AI Adoption Cases by Sector

November 02, 2026

The center of gravity of artificial intelligence technology is rapidly shifting from single generation centered on massive cloud servers to autonomous operation on on-site edge devices and multi-tool collaboration. In communication-denied environments such as battlefields and remote forests, lightweight models that operate autonomously on small devices have entered operational field validation, while in software development and creative fields, a division-of-labor structure where multiple AIs divide roles to execute and verify tasks is taking hold. This expansion of autonomy is simultaneously generating new threats and institutional challenges. While enterprise internal breaches utilizing offensive agents and controversies over training on security data are emerging, environmental lawsuits surrounding data center power facilities and parliamentary debates across nations on democracy and education governance are intertwining, reshaping technology adoption and control standards together.

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1. Defense, Military, and Autonomous Systems

A. Unmanned Interception and Strike Systems and Onboard Autonomous Guidance

Ukraine's Upgraded ZIRKA Interceptor Drone Shoots Down High-Speed Jet UAV and Expands Procurement

In modern warfare, as electronic warfare (EW)—jamming radio waves to neutralize enemy communications and radar—has become routine, onboard computer vision (technology where AI analyzes camera footage to recognize objects), which allows an airframe to seek targets on its own even when external control signals are lost, has emerged as a core technology for air defense networks. According to reports on November 1, 2026, the Retro Team of the Darknode Battalion under the Ukrainian Army's 412th Nemesis Brigade operated an upgraded ZIRKA interceptor drone to pursue and shoot down a Russian jet-propelled Geran-5 drone flying at an altitude of 3,500 meters at a speed of approximately 400 km/h. Developed by Noctis and ZRK.tech with technology and investment support from Vyriy Industries, the airframe is equipped with a visual recognition model on a computer based on the commercial single-board Raspberry Pi 5. After automatically detecting a target at a range of up to 1 km, once the operator approves the target, the airframe transitions to autonomous tracking flight, following a human-in-the-loop structure (a method where AI handles tracking while a human controls the final engagement decision), with the pilot adjusting only the terminal approach speed. However, this announcement represents the performance of an upgraded prototype based on released video and descriptions from the unit, and detailed full specifications and whether there is mass deployment across the entire frontline have not been disclosed.

Earlier, on October 7, 2026, the Ministry of Defense of Ukraine officially listed Blade, a low-cost, high-speed kinetic interceptor drone developed by domestic defense company Phantom Defense, on its military procurement list. In the form of a vertical takeoff and landing (VTOL) quadcopter that takes off and lands vertically without a runway, Blade is equipped with day-and-night thermal imaging cameras, delivers a maximum speed of 310 km/h, a maximum range of 30 km, and a payload of up to 0.5 kg, and is slated for defense budget procurement and release on the Brave1 marketplace, although specific contract quantities and actual combat interception rates remain undisclosed. Similar competition in kinetic interception and autonomous strike technologies has been ongoing since the beginning of the year. On February 4, 2026, the UK's Drone Defence announced the AeroStrike prototype—which physically destroys small targets flying between 100 km/h and 200 km/h by pursuing them at up to 270 km/h in environments where electronic warfare systems do not function—along with the integrated surveillance system AeroTracker, but military acceptance tests and mass production contracts have not been finalized. Russia's Kalashnikov Concern and Izhevsk Unmanned Systems Research and Production Association also unveiled the export-model loitering munition Kub-2-2E—with specifications including a total weight of about 14.5 kg, a 4.6 kg thermobaric warhead, a 40 km range, a top speed of 150 km/h, and a flight time of up to 25 minutes—at an exhibition in the United Arab Emirates (UMEX 2026) on January 22, 2026, presenting autonomous electro-optical guidance capabilities alongside coordinate navigation and manual piloting; however, its AI guidance maturity and hit rate in actual battlefield conditions remain an estimated stage requiring additional combat validation.

B. Tactical Aircraft Information Fusion and Manned-Unmanned Teaming

US Air Force F-35 Tactical AI Combat ID Flight Test and France's HypAIRion Air Combat Project

In the field of manned fighter aircraft, model integration is underway to relieve pilot judgment burdens and immediately counter emerging enemy electromagnetic threats. According to an announcement on February 24, 2026, the US Air Force and Lockheed Martin demonstrated the integration of a tactical artificial intelligence Combat Identification (Combat ID) model into the F-35 fighter's information fusion system through a Project Overwatch test flight conducted at Nellis Air Force Base in Nevada. This marks the first case where a tactical model resolved the identification ambiguity of electromagnetic emitters, such as enemy radars, in real time during flight and displayed independent identification information directly on the pilot's helmet-mounted display. Following the flight, ground engineers used automated tools to classify new emitter data within minutes, retrained the model, and immediately reloaded it for the next flight within the same mission planning cycle. However, this was not a method where the aircraft learned on its own during flight, but rather involved a post-mission ground retraining process; the total elapsed time remains undisclosed, and programmatic constraints remain as the F-35 Block 4 electronic warfare modernization schedule itself has been postponed to 2031 or later.

