SOLVEX

TECHNOLOGY

Automating & Securing Tenant-Landlord Transactions

Date: 15th July 2025

1. Title of the Invention

A System and Method for Automating and Securing Tenant-Landlord Transactions Using Digital Escrow, Compliance Logic Engines and Smart Contract Integration

The invention relates generally to the field of property management technology, with a specific focus on enhancing the security, automation and legal compliance of rental transactions through a digitally governed platform. More particularly, the invention discloses a technical infrastructure designed to support the entire tenancy lifecycle, including deposit management, contract enforcement, compliance verification and dispute resolution — all executed through programmable workflows and event-driven logic.

In existing real estate ecosystems, tenant-landlord transactions are often fragmented across multiple unconnected systems (example: banks, legal offices, property agents), resulting in delays, errors, disputes and compliance gaps. This invention addresses those inefficiencies by introducing a digital transaction layer between parties — equipped with:

- **A conditional escrow deposit mechanism** that securely holds tenant deposits and releases them only when system-defined rules are met.

- **An automated compliance engine** that continuously evaluates obligations (such as tenancy term, Ejari registration and payment deadlines) against real-time data.

- **Dispute resolution triggers** that either resolve conflicts within the system or escalate them via secure integrations to legal authorities such as Rental Dispute Centers (RDC) and or Real Estate Regulatory Agency (RERA) — Dubai Land Department.

- **Smart AI based contracts** that encode legal terms into enforceable machine-readable logic.

- **Role-based identity verification** to ensure that only verified tenants, landlords or managers can participate in the contractual flow.

This invention is not limited to residential real estate and may be extended to commercial rentals, co-living/co-working agreements and institutional leasing environments across the regions.

In short, the title refers to an integrated technological method and system that provides a secure, automated, legally integrated and auditable environment for executing and managing rental transactions — reducing fraud, delays and ambiguity in the landlord-tenant relationship.

2. Background of the Invention

The real estate rental industry, particularly in rapidly urbanizing regions such as the United Arab Emirates, faces significant operational and legal inefficiencies in managing tenant-landlord relationships. The rental lifecycle — from contract signing and deposit management to compliance monitoring and dispute resolution — is often executed using disparate tools, paper-based processes and manual interventions. These fragmented systems create vulnerabilities and inefficiencies that negatively impact all stakeholders: tenants, landlords, property managers, real estate agents and regulatory authorities.

One of the primary issues is the lack of a unified and transparent mechanism for handling security deposits. In the current landscape, tenant deposits are manually collected by landlords or agents, often held in private bank accounts without regulated escrow mechanisms. This introduces a high degree of mistrust, lack of accountability and financial exposure, especially in situations where disputes arise at the end of the tenancy period.

Furthermore, there exists a significant compliance gap between tenancy agreements and the regulatory requirements set by governmental bodies such as the Dubai Land Department (DLD), Real Estate Regulatory Authority (RERA) or Rental Dispute Center (RDC). Contractual obligations like Ejari registration, renewal notices, rent payment deadlines and notice periods are not systematically tracked or enforced, leading to missed deadlines, invalid leases or disputes that escalate to costly legal action.

Additionally, when disputes occur between landlords and tenants — such as disagreements over deposit deductions, property damage, early termination or unpaid dues — the process of initiating and managing a resolution is manual, time-consuming and often opaque. There is typically no standardized digital framework through which evidence is gathered, actions are triggered or cases are synchronized with official judicial or quasi-judicial bodies.

While property technology platforms exist for real estate listings and property management, none offer a dedicated, legally integrated, transaction-secured system that manages both financial and legal obligations dynamically. Similarly, general-purpose payment platforms or e-signature services lack the ability to enforce local real estate regulations or connect directly to the real estate authorities and the legal centers.

This fragmented landscape results in:

- **Delayed or contested refund of security deposits**
- **Non-compliance with rental regulations**
- **Inefficient dispute escalation and resolution**
- **Unverified or fraudulent parties entering into binding agreements**
- **Limited traceability of actions and lack of audit trails**

The need, therefore, is for a technical platform that consolidates and automates the essential pillars of rental transactions — security deposit handling, legal compliance, tenant-landlord obligations and dispute resolution — through secure, automated, rule-based systems that can interact with both users and external authorities. Such a system should be able to translate legal contracts into executable processes, minimize human error and build trust through transparency, accountability and regulatory alignment.

This invention, SOLVEX, directly addresses these systemic inefficiencies by proposing a novel, technically advanced platform that serves as a digital legal-financial bridge between tenants, landlords and real estate authorities — thereby transforming the real estate rental ecosystem into a structured, automated and legally compliant environment.

