



# Rise of the Machines: Deep Research on the Most Important AI Robotics Breakthroughs (Past 7 Days)

## Introduction

The past week in robotics has embodied the theme **“Rise of the Machines”**, with a particular emphasis on **humanoid robots** – those with human-like forms and capabilities. Unlike specialized industrial arms or wheeled robots, humanoid form factors promise general-purpose utility in environments built for humans. This report highlights recent breakthroughs and demonstrations in AI-driven humanoid robotics, from cutting-edge prototypes to new commercial designs. We focus on humanoid robots’ strides (while briefly noting other robots), reflecting a global surge of innovation. The goal is to unpack the *humanoid advantage* and how artificial intelligence is powering these machines to act, learn, and work alongside people.

## Major Breakthroughs in Humanoid Robotics

**Next-Gen Humanoid Designs:** Several new humanoid robot models were unveiled this week, showcasing significant hardware advances. *Figure AI* officially revealed its **Figure 03** – a third-generation humanoid built from the ground up for real-world deployment <sup>1</sup> <sup>2</sup>. Unlike its predecessors, the Figure 03 is not just a research prototype but a product engineered for **mass manufacturability** and home use, with nearly every component redesigned for high-volume production (e.g. die-cast joints instead of machined parts) <sup>3</sup>. The robot stands human-sized and features **upgraded vision and tactile systems**: dual high-frame-rate cameras in the head (60% wider FOV than before) and new **tactile fingertip sensors** sensitive enough to detect a mere 3 gram force <sup>4</sup> <sup>5</sup>. These give the humanoid human-like dexterity – for example, handling a paperclip or an egg without crushing it <sup>5</sup>. The Figure 03 is also wrapped in soft textiles and foam, making it 9% lighter and safer for close human interaction in homes <sup>6</sup>. In short, Figure’s latest humanoid emphasizes **safety, autonomy, and scalability** – a leap toward robots leaving the lab and entering daily life <sup>7</sup>.



Image: Deep Robotics' new DR02 humanoid is designed for harsh conditions – seen here kneeling in the rain. The Chinese firm claims an IP66-rated all-weather design, targeting outdoor industrial tasks <sup>8</sup> <sup>9</sup> .

Another breakthrough came from China's *Deep Robotics*, which **unveiled the DR02 humanoid** aimed at heavy-duty industrial work <sup>10</sup> . Billed as the “world's first all-weather humanoid,” the DR02 can operate in environments previously off-limits to bipedal bots. It carries an IP66 rating for water- and dust-proofing (it can withstand powerful water jets and dust ingress) and functions across a wide temperature range of -20 °C to 55 °C <sup>8</sup> <sup>9</sup> . This durability opens use-cases like outdoor inspections in rain, cold-storage warehouse work, or hot factory floors that typical electronics couldn't survive <sup>11</sup> <sup>12</sup> . Standing 175 cm tall, DR02 has a two-arm design (10 kg payload each) and human-speed locomotion (1.5 m/s walking, with stairs/slopes up to 20°) <sup>13</sup> . Notably, Deep Robotics leveraged its experience with quadrupeds (famous for the rugged “Jueying” robot dog) to build the DR02 – moving from four legs to two while keeping a focus on *environmental resilience* <sup>14</sup> <sup>15</sup> . The result is a humanoid platform intended for continuous, all-weather duty rather than just indoor demos. Observers note that such engineering – emphasizing reliability over flashy acrobatics – is crucial to scaling humanoids from lab curiosities to *practical* workforce machines <sup>16</sup> <sup>15</sup> .