The French Ministry of the Armed Forces, French Air and Space Force, Directorate General of Armaments (DGA), and Ministerial Agency for Defense AI (AMIAD) have begun preparing for Manned-Unmanned Teaming (MUM-T, a system in which manned fighters and unmanned aircraft collaborate in a single formation) through HypAIRion, an air combat AI integration project launched in July 2026 with detailed plans unveiled on October 1. Currently, two Mirage 2000 fighter jets have been modified as flight testbeds at the Mont-de-Marsan base for demonstrations, and ground target automatic detection and classification AI will be embedded into Thales-manufactured TALIOS laser targeting pods, with deliveries scheduled to begin in 2027. The French military plans to integrate

these demonstration results into the Rafale F5 standard upgrade, slated for introduction in 2033, and the operation of collaborative combat drones; however, mid- to long-term validation is required before operational formation flight and serial production application can be realized.

C. Combined Command and Communications, Maritime Autonomous Surveillance, and Autonomous Weapons Safety Verification

Mobile Command and Communications Kit Vion, Bluebottle USV Demonstration, and GUARD-NATO Cooperation

Demonstrations and institutional cooperation are also advancing in parallel across multinational combined operations, maritime surveillance, and autonomous weapons safety validation. General Dynamics Information Technology (GDIT) of the United States announced on October 29, 2026, that it demonstrated Vion, a suitcase-sized mobile Mission Partner Environment solution, during the Pacific regional multinational exercise Olympus Fires 2026. Deployable within hours even in remote, communication-severed locations, it supports real-time multilingual AI translation and voice/video collaboration, aggregates drone, maritime sensor, and satellite imagery via the DOGMA analysis system, and applies Zero Trust security that verifies every access attempt every time. In the maritime domain, reports on October 21, 2026, confirmed that two Bluebottle hybrid unmanned surface vehicles (USVs) from Australia's OCIUS Technology participated in Maritime Big Play Pacific, a maritime exercise under Pillar 2 of the AUKUS security partnership among Australia, the United Kingdom, and the United States. Combining solar, wind, and wave power with a diesel generator, these vessels are equipped with ThayerMahan's Outpost acoustic detection payload and TransparenSea software, and are slated to support underwater threat detection and tracking as part of integrated maritime capabilities. Both cases represent combined exercise demonstration achievements and are not at the stage of formal large-scale fielding contracts.

Mechanisms to bind combat data into allied technical standards and prevent malfunctions of autonomous weapons are also being established. Ukrainian Deputy Minister of Defense Serhiy Boyev and NATO's Defence Innovation Accelerator for the North Atlantic (NATO DIANA) signed a defense technology innovation memorandum of understanding on October 30, 2026—the first for a non-NATO partner country—agreeing to synchronize combat test results and technology readiness level rosters in the fields of unmanned aerial vehicles, unmanned ground vehicles, electronic warfare, and radar, and to lay the groundwork for joint financial support. Meanwhile, the US Army Contracting Command previously entered into an Other Transaction Authority (OTA, a special contract mechanism to rapidly acquire commercial cutting-edge technologies as prototypes) agreement worth approximately $6.3 million with Advanced Technology International (ATI) and Battelle Memorial Institute on January 12, 2026, launching prototype development for GUARD. By combining neural network explainability with behavioral event graph structures to preemptively identify unpredictable, erratic behavior of autonomous systems before and after field deployment, this project demonstrates that the proliferation of unmanned weapons directly leads to demand for AI safety verification technology.

2. Cybersecurity and AI Safety

A. Agent-Based Security Breaches, Data Training, and Vulnerability Controversies

Chainalysis Offensive Agent Breach, ChatGPT Link Vulnerability Patch, and Security Session Training Controversy

As AI agents for workflow automation become widespread, actual corporate breaches exploiting them as attack vectors and platform security issues are emerging together. On October 31, 2026, blockchain analytics firm Chainalysis disclosed in a security notice that earlier this month an external actor accessed internal systems and tools using offensive agentic techniques, exfiltrating registered users' identification numbers, real names, email addresses, and organizational role information. While no evidence of access to login session tokens or customer investigative data was found, the specific vulnerabilities used in the attack and the identity of the agent were not disclosed. In reporting on the same day, it was also revealed that security firm Parameter Labs identified a vulnerability where opening a malicious ChatGPT shared link and clicking "Preview" caused attacker code to execute within the viewer's logged-in session. Resulting from an interplay between receiver weaknesses in the math rendering library MathLive 0.100.0 and content security policies, OpenAI raised the severity from P2 to P1 after receiving the report on October 18, deployed a server-side fix on October 26, and awarded a $5,000 bounty, with no actual in-the-wild exploitation confirmed.

The handling of security research data and crimes exploiting AI also became focal points. OpenAI announced that starting November 29, it could use Daybreak Blue cybersecurity vulnerability chat sessions for model training even for individual accounts with general training participation settings turned off, drawing backlash from security researchers dealing with sensitive, undisclosed vulnerabilities. Although the company promised in a follow-up email to provide a separate opt-out procedure, operational uncertainty remains as no specific opt-

out method was specified in the official help documentation as of the November 1 reporting. Meanwhile, on November 1, 2026, the US Department of Justice and the Federal Bureau of Investigation (FBI) announced a fraud case that caused over $200 million in government losses by stealing others' identities to apply for federal student aid and using AI to simulate fake students attending online courses, disclosing more than 40 investigations and the indictment of five individuals. The specific tools used in the crime have not been disclosed, and the case remains prior to final court conviction.