3. Summary of the Invention

This invention relates to a technical system and method designed to automate, secure and legally enforce rental transactions between tenants and landlords. Branded as SOLVEX, the invention provides a platform that transforms traditional rental workflows into a digitally governed, event-driven ecosystem — ensuring trust, compliance and operational efficiency throughout the tenancy lifecycle.

At its core, the invention integrates financial logic, legal rule engines and digital verification systems into a centralized platform. SOLVEX addresses each stage of the rental relationship — from user onboarding and contract creation to security deposit management, real-time compliance tracking and dispute resolution — through a set of interlinked modules designed for seamless automation.

One of the principal innovations of SOLVEX is its Digital Escrow Engine, a secure transaction layer that holds tenant security deposits in escrow accounts. The engine enforces conditional release of funds based on predefined rules outlined in the tenancy agreement. These rules may include contract expiry, condition of property, mutual agreement of both parties or a verdict from an external authority such as a Rental Dispute Center (RDC). This mechanism reduces trust dependency between parties, thereby minimizing financial risk and ensuring fairness.

In addition, the invention introduces an Automated Compliance Logic Engine that continuously monitors contract milestones and obligations. This engine evaluates parameters such as:

- **Ejari registration and renewal**
- **Payment of rent or service charges**
- **Legal notice periods for termination**
- **Contract extension deadlines**
- **Dispute cooling-off periods**

Using these parameters, the system generates automated alerts and enforces business logic that governs subsequent actions — such as withholding a deposit, sending a breach notification or escalating the issue to a dispute module.

A further innovation lies in the Dispute Resolution Module, which provides an interface for tenants or landlords to raise grievances within the system. The module includes tools for documenting evidence, communicating with the other party and, if unresolved, initiating API-based integration with the official Rental Dispute Center. Through this integration, the platform can auto-populate dispute forms, transfer relevant case files and track legal responses, thereby reducing the burden of manual submissions and errors.

To ensure integrity and traceability, the invention also features Smart Contract Integration. The tenancy agreement is transformed into a machine-readable and executable smart contract, allowing the system to trigger defined actions without manual oversight. For example, the smart contract can automatically:

- **Reject early withdrawal without proper notice**
- **Freeze deposit releases in case of active disputes**
- **Renew contracts conditionally upon mutual approval**

Security is further enhanced through a multi-level authentication(MLA) module that includes document verification, biometric login (optional), OTPs and Emirates ID validation. Access to different modules is role-based, ensuring that only authorized stakeholders (example: tenants, landlords, legal administrators) can initiate or approve sensitive actions.

The invention also provides a backend control panel for system administrators and regulators, enabling oversight of platform activity, manual intervention in edge cases, audit trail visibility and compliance enforcement.

In essence, SOLVEX reimagines the tenant-landlord ecosystem by offering:

- A **technically enforceable framework** for rental obligations
- A **compliance monitoring system** that prevents regulatory violations
- A **dispute escalation path** that integrates directly with judicial infrastructure
- A **digitally secure escrow system** with release conditions tied to real-world legal and contractual triggers

By embedding legal, financial and operational workflows into a modular, scalable and secure platform, this invention eliminates ambiguity, delays and manual dependencies in rental transactions — delivering a high-trust, low-friction experience for all parties involved.

4. Detailed Description of the Invention

The invention disclosed herein is a comprehensive digital platform, branded as SOLVEX, that facilitates the secure, automated and compliant management of tenancy transactions between tenants and landlords. The system is composed of several integrated technical modules, each serving a distinct function, yet working cohesively to enforce contractual, legal and financial obligations through a digital architecture.

4.1. Architecture Overview

The SOLVEX system is a web and mobile-based platform built using modular micro-services architecture. Each module is responsible for a core function within the rental lifecycle and the platform communicates with external regulatory bodies and authorities through encrypted APIs. All actions performed within the platform are logged & tracked through a secure backend with role-based access & audit trails.

4.2. Key Functional Modules

4.2.1. User Onboarding & Identity Verification Module

This module enables the registration and authentication of users (tenants, landlords, property managers and legal agents).

Functionality:

- Digital KYC process using Emirates ID or passport scans
- Facial recognition or biometric verification (optional)
- Role assignment upon verification (tenant/landlord/legal agent)
- Linking to property or tenancy profiles in government records

Security Features:

- Multi-factor authentication (OTP, password, biometric)
- End-to-end encryption of personally identifiable information (PII)

4.2.2. Smart Tenancy Contract Creation Engine

This module facilitates the creation and signing of tenancy contracts through a legally compliant, dynamic smart form system.

