# 基于零知识证明的隐私保护AI门禁系统

# Zero-Knowledge Proof-Based Privacy-Preserving AI Access Control System

## 专利标题 | Patent Title

基于零知识证明的隐私保护AI门禁系统

Zero-Knowledge Proof-Based Privacy-Preserving AI Access Control System

## 技术领域 | Technical Field

本发明属于信息安全和人工智能领域，涉及一种利用零知识证明技术实现的隐私保护门禁系统，特别是一种在验证用户身份权限的同时保护用户身份隐私的AI门禁系统。

This invention belongs to the field of information security and artificial intelligence, involving a privacy-preserving access control system implemented using Zero-Knowledge Proof (ZKP) technology, particularly an AI-based system that protects user identity privacy while verifying user access permissions.

## 背景技术 | Background Technology

传统门禁系统通常通过物理卡片、密码、生物特征（如指纹、人脸）等手段验证用户身份。尽管这些方法能够有效地确保授权用户的访问权限，但在验证过程中会暴露用户的身份信息，存在隐私泄露风险。  
零知识证明是一种密码学技术，允许证明者向验证者证明其拥有某些信息的真实性，而无需暴露该信息的具体内容。利用该技术，可以设计一种门禁系统，在验证用户具有访问权限的同时，保护用户的身份隐私。

Traditional access control systems typically verify user identity using physical cards, passwords, or biometric features (such as fingerprints or facial recognition). While these methods effectively ensure authorized access, they expose user identity information during the verification process, posing privacy risks.  
Zero-Knowledge Proof is a cryptographic technique that allows a prover to demonstrate the validity of certain information to a verifier without revealing the specific details of the information. Using this technology, an access control system can be designed to verify user access permissions while preserving user identity privacy.