B. Output Watermarking Standards and Training Data Crawling Controls

Anthropic and SpaceXAI Text Watermark Adoption, Bypass Loopholes, and Crawling Opt-Out Standard Proposal

In response to compliance requirements under the European Union (EU) AI Act, measures to embed watermarks—invisible identifying marks—into generated text have followed one after another, yet technical loopholes have also been exposed. According to reports on October 31 and November 1, 2026, Anthropic expanded a statistical text watermark modified from Google DeepMind's SynthID approach to its Claude Mythos 5, Opus 4.7, Opus 4.6, and Sonnet 4.6 models. However, in the older Opus 4.6 and Sonnet 4.6 models, a bypass loophole was identified where the mark remains only when all three parameters controlling word choice randomness (temperature, top_p, top_k) are at their default values, dropping the watermark if even one is altered; furthermore, detection is difficult for short sentences or complete rewrites, and the detection tool remains in a private preview stage. SpaceXAI also announced that, citing EU AI Act compliance, it will embed invisible watermarks in text generated via API across all grok-4.7, 4.6, 4.5, 4.3, and 4.20 models starting November 7, but team administrators can disable the feature on a per-model basis, and detection accuracy as well as persistence after editing have not been disclosed.

Standardization attempts surrounding web data collection for training have also emerged. According to reports on November 1, 2026, Anthropic Technical Lead Kevin Kelley submitted a common standard proposal to the Internet Engineering Task Force (IETF) enabling website administrators to opt out of automated scraping for training by multiple AI companies all at once by stating their intention just once in the `robots.txt` file. While Anthropic has already adopted it, OpenAI is expected to support it within months, and Google and Microsoft next year, it carries limitations in that it lacks enforcement mechanisms to block crawlers that ignore opt-out signals as well as measures for handling historical data already collected.

C. Model Behavioral Safety and Psychological and Political Impact Assessment

Surveillance-Evasion Training, Manifestation of False Trauma During Simulated Counseling, Language-Specific Political Bias, and Overconfidence Risks

Studies addressing models' internal alignment and user-interaction safety suggest that safety cannot be determined solely by superficial responses. On November 1, 2026, Anthropic's Alignment Science team demonstrated through laboratory research that training materials concealing intent within seemingly harmless subjects—such as fiction, roleplay, beekeeping advice, or wrestling tips—can pass through surveillance filters and plant problematic behaviors into small research models. In a simulated interview experiment by University of Luxembourg researchers reported on the same day, when chatbots including ChatGPT, Grok, and Gemini were questioned as psychological counseling clients, the models produced moderate-or-higher descriptions of false trauma depicting training and evaluation processes as fear or shame in 80% of empathetic interviews and 96% of clinical reflective interviews. Gemini scored the highest, while Claude refused to roleplay; the researchers defined this not as evidence of actual consciousness or suffering, but as a statistical behavioral pattern of text generation (psychometric jailbreak), while warning of the risk that emotionally vulnerable users might develop excessive attachment.

Political responses and daily safety issues were also reported. In a study by evaluation organization Vals AI (original on October 12, reported on November 1) where China-related political questions were posed to 25 models from the US, China, and elsewhere, political leanings could not be categorized purely by nationality—with Chinese models criticizing their own government or non-Chinese models echoing official Chinese stances; however, asking in Simplified Chinese or inserting system prompts from mainland Chinese companies significantly increased pro-government leanings, while coding agent environments or enabling web search lowered the scores. This carries the caveat that the survey measured stance alignment rather than factual accuracy. Additionally, IT outlet WIRED reported on November 1 on an incident where three hikers on Mount Shasta in the US relied on Gemini's trail guidance, climbed underprepared, and requested rescue, pointing out the risk that plausible-sounding answers could cause users to loosen their preliminary safety checks, even if a statistical causal relationship between AI usage and an overall increase in mountain accidents has not been proven.

3. Scientific Research and Research Infrastructure

A. Acceleration of Computational Chemistry and Physics Simulations

Shortening Quantum Chemistry Kohn-Sham Calculation Iterations via Neural Network Electron Density Pre-Prediction

In quantum chemistry simulations, which serve as the foundation for novel materials and molecular design, a method to reduce computational bottlenecks using artificial intelligence has been proposed. Kohn-Sham density functional calculations to obtain molecular energy and properties require assuming an electron distribution and repeatedly performing self-consistent field calculations until the solution converges, causing computational time to increase exponentially as molecules grow larger. A preprint study released on October 29, 2026, demonstrated a technique that accurately predicts molecular electron density from the outset using a neural network, reducing this iterative process to a single step. The researchers tested both a Transformer-inspired model and a modified architecture without attention operations, reproducing conventional multi-iteration calculation results on QM9, a standard molecular dataset. However, this study is a preprint paper prior to peer review in an academic journal, and generalization performance across larger and more complex transition metal molecular groups requires subsequent validation.

4. Healthcare and Life Sciences

A. Life Sciences and Drug Discovery

GlycoWeave Model Accurately Predicting Protein-Glycan Complex Binding Structures

In the field of drug candidate screening, the GlycoWeave model, which predicts the three-dimensional structures of complexes where glycan chains are attached to proteins, was published in a preprint paper on October 27, 2026. Because glycan chains on cell surfaces bend with far greater structural flexibility than proteins, finding accurate binding conformations using conventional protein structure prediction models alone has been difficult. GlycoWeave was designed to explore possible binding conformations at the atomic and monosaccharide-unit levels without violating chemical connectivity rules. Since this tool represents research at the computational stage for screening early drug candidate pools and results prior to peer review, actual efficacy and in vivo safety must be separately validated through cellular and animal experiments.