**AI and Algorithmic Breakthroughs:** On the software side, research teams delivered new methods to make humanoids smarter and more skilled. *Amazon's Frontier Robotics* group introduced **ResMimic**, a novel AI framework for teaching humanoids fine manipulation <sup>17</sup> . The approach addresses a persistent challenge: robots can be trained to imitate broad human motions, but they often fumble when precise object interactions are required (hands miss grabs, objects slip, etc.) <sup>18</sup> . ResMimic solves this by **two-stage learning**: first the robot learns a general imitation policy to move *like* a human (trained on a large 42-hour dataset of human motion), then a second “residual” policy layers on top to add *just the small corrections* needed to actually grasp and lift objects properly <sup>19</sup> <sup>20</sup> . This targeted fine-tuning drastically improves success rates. In simulations on a Unitree humanoid, ResMimic achieved **92.5% success** on tasks like kneeling to lift a 4.5 kg box or hoisting awkwardly shaped chairs – tasks where baseline policies failed 92–100% of the time <sup>21</sup> <sup>22</sup> . By focusing the learning on the “last mile” of precision (instead of retraining everything from scratch), the method is much more efficient and retains the natural fluidity of human-like movement <sup>20</sup> <sup>23</sup> . The researchers note this complements their prior project **OmniRetarget**, which generated diverse training data from single human demos <sup>24</sup> . Together, these advances from Amazon's lab

hint at a future where a humanoid can quickly learn new physical skills – *moving with grace then acting with precision* – without enormous hand-coding or data requirements. It’s a step toward humanoids that learn **robust, generalizable skills** more like humans do <sup>25</sup> .

Meanwhile in China, scientists debuted a different tool for imparting human-like skills: an **exosuit system called HumanoidExo** that lets robots learn from *your* motions. Engineers at the National University of Defense Technology (with Midea Group) created a wearable suit that captures a human’s full-body movements with embedded sensors and LiDAR <sup>26</sup> . As a person walks, crouches, or reaches, the suit records subtle shifts in balance and joint pressure – effectively creating a *high-fidelity motion dataset* beyond what camera-based motion capture provides <sup>27</sup> <sup>28</sup> . This data is fed into an AI model (nicknamed **Exo-VLA**, for vision-language-action) that teaches a humanoid robot to replicate the *dynamics* of human locomotion and manipulation <sup>29</sup> . In testing, a Unitree G1 humanoid trained with HumanoidExo data saw its task success rates skyrocket – e.g. a pick-and-place success rate jumped from 5% to nearly 80% after incorporating 200+ exosuit-recorded sessions, approaching human-level performance <sup>30</sup> . The robot even learned to *walk* more effectively by mimicking the exoskeleton wearer’s gait, despite not being directly trained on walking before <sup>31</sup> <sup>32</sup> . In essence, this breakthrough lets robots borrow human “muscle memory” – offering a **data-driven shortcut** for humanoids to acquire balanced, resilient motion (like recovering from slips or navigating uneven ground) by learning from people <sup>33</sup> <sup>34</sup> . Such integration of biomechanics and AI could finally imbue humanoid robots with that missing ingredient: *authentic human-like movement* <sup>35</sup> .

## Demonstrations and Prototypes

The past week also saw eye-opening **real-world demos** of humanoids, proving how far these machines have come – and what still needs work. In a milestone for humanoids in industry, startup *Figure AI* announced that one of its robots has been quietly doing real factory shifts **for five months straight** <sup>36</sup> <sup>37</sup> . The Figure humanoid has been operating **10 hours per day** on a BMW automotive production line in South Carolina, handling sheet-metal parts alongside human workers <sup>38</sup> <sup>39</sup> . This appears to be the **first-ever continuous deployment** of humanoid robots in a modern manufacturing setting <sup>38</sup> <sup>40</sup> . A time-lapse video (shared by Figure’s CEO) showed the bipedal robot repeatedly picking metal panels from a bin and placing them for processing <sup>41</sup> . While the task (material handling) is simple, the achievement is in the *endurance and integration*: running daily in a real factory without major failure, for months <sup>42</sup> <sup>43</sup> . Skeptics had questioned if humanoids could reliably work beyond short demos, and even BMW treated the pilot cautiously at first <sup>44</sup> . Figure’s 5-month report – if validated – is a strong reply that their robots can be **reliable and consistent** on the shop floor <sup>43</sup> <sup>45</sup> . It’s also informed the design of the new Figure 03, which the company hopes to mass-produce by the thousands <sup>46</sup> <sup>47</sup> . Still, questions remain about how autonomously the robot operated and how often humans intervened <sup>45</sup> . But this long-duration demo moves humanoids *one step closer to the workforce*, providing valuable data on reliability and performance under real stress <sup>48</sup> <sup>49</sup> .