Functionality:

- Custom templates aligned with local tenancy law (example: Dubai Tenancy Law)
- Editable clauses with system-enforced mandatory terms
- Smart contracts: Each clause is mapped to a logic-based condition
- Integrated digital signature via UAE Pass or in-app verification

Output:

- Executable smart contract stored on secure cloud & on blockchain(optional)
- Summary of tenant and landlord obligations in machine-readable format

4.2.3. Digital Escrow Deposit Engine

This is the financial core of SOLVEX, responsible for holding, freezing and releasing tenant deposits based on event-driven logic.

Functionality:

- Upon contract execution, tenant transfers security deposit to system-linked escrow account
- Deposit is locked and not accessible to either party during the contract term
- Release is triggered based on:
  - Expiry of contract with no active disputes
  - Mutual digital confirmation by tenant and landlord
  - Resolution verdict issued by RDC or designated authority

Compliance:

- Escrow terms are governed by tenancy contract rules
- All transactions are auditable and traceable

Flexibility:

- Option for split releases in case of partial damages or agreements

4.2.4. Compliance Engine

This is a rules-based logic engine that monitors contractual, regulatory and financial obligations during the rental lifecycle.

Functionality:

- Monitors key deadlines: Ejari registration, renewal, rent due dates, termination notice periods
- Generates real-time notifications for upcoming or missed events
- Auto-flags violations or inaction (example: non-renewal after expiry)
- Applies escalation rules or penalties as defined in smart contract

Legal Integration:

- Cross-verifies data with government portals (example: DLD APIs)
- Automatically blocks certain actions (example: deposit release) if legal steps are skipped

4.2.5. Dispute Management & RDC Sync Module

This module manages the resolution of conflicts between parties and offers integration with the Rental Dispute Center (RDC).

Functionality:

- Users can raise a dispute with predefined categories (example: deposit refund, property condition and more)
- Upload of supporting evidence (images, messages, contract extracts)
- In-system communication thread between parties
- Automated escalation: If not resolved internally, system syncs case with RDC through API

API Actions:

- Auto-fill case forms using platform data
- Upload attached documents to RDC database
- Track status and verdicts issued by RDC
- Use RDC judgment to trigger actions (example: forced deposit release)

4.2.6. Notification & Alert Engine

This real-time communication system ensures that users remain informed of critical deadlines, compliance events or dispute escalations.

Functionality:

- Automated SMS, email and in-app alerts
- Configurable reminders (weekly, monthly, milestone-based)
- Escalation notices for non-actionable events
- Push notifications for payment confirmations, renewal opportunities and contract milestones

4.2.7. Backend Administrative Control Panel

Designed for platform administrators, regulators or arbitration officers.

Functionality:

- Full log visibility of transactions, messages, status changes
- Manual override tools in extreme cases (example: fraud, court orders)
- Account management for flagged or suspended users
- Reporting dashboards (compliance rates, dispute trends, time-to-resolution metrics)

Security:

- Role-based access controls
- Audit logs with timestamp and user traceability
- GDPR-compliant data handling and deletion protocols

4.2.8. Integration Layer & APIs

SOLVEX communicates with external platforms using encrypted API calls.

Integration Targets:

- Dubai Land Department (DLD) — tenancy registration, property validation
- Rental Dispute Center (RDC) — legal escalations
- Financial institutions — escrow account handling & payment gateway services
- UAE Pass and Emirates ID validation systems

4.3. System Logic & Workflow (Basic)

User Onboarding
- User signs up → KYC and role verified

Contract Generation
- Landlord and tenant digitally draft and sign tenancy agreement → Smart contract generated

Deposit Handling
- Tenant pays security deposit → Funds locked in digital escrow

Lifecycle Monitoring
- Compliance engine monitors contract events (rent, renewal, violations) → Sends notifications

Dispute Handling
- Dispute raised by tenant/landlord → In-app resolution attempted → RDC API integration (if unresolved)

Contract Expiry or Termination
- Compliance engine evaluates end-of-term status → No disputes? → Deposit released automatically

4.4. Deployment and Scalability

The invention is deployable on cloud infrastructure (example: AWS, Azure), with scalable architecture designed for:

- Multi-property support for landlords with multiple units
- Multi-tenant SaaS distribution
- Real-time syncing with national tenancy databases

The platform is configurable for different jurisdictions across UAE & more, allowing for localization of:

- Legal logic
- Compliance requirements
- Payment channels
- Authority integrations

5. Patent Claims

Patent Claim 1 (Independent)

A computer & AI engine-implemented method for managing security deposits in a tenancy agreement, comprising:

- Receiving a digital tenancy contract between a tenant and their landlord,
- Establishing a digital escrow account linked to said contract,
- Receiving a security deposit from the tenant into said escrow account,
- Monitoring predefined contract lifecycle events using a rule-based logic engine,
- Conditionally releasing the deposited funds from the escrow account upon satisfaction of one or more of the following: mutual agreement by both parties, expiration of tenancy term without disputes, or a final resolution verdict issued by an external legal or governing authority,
- Wherein all transactions are digitally logged & auditable through a centralized platform.

