



## **Morning Running Attendance System for Preventing Students from Cheating**

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**Abstract:** The morning running attendance system for preventing students from cheating includes the following steps: responding to the scanning action that triggers running punch-in, drawing the corresponding virtual path, wherein the virtual path includes several virtual check-in points and presents the virtual path on the display screen of attendance terminal equipment; In response to the movement signal of the attendance terminal device along the virtual path, Acquiring the positioning information of the attendance terminal equipment in real time, guiding the attendance terminal equipment to sign in after the attendance terminal equipment enters the sign-in point area, and acquiring the sign-in information; Draw the real path of morning run according to the sign-in information and positioning information, and compare the real path with the virtual path to judge the completion of morning run attendance. This design can avoid students' cheating in the morning running process, and at the same time, it can increase the interest of morning running through specific sign-in methods to improve students' enthusiasm for morning running, and change passive mandatory morning running into active morning running to better improve students' physical quality.

**Keywords:** Student cheating, morning run, attendance system.

### **1. Purpose and significance of project implementation**

In order to improve the physical quality of college students, many colleges and universities began to implement the morning running system, and adopted the morning running attendance system and formulated corresponding management systems to supervise students' morning running. At present, there are about three types of modes of managing students' morning run in colleges and universities. The first type is completely manual roll call, that is, all students gather to roll call before the morning run and roll call again after the morning run. The second type is swipe card sign-in type, in which students swipe card sign-in before the start of morning run,

and there are attendance machines for students to swipe card sign-in during the morning run and at the end of the morning run. The third type is the combination of swiping card and fingerprint. Students swipe their cards and sign in by fingerprint before the morning run. Attendance machines are also set up on the way and at the end of the morning run to provide students with swiping card and fingerprint sign in. Through the combination of self-service attendance system and manual management, and taking the morning running record as the basis of final evaluation, we can urge students to do morning running to keep fit.

Because the first type of completely manual attendance management model is ineffective, and most colleges and universities now have campus cards, the second and third types of morning running attendance management models are basically used in the morning running attendance management of colleges and universities. The morning running attendance management system is mainly composed of campus card, attendance machine and attendance management software. The system realizes the student identity authentication of the attendance system by docking with the unified identity authentication system of the school and inputting fingerprint information by the students. When the students run in the morning, they swipe their cards on the attendance machine at the check-in point and press the fingerprint to confirm that the person has arrived. After the check-in is completed, they run to the next check-in point and repeat the check-in operation until the morning run is completed.

Although this kind of morning running attendance check-in system urges and supervises students' morning running activities to a certain extent, there are still some shortcomings:

Due to the need to set attendance machines for attendance, if the attendance machines are set too little and the card swiping is concentrated, there will be a long queue in the morning run, which will make students waste a lot of time on card swiping. If the number of attendance machines is increased, the construction cost will also increase.

Although the fingerprint mode of swiping the card avoids the cheating behavior of others to sign in by swiping the card, it can't avoid the cheating behaviors such as cutting corners, climbing over the fence, riding bicycles, etc., and the students' morning running exercise effect is not good;

Due to the network problems, it often happens that the attendance machine can't identify students or the identification speed is slow.

Due to the huge amount of data of students' morning running attendance, slow synchronization of system database, the system didn't count the number of students' morning running attendance after the end of students' morning running attendance, which affected the final evaluation. Therefore, a set of intelligent and convenient

attendance methods and systems that can effectively prevent cheating are urgently needed.

## **2. Research contents of the project and problems to be solved**

Aiming at the shortcomings in the prior art, this design provides a morning running attendance system which can reduce cheating and cut corners and prevent students from cheating.

The morning running attendance system for preventing students from cheating includes the following steps:

Responding to the scanning action of triggering the running punch card, drawing a corresponding virtual path, wherein the virtual path contains a plurality of virtual check-in points and presents the virtual path on the display screen of the attendance terminal device;

Responding to the mobile signal of the attendance terminal device along the virtual path, obtaining the positioning information of the attendance terminal device in real time, guiding the attendance terminal device to sign in after the attendance terminal device enters the sign-in point area, and obtaining the sign-in information;

Draw the real path of morning run according to the sign-in information and positioning information, and compare the real path with the virtual path to judge the completion of morning run attendance.

In response to the scanning action that triggers the running punch-in, the corresponding virtual path is drawn, the virtual path includes several virtual check-in points, and the virtual path is displayed on the display screen of the attendance terminal device, and the specific steps include:

Identify the sign-in signal of the attendance terminal equipment at the sign-in point, obtain the user information, punch-in time information and location information of the attendance terminal equipment, and draw the initial virtual path;

According to the drawn distance of the initial virtual path, setting a starting point, an ending point and a plurality of check-in points on the initial virtual path to form a virtual path;

Display the virtual path on the display screen of the attendance terminal device.