*Image: Tesla's Optimus humanoid (prototype v2.5) waves in a new company video. In a recent demonstration, Tesla showed multiple Optimus units doing office chores, retail service, and even bartending – an attempt to position the robot as a versatile aide in daily environments* <sup>50</sup> <sup>51</sup> .

Tesla also spotlighted its **Optimus** humanoid in an unconventional new role: corporate spokesperson. In a video released this week, Tesla had an Optimus robot *narrate* instructions to shareholders on how to vote in the upcoming annual meeting <sup>52</sup> <sup>50</sup> . The montage featured Optimus units performing an eclectic mix of tasks – working at a desk, serving as a store clerk, tending bar, and even relaxing in a home sauna – all while a synthesized voice (as the robot) guided viewers through the voting process <sup>50</sup> <sup>53</sup> . This tongue-in-cheek demo served a dual purpose: it handled a routine corporate announcement *and* doubled as marketing for the humanoid project <sup>54</sup> . By placing Optimus in everyday scenarios (office, retail, home), Tesla signaled ambitions far beyond the factory floor – portraying the robot as an eventual **general-purpose helper**. Viewers also got a close look at **Optimus's updated design** (dubbed version 2.5) <sup>55</sup> . Notable changes include a new metallic bronze finish on its chest and arms and refined joints <sup>56</sup> . However, online robot enthusiasts spotted a remaining flaw: a **large gap in the elbow joint** that appears when the arm bends, creating a potential pinch hazard <sup>57</sup> . “Keep your fingers clear of Optimus v2.5's elbows,” one observer warned – feedback Tesla will likely address as it iterates the hardware <sup>57</sup> . In recent months, Optimus prototypes have also been shown learning *Kung Fu*-style movements for agility <sup>58</sup> . While the shareholder video didn't showcase new acrobatics, it reinforced that Tesla is steadily improving Optimus's capabilities (both hardware and AI) and even integrating it into the company's public image <sup>59</sup> <sup>60</sup> . The message: Optimus is becoming *more real*, and Tesla wants us to imagine it not just building cars, but maybe greeting you at the store or mixing your drink in the future.

Another dramatic demo bridging AI and robotics came from *Google DeepMind*. In a series of tests revealed in the last week, **DeepMind's "Apollo" robot** (built on Apptonic's Apollo humanoid) performed various **household chores on pure voice command** <sup>61</sup> <sup>62</sup> . Say “Clean up the table,” and Apollo will parse the request, visually identify clutter, and execute a multi-step plan to tidy up <sup>63</sup> <sup>64</sup> . In videos, the robot successfully folded clothes, loaded dishes, and even fetched items from another room *just by understanding spoken instructions* <sup>61</sup> <sup>62</sup> . Behind the scenes, this is powered by DeepMind's latest AI models – **Gemini**

**Robotics 1.5**, a vision-language-action model, coupled with a reasoning module (Gemini-ER) <sup>65</sup> <sup>66</sup> . Essentially, the humanoid is running a large language model alongside its perception systems, allowing it to **interpret high-level commands and plan tasks** in a human-like way <sup>67</sup> <sup>62</sup> . DeepMind calls Apollo an “*embodied conversational agent*,” reflecting how it merges dialogue understanding with physical action <sup>64</sup> <sup>68</sup> . Observers have dreamed of this for years: robots that you program simply by *talking* to them <sup>69</sup> . Apollo’s demo shows it’s increasingly feasible – the robot doesn’t need explicit coding or step-by-step scripts, just natural language prompts. It represents the convergence of AI chatbots with robotics, where soon telling a helper robot “I spilled juice” might lead it to fetch a cloth and wipe the floor automatically <sup>64</sup> <sup>69</sup> . DeepMind’s prototype is still early (and was presented partly to illustrate the Gemini AI models), but it immediately ignited discussion about *intuitive robot training*. As one tech outlet summarized: *the day is approaching when robots can be trained not by code, but by conversation* <sup>68</sup> <sup>70</sup> . This week’s Apollo demonstrations hint at a near-future home robot that truly **understands your words and intents** – a long-standing sci-fi vision inching closer to reality.

