IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Secure Online Registration With Video Consent & Ai Verification

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Abstract : Secure online registration system incorporating video consent and AI-powered verification to enhance the registration process for various services. Traditional registration methods often rely on static forms or basic authentication mechanisms, which may lack sufficient security and user verification measures. By integrating video consent, users are required to record a brief video confirming their identity and agreeing to the terms of service. This video is then processed using AI-based facial recognition and behavioral analysis to ensure the individual matches their submitted identification, preventing fraudulent activities and impersonation. The AI system also verifies the authenticity of the consent, reducing the risks of coercion or false claims. This multi-layered approach provides a higher level of security and trust for online registrations, offering both users and service providers a safer, more efficient solution for digital transactions and account creation.

Keywords: Secure online registration, video constant verification, digital Signature Auhentication, AI-based Sentiment Analysis. Voluntary Participaion, Faceless Registration, Biomeric Verifiction, Consent Management, Liveness Detection, Non-Repudiation.

I. INTRODUCTION

In the digital era, online registration systems have revolutionized the way individuals and organizations conduct official transactions. From property transfers to contractual agreements, these systems provide convenience, speed, and accessibility—especially in situations where physical presence is not feasible. However, this transition to faceless processes introduces a critical challenge: ensuring that participants, particularly sellers or signatories, are engaging voluntarily and without coercion. Traditional mechanisms such as manual signatures or biometric verification alone are insufficient to establish intent or protect against legal disputes regarding the authenticity or voluntariness of consent.

The core issue lies in the inability to verify a user's willingness beyond identity verification. In the absence of physical interaction, parties may later claim that fingerprints were forced, documents were signed under pressure, or digital consent was given without understanding. These scenarios not only undermine the integrity of the system but also expose institutions to legal and ethical risks. Hence, a more intelligent and secure approach is required—one that not only confirms identity but also captures genuine intent and consent.

To address this gap, the proposed system integrates video consent verification, where a participant records a real-time video while performing specific consent-driven tasks. This video is analyzed using AI-based sentiment analysis to assess emotions and detect signs of stress, hesitation, or duress. In parallel, digital signature authentication ensures the legal validity of actions performed, while biometric checks like facial recognition and liveness detection prevent impersonation. Together, these components form a multilayered security mechanism that offers both legal protection and user assurance.

Additionally, the system employs tamper-proof audit trails and secure data storage protocols to preserve the integrity of the captured data. Blockchain-based consent logs or time-stamped video metadata may be integrated to further enhance non-repudiation and transparency. By combining these innovative technologies, the solution aims to build trust, improve compliance, and establish a standard for secure, ethical, and efficient online registrations in sectors such as real estate, finance, and legal services

II. LITERATURE SURVEY

Recent research in secure digital systems emphasizes the importance of integrating AI, biometrics, and consent-verification technologies to ensure transparency and authenticity in online registration processes. Studies published in IEEE Xplore and Elsevier journals highlight the potential of combining facial recognition, digital signature authentication, and video consent to establish both identity and willingness in faceless registration scenarios. These technologies help address growing concerns over coercion, impersonation, and legal disputes in remote documentation processes, especially in property registrations and financial transactions.

Prominent studies from 2021 to 2023 explore how video-based consent systems, supported by AI-driven sentiment analysis, can capture non-verbal cues such as stress, hesitation, or confusion during the signing process. This enables the system to assess whether a user is genuinely acting voluntarily. Real-time facial emotion recognition, liveness detection, and voice tone analysis have been used to strengthen verification layers beyond conventional fingerprint or OTP-based systems. These systems are particularly valuable in environments where in-person validation is impractical, such as remote land registrations or digital onboarding of clients.

Several researchers have proposed multi-modal frameworks that integrate biometric authentication, blockchain for consent traceability, and tamper-proof video recording to ensure non-repudiation and legal validity. Studies have also investigated the role of digital signature encryption and timestamping to bind the user's intent securely with the submitted documents. While many of these technologies function independently, integrated platforms combining all these elements have shown promise in increasing efficiency, reducing fraud, and protecting user rights.

Challenges addressed in recent work include the risk of deepfake attacks, privacy concerns, and ethical implications of sentiment analysis. To counteract these issues, studies propose implementing edge AI models for local processing, GDPR-compliant consent management frameworks, and secure audit trails. Additionally, lightweight machine learning models are being explored to enable emotion detection in resource-constrained environments, making the systems scalable and suitable for deployment in rural or under-resourced areas.

This survey underscores the growing need for secure, AI-augmented online registration systems that not only verify identity but also establish informed and voluntary participation. By combining video consent, behavioral analysis, and digital signature validation, these systems pave the way for a future of transparent, efficient, and trustworthy faceless registration process.

