

# Design and Application of Virtual Simulation Training Platform for Emergency Treatment in Prison

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**Abstract:** Such problems have always been faced in the training and teaching of judicial professional prison law enforcement management personnel training: The law says you can't move the teaching site to the supervision site; The site environment of occupational exposure event is complex, and the on-site operation of students is dangerous; The occurrence of emergencies is too strong, the probability of occurrence is not large, and there are too many uncontrollable factors on site, students are facing great danger; Compared with traditional training teaching methods, virtual simulation training teaching has the characteristics of "flexible project preset, vivid and intuitive operation experience, sharing learning anytime and anywhere, safe, reliable and controllable cost". Virtual simulation training can enrich the "integration of teaching, practice and war" talent training mode, effectively solve the pain and difficulty of training "practice", and help the quality of talent training.

## 1. Content and Function Design

### 1.1 Prison Cognitive Module

The students can have a general and intuitive understanding of various areas, facilities and personnel structure in the virtual prison through autonomous roaming and interactive operation in the first person perspective. The functions of each cognitive section in the virtual prison are detailed.

### 1.2 Skill Training Module

The skill training module consists of two parts: Virtual equipment training and virtual and real combined equipment training system. Virtual equipment training system uses cognitive training 3D engine to carry out virtual modeling of police equipment, and combines the basic theory of related equipment, police equipment construction, basic movements and safety education to conduct in-depth study and simulation operation, laying a solid foundation for future physical training. Students complete the training content as prompted, and the system will evaluate their mastery degree according to the simulation operation of students, so as to assess the mastery degree of all kinds of police equipment.

### 1.3 Emergency Handling Training Module

According to the different nature and trigger factors of the incident, the training module of emergency handling is divided into two parts: emergency handling training of human factors and emergency handling training of environmental factors.

The training of dealing with human factors emergencies includes virtual simulation training of scenes such as fighting, suicide by self-injury, making trouble in prison, attacking the prison, escaping and transporting criminals; the training for dealing with environmental factors emergency includes virtual simulation training for fire, power failure, earthquake and other scenes in prison. The corresponding environment, items, personnel, AI and other elements are established according to different types of events, and the event evolution nodes, corresponding training assessment nodes and assessment script parameters are set.

## **1.4 Laser Image Shooting Training Module**

The laser shooting training module plays the pre-made scene image on the projection screen to assess the trainees' handling of the incident and the use of various police equipment. The scene image environment is composed of multi-branch videos, which can be triggered by equipment (such as shooting, swinging baton, etc.) or triggered by environmental sensors (such as opening and closing doors, emerging from hiding, etc.). System through the image of real system and typical 3 d background and target model, made in different background and an emergency training mode, the students can master the skilled in the face of all kinds of emergency operational essentials and operating procedures.

## **1.5 "Path to Rebirth" Rehabilitation Training System for Prisoners Released from Prison**

Taught by grassroots tube out of the prison policemen guiding the criminal fitness training, after considering the out of the prison must face all kinds of social situation, make its have basic survival ability, and in the form of VR use prison education close to the real scene of daily life, help rehabilitation personnel as soon as possible into the social, rehabilitation personnel return to society, and improve the ability to adapt to society.

## **2. Platform Architecture Design**

### **2.1 The Overall Architecture of the Virtual Simulation Training Platform for Emergency Disposal in the prison**

The platform adopts hierarchical logical structure, three-layer structure and unified management platform structure of all applications, which is divided into data acquisition layer, data processing layer and general control interface layer.

The data acquisition layer provides the most basic original collected data for the whole virtual simulation training and drill system, the data processing layer conducts background data analysis and processing for the collected data information, and the general control interface layer provides interfaces for users (system administrators, teachers and students) to realize operation interfaces of various functions. The functional modules between data acquisition layer and data processing layer interact with each other through interfaces. Similarly, the results of data processing also provide users with all kinds of practical training assessment process analysis and results query.

### **2.2 Platform to Build**

The virtual simulation and training platform for emergency disposal of the prison adopts B/S mode to realize the remote deployment of cross-platform applications. The server background adopts J2EE technology to realize the organization and management of big data with Hadoop database. The middleware uses Apache. Cooperate with HadoopMapReduce interface development to realize distributed service and mobile application development expansion. VR underlying engine adopts Unity3D, which is the most mature and reliable in the industry, while AI engine is independently developed intelligent training AI engine.

Hardware system, including computer room hardware, display system, virtual reality omnidirectional action platform, VR wearable equipment, whole body motion capture system, etc.

The Software System. The platform software system includes front-end display module, courseware resource management module, practice room use management module, teacher login and background management, student login and background management, administrator login and background management, practice and exercise and assessment management module. The platform can be connected with the educational administration system of the school through the corresponding API, so that students can log in with the school account, make an appointment for learning and assessment, and check their academic performance. At the same time, they can also make an appointment through the special wechat public account.

The virtual simulation environment construction and interactive development software of the emergency disposal virtual simulation training platform of the supervision Institute include MultiGen,

AutoCAD, 3ds Max and Lightwave3D, etc.

### **3. Key Technologies and Equipment**

#### **3.1 Prison Virtual Simulation Environment Modeling Technology**

Prison virtual simulation environment modeling is the foundation of the whole virtual simulation application system.

The prison emergency disposal virtual simulation training platform needs to create a prison virtual simulation environment including 3D model, scene and sound, etc. Practice the virtual simulation environment modeling including geometric modeling, movement modeling, object behavior modeling and physical modeling 3d visual modeling, using 3ds Max tool modeling techniques are needed to build prison was AB door, peripheral environment, the prison buildings, criminal labor field, the criminal canteen, cell, criminals and police body 3 d model.

#### **3.2 Panoramic Stereo Display Technology**

Panoramic immersive photorealistic shooting training system for police, 3D professional folding loop projection, and highly simulated gun laser simulator. Through the high definition digital projector, the real scenes are projected onto the big screen of folding ring screen, and the computer technology is used to create a realistic virtual environment with various senses such as sight, hearing and so on, so that the experiencer can have the feeling of being on the scene. The system is highly consistent with the real operation training in weapon structure, state indication, operation mode and training effect display. The system has the following characteristics: full-function training module and management framework for shooting range; based on database technology, support remote information management; multi-projection seamless stitching to build a large scale image environment, supporting 120-180° circular screen projection; support multi-projection splicing active stereoscopic display, stronger sense of presence;3d interactive training courses and tools; virtual characters can be inserted into shooting videos to achieve more diversified situational training; Hd camera dynamic video Mosaic technology supports site image environment.

### **4. Conclusion**

By creating diversified teaching environment and realizing the combination of virtual simulation experiment and solid experiment, it can effectively remedy the defects of traditional experimental teaching, such as high experimental cost, high risk and poor student experience. Combined with professional characteristics and experimental teaching experience, this paper makes a comprehensive analysis of the virtual simulation training platform for prison emergency disposal, which has certain reference value for the construction of virtual simulation training platform in similar colleges and related majors.

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