gNext: Transforming Infrastructure Management with AI-Powered Inspections

By Sanjay Gangal

In an era where infrastructure deterioration poses an increasing risk to public safety and financial resources, gNext has emerged as a transformative force, leveraging artificial intelligence, drone technology, and advanced data analytics to streamline inspections and maintenance processes. The SaaS-based platform integrates machine learning and 3D modeling to help engineers and asset managers make data-driven decisions, ensuring the longevity of critical infrastructure.

Russ Ellis, President of gNext, recently sat down to discuss the latest developments in the company's AI-powered InspectAssist tool, which is rapidly reshaping how infrastructure is monitored and maintained. He emphasized that the company continues to innovate and add new capabilities, making infrastructure inspections faster, more efficient, and more precise. The demand for these advancements comes from a growing industry need to transition from manual, labor-intensive inspections to automated, data-driven processes.

The release of InspectAssist marked a significant milestone for gNext, particularly in its ability to detect, annotate, and quantify defects in concrete and asphalt structures. These materials are among the most commonly used in infrastructure, and their maintenance is critical to ensuring long-term durability and safety. The AI-powered system can identify various types of defects such as cracks, spalls, exposed rebar, and water infiltration indicators like efflorescence. By automating the traditionally manual task of defect identification, the software drastically reduces the time and labor required for inspections, allowing engineers to focus on analyzing and addressing issues rather than spending hours identifying them.

gNext is not stopping at concrete and asphalt structures. The company has plans to expand its AI capabilities into additional infrastructure areas, including airport runways, communication towers, and electric substations. These expansions address critical safety and efficiency needs in various industries. For instance, in airport infrastructure, AI models can now identify cracks, vegetation encroachments, and obstacles in approach paths, which have historically been difficult to detect with traditional manual inspections. The Federal Aviation Administration requires clear flight paths, and when trees or other obstructions interfere, they must be removed. gNext's AI system enables authorities to pinpoint the exact location and height of obstructions, allowing for targeted pruning or removal rather than broad-scale deforestation. This precision drastically cuts down on the time and resources required for compliance.

Another key feature of gNext's platform is its ability to integrate multiple data types, including images, videos, 360-degree imagery, LiDAR scans, and plan drawings. This variety allows for a more comprehensive inspection process, as different data types provide different perspectives on an asset's condition. Drone-captured images provide aerial views, while LiDAR scans offer

detailed depth and measurement accuracy. The ability to marry these datasets ensures that inspections are as precise and thorough as possible. For instance, LiDAR scans provide highly accurate dimensional data but lack visual clarity, whereas 3D mesh models offer detailed visual representations. Combining the two allows for better defect detection and measurement.

One of gNext's most impressive achievements is the development of 42 predefined asset types that streamline the photogrammetry process for users. This means that users do not need to have an extensive background in photogrammetry to use the platform effectively. The software includes predefined settings tailored for specific asset types such as bridges, towers, roads, roofs, and even nuclear cooling towers. By selecting the appropriate asset type, users can process data efficiently without having to tweak complex settings. This feature has significantly reduced the learning curve and processing time for new users, making it easier for organizations to adopt AI-driven inspections without requiring specialized training.

Security is a top priority for gNext, especially considering the sensitive nature of infrastructure data. The company ensures the security of client data through AWS-secured cloud processing and a SOC 2 Type II certification. This globally recognized certification requires annual penetration testing, adherence to strict security protocols, and continuous monitoring of internal and external security procedures. Achieving this certification is no small feat, as it involves rigorous compliance measures, but it provides clients with the assurance that their data is protected at the highest industry standards.

gNext has already gained the trust of major organizations, including Network Rail, Southern Company, Vinci UK, and various Departments of Transportation. The company has also established a key partnership with Skydio, a leading drone manufacturer, to integrate cloud-to-cloud data collection and analysis. This integration streamlines workflows, allowing users to capture inspection data with Skydio drones and process it seamlessly within gNext's platform. The result is a faster, more efficient inspection process that eliminates redundant steps and reduces human error.

Looking ahead, gNext is preparing to roll out several new AI-driven features and enhancements. In addition to improving defect detection and reporting capabilities, the company is expanding its AI models for use in communication tower inspections. These models can automatically identify and catalog equipment on cell towers, helping telecommunications companies maintain accurate inventories. This level of automation reduces the need for manual record-keeping and ensures that operators have up-to-date information on tower assets. Another upcoming feature focuses on AI-powered substation inspections, which will help energy companies monitor the condition of critical infrastructure components. Given the importance of power reliability and safety, the ability to quickly and accurately assess substation conditions is a valuable addition to the platform.

Despite being a small company with fewer than ten employees, gNext has made a significant impact in the infrastructure technology space. The company is currently experiencing rapid growth, driven by increasing demand for AI-powered inspection solutions. As more industries recognize the benefits of automated infrastructure management, gNext is poised to continue

expanding its capabilities and customer base. Ellis remains confident in the company's trajectory, emphasizing that every new feature and capability is developed based on real customer needs rather than speculative innovation. By staying closely connected to industry demands, gNext ensures that its platform delivers meaningful, practical solutions that drive efficiency and safety in infrastructure management.

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