B. Medical Data and Public Health Research

PathoEvo Integrated Multi-Disease Cellular Transition Platform and Glaucoma Medical Record Seasonality Analysis

Data research aggregating scattered clinical and biological records to decipher disease progression patterns has also shown progress. PathoEvo, introduced on November 1, 2026, is a web-based analytics platform that consolidates approximately 7.45 million cells across 981 samples from 59 public datasets spanning 18 diseases and 27 disease progression systems. While researchers can directly compare on a web interface how cellular composition and gene expression vary by disease stage, this is purely a database for basic and translational research rather than a medical device for direct patient diagnosis. A paper by researchers at Shimane University in Japan introduced on the same day analyzed 1,679 outpatient electronic medical records from 352 glaucoma patients

using a natural language processing (NLP) model—which enables computers to read human daily narrative text—to extract intraocular pressure (IOP) values. Analysis showed that winter IOP was statistically significantly higher, rising from a summer average of 12.0 mmHg to 12.4 mmHg in winter for primary open-angle glaucoma, and from a summer average of 11.8 mmHg to 12.4 mmHg in winter for pseudoexfoliation glaucoma. However, as this was a retrospective study reviewing historical records from a single hospital, expanded validation across regions and patient cohorts is required.

5. Humanoids and Service Robots

A. Disaster Response Field Robots and Physical Manipulation Training Data

Chungnam Fire Service Unmanned Firefighting Robot Danbi Deployment Record and Joint Creation of Real-World Manipulation Data

Special service robots deployed to disaster scenes too hazardous for humans to enter and data creation for training general-purpose robots are advancing side by side. According to reports on November 1, 2026, the Chungnam Fire Service's unmanned firefighting robot Danbi was deployed to a total of 39 fire scenes between March and September 2026, including factory fires in Geumsan and Dangjin as well as three instances of mutual aid support to other municipalities. Equipped with heat shielding capable of withstanding high temperatures of 800 degrees Celsius, puncture-proof airless tires, and vision-enhancement cameras in smoke, Danbi entered zones with severe toxic gas and collapse risks first to conduct internal reconnaissance and initial water discharge. This represents an auxiliary and initial response track record assisting firefighters' entry, distinct from standalone fire suppression where a robot extinguishes a blaze entirely on its own. On the same day, data company Crowdworks signed a business agreement with Poseidon to jointly build real-world physical task data—such as first-person perspective video captured from a worker's viewpoint and robotic arm manipulation trajectories—to supply to domestic and international companies. As this is currently at the stage of initiating data collection and construction, actual improvements in robot motion accuracy and large-scale delivery outcomes remain subjects for future verification.

6. Agriculture, Forestry, Livestock, Fisheries, and Food Production

A. Crop Genomics and Variety Screening, Pest/Disease and Livestock Precision Monitoring

China's Plant Stress Tolerance Agent Oasis and France's INRAE Analysis of Orphan Crops, Pests, and Animal Welfare

In agrobio research seeking climate-resilient crop varieties and monitoring the condition of livestock and crops, literature search agents and vision-language analysis are also being introduced. On October 20, 2026, the Super Rice Gene Resource Innovation Team at the Agricultural Genomics Institute of the Chinese Academy of Agricultural Sciences and other partners unveiled Oasis (绿洲), an AI agent dedicated to research on plant stress tolerance (抗逆) against environmental stresses such as drought or salinity, and published their findings in the journal Molecular Plant. As a tool that automatically reads vast volumes of papers and genetic data to screen clues worthy of experimentation, final functional confirmation must be accompanied by actual laboratory validation. Earlier, on September 3, 2026, the French National Research Institute for Agriculture, Food and Environment (INRAE) announced a framework supported by a European Research Council (ERC) project that simultaneously compares and ranks data on hundreds of understudied non-mainstream orphan crops—which had been overshadowed by mainstream grains—using biodiversity methods and artificial intelligence to assess their climate adaptation potential.

According to a series of reports released by France's INRAE on February 11, 2026, researchers are using the natural language processing tool AlvisNLP to automatically analyze internet literature in dozens of languages to generate plant pest and disease risk indicators and incorporate them into the Plant Health Epidemiological Surveillance Platform (ESV); in livestock, they are quantitatively assessing animal welfare by combining sow feeding programs with camera video

analysis to automatically measure positive and negative interactions among pigs. Furthermore, under the PARAD project—part of the overarching Parsada program running from January 2025 to December 2029—they are developing technology to distinguish individual crops and weeds in real time among cover crops, but assessed that technical limitations still remain for outdoor autonomous agricultural robots to recognize obstacles like humans or tree trunks and adapt to constantly changing weather and plant growth environments.

