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(57) Abstract :

A secure multi-factor authentication system includes an access interface (101), a credential verification engine (102), a biometric acquisition layer (103), a fusion controller (104), a context analysis engine (105), a policy decision module (106), a secure template vault (107), and a session authorization manager (108). The system acquires at least two biometric modalities, validates liveness and sample quality, compares transformed feature representations with protected references, computes a composite identity confidence value, evaluates contextual risk, and grants, denies, or escalates access accordingly. The arrangement improves spoof resistance, privacy protection, adaptive verification, and secure session continuity.

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