmission length | / | The actual action space will not change |

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intelligent monitoring and tracking image. The specific method is as follows:

If the number of components of the human body texture feature extracted from the intelligent monitoring and tracking image is \(K\), the following membership rules can be obtained:

\[
P_x = \sum_{i=1}^{n} z_i \times P_{ik},
\]

where \(P_x\) represents the Gaussian distribution of pixels and \(z_i\) represents the weighting coefficient corresponding to \(P_{ik}\). The following formula can be used to track the characteristic function of intelligent monitoring of abnormal conditions around the prison perimeter:

\[
R(\theta) = P_x \times \sum_{i=1}^{n} L_i(\phi, \varepsilon),
\]

where \(L_i(\phi, \varepsilon)\) represents the expansion coefficient of prison perimeter intelligent monitoring system. According to the above formula, the thinning process of the pixels of the intelligent monitoring and tracking image can be completed, the human body image recognition can be carried out according to the results of the thinning process, and the human body image recognition in the intelligent monitoring image can be completed. According to the function and technical requirements of prison perimeter intelligent monitoring system, this paper puts forward the design scheme of intelligent monitoring and tracking of abnormal conditions in prison perimeter, so as to ensure that each perimeter area of prison is independent of each other, which is of great significance for the design of prison perimeter intelligent monitoring system. So far, the construction of software execution environment of various prison perimeter intelligent monitoring systems has been completed. With the support of cloud intelligence technology, combined with hardware and software, the design of prison perimeter intelligent monitoring system has been realized.

4. Experimental Analysis

In order to verify the effectiveness of the prison perimeter intelligent monitoring system based on cloud intelligence technology, experiments are needed. The on-site image acquisition equipment realizes the real-time acquisition and transmission of personnel behavior characteristic images, and the terminal monitoring system realizes the remote control and reception of personnel behavior images around the prison. In the process of the experiment, the monitoring distance is set to 10 km. The traditional literature monitoring system uses twisted pair to transmit the monitoring image. In this paper, the system uses GPRS technology to transmit the information and uses the handheld terminal to scan the electronic label to read the monitoring image information. Prison big data, personnel information data, and the whole public security and braking system all need the support of computer network technology and big
data of the overall situation of the prison. The ideological construction of prison-related personnel, the ideological transformation of prisoners in prison, the formulation of relevant laws, and the improvement of various systems are also the main construction aspects of intelligent monitoring around the prison. Based on the theory of cloud intelligence technology, with the development of prison emergencies, the prison emergency preparedness system should be a continuously developing and perfect system, which cannot remain unchanged. It is a dynamic structure that can be adjusted according to the actual situation at any time. Intercept the same amount of data information parameters as the experimental research object, keep other interference conditions unchanged, and record the specific changes of various experimental indexes. It is known that the system host in this paper is equipped with a remote monitoring system based on cloud computing network communication, and the literature system host is equipped with a traditional C/S monitoring system. The specific settings of experimental parameters are shown in Table 2.

According to the parameter settings in Table 2, the DPI index is used to verify the efficiency of the system in this paper. The DPI index can reflect the actual troubleshooting accuracy of the system host for data information. Generally, the larger the DPI index value, the higher the troubleshooting accuracy level, and vice versa. The specific changes of DPI indexes of this system, Reference [8] system, and Reference [9] system are shown in Table 3.

It can be seen from Table 3 that with the extension of the experimental time, the DPI index of the system in this paper maintains the change trend of first decreasing, then rising, and finally stable, and the global maximum reaches 95.2%. The DPI index of Reference [8] system began to decline after a short period of stable state, and the global maximum value only reached 60.2%. The DPI index of Reference [9] system began to decline after the first 15 minutes of stable state, and the global maximum value only reached 71.5%. Compared with the system extreme value in this paper, the DPI index of Reference [8] system and Reference [9] system decreased by 35% and 23.7%, respectively. In conclusion, with the application of prison perimeter intelligent monitoring system based on cloud smart technology, DPI index has an obvious upward trend, which plays an appropriate role in enhancing the actual investigation accuracy of data information.