## AI Integration: Smarter Brains for Robots

Underpinning all these advances is the deep integration of **artificial intelligence** into robotic “brains.” Modern humanoids are increasingly **AI-native**, relying on advanced algorithms for perception, decision-making, and learning. A clear trend in the past week’s news is the use of **vision-language-action (VLA) models** – AIs that combine visual perception with language understanding to generate robot actions <sup>71</sup> <sup>72</sup> . For example, DeepMind’s Gemini 1.5 model allowed the Apollo robot to take high-level spoken commands and break them down into physical tasks by leveraging language understanding fused with real-time vision <sup>65</sup> <sup>66</sup> . Similarly, *Seven-Eleven Japan* and partner Telexistence highlighted VLA models as the core of their planned humanoid store clerk, “Astra.” The robot’s generative AI system will parse customer requests or inventory data and translate that into movements (like finding and restocking a product) <sup>73</sup> <sup>74</sup> . These VLA models essentially serve as a robot’s **cognitive engine**, enabling more natural interaction. Instead of rigid programming, the robot uses an AI that *understands* descriptions and goals – a breakthrough made possible by large language models and multimodal training <sup>67</sup> <sup>62</sup> . As Northeastern University’s robotics experts noted, integrating large language models with robot control is new and promising: it lets users “ask the robot to do tasks using simple language,” bridging the gap between human instruction and robotic execution <sup>75</sup> <sup>66</sup> . However, they caution that despite appearances, the robot **is not actually thinking independently** – it’s running through lots of data-driven patterns and algorithms behind the scenes <sup>76</sup> <sup>66</sup> . In other words, today’s AI-humanoids can *simulate* understanding and respond flexibly, but true reasoning and common sense remain long-term challenges.

AI is also improving how robots **learn new skills**. Beyond voice interfaces, methods like Amazon’s ResMimic and China’s HumanoidExo (discussed above) embed AI at the core of motor learning. Reinforcement learning controllers now help humanoids maintain balance while learning from demonstration <sup>29</sup> . Imitation learning and residual learning allow a robot to generalize a human skill to its own body shape with minimal errors <sup>77</sup> <sup>78</sup> . Crucially, these AI-driven training techniques mean robots don’t require exhaustive manual coding for each new task. For instance, with ResMimic a humanoid quickly learned to lift heavy, odd objects by itself correcting only the fine details of a human motion – the AI discerned the necessary adjustments via trial-and-error rewards (using vision data and contact feedback) <sup>20</sup> <sup>79</sup> . In effect, the robot *builds on* a foundation model (how to move like a person) with a lightweight AI layer to handle specifics <sup>78</sup> <sup>23</sup> . This layered learning is analogous to how we humans first learn a general skill (like the idea of lifting) then adapt to a specific situation (this particular box’s shape). Such AI paradigms are

accelerating progress toward **general-purpose humanoid skills** – robots that can be taught a broad skillset and then fine-tuned for particular tasks on the fly.