III. OBJECTIVE

1. To design and develop a secure online registration system that enables remote users to complete registration processes without physical presence.

2. To integrate video consent capture as a core component of the system, ensuring that users can record and submit their verbal and visual consent in real-time.

3. To implement AI-based sentiment analysis on the recorded video to detect emotional cues (such as stress or hesitation) and confirm voluntary participation.

4. To authenticate user identity through multi-modal biometrics, including facial recognition and liveness detection, ensuring that the person giving consent is genuine and present.

5. To incorporate digital signature authentication for securely signing documents, binding them legally with the verified consent of the user.

6. To provide tamper-proof logging and audit trails, possibly through blockchain or secure timestamping, to ensure transparency and non-repudiation of actions taken.

7. To ensure user data privacy and regulatory compliance by integrating encryption, access control, and GDPR-compliant consent management protocols.

8. To evaluate the system's performance in terms of accuracy, speed, security, and user experience, especially in low-resource or rural environment.

IV. EXISTING IDEA

Current digital registration systems largely rely on biometric-based authentication methods such as fingerprint scanning, facial recognition, and iris detection. These technologies are commonly used in identity verification processes like Aadhaar-based KYC in India or in online banking applications. While effective for confirming a user's identity, they fall short in verifying whether the user is acting voluntarily, which is critical in legal and high-value transactions. Additionally, platforms such as eSign and DocuSign allow users to digitally sign documents using OTPs or digital certificates, providing legal validity to agreements. However, these systems lack built-in mechanisms to assess user willingness or detect coercion during the signing process.

Video KYC systems have emerged in recent years, especially in the financial and telecom sectors, enabling customer verification through real-time video interactions with human agents. Though useful, these systems often require manual oversight and are not fully automated, limiting their scalability and objectivity. On the other hand, advancements in AI-driven sentiment and emotion analysis offer promising solutions to assess a user's emotional state during interactions. These technologies, primarily used in customer support or behavioral analysis, can detect stress, hesitation, or confusion, which could indicate coerced participation—but they are yet to be fully integrated into consent verification workflows.

Furthermore, technologies like liveness detection and anti-spoofing mechanisms have been developed to ensure that biometric inputs come from real, present users and not from photos or videos. These are critical in preventing impersonation but still don't address the aspect of informed consent. Blockchain has also been introduced as a secure method for storing and verifying consent logs. By creating tamper-proof, time-stamped records of user consent, blockchain enhances transparency and legal accountability. However, most of these existing systems operate in isolation

and do not combine video consent, AI-based sentiment analysis, digital signature verification, and tamper-proof storage in a unified platform.

Therefore, while the existing ideas offer strong components for identity verification and data security, they lack a comprehensive framework that captures user consent, identity, and emotional state simultaneously in a fully automated, secure, and scalable manner. This project aims to bridge that gap by developing an integrated system that ensures voluntary participation in faceless online registrations, thus reducing the risk of coercion and enhancing trust in digital processe.

Disadvantage

Despite the advancements in biometric authentication and digital consent tools, existing online registration systems still face several limitations. One of the primary drawbacks is the inability to confirm the user's willingness or detect signs of coercion during the registration process. Most systems focus solely on verifying identity using facial recognition, fingerprints, or OTP-based authentication, but do not assess the user's emotional state or intent. This creates vulnerabilities in high-risk scenarios, such as property registrations, where coercion or forced participation can have serious legal consequences.

Another significant limitation is that video-based KYC systems often require human intervention, making them labor-intensive, slow, and prone to human error or bias. While these systems provide visual confirmation, they lack real-time AI-driven analysis to detect subtle behavioral cues that could indicate distress or unwillingness. Additionally, current digital signature platforms like eSign or DocuSign offer security and legal recognition, but do not integrate biometric or video verification, thus relying heavily on weak points like OTPs that can be misused.

Moreover, many existing platforms are not fully automated or scalable, especially in rural or low-resource areas where consistent internet connectivity and advanced hardware may not be available. Data privacy and security concerns also persist, particularly when handling sensitive video, biometric, and sentiment data, with limited solutions in place for secure, decentralized storage or consent traceability.

Finally, most systems operate in silos, with no single platform integrating video consent, emotion analysis, digital signatures, and secure audit trails. This fragmented approach results in incomplete protection against fraud, identity theft, and legal disputes. These limitations highlight the urgent need for a more robust, integrated, and intelligent system that not only verifies identity but also ensures voluntary participation in a secure, transparent, and efficient manner.