In response to the mobile signal of the attendance terminal device along the virtual path, the positioning information of the attendance terminal device is obtained in real time, and when the attendance terminal device enters the check-in point area, the attendance device is guided to check in, and the check-in information is obtained. The specific steps include:

Instruct the holder holding the attendance terminal equipment to run in the morning along the virtual path and acquire positioning information in real time, and send a

sign-in reminder signal to the attendance terminal equipment when the acquired positioning information falls into the sign-in point area for the first time;

Generating sign-in information in response to the specified action of the attendance terminal equipment to sign in at the sign-in point.

Generating sign-in information in response to the designated action of the attendance terminal equipment to sign in at the sign-in point, wherein the designated action includes any one of taking pictures on the spot, playing games or singing songs;

Check-in information includes: check-in time and check-in location.

According to the sign-in information and positioning information, draw the real path of the morning run, and compare the real path with the virtual path to judge the completion of the morning run attendance. The specific steps include:

According to the real-time acquired positioning information, sorting according to the time sequence and combining with the acquired sign-in information, drawing a real path map;

Comparing the real path map with the virtual path to verify whether the real path map and the virtual path are unified within the effective range, wherein, if the paths are unified within the effective range, the attendance will end; If the paths are not uniform within the effective range, the scanning action that triggers the running punch card is performed again.

The morning running attendance system for preventing students from cheating includes:

A virtual path drawing unit, configured to draw a corresponding virtual path in response to the scanning action that triggers running punch-in, wherein the virtual path includes several virtual check-in points;

A virtual path presenting unit, configured to present a virtual path on the display screen of the attendance terminal device;

The positioning information acquisition unit is used for acquiring the positioning information of the attendance terminal equipment in real time in response to the moving signal of the attendance terminal equipment along the virtual path;

A sign-in information obtaining unit, configured to guide the attendance terminal equipment to sign in and obtain sign-in information after the attendance terminal equipment enters the sign-in point area;

The path comparison unit is used to draw the real path of the morning run according to the sign-in information and positioning information, and compare the real path with the virtual path to judge the completion of the morning run attendance.

The virtual path drawing unit is configured to identify the sign-in signal of the attendance terminal equipment at the sign-in point, obtain the user information, clock-in time information and location information of the attendance terminal equipment,

and draw the initial virtual path;

The virtual path drawing unit is configured to set a starting point, an ending point and a plurality of check-in points on the initial virtual path according to the drawn distance of the initial virtual path to form a virtual path;

The virtual path presentation unit is configured to display the virtual path on the display screen of the attendance terminal device.

The location information acquisition unit is configured to guide the holder holding the attendance terminal equipment to run in the morning along the virtual path and acquire location information in real time, and send a sign-in reminder signal to the attendance terminal equipment when the acquired location information falls into the sign-in point area for the first time;

The sign-in information acquisition unit is configured to generate sign-in information in response to the specified action of the attendance terminal equipment to sign in at the sign-in point.

The sign-in information acquisition unit is configured to generate sign-in information in response to the designated action of the attendance terminal equipment to sign in at the sign-in point, wherein the designated action includes any one of taking pictures on the spot, playing games or singing songs;

Check-in information includes: check-in time and check-in location.

The path comparison unit is configured to sort according to the real-time acquired positioning information according to the time sequence and draw a real path map by combining the acquired sign-in information;

Comparing the real path map with the virtual path to verify whether the real path map and the virtual path are unified within the effective range, wherein, if the paths are unified within the effective range, the attendance will end; If the paths are not uniform within the effective range, the scanning action that triggers the running punch card is performed again.

### **3. Features and innovations of the project**

According to the design, a virtual path can be established according to the requirements, and corresponding attendance check-in points and check-in methods of each attendance check-in point can be set on the virtual path, so that students can check the morning running path and check-in point information through the attendance terminal equipment, and students can avoid cheating in the morning running process. It is possible to judge the students' real attendance at the attendance check-in point through the combination of specific check-in mode and manual management. At the same time, it can increase the interest of morning running through specific check-in mode to improve the enthusiasm of students' morning

running, and change passive mandatory morning running into active morning running to better improve students' physical quality.

#### **4. Project implementation plan**

The morning running attendance system to prevent students from cheating, as shown in Figure 1, includes the following steps:

S1, responding to the scanning action that triggers running punch-in, drawing a corresponding virtual path, wherein the virtual path includes several virtual check-in points, and displaying the virtual path on the display screen of the attendance terminal device;

S2, responding to the mobile signal of the attendance terminal device along the virtual path, acquiring the positioning information of the attendance terminal device in real time, and guiding the attendance terminal device to sign in after the attendance terminal device enters the sign-in point area, and acquiring the sign-in information;

S3, draw the real path of morning run according to the sign-in information and positioning information, and compare the real path with the virtual path to judge the completion of morning run attendance.