Patent Claim 2 (Independent)

A system for validating compliance with tenancy-related legal and contractual obligations, comprising:

- A smart contract engine configured to interpret and store contract terms in a machine-readable format.
- A compliance validation module that tracks key events including rent payment deadlines, Ejari registration, contract renewal or termination dates.
- A notification engine that issues alerts upon the occurrence of predefined compliance events or breaches.
- A logic enforcement module that blocks or triggers financial actions (example: deposit release, penalty enforcement) based on compliance status.
- An interface for syncing compliance data with one or more external regulatory authorities.

Patent Claim 3 (Independent)

A dispute resolution module for tenancy management systems, comprising:

- A user interface configured to allow either the tenant or the landlord to initiate a dispute request related to the tenancy agreement.
- A documentation module to upload and organize evidence (contracts, communications, images)
- An internal resolution workflow allowing bilateral communication between parties
- A dispute escalation engine configured to synchronize dispute details with a government-affiliated Rental Dispute Center (RDC) via secure API integration.
- A verdict enforcement system that applies dispute outcomes to system logic including deposit release or contract termination.

Patent Claim 4 (Independent)

A digital tenancy management platform with embedded smart contract logic, comprising:

- An onboarding engine configured to perform user identification and assign roles (tenant, landlord, manager)
- A dynamic tenancy contract generator that produces smart contracts based on jurisdiction-specific legal frameworks
- A transaction layer configured to manage rental payments and security deposits through regulated financial instruments
- A backend administrative panel that allows authorized personnel to override, review or audit actions
- A modular integration layer that supports external API connections with real estate authorities, courts or other governmental service sectors.

Patent Claim 5 (Independent)

A computer-implemented method for executing event-driven tenancy contract workflows using smart contracts, comprising:

- Encoding contract clauses into digital logic using a rule-based schema,
- Triggering contract conditions based on time-bound or event-driven inputs (example: rent not paid by due date)
- Evaluating contract state periodically to determine system actions (example: sending notice, freezing account access)
- Generating immutable audit logs for each contract event
- Enforcing or blocking user actions based on real-time contract evaluations.

Patent Claim 6 (Dependent on Claim 1)

The method of Claim 1, wherein the escrow account is a regulated third-party custodial account held by a licensed financial institution and wherein deposit release requires at least two-factor authentication and event validation.

Patent Claim 7 (Dependent on Claim 2)

The system of Claim 2, wherein the compliance validation module retrieves external data in real-time from one or more of the following entities:

- Dubai Land Department (DLD) & Rental Disputes Centre (RDC)
- Real Estate Regulatory Authority (RERA)
- Emirates Identity Authority
- An integrated court system.

Patent Claim 8 (Dependent on Claim 3)

The dispute resolution module of Claim 3, further comprising a machine learning algorithm trained to suggest likely outcomes or mediation steps based on previous case data, evidence types and jurisdictional law.

Patent Claim 9 (Dependent on Claim 4)

The platform of Claim 4, wherein the administrative panel includes a dashboard with key metrics such as compliance rates, tenant satisfaction scores, unresolved disputes and audit risk flags.

Patent Claim 10 (Dependent on Claim 5)

The method of Claim 5, wherein smart contracts are deployed and stored on a blockchain ledger to ensure transparency, immutability and legal verifiability of all contract actions.

Patent Claim 11 (Dependent on Claim 2 & Claim 4)

The system of Claims 2 and 4, wherein non-compliance events automatically trigger suspension of user privileges, issuance of legal warning notices or referral to regulatory enforcement authorities.

Note on Claims

- Patent Claims 1–5 are independent claims, which form the core innovations of the SOLVEX system.

- Patent Claims 6–11 are dependent claims, offering further protection and refinement for specific components or use-cases.

- These claims collectively protect both methods and systems, ensuring SOLVEX’s technical processes, user flows, financial logic and authority integrations are all legally safeguarded.

6. Abstract

The present invention relates to a computer-implemented system and method for automating and securing tenancy-based transactions between tenants and landlords through a unified digital platform. The invention, branded as SOLVEX, provides a legally aware, rule-based environment for managing security deposits, enforcing contract compliance and resolving disputes through smart contract logic and authority integration.