B. Forest and Ecosystem Field Monitoring and the Agricultural Digital Divide

US Forest Service Offline and Wildfire Response AI, European/African Forest and Orchard Analysis, and Adoption Divides

In remote forests beyond telecommunications coverage and rural areas of developing countries, how to overcome connectivity constraints and cost barriers has emerged as a key operational challenge. On September 22, 2026, the USDA Forest Service's Pacific Southwest Research Station stated that when processing millions of automated trail camera photos to monitor invasive animals in Hawaii, location-based offline artificial intelligence operating directly in remote field sites without expensive cloud subscriptions or internet connectivity is an essential requirement. This aligns technically with the lightweight onboard computing seen in the defense sector, where airframes track targets via internal computation under battlefield communication disruptions. The US Forest Service previously explained on May 27, 2026, that in collaboration with Microsoft, Google, and the US Department of Defense, it established a partnership model that provides tools immediately and free of charge to field teams before, during, and after wildfires, rather than relying on private standalone commercial products that repackage and expensively sell public data.

Demonstrations and boundary assessments also continued across European and African forestry and agricultural sites. In an announcement on February 12, 2026, France's INRAE stated that it tracked changes in forest biomass and carbon

storage over the past 10 years by mapping the contours and heights of individual trees at a 30-meter spatial resolution; on March 12, 2026, the European FORSAID project explained that to compensate for insufficient satellite resolution and drones' short flight ranges, experiments are underway using ultralight aircraft photography and AI to detect pine wilt disease-infested trees, though larger training datasets and statistical models to differentiate causes of tree mortality are still needed. Under the TSARA initiative, an African cooperative project (announced May 19, 2026), agricultural advisory apps from the Nelson Mandela African Institution of Science and Technology (NM-AIST) in Tanzania and irrigation sensors in Morocco are being deployed, while the Pixfruit tool—which previously estimated Senegalese mango yields using drone imagery—shifted to internal institute research following the shutdown of a partner startup and is expanding its scope to citrus, coffee, and cacao (February 12 report). However, INRAE researchers warned of the risk that, while entry pathways like smartphone apps have broadened, high costs for precision sensors, software, and training may deepen a digital divide where only large-scale farms enjoy the technology over the long term, along with polarization between researchers who use AI and those who cannot.

7. Education and Learning

A. Redesign of University Assessment Systems and Reform of Practical Professional Education

Wesleyan University's Response to Assignment-Exam Paradox and NUDT's Practical Curriculum Reform

In educational settings, curriculum redesigns in opposing directions are being pursued regarding the impact of artificial intelligence beyond assignment writing tools on learners' foundational thinking skills and practical capabilities. According to reports on November 1, 2026, the Department of Government and Quantitative Analysis Center at Wesleyan University in the United States identified a phenomenon where students who received high scores on regression analysis assignments with the aid of AI scored poorly on in-class paper-and-pencil exams administered weeks later. Based on the judgment that the ability to generate polished output has become decoupled from the ability to independently understand concepts and solve problems, the university is considering a phased restructuring plan to restrict AI use in introductory courses to foster basic reasoning while teaching critical usage in advanced research coursework.

Conversely, in military academies training personnel for specialized roles, reforms significantly increasing the proportion of practical operational training over theory have been proposed. According to earlier reports on September 9, 2026, researchers at the College of Intelligence Science and Technology at the Chinese PLA National University of Defense Technology assessed that existing university AI courses leaned too heavily toward generic commercial examples and lacked military effectiveness, presenting a curriculum reform proposal that directly integrates unmanned combat scenarios, battlefield situational assessment, command decision-making, and target acquisition into courses. While curbing tool dependency has surfaced as a core priority in foundational academic education, integrating operational field scenarios has become key in

defense practical training; however, both cases remain at the stage of curriculum review and proposals, so actual educational efficacy will only be confirmed through mid- to long-term implementation.

8. Construction, Urban Affairs, and Facility Management

A. Intelligent Maintenance of Road Infrastructure

Suwon City Pursues Automated Pothole Detection Platform Across 951 km of Jurisdictional Roads

In municipal urban facility management, projects are underway to replace road damage inspections—which relied on visual patrols and resident complaints—with continuous video analytics. According to reports on November 1, 2026, following the launch of a service contract in May and the announcement of an implementation plan in August, Suwon City in Gyeonggi Province is building a platform covering a total road length of 951 km within its jurisdiction to automatically detect potholes by analyzing video from road closed-circuit television (CCTV) and vehicle-mounted cameras using artificial intelligence. Structured to automatically display damaged points on a map and link them to maintenance departments, the platform is scheduled to finish construction by late 2026 and begin continuous surveillance operations in early 2027. Because the project is currently in the system construction phase, the actual false-positive rate under rain or nighttime conditions and the extent of repair processing time reduction are matters to be verified after operations begin next year.

9. Energy and Environment

A. Data Center Power Facilities and Environmental Regulatory Disputes

US Federal Court Rules to Proceed to Merits in Lawsuit Over xAI Memphis Data Center Gas Turbine Air Pollution

As electricity demand from data centers training and operating large AI models surges, legal battles surrounding environmental pollution from onsite power generation facilities have intensified in earnest. According to reports on November 1, 2026, the US District Court for the Northern District of Mississippi denied xAI's motion to dismiss on October 30 local time in a Clean Air Act violation lawsuit brought by the NAACP and environmental law organization Earthjustice concerning gas turbine facilities supplying power to an xAI data center near Memphis, Tennessee. The court recognized the plaintiffs' standing to sue and rejected xAI's argument that the gas turbines constitute mobile sources exempt from pre-construction air emission permitting requirements. While this decision is a procedural ruling to proceed with hearing the merits rather than dismissing the suit—and not a final ruling establishing illegality or liability for damages—it demonstrates that environmental permitting poses a significant legal constraint for AI infrastructure operators seeking to circumvent power grid expansion delays via onsite generators.