In this design, the attendance can be completed by the attendance terminal device alone, that is to say, a mobile morning running attendance software based on virtual path is developed based on the attendance terminal device, and the method is directly realized. Another way is to realize it through the attendance terminal equipment and the background server. After the background server receives the scanning action that triggers the running clock-in, According to the information of the attendance terminal equipment carrier, and the virtual path is displayed on the display screen of the attendance terminal equipment. The attendance terminal equipment carrier runs in the morning according to the virtual path and signs in at the sign-in point, and uploads the sign-in information to the background server, which collects the sign-in information and positioning information. Finally, draw the real path map, compare the real path map with the virtual path, and judge the completion of morning running attendance. This design can effectively prevent students from cheating in the morning run, and the judgment result is reliable.

Example 1:

The morning running attendance system to prevent students from cheating, as shown in Figure 1, includes the following steps:

S1, responding to the scanning action that triggers running punch-in, drawing a corresponding virtual path, wherein the virtual path includes several virtual check-in points, and displaying the virtual path on the display screen of the attendance terminal device;

S2, responding to the mobile signal of the attendance terminal device along the virtual path, acquiring the positioning information of the attendance terminal device in real time, and guiding the attendance terminal device to sign in after the attendance terminal device enters the sign-in point area, and acquiring the sign-in information;  
S3, draw the real path of morning run according to the sign-in information and positioning information, and compare the real path with the virtual path to judge the completion of morning run attendance.

In step S1, corresponding virtual paths are drawn in response to the scanning action that triggers the running clock-in, and the virtual paths include several virtual check-in points, and the virtual paths are displayed on the display screen of the attendance terminal device, and the specific steps include:

Identify the sign-in signal of the attendance terminal equipment at the sign-in point, obtain the user information, punch-in time information and location information of the attendance terminal equipment, and draw the initial virtual path;

According to the drawn distance of the initial virtual path, setting a starting point, an ending point and a plurality of check-in points on the initial virtual path to form a virtual path;

Display the virtual path on the display screen of the attendance terminal device.

Here, the initial virtual path refers to the initial virtual path without adding a start point, an end point and a number of check-in points, which is formed on the display screen of the attendance terminal device after adding a start point, an end point and a number of check-in points to the initial virtual path.

The specific steps of step S2 include:

Instruct the holder holding the attendance terminal equipment to run in the morning along the virtual path and acquire positioning information in real time, and send a sign-in reminder signal to the attendance terminal equipment when the acquired positioning information falls into the sign-in point area for the first time;

Generating sign-in information in response to the specified action of the attendance terminal equipment to sign in at the sign-in point.

In an embodiment, sign-in information is generated in response to the designated action of the attendance terminal equipment to sign in at the sign-in point, wherein the designated action includes any one of taking pictures on the spot, playing games or singing songs;

Check-in information includes: check-in time and check-in location. In order to prevent students from cheating more effectively, it is specified that the way to complete the sign-in is one of taking pictures, playing games or singing on the spot. After the sign-in is completed, the sign-in information is uploaded to the sign-in information acquisition unit, which collects the sign-in information and verifies it after

collection. And compare the check-in location with the check-in point in the virtual path to see if it is checked in at the designated check-in point in the virtual path.

In step S3, the real path of the morning run is drawn according to the sign-in information and positioning information, and the real path is compared with the virtual path to judge the completion of the morning run attendance. The specific steps include: According to the real-time acquired positioning information, sorting according to the time sequence and combining with the acquired sign-in information, drawing a real path map;

Comparing the real path map with the virtual path to verify whether the real path map and the virtual path are unified within the effective range, wherein, if the paths are unified within the effective range, the attendance will end; If the paths are not uniform within the effective range, the scanning action that triggers the running punch card is performed again.

That is to say, it is possible that students can sign in directly to the sign-in point in order to cheat, cut corners or by other means. Therefore, in order to better prepare for the assessment of students' morning run, draw the real-time positioning information and sign-in information into a real path map, and then unify the paths between the real path map and the virtual path within the effective range. If the path is uniform within the set effective range, it means that the morning run attendance has been completed; if the path is not uniform within the set effective range, it means that the morning run attendance has not been completed, and it is necessary to perform the morning run attendance again.

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### **References**

- [1] A smart street lamp system based on the Internet of Things [J]. Liu Qiming, Zhao Liang, Yang Junwen, Qu Shaocheng. Computer and Digital Engineering .2020 (02).
- [2] Design and research of directional movement punching system based on RFID and ZigBee wireless sensor network [J]. Yang Jing. Electronic Design Engineering. 2018(17).
- [3] Research on the design and implementation of fingerprint attendance management system for 3G network transmission [J]. Zhang Xiyang. Science and technology outlook. 2017(03).
- [4] Architecture of PLC-controlled dedicated lane automatic identification system based on ZigBee technology [J]. Ping He, Wang Zheng. Electronic test. 2016(24).
- [5] Parallel check-in attendance management system based on WeChat platform [J]. Xu Ning. Computer knowledge and technology. 2016(30).