Paper system, Reference [8] system, and Reference [9] system are, respectively, used for visual monitoring of the monitoring area in the prison. During the experiment, the original monitoring image obtained can be described in Figure 5.

Three different systems are used for visual monitoring and tracking image processing, and the obtained experimental results are described in Figure 6.

According to Figure 6, the accuracy of the monitoring image obtained by using this system for visual monitoring and tracking image processing of personnel abnormalities in prison is obviously better than that of the Reference [8] system and the Reference [9] system. The image processed by the Reference [8] system has error tracking. Although it is highly similar to the original image, it cannot distinguish the color, and the whole monitoring image is gray. However, the image processed by the Reference [9] system appears
fuzzy tracking, and the image quality of the monitoring image is fuzzy, showing black and white as a whole. The processing results of the system in this paper are close to the original image results, highly similar, and the image color is consistent, so as to avoid the impact caused by the scene change after the reference system processing. The reason is that the system in this paper sets up intelligent monitoring in the area where personnel abnormalities occur in the prison, uses cloud intelligence technology to transmit relevant images, and judges according to the preset intelligent results.

5. Conclusions and Prospects

5.1. Conclusions

(1) The DPI index of the prison perimeter intelligent monitoring system designed based on cloud intelligence technology has an obvious upward trend, and the global maximum value has reached 95.2%, which plays an appropriate role in enhancing the actual investigation accuracy of data information

(2) The processing result of the designed system is close to the original image result, highly similar, and the image color is consistent, so as to avoid the influence caused by the scene change after the document system processing

5.2. Prospects

(1) The high-definition, digital, networked, and intelligent prison intelligent monitoring system has high advantages and prospects, which represents the development trend of prison video system. The successful practice of the project has strengthened the confidence of prison to apply the monitoring system based on cloud smart technology, which can be studied in depth in the future

(2) The next step is to keep up with the development trend of information technology, continuously improve the application level of information technology, strengthen the prison technical defense ability, make the prison security and stability reach a higher level, and strive to achieve prison security, stability, and long-term stability

(3) Realize and verify the intelligent monitoring based on modern speech technology and improve the recognition accuracy of the whole system through speech recognition in the intelligent monitoring system. At the same time, in the development process of intelligent monitoring system, various emerging technologies can be comprehensively applied, such as network communication technology, network identity authentication technology, and distributed database technology, so as to further provide the performance and application scope of the system, so as to make the monitoring system truly have the function of multilevel linkage and multilevel monitoring

Data Availability

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Conflicts of Interest

The authors declared that they have no conflicts of interest regarding this work.

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References

[1] L. Lafferty, J. Rance, G. J. Dore, J. Grebely, and C. Treloar, “Hepatitis C treatment as prevention in the prison setting: assessments of acceptability of treatment scale up efforts by prison correctional and health personnel,” International Journal of Drug Policy, vol. 98, no. 1, article 103379, 2021.

[2] J. O. Muiz, “Exclusionary discipline policies, school-police partnerships, surveillance technologies and disproportionality: a review of the school to prison pipeline literature,” The Urban Review, vol. 53, no. 2, pp. 735–760, 2021.

[3] M. Pignatelli, “The intelligence activity carried out by the prison police force,” Expanding Horizons: Business, Management and Technology for Better Society, vol. 20, no. 2, pp. 1–10, 2020.

[4] E. Hare, E. Joffe, C. Wilson, J. Serpell, and C. M. Otto, “Behavior traits associated with career outcome in a prison puppy-raising program,” Applied Animal Behaviour Science, vol. 236, no. 3, article 105218, 2021.

[5] E. Plugge, “Mental health among people in prison at the time of COVID-19: all bad news?,” European Journal of Public Health, vol. 31, Supplement_3, pp. 145–156, 2021.

[6] J. M. Levine, “Growing old in prison,” Journal of the American Geriatrics Society, vol. 69, no. 12, pp. 3689–3689, 2021.