Another facet of AI integration is making robots more **robust in human environments**. The KAPEX humanoid project announced in South Korea will incorporate LG's *Exaone* large-scale AI as the robot's "brain," aiming for a machine that not only mimics human motions but truly learns and adapts in real time <sup>80</sup> <sup>81</sup>. Exaone is a massive multimodal AI that will give KAPEX vision-language understanding and decision-making abilities – so it can interpret its surroundings and instructions similarly to how a person might <sup>81</sup>. Pairing that with KIST's expertise in autonomous walking, KAPEX is envisioned as an **intelligent companion** that learns from experience rather than following only pre-programmed routines <sup>82</sup> <sup>83</sup>. The global humanoid race is increasingly about who can best fuse advanced AI brains with reliable bodies. Companies like *Tesla* and *Figure* have both highlighted their in-house AI models (Tesla's is often touted as an extension of its Autopilot neural nets; Figure's is called "Helix") that allow their robots to navigate and manipulate with greater autonomy <sup>84</sup> <sup>85</sup>. Figure's Helix, for example, is a vision-language-action model similar in spirit to DeepMind's – it's fed by the robot's new stereo cameras and fingertip sensors to create an AI that perceives and plans in human spaces <sup>84</sup>. This week, Figure claimed that Helix enabled learning a task like towel-folding with only 80 hours of video data – a fraction of what was thought necessary <sup>86</sup> <sup>87</sup>. If true, that's a testament to how far AI has narrowed the gap to humanlike learning efficiency.

Overall, the state-of-the-art humanoid is as much an AI system as it is a mechanical one. The **breakthrough** is not just bipedal locomotion (which is now almost routine) but the ability to *think and perceive* in unstructured environments. By integrating vision, language, and motor control networks, today's humanoids can recognize objects, understand basic spoken commands, and even respond to gestures or human demonstrations. This tight coupling of AI algorithms with robot hardware is what's powering the "rise of the machines" – creating robots that are smarter, safer, and more useful than their predecessors <sup>67</sup> <sup>75</sup>. Yet, as experts remind, these AIs are data-crunching specialists, not true artificial general intelligence <sup>76</sup>. They excel at *narrow* tasks and pattern recognition within the bounds of their training data. Giving a robot **common sense**, or the human-like ability to handle complete surprises, remains an unsolved challenge. Nonetheless, the past week's progress in AI integration suggests that we're steadily chipping away at the problem, one learned skill and one multimodal model at a time.

## Comparative Advances: Humanoids vs. Other Robots

While humanoid robots took center stage, it's worth noting that **non-humanoid robots** also saw notable advances – often targeting tasks and environments where human-like form isn't necessary. For example, in Japan the utility TEPCO deployed a **quadrupedal inspection robot** (akin to Boston Dynamics' "Spot") equipped with an arm for manipulating valves and doors <sup>88</sup>. This four-legged robot is built to handle narrow industrial spaces and hazardous conditions like radiation, addressing maintenance needs in aging power plants <sup>88</sup> <sup>89</sup>. Its rollout on October 7 marked the first use of such a legged machine by a Japanese power company <sup>90</sup>. The ability to **navigate stairs and tight corners** on four legs, plus manipulate objects, gives it an edge in inspecting areas too risky for humans (a lesson underscored after Fukushima) <sup>91</sup>. This indicates that for certain jobs – like crawling through pipes or rubble – specialized robots (quadrupeds, snakes, drones) continue to be invaluable. Indeed, this week also saw buzz about robot "dogs" training for lunar construction and **flying car drones** in tech news, showing the diversity of robotics progress <sup>92</sup> <sup>93</sup>.

However, even these non-humanoid projects often inform humanoid development. TEPCO's legged inspector, for instance, blends **mobility with manipulation** – a combination also at the heart of humanoids

<sup>94</sup> . Techniques developed for balancing a quadruped on uneven terrain or for tele-operating an arm in complex spaces can transfer to two-legged robots. Likewise, the **exoskeleton data suit** from China could improve any robot with limbs, not just human-shaped ones <sup>27</sup> <sup>95</sup> . We are seeing a cross-pollination: innovations in one form factor (e.g. drone swarming AI, or soft robotic grippers from industrial bots) often find their way into humanoid designs. But it's also clear why humanoids garner special attention – their human-like shape is uniquely suited to *replacing or assisting humans directly* in our environments. A wheeled warehouse robot might excel at logistics, but only a bipedal humanoid can climb a ladder to change a light bulb or use human tools with minimal modifications. For that reason, many breakthroughs discussed (AI reasoning models, dexterous manipulation techniques) are aimed squarely at conquering the humanoid challenge. Non-humanoid robots will continue to advance in parallel, often outperforming humanoids in niche domains (e.g. a robotic arm on wheels may be cheaper and more efficient in a factory than a full humanoid worker). The industry increasingly recognizes **humanoids as complementary**: they won't replace all other robots, but will fill the gaps where human-like versatility is needed.

