

## NXT22-009 - Artificial intelligence for diagnostics of ALT-positive cancer (AI4CAN)

### Abstract

The AI4CAN project was aimed at making advanced cancer diagnostics more accessible by developing a web-based software prototype that uses artificial intelligence to analyze microscope images. Initially focused on detecting ALT (Alternative Lengthening of Telomeres), a biomarker associated with poor prognosis in neuroblastoma and other cancers, the tool was designed to support diagnostic laboratories that lack specialized data science expertise. Throughout the project, the prototype evolved into a robust platform that allows users to create patient records, upload sample metadata, and submit high-resolution microscopy images in standard formats. Once uploaded, the system applies AI models that segment cell nuclei and fluorescence in situ hybridization signals, extract relevant features, and classify the ALT status of each sample. The results are presented in a downloadable report, enabling side-by-side comparison with expert annotations. Building on this foundation, the team extended the software to support the detection of MYCN oncogene amplification, another critical biomarker for unfavorable outcomes in neuroblastoma and other cancers. This expansion demonstrates the flexibility of the platform and its potential for broader clinical use. The same approach could be adapted to other cancers with ALT or gene amplifications in the future, such as breast cancer, where HER2 amplification is a key diagnostic marker. By combining user-friendly design with AI-driven analysis, AI4CAN bridges the gap between cutting-edge research and clinical diagnostics. The prototype was successfully tested with real patient data from three diagnostic laboratories and is now ready for wider deployment.

### Keywords:

cancer, neuroblastoma, software prototype, artificial intelligence, clinical diagnostic

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Further links to the persons involved and to the project can be found under <https://www.gmbh.wwtf.at/funding/programmes/ei/NXT22-009/>