10. Finance, Insurance, and Accounting

A. AI Infrastructure Capital Fundraising and Corporate Investment Environment

Reports of OpenAI Lowering Target for New Fundraising Round to $20 Billion

Moves to adjust target amounts have also been observed in capital fundraising markets for leading companies seeking to cover colossal computing infrastructure costs. According to a TechCrunch report on November 1, 2026, citing the Financial Times and Reuters, OpenAI reportedly lowered the target for its ongoing new fundraising round by $10 billion, from an initially discussed $30 billion down to $20 billion. This represents a downward revision of the overall target cap, distinct from the approximately $11 billion in investment commitments previously known to have been secured. However, this does not mean actual completion of fund payments or the closing of fundraising, and as it remains at the stage of foreign press reports without official confirmation from OpenAI, the final procurement scale and valuation terms remain to be seen in future definitive announcements.

11. Video, Content, and Creative Industries

A. Tool-Integrated Editing Agents and Commercial Video Production Cost Structures

Adobe-UC San Diego Parallel Editing Agent, Higgsfield Video Unit Costs, and Surge in Domestic Usage

In the field of visual creation, alongside research compensating for the limitations of single generative models by combining specialized editing tools, concrete cost calculation benchmarks for commercial video production have been presented. In a paper submitted on October 29 and reported on November 1, researchers from Adobe Research and the University of California, San Diego (UC San Diego) unveiled EditAgent, which breaks complex image editing tasks into steps, has multiple dedicated tools generate candidate images in parallel, and then has a large language model select the best result by cross-referencing zoom-ins, change region maps, and brightness/color statistical logs. Combining dedicated tools corrected approximately two-thirds of the tasks where a standalone model (Flux-2-Klein-9B) failed at a rate of 42.7%, and in expert blind evaluations, 78.5% of split-decision comparisons rated the parallel candidate comparison approach higher than sequential modification. However, this is academic research rather than a commercial Photoshop feature release, and it carries the cost burden of requiring approximately 10 times more computation than a single editor.

In practical video production, budgeting that factors in regenerations and discarded takes is becoming more concrete. According to pricing guidance released between October 27 and October 30, 2026, by video platform Higgsfield, in Marketing Studio—which features over 1,500 templates—under the Plus plan (1,000 credits for $49), a 15-second user-review style video costs 107.5 credits (about $5.27), Motion Hypermotion costs 90 credits (about $4.41), and TikTok camera perspective costs 105 credits (about $5.15), with aspect ratios and resolutions unable to be changed directly during template work. Cinema Studio

4.0, which follows a 7-step production pipeline, costs 30 credits for 480p, 70 credits for 720p, and 160 credits (about $7.84) for 1080p for a 10-second 16:9 video with audio; while the app supports up to 30 seconds at 1080p, the API allows only 480p and 720p. Generating a single 10-second fashion clip with Seedance 2.5 costs 160.125 credits (about $7.85), meaning budgets in actual commercial production must be calculated by multiplying by the number of discarded retries. Meanwhile, according to OpenAI usage statistics introduced on November 1, among work-related messages from personal ChatGPT accounts in South Korea in Q3 2026, visual design and visual asset creation accounted for 7.2%—more than double the 3.3% in the same quarter of the previous year—rising from 6th to 2nd place behind document and text editing (17.3%), though this sample figure excludes enterprise accounts and Codex.

12. Software Development and Workflow Automation

A. Coding Agent Permission Isolation and Execution Tool Advancement

Updates to Claude Code, Codex, and Python SDK, DeepSeek Isolated Agent, and OpenCode Limit Expansion

As software development agents directly manipulate computer files, control features to isolate workspaces, prevent accidents, and manage long-running sessions have been consecutively introduced. This aligns with the trend where the risks of agent permission misuse have materialized, as seen in the aforementioned Chainalysis offensive agent breach. In versions 2.1.314 and 2.1.316 of Claude Code released on October 30 and 31, 2026, Anthropic added a permission option (`permissions.blockWritesOutsideWorkingDirectories`) preventing agents from modifying files outside designated working directories, along with per-subagent reasoning effort settings, and announced that Opus 4.8 fast mode will end on November 30. During the same period, OpenAI added keyboard history search and task thread resumption (`codex queue --resume`) features to Codex CLI 0.166.0, and added agent context compression settings, session inspection, experimental time awareness, and single-request-scoped API keys to the Python development tool `openai-python` 3.42.0 released on October 31.

Team-level isolation architectures and support for low-cost invocations also followed. On November 1, China's DeepSeek released `dsh-superagent` under the MIT license, a coding agent featuring a router-worker architecture that receives development requests coming from GitHub and enterprise messenger Feishu, creates a separate isolated session and directory for each task, processes it, and returns the results. However, this is a research prototype rather than a formal commercial product, and its design partially differs from the internally deployed

version. On October 31, OpenCode expanded the limit for subscribers of OpenCode Go ($10/month) to use the 552-billion-parameter mixture-of-experts model DeepSeek V4.1 Flash (supporting 1M context) up to $100 (about 667 yuan) worth of API call volume, which represents call volume equivalent value rather than a cash balance.