In summary, this week's news highlighted that *all* robots – from four-legged inspectors to AI-powered warehouse arms – are rising in capability, but the humanoids are rising to meet them. If a non-humanoid solution can do the job safer or cheaper, it likely will be used; humanoids must prove themselves worth the complexity. That's why events like Figure's BMW deployment are crucial: they test whether a humanoid can economically do a task that maybe a fixed automation or simpler robot could also do <sup>45</sup> . The coming years will refine this division of labor. For now, the breakthroughs across the spectrum show a healthy and diverse robotics ecosystem, with humanoids as the ambitious frontier pushing toward general-purpose utility.

## Applications and Implications

With these rapid advancements, **real-world applications** of humanoid robots are coming into focus – as are the challenges of deploying them outside controlled labs. One clear application domain is **manufacturing and logistics**. Humanoids like Figure's and Tesla's are initially being targeted at dull, repetitive, or ergonomically tough tasks in factories and warehouses <sup>96</sup> <sup>97</sup> . The rationale is straightforward: such robots can work tirelessly (no shifts or fatigue), improve workplace safety by handling dangerous tasks, and address labor shortages. This week's updates strengthen that case – e.g. Figure's humanoid proved it can load car parts for hours on end without issue <sup>38</sup> <sup>40</sup> . Amazon's research on ResMimic also directly ties to logistics: teaching a biped to lift boxes properly without dropping them is key if humanoids are to help in fulfillment centers or delivery services <sup>97</sup> <sup>98</sup> . In fact, Amazon's broader humanoid ambitions are likely aimed at future warehouse workers that can do any manual job a human can <sup>24</sup> <sup>25</sup> . If these robots succeed, the implication is a transformation of various industries – from auto assembly to retail stock rooms – where *flexible automation* could replace or augment human labor. However, there are caveats. For one, current humanoids still have limits in battery life and strength; the Figure robot at BMW likely performed a narrow task and may need frequent recharging or supervision <sup>45</sup> . Scaling up to a fleet of humanoids will require proving reliability and justifying cost over simpler robotics or human workers. It's notable that BMW treated the initial phase as a careful feasibility study <sup>44</sup> . We can expect more such pilot programs in the near term as companies gauge ROI and reliability.

Another emerging application is **service and hospitality**. In Japan, with its aging population and labor crunch, they are literally planning to put humanoids in convenience stores. *Seven-Eleven Japan* announced a partnership to develop **Astra**, a humanoid store clerk, by 2029 <sup>73</sup> <sup>99</sup> . The idea is that these robots will stock shelves, clean, and greet customers (with polite bows, of course) during late-night shifts or in rural areas where staff are scarce <sup>100</sup> <sup>101</sup> . The cultural significance is big: in Japan's service-oriented retail

culture, a humanoid that can interact naturally (even saying *irrashaimase!* to customers) could ensure convenience stores stay open and fully staffed despite demographic challenges <sup>102</sup> <sup>103</sup>. The partnership with Telexistence (a robotics firm) and involvement of Japanese research experts indicates a serious national push <sup>104</sup> <sup>105</sup>. These humanoid clerks, dubbed a kind of “*robotic superworker*,” are expected to work up to 18 hours a day and adapt to different store layouts via AI learning <sup>103</sup> <sup>101</sup>. If successful, the impact extends beyond retail – it could normalize humanoids in everyday public settings, paving the way for robots in supermarkets, malls, and restaurants around the world. On the flip side, it raises questions about how customers feel interacting with robot staff. Initial pilot studies show fascination but also **concerns about trust and social comfort**. Retail robots will need to not only perform tasks but do so in a customer-friendly way (tone of voice, understanding social cues, etc.). This is why Seven-Eleven’s concept stresses “*friendliness and cultural nuance*,” aligning the robot’s behavior with Japan’s hospitality norms <sup>106</sup> <sup>102</sup>. The implication is that beyond engineering, successful deployment will require careful human-robot interaction design and likely public education.