[7] B. Yhya, A. Lmt, and C. Kmca, “Analysis of outpatient medical services for correctional institution’s inmates entitled to national health insurance: a prison in Taiwan,” Journal of the Formosan Medical Association, vol. 120, no. 2, pp. 804–809, 2021.

[8] S. Perrett, E. Plugge, P. Conaglen, E. O’Moore, and S. Sturup-Toft, “The Five Nations model for prison health surveillance: lessons from practice across the UK and Republic of Ireland,” Journal of Public Health, vol. 42, no. 4, pp. e561–e572, 2020.

[9] A. S. Abuazour, E. Magola-Makina, J. Dunlop et al., “Implementing prescribing safety indicators in prisons: a mixed methods study,” British Journal of Clinical Pharmacology, vol. 80, no. 10, pp. 1–8, 2021.

[10] A. Cyrus, H. Craig, E. Kim, and W. Brie, “Role of a US-Norway exchange in placing health and well-being at the center of US prison reform,” American Journal of Public Health, vol. 110, no. 1, pp. 27–29, 2020.

[11] H. Sweeting, E. Demou, A. Brown, and K. Hunt, “Prisoners and prison staff express increased support for prison smoking bans following implementation across Scotland: results from the Tobacco In Prisons study,” Tobacco Control, vol. 30, no. 5, p. 2020055683, 2020.
[12] M. Weightman, R. Kini, R. Parker, and M. Das, “Pharmacological approaches to managing violence and aggression in prison populations: clinical and ethical issues,” Drugs, vol. 80, no. 16, pp. 1635–1647, 2020.

[13] C. V. Amoke, M. O. Ede, B. N. Nwokeoma, S. O. Onah, and T. Nweze, “Effects of group cognitive-behavioral therapy on psychological distress of awaiting-trial prison inmates,” Medicine, vol. 99, no. 17, p. e18034, 2020.

[14] D. Pralong, A. Renaud, A. D. Secretan, M. Blanc, and N. T. Tran, “Nurse-led mind-body relaxation intervention in prison: a multiperspective mixed-method evaluation,” Nursing Outlook, vol. 68, no. 5, pp. 637–646, 2020.

[15] A. E. Salwa, Q. Mohammed, S. Labibah, and G. Yasser, “Corrigendum to: 1513 foodborne outbreak in the Central Prison, Amanat Al-Asimah, Yemen-October, 2020,” International Journal of Epidemiology, vol. 50, no. 6, pp. 6–11, 2021.

[16] L. H. Unruh, S. Dharmapuri, and K. L. Soyemi, “Letter to the Editor in response to ‘COVID-19 and the correctional environment: the American prison as a focal point for public health’,” American Journal of Preventive Medicine, vol. 59, no. 2, pp. e89–e90, 2020.

[17] H. Li, B. Cameron, D. Douglas et al., “Incident hepatitis B virus infection and immunisation uptake in Australian prison inmates,” Vaccine, vol. 38, no. 16, pp. 3255–3260, 2020.

[18] A. G. Montoya-Barthelemy, C. Cchp-P, D. R. Cundi, and E. B. S. D. Ctw, “COVID-19 and the correctional environment: the American prison as a focal point for public health,” American Journal of Preventive Medicine, vol. 58, no. 6, pp. 888–891, 2020.

[19] P. M. Ayyaz, U. I. Butt, D. M. Umar, D. W. H. Khan, and P. M. Farookea, “Setting up a COVID-19 care facility at a prison: an experience from Pakistan,” Annals of Medicine and Surgery, vol. 57, no. 9, pp. 343–345, 2020.

[20] J. G. Júnior, J. P. de Sales, F. C. da Silva et al., “Analysis of the prison population’s mental health in Sars-Cov-2 pandemic: qualitative analysis,” Psychiatry Research, vol. 296, no. 2, article 113669, 2021.

[21] S. Shah, S. Awais, and S. Shah, “Commentary on “Setting up a COVID-19 care facility at a prison: an experience from Pakistan”,” Annals of Medicine and Surgery, vol. 59, no. 11, pp. 143–144, 2020.