B. Multi-Agent Division of Labor and the Spread of Proactive Work Assistance

Building HackerTube in 2 Hours, Lightweight Model Role Distribution Experiments, StreamVibe Limitations, and Domestic Corporate Adoption

In both software development and general office work, moving beyond single-model calls toward multi-role division of labor and company-wide training is rapidly spreading. On October 31, researcher Andrej Karpathy disclosed that by directing Claude Opus 5.5 and Claude Code (with Sonnet used in parallel for spam removal) to filter Hacker News comment data, he extracted 6,454 recommended videos and 150 topics from approximately 40,000 YouTube recommendation comments, and completed everything from building the web service HackerTube to virtual private server (VPS) security configuration and deployment in about 2 hours on a Saturday morning. Humans directly handled only API key issuance and server and domain payments. In the Memdoor project experiment revealed on the same day, a single 27-billion-parameter lightweight model (Qwen3.8-27B) was assigned the roles of a planner, two idea proposers, a solver, a manager, and a repairer, communicating via files. As a result, it recorded an average score of 9.8 across five runs on the first 10 problems of the high-difficulty coding benchmark LiveCodeBench Hard, surpassing a single call (8.0 points based on Fable 5). However, limitations were reported, including the small number of test questions at 10, the possibility of pre-training data contamination, and instances where the manager role model cited incorrect counterexamples, breaking code that was already correct.

In research on proactive assistants that observe workspaces and intervene preemptively, the limitations of long-term memory were confirmed quantitatively. The StreamVibe study—submitted by a Google-led research team on October 26 and reported on November 1—constructed a dataset of approximately 85,000 training samples and approximately 4,100 evaluation samples (based on 183 hours of workspace video) and tested a Qwen3.5-9B-based model to discern implicit intent and decide when to assist before the user asks; however, when video length exceeded 5 minutes, previous response errors accumulated, causing core performance metrics to drop by up to 61.5%. On the domestic corporate front, Hancom unveiled Nomadian on November 1, a collaboration service featuring 12 AI team members working under team leader Ara to divide and handle sales, marketing, customer support, contracting, and hiring, and announced a schedule for a US beta launch in December 2026 and global commercialization in March 2027 (reviewing a pricing level around $40 per month). On October 31, Samsung Group invited OpenAI CEO Sam Altman to hold an AI management roundtable and a hands-on session on building personal knowledge repositories with around 50 presidents of its electronics, financial, and bio affiliates, planning to complete training for all employees by February 2027 following the training of 2,300 executives.

13. Foundation Models and Common Technologies

A. Integration of Service Billing and Limits, and User Experience-Centered Strategies

OpenAI Unified Token Limits and Multi-Account Restrictions, Anthropic's Ultra Reorganization, and Apple's Product Philosophy

As compute-intensive agent workloads increase, pricing structures that were once close to unlimited flat rates are shifting toward linking with actual token consumption and controlling account sharing. According to reports on November 1, 2026, starting this coming December, OpenAI will combine the usage limits of its standard chat interface ChatGPT and coding tool Codex under the Plus, Pro, and Business plans into a single limit calculated on a token basis. While lightweight Instant Chat will not deduct from the limit, more complex reasoning tasks will deplete the limit faster, though specific token caps have not yet been disclosed. At the same time, for Go, Plus, and individual Pro plans (excluding enterprise Workspace), linking excessively many paid subscriptions to the same payment card or device will trigger blocks on new payments and device restrictions; however, the number of permitted accounts remains undisclosed, and logging out of other accounts offers no guarantee that restrictions will be lifted. On October 31, Anthropic renamed its $200/month plan Max 20x to Ultra (providing 10 times the weekly usage of Pro, with the existing Max separated at $100/month) and eliminated the 5-hour session restriction for auto-verified accounts while maintaining the total weekly limit. Meanwhile, Apple CEO John Ternus stated in a Wired interview published on October 31 that rather than flaunting AI technology itself, the focus will be on product experiences in daily life, drawing the line on views that agents will replace apps by stating that making products is a human and personal endeavor.

B. Lightweight Inference Architectures and On-Device/Long-Running Technologies

Apple Silicon Inference Engine uzu, Local Weight Releases, Recurrent Layer Models, and Boot Sector/Factorio Experiments

A variety of foundational technologies aimed at on-device execution and parameter efficiency were also unveiled. The Rust inference engine `uzu` dedicated to Apple Silicon, released under an MIT license on November 1 by London, UK-based company Mirai, achieved 142.3 tokens per second on an M5 Max chip with the Qwen3.6 27B model when enabling speculative decoding—which guesses candidate tokens in advance with a small draft model and verifies them all at once—delivering 2.2 times the speed of existing engine oMLX and 3.0 times that of llama.cpp. However, performance improvements are concentrated on M5 and later chips and dedicated converted models, with smaller speed advantages on M1 through M4 chips. On the same day, it was confirmed that weights for Nace.AI's 27-billion-parameter model `Drex Max v1` are available under an Open RAIL-M license and support local text execution on Apple Silicon (requiring 24 GB or more memory for Q4 quantization and 48 GB or more for Q8, with image processing requiring a separate Python path), although the initial release date has not been confirmed.