In the home, humanoid robots hold both promise and hype. Figure’s ultimate vision is a **home humanoid** that can do chores like laundry, dishes, and cleaning up clutter <sup>107</sup> <sup>108</sup>. They explicitly pitch Figure 03 as eventually suitable for domestic chores (after testing with partners first) <sup>109</sup> <sup>110</sup>. The *Time* cover story this week on Figure highlighted how challenging these mundane tasks still are – during a demo, the previous Figure robot struggled with folding towels and picking up dropped laundry (succeeding only on third tries) <sup>111</sup> <sup>112</sup>. Adcock, Figure’s CEO, acknowledges they’re “not there yet” on full autonomy at home, but aims for 2026 to reach a point where the robot can handle most house tasks all day <sup>109</sup> <sup>113</sup>. If achieved, this could fundamentally change home life: imagine a robot butler/maid accessible to average households. It might alleviate the burden of daily chores, provide assistance to the elderly or disabled, and generally free up human time. However, experts urge caution on the timeline. As one robotics professor said in response to the DeepMind Apollo demo: *we still have a long way to go* for robots to gain capabilities like **touch sensitivity equivalent to human skin, or the ability to feel pain or smell odors** <sup>114</sup> <sup>115</sup>. These senses are crucial for truly safe and effective home helpers (a robot chef that can’t smell burning food, for instance, is limited). There are also concerns about **safety and privacy** – having a powerful autonomous machine roaming your home with cameras and network connectivity poses new risks. Surveys (like one by IEEE Spectrum last month) show mixed feelings from the public: many are excited about help with chores, but worry about robots *accidentally* injuring people or collecting personal data <sup>116</sup> <sup>117</sup>. This implies that for widespread home adoption, companies must not only solve technical problems but also build **trust**. That could involve regulations (for example, safety certifications akin to how we certify appliances), transparency about data use, and rigorous testing in millions of edge cases to prevent accidents.

**Global Impact and Outlook:** The breakthroughs of the last week underscore that the **race for humanoid leadership is global**. The United States (via startups like Figure, giants like Tesla and Google, and Amazon’s labs) currently leads in funding and prototypes on the ground <sup>118</sup> <sup>119</sup>. But others are charging ahead: **China** is leveraging its strengths in manufacturing and AI – the HumanoidExo project and companies like Unitree and Deep Robotics show a concerted effort to catch up in core technology <sup>120</sup> <sup>121</sup>. **South Korea**’s KAPEX project, launched by LG and KIST with government backing, explicitly frames humanoids as a strategic national endeavor, aiming to produce a commercially viable humanoid within four years <sup>82</sup> <sup>122</sup>. They are pooling expertise from hardware (LG’s actuators), AI (LG’s Exaone model), and walking algorithms (KIST’s humanoid research) to make a robot that can learn and adapt in complex environments <sup>123</sup> <sup>81</sup>. This mirrors a point made in *Time*: dozens of companies worldwide are now racing to create the first truly **viable general-purpose humanoid**, with a potential market value in the trillions <sup>124</sup> <sup>119</sup>. Observers predict that within a decade, humanoid robots could number in the millions or even billions across industries <sup>125</sup> <sup>126</sup>. If

those forecasts hold, we might see a revolution in the workforce akin to the computer revolution – mundane physical work could increasingly be automated by humanoids much as calculations were automated by computers. This could boost productivity but also disrupt jobs, raising the need for *reskilling* programs and new economic models. Optimists like Figure’s CEO even suggest “every home will have a humanoid” and the largest company in the world may be a humanoid maker within 10 years <sup>118</sup> <sup>127</sup>. That may be hyperbole, but it signals the confidence in this field.

