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(57) Abstract :

A self-evolving neural network architecture for dynamic environments includes an input acquisition interface (101), an environmental state encoder (102), a neural inference engine (103), a performance surveillance layer (104), an evolution controller (105), a topology adaptation manager (106), a candidate validation sandbox (107), a model registry (108), and a deployment switcher (109). Live conditions are encoded into environment signatures, model degradation is monitored during deployment, and structural candidate variants are generated, validated, stored, and selectively promoted or rolled back to maintain predictive performance, stability, and resource-aware operation under changing environmental conditions.

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