V. PROPOSED ARCHITECTURE

1. **User Interface**: This is the entry point for farmers and administrators to interact with the system via a web or mobile application. Through the UI:- Farmers can view real-time statistics (e.g., temperature, humidity, feed/water levels). They can configure thresholds (turn on fans if temp > 30°C). Alerts and recommendations are also received through this layer.

2. **Sensor Network Layer**: The backbone of the IoT system. It includes:- *Temperature Sensor*: Monitors ambient temperature inside the poultry shed. *Humidity Sensor*: Ensures optimal moisture levels for bird comfort. *Light Sensor (LDR)*: Controls artificial lighting, mimicking natural daylight. *Water Level Sensor*: Monitors the water in drinkers to avoid dehydration. *Gas Sensor (Ammonia/NH_3):* Detects toxic levels harmful to birds.

3. **2Data Collection Module**: A microcontroller receives data from sensors:-Aggregates and filters noise or irregular data. Performs initial processing (e.g., average readings, signal calibration). Sends processed data to the cloud for further analysis.

4. **Cloud & Storage Layer**: Data from multiple farms or devices is stored in the cloud, providing:- Historical trends of sensor data. Access to analytics dashboards. Support for scalability and multi-location operations.

5. **Data Analytics & Machine Learning Module**: This is the brain of the system. It analyzes incoming sensor data to:-Detect anomalies (e.g., sudden rise in ammonia levels). Predict environmental risks (e.g., overheating). Identify trends (e.g., frequent temperature drops during nights). *Machine Learning Models:-* Trained on past sensor data to predict disease outbreak conditions or suggest optimized feed/water schedules. Can auto-adjust thresholds for optimal growth based on bird age or breed.

6. **Automation and Control Layer**: Based on decisions from the ML model or predefined rules: Actuators are triggered:- Turn on/off heaters or fans, Control light intensity, Start/stop water pumps, Dispense feed at intervals.

7. **Noification and Alert System**: In case of abnormalities (e.g., water empty, high temperature), the system:- Sends SMS/email/app notifications Highlights issues on the dashboard Enables remote override of controls.

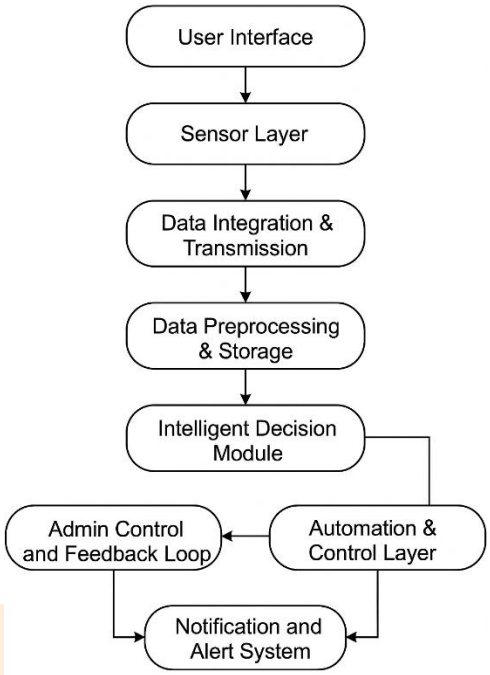
User Interface
Sensor Layer
Data Integration & Transmission
Data Preprocessing & Storage
Intelligent Decision Module
Admin Control and Feedback Loop
Automation & Control Layer
Notification and Alert System

Figure 1

VI. CONCLUSION

The IoT-Based Smart Poultry Farming System developed in this project represents a transformative step in modern agricultural technology, specifically designed to enhance productivity, efficiency, and sustainability in poultry farming. By integrating real-time sensor networks with machine learning algorithms and automated control systems, the solution provides farmers with intelligent insights and responsive environmental management, ensuring optimal conditions for bird growth and well-being.

The system's layered architecture—from data collection and cloud storage to automated actuation and user-friendly interfaces—demonstrates a robust and scalable approach to smart farming. It empowers farmers with real-time alerts, predictive analytics, and data-driven recommendations, reducing manual effort and minimizing risks such as disease outbreaks, feed waste, or temperature-related stress.

This project not only addresses key challenges in traditional poultry management but also opens the door for future expansion, including integration with advanced AI models, mobile-based remote monitoring, and large-scale data analytics for livestock health forecasting. Aligned with the global movement towards smart agriculture, the system paves the way for more sustainable, efficient, and informed farming practices.

By combining IoT, automation, and intelligent analytics, this project contributes significantly to the digital transformation of the poultry industry—ensuring better resource management, higher productivity, and improved animal welfare while enabling farmers to make proactive, informed decisions in real time.

VII. REFERENCES

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