[22] L. Basford, J. Lewis, and M. Trout, “It can be done: how one charter school combats the school-to-prison pipeline,” The Urban Review, vol. 53, no. 1, pp. 540–562, 2020.

[23] P. Chiu, P. Triantafyllopoulou, and G. H. Murphy, “Life after release from prison: the experience of ex-offenders with intellectual disabilities,” Journal of Applied Research in Intellectual Disabilities, vol. 33, no. 4, pp. 686–701, 2020.

[24] G. Gentile, M. Nicolazzo, R. Bianchi, P. Bailo, and R. Zoja, “Mortality in prisons: the experiences of the Bureau of Legal Medicine of Milan (Italy) (1993–2017): suicides and natural deaths in prison,” Medicine, Science, and the Law, vol. 61, 1 suppl., pp. 67–76, 2021.

[25] F. Al-Obaidy and F. A. Mohammed, “Predictions optimal routing algorithm based on artificial intelligence technique for 3D NoC systems,” Microsystem Technologies, vol. 27, no. 9, pp. 3313–3323, 2021.

[26] A. Ghan, A. B. Manduri, S. U. Jan, A. A. Alshdadi, and A. Daud, “Issues and challenges in cloud storage architecture: a survey,” SSRN Electronic Journal, vol. 13, no. 7, pp. 1–10, 2020.

[27] A. Banitalebi-Dehkordi, N. Vedula, J. Pei, F. Xia, and Y. Zhang, “Auto-split: a general framework of collaborative edge-cloud AI,” ACM, vol. 21, no. 8, pp. 14–18, 2021.

[28] V. R. Kebande, F. M. Awaysheh, R. A. Ikuesan, S. A. Alawadi, and M. D. Alshehri, “A blockchain-based multi-factor authentication model for a cloud-enabled Internet of vehicles,” Sensors, vol. 21, no. 18, p. 6018, 2021.

[29] B. J. Faritha, R. Revathi, M. Suganya, and M. N. R. Gladiss, “IoT based cloud integrated smart classroom for smart and a sustainable campus,” Procedia Computer Science, vol. 172, no. 1, pp. 77–81, 2020.

[30] S. Kala, E. M. Shakhshuki, S. Guntuka, A. U. H. Yasar, and H. Malik, “Acknowledgement scheme using cloud for node networks with energy-aware hybrid scheduling strategy,” Journal of Ambient Intelligence and Humanized Computing, vol. 11, no. 10, pp. 3947–3962, 2020.

[31] R. S. Ponnagal, S. Karthick, B. Dhiyanesh, S. Balakrishnan, and K. Venkatachalam, “Optimized virtual network function provisioning technique for mobile edge cloud computing,” Journal of Ambient Intelligence and Humanized Computing, vol. 27, no. 5, pp. 1–9, 2020.

[32] H. Al-Mohannadi, I. Awan, and J. A. Hamar, “Analysis of adversary activities using cloud-based web services to enhance cyber threat intelligence,” Service Oriented Computing and Applications, vol. 14, no. 3, pp. 175–187, 2020.

[33] S. I. Shyla and S. S. Sujatha, “Efficient secure data retrieval on cloud using multi-stage authentication and optimized blowfish algorithm,” Journal of Ambient Intelligence and Humanized Computing, vol. 19, no. 3, pp. 1–13, 2021.

[34] S. B. Yue, Q. H. Wang, X. C. Wang, and L. D. Xie, “Simulation of network node correlation risk assessment based on cloud technology,” Computer Simulation, vol. 37, no. 8, pp. 247–251, 2020.

[35] A. Mukherjee, S. Ghosh, A. Behere, S. K. Ghosh, and R. Buuya, “Internet of Health Things (IoHT) for personalized health care using integrated edge-fog-cloud network,” Journal of Ambient Intelligence and Humanized Computing, vol. 12, no. 1, pp. 943–959, 2021.

[36] M. Ghorbani, M. Bahaghigahit, Q. Xin, and F. Zen, “Conv LSTMConv network: a deep learning approach for sentiment analysis in cloud computing,” Journal of Cloud Computing, vol. 9, no. 1, pp. 1–12, 2020.