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(57) Abstract :
A smart reservoir water-release and flood-protection system integrates catchment rainfall gauges, reservoir-stage and inflow sensors, outlet-discharge and gate-position measurements, downstream river-stage stations and meteorological forecasts. A processor predicts reservoir inflow using a trained forecasting model, evaluates future storage levels for candidate release schedules and calculates corresponding downstream river-stage and flood-risk conditions. Candidate releases violating configured hydraulic operating limits are excluded before a recommended schedule is presented to an authorized dam operator. A release-setpoint interface communicates an approved setting to existing outlet-control equipment, while gate-position and downstream river measurements are used to check the resulting physical response and update subsequent calculations. A dashboard and notification device communicate measured conditions, predicted thresholds and warnings. The system provides instrument-linked, operator-authorized reservoir operation with downstream flood-risk assessment and measured operational feedback.

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