At the core of the invention is a Digital Escrow Engine that receives and holds tenant deposits under pre-agreed conditions, releasing funds only upon satisfaction of predefined triggers. The system continuously monitors contract lifecycle events such as tenancy commencement, rental payments, renewal timelines and dispute flags through an Automated Compliance Engine, which validates legal obligations and enforces penalties or freezes based on real-time assessments.

The invention also includes a Dispute Management Module capable of facilitating internal resolution workflows and escalating unresolved issues directly to governmental dispute resolution centers such as the Rental Dispute Center (RDC) via secure API integrations. All actions within the system are governed by smart contracts derived from jurisdiction-specific tenancy laws, enabling automatic enforcement of terms without manual intervention.

A multi-layer user authentication system ensures that only verified individuals may participate in contractual and financial activities. The platform supports full audit trails, system logs, authority-level overrides and integrations with identity verification services and property databases.

SOLVEX delivers a comprehensive, secure and transparent digital infrastructure that enhances trust, compliance & operational efficiency in real estate rental domain.

7. Drawings (Check Annexure-A)

The patent application includes the following illustrative diagrams to clearly depict the functional components and logical workflows of the invention:

7.1. Overall System Architecture Diagram

Purpose:
To show the technical components and their relationships within SOLVEX.

Elements:

- Frontend Interfaces (Web & Mobile)
- User Onboarding & Identity Module
- Smart Contract Generator
- Digital Escrow Deposit Engine
- Compliance Engine
- Notification Engine
- Dispute Resolution Module
- Admin Control Panel
- API Integration Layer (DLD, RDC, UAE Pass & more)
- Encrypted Database & Audit Trail Storage
- Blockchain Ledger (optional)

Flow:
User → Web/Mobile Interface → Role Verification → Smart Contract → Deposit Engine ↔ Compliance Engine ↔ Dispute Module → Backend + APIs

7.2. Deposit Lifecycle Flowchart

Purpose:
To represent the full flow of security deposit handling.

Stages:

- Contract is signed via platform.
- Tenant pays security deposit into escrow.
- Deposit is locked — system checks compliance.
- Event triggers (contract expiry, mutual approval, RDC decision).
- Deposit is released to landlord or refunded to tenant.
- Audit trail is logged.

Logic Nodes(examples):

- Is contract expired?
- Are there active disputes?
- Was property handover accepted?

7.3. Compliance Monitoring Timeline

Purpose:
To show time-based and event-driven obligations monitored by the platform.

Monitored Events:

- Ejari registration (Day 0)
- Rent due date (Monthly, Quarterly, Triannual, Biannual or Annually)
- Renewal notice (60 to 90 days prior)
- Termination notice (60 to 90 days prior)
- Contract expiration (End of term)

Visual:
A horizontal timeline showing system-generated alerts and actions at each milestone, with user interaction points and enforcement triggers.

7.4. Dispute Resolution Process Flowchart

Purpose:
To illustrate internal and external dispute management steps.

Flow:

- User raises dispute → Selects dispute category.
- Uploads evidence → Sends message to other party.
- If dispute resolved internally → Close case.
- If unresolved → System exports case to RDC.
- RDC decision → System enforces result (example: deposit release).

Icons:
Document upload, status tracking, API transmission, legal verdict & more

7.5. Smart Contract Logic Map

Purpose:
To demonstrate how contract clauses are encoded into digital logic.

Features(example):

- Condition: "If rent not paid within 7 days…"
- Action: "Trigger penalty notification + freeze deposit release"
- Authority Check: "Is Ejari registration confirmed?"
- Result: "Allow/deny contract renewal"

Visual:
A decision-tree map representing clauses → triggers → system actions.

7.6. Role-Based Access Control Diagram

Purpose:
To define who can perform what actions on the platform.

Roles:

- Tenant
- Landlord
- Admin/Regulator
- Legal Representative
- Governmental Agency/ Third Party
- Property Manager/Agent(optional)

Permissions:
View-only, Edit, Approve, Escalate, Override

Visual:
Matrix table or flowchart showing permissions per role.

8. Inventor & Applicant Information

The applicant is an individual that holds the legal ownership rights over the invention and is entitled to file, license, assign or and enforce the patent.

Primary Inventor & Individual Applicant:

- Inventor & Applicant Name: Ali Taraghijah
- Nationality: Vanuatu
- Contact: +971 507033232
- Email: chairman@irtm.ae
- Supporting attachments:
  - Drawings (Check Annexure-A)
  - Emirates ID (front & back)
  - Valid Passport copy
- Declaration of inventor-ship and entire rights: Signature