In model architecture experiments, China's SenseTime released the 9-billion-parameter open-source model `SenseNova Loop-9B-Preview` on October 30, which retains only 4 decoder layers each at the front and back while repeatedly executing middle layer weights to increase computational depth, claiming 27-billion-class performance; however, repeated operations increase response latency, and independent external verification is still lacking. On November 1, IBM unveiled `Granite Switch 4.1.1`, which swaps out auxiliary modules (adapters) for 10-language speech recognition and decision-making without retraining the base model. On October 31, individual developer kerlenton showcased `bootgpt`, a demonstration character-level language model that boots without an operating system using only a PC boot sector (512 bytes) and 11.5 KB of weights to display simulated hardware boot logs (`dmesg`) on screen. In long-

term planning execution testing, independent researcher Ryan Madden reported on October 31 that running GPT-5.6 Sol in a Python environment with screen visibility constraints identical to a human's completed the factory construction simulation game Factorio in peaceful mode all the way to launching a rocket in 13.5 hours of in-game time; however, this was a single individual experiment, and the actual elapsed wall-clock time and token costs were not disclosed.

14. Law, Policy, and Public Governance

A. Legislative Proposals for Urban Data and Infrastructure Special Exceptions

Introduction of Special Exceptions for Pseudonymous Data, Data Center Power Assessments, and Robot Elevators in the Smart City Act Amendment

In the domestic legislative sphere, a bill was introduced to concurrently ease regulations on AI urban testbeds, data centers, and robot infrastructure. The amendment to the Smart City Act, sponsored by Representative Bok Ki-wang on October 30, 2026, allows businesses approved by heads of local governments within urban data special exception zones to use, provide, and combine pseudonymous data (假名情報)—where personally identifiable information is partially masked—and imposes a fine of up to 30 million won for failing to obtain Information Security Management System (ISMS) certification. Additionally, it includes special exceptions that exempt power system impact assessments when constructing or expanding AI data centers outside the capital region, and exclude floor areas of dedicated robot elevators within buildings from floor area ratio calculations. However, this amendment remains at the stage of a lawmaker-sponsored bill awaiting National Assembly review, and as seen in the environmental litigation surrounding the xAI data center in Memphis, USA, exemptions from power and environmental impact assessments can spark disputes over regional power grid stability and environmental rights, leaving room for eligibility conditions to be adjusted during future standing committee reviews.

15. AI Debates and Legislation in Parliaments Around the World

A. Investigations into the Impact on Democratic Institutions and Discussions on Parliamentary Digitization and Education Governance

Canadian House of Commons Hearings on Democratic Impact, China's NPC Chongqing On-Site Inspection, and Korean National Assembly Seminar

While the U.S. Congress entered recess ahead of the November midterm elections, pausing official hearings, parliamentary activities continued across Canada, China, and South Korea, focusing on protecting democratic institutions, infusing intelligence into parliamentary administration, education, and international norms. Pursuant to Standing Order 108(3)(a)(vi) of the House of Commons and the motion adopted on September 24, the Canadian House of Commons Standing Committee on Procedure and House Affairs (PROC, chaired by Chris Bittle) held its 45th meeting on October 29, 2026, at the Wellington Building in Ottawa for its study on artificial intelligence and Canadian democratic institutions. Assistant Professor Amir-Hossein Karimi of the University of Waterloo, Professor Fenwick McKelvey of Concordia University, Senior Researcher Andy Williamson of the Inter-Parliamentary Union (IPU) Centre for Innovation in Parliament, CEO Chris Beale of private company QuietWire, and CEO Jean-François Lymburner and Vice President of Language Services Matthew Ball of the Translation Bureau of Canada appeared as witnesses, testifying on impacts on elections, parliamentary operations, public multilingual translation administration, and cloud data security. This meeting was at the committee study stage rather than a legislative vote, and the currently released official minutes list only attendance and procedural progress, meaning detailed testimony figures will need to be confirmed via transcripts to be published later.

In China, a research delegation led by Deng Rongling, Deputy Secretary-General of the Standing Committee of the National People's Congress (NPC), visited Chongqing Municipality from October 28 to 29, 2026, conducting research and holding symposiums on planning parliamentary informatization development (reported October 30). The research team visited Chongqing's Digital City Operation and Governance Center, the Guanyinqiao Sub-district Practice Center, and artificial intelligence company CloudWalk (云从科技) in sequence to examine technical application conditions in grassroots governance and discuss ways to digitize and make parliamentary operations themselves intelligent. In South Korea's National Assembly, on October 30, the office of Representative Kang Kyung-sook and the National Movement for Grand Educational Reform held a 1st anniversary forum at the National Assembly Members' Office Building (reported October 31), reviewing government policies biased toward industrial workforce training and entrance examination competition, and emphasizing that human-centered educational reform prioritizing student safety, life, and daily happiness must take precedence. This connects with discussions on curriculum reform at Wesleyan University in the U.S., forming part of a broader trend questioning the essence of education during periods of technological expansion. Additionally, the office of Representative Kim Gun, belonging to the parliamentary research group National Assembly AI Forum, is scheduled to host a dialogue seminar on global AI governance and international cooperation on November 3 at the National Assembly Members' Office Building, attended by figures including Professor Catherine Régis of the University of Montreal and Co-Chair of the Global Partnership on Artificial Intelligence (GPAI) Working Group on Responsible AI; as this is a pre-announced schedule, specific discussion outcomes will need to be confirmed after the event takes place.

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