

Indian neurosurgeons have successfully tested the development of SPbPU

A scientific team led by SPbPU Professor Vladimir Ivanov, in partnership with neurosurgeons from a specialized hospital in Chennai (India), successfully tested an improved version of a surgical navigation system based on artificial intelligence and augmented reality. The development makes it possible to project detailed 3D holograms of brain structures integrated with MRI data onto the surgical field in real time, which increases the accuracy of interventions and reduces intraoperative risks.



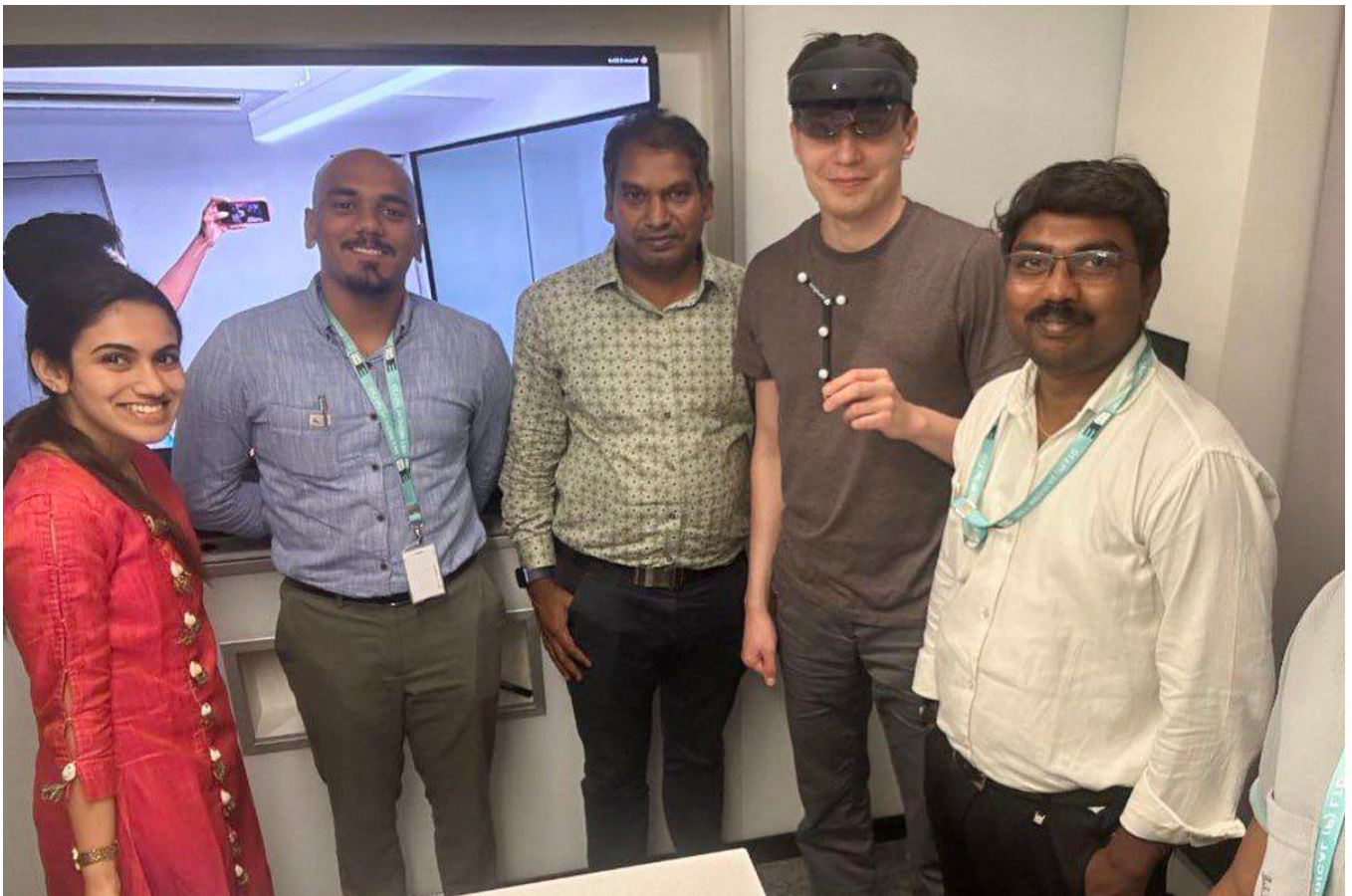
Surgical navigation is the gold standard in modern neurosurgery. However, traditional systems have limitations that require the surgeon to constantly shift his gaze from the operating field to a separate monitor. Augmented reality (AR) and artificial intelligence (AI) technologies are designed to solve this problem by integrating virtual three-dimensional models of anatomical structures directly into the surgeon's field of vision.

One of such promising developments is the Medgital Vision hardware and software complex, created by the scientific group of Professor Vladimir Ivanov from the Higher School of Theoretical Mechanics and Mathematical Physics of St. Petersburg

State University.

The Medgital Vision system is a complex that combines computer vision, machine learning, and augmented reality algorithms.

- Three-dimensional reconstruction. Based on MRI/CT data, AI algorithms create high-precision 3D models of the operated area, in particular, complex structures of the brain.
- Holographic projection. The model in the form of an interactive hologram is projected directly onto the operating field through an AR headset or a specialized display, providing the surgeon with «X-ray» vision.
- Intraoperative navigation. The system monitors the position of surgical instruments in real time and combines them with a virtual hologram, ensuring the highest accuracy of navigation.



The testing of the updated version of the system was carried out by the leading developer Ildar Mamaev on the basis of a specialized hospital. At the request of Indian colleagues, AI algorithms have been refined for even more detailed visualization of specific areas of the brain. The first operation performed using the updated system confirmed its clinical effectiveness and stable operation in a real surgical process.

The success in India continues a series of international technology deployments.

- 2023 — the first operations using the system were performed in medical centers in Turkey and Belarus.
- 2024 — the development received the highest awards at the prestigious international competitions HICOOL (China) and ITECH (China).
- 2025-2026 — it is planned to introduce the system in clinics in Mexico and Ecuador, as well as open a full-fledged representative office in India.



The successful testing of the Medgital Vision system in India confirms its competitiveness in the global medical equipment market. The development of St. Petersburg scientists makes a significant contribution to the development of digital surgery, making it possible to increase safety and reduce the invasiveness of complex neurosurgical operations. Further international expansion and collection of clinical data will contribute to the evolution of the system towards full automation of surgical planning.

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