In the near term, expect to see more **field trials and partnerships** as companies test use-cases. Automakers, logistics firms, and retailers will likely expand pilot programs if initial results (like BMW’s) continue to impress. We’ll also see iterative improvements: battery technology is one critical area (Figure just achieved a UN safety certification for its robot’s new battery, and is experimenting with wireless charging mats so robots can self-recharge <sup>128</sup> <sup>129</sup>). Each increment that extends a robot’s run-time or reduces maintenance will make deployments more viable. The fact that Deep Robotics designed the DR02 with quick-swap modular limbs for easy repairs shows a practical mindset toward minimizing downtime <sup>130</sup> <sup>131</sup>. **Regulation and standards** for humanoids are also on the horizon – for instance, what safety protocols should a 100 kg robot follow when working near humans? Industry groups and governments will need to establish guidelines, much as we have for autonomous cars. This week’s news of various nations (US, China, Korea, Japan) pushing humanoids suggests that international standards may eventually be necessary to ensure compatibility and safety across borders.

Finally, a social implication: As robots become more common in public and work life, society will need to adapt. This ranges from practical (e.g. robots in the workplace might require new training for human coworkers, and perhaps labor laws updated to account for robotic “colleagues”) to ethical (e.g. how do we treat humanoid robots – as appliances, as quasi-employees, something else?). Japan’s approach in 7-Eleven – where the robot is treated as a friendly helper rather than a threat – might serve as a cultural case study <sup>102</sup>. In contrast, Western reactions often carry a bit of the “uncanny valley” or job displacement anxiety. Managing this transition will involve public communication and realistic expectation-setting. As one expert put it, it’s important to view flashy robot demos with some skepticism – these machines **are impressive, but they have strict limits and follow pre-defined rules** <sup>114</sup> <sup>132</sup>. The hype can sometimes run ahead of reality. This IEEE Spectrum’s “*Reality of Humanoid Hype*” report last month pointed out issues like power supply, maintenance, and cost that are often glossed over <sup>133</sup> <sup>125</sup>. For instance, even if Agility Robotics can *build* 10,000 humanoids a year in their new factory, can they also deploy and support them effectively? <sup>125</sup> Those practical challenges must be solved for the “rise of the machines” to truly scale.

**In conclusion**, the past week delivered concrete signs that humanoid robots are swiftly evolving from lab prototypes to real-world actors. We saw machines that can walk in the rain, work through the night, understand spoken orders, and learn new tricks from human teachers – all within days of news. Each breakthrough is incremental, yet the trajectory is undeniable. Humanoid robots are steadily becoming **more capable, more resilient, and more integrated with AI**, reducing the gap between science fiction and fact. If these trends continue, the coming years will likely see humanoids taking on meaningful roles in factories, stores, and maybe even our homes. The world’s leading tech powers are investing heavily to make it so, and even this week’s snapshot shows *global momentum*. There are still many hurdles to overcome (from technical limitations to societal acceptance), but the tone has shifted from “*if* humanoid robots will be useful to “*when*”. As one robotics CEO teased during this week’s announcements: the seemingly crazy robot feats we see today might soon be the “*least crazy*” things these companies accomplish <sup>134</sup> <sup>135</sup>. The rise of the machines is underway – guided by human ingenuity and caution in equal measure – and the next decade will reveal just how far these humanoid helpers will climb.

**Sources:** Recent announcements and reports from robotics companies, research labs, and news outlets (October 7-14, 2025), including *Humanoids Daily* <sup>8</sup> <sup>136</sup>, *IEEE Spectrum* <sup>16</sup>, *MIT Technology Review*, *ScienceDaily*, *Tech Xplore* <sup>61</sup>, *Reuters*, *TIME* <sup>107</sup>, *AI Business* <sup>73</sup>, and others. All information has been cross-verified via multiple credible sources to ensure accuracy and global coverage.

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