

TECH OFFER

AI-Powered Digital Pathology Solution for Thyroid Cancer Diagnosis



KEY INFORMATION

TECHNOLOGY CATEGORY:

- Healthcare - Medical Devices
- Healthcare - Diagnostics
- Healthcare - Pharmaceuticals & Therapeutics
- Healthcare - Telehealth, Medical Software & Imaging
- Infocomm - Artificial Intelligence

TECHNOLOGY READINESS LEVEL (TRL): **TRL6**

COUNTRY: **SOUTH KOREA**

ID NUMBER: **TO175174**

OVERVIEW

Cancer is one of the most deadly diseases worldwide, requiring pathological testing to confirm the diagnosis. With recent advancements in digital pathology, there is a growing demand for AI-based digital pathology diagnostic products to manage and shorten diagnosis time for accurate and targeted treatments.

Thyroid cancer is a relatively common type of cancer. The malignancy of thyroid nodules is determined through the pathological examination of cells obtained via Fine Needle Aspiration (FNA) or Core Needle Biopsy (CNB). However, due to the complexities of thyroid nodule pathology, over 30% of patients' biopsy samples are classified as indeterminate, meaning they cannot be definitively diagnosed as benign or malignant. Additional testing, such as Next-Generation Sequencing (NGS) molecular tests are required to provide further clarification. However, the high cost of testing limits patient accessibility.

This technology is an AI-powered solution that analyze pathology images obtained through Core Needle Biopsy (CNB), providing diagnostic results for benign or malignant nodules. It offers interpretation and visualization of AI analysis results. This allows for accurate diagnosis of not only the benign(C2) and malignant(C6) cases traditionally identified by pathologists but also indeterminate(C3,C4,C5) cases that were previously challenging to diagnose.

This approach ultimately reduces unnecessary surgeries, thereby improving the quality of life for patients. It offers a cost-effective alternative to expensive and less accessible NGS testing, delivering similar diagnostic accuracy without the need for additional tests.

The technology owner is seeking partnerships with medical institutions specializing in oncology, including major hospitals and clinical laboratories, pharmaceutical and biotechnology companies.

TECHNOLOGY FEATURES & SPECIFICATIONS

AI-based Pathology Image Analysis Solution: This technology leverages AI to analyze CNB thyroid nodule tissue images stained with H&E. This process involves a highly complex series of steps distinct from typical natural image analysis. These steps include tissue detection within the image, patching of tissue images, feature extraction from these patches, and the classification of malignant and benign nodules. This AI solution provides an optimized technology pipeline for such analysis and incorporates state-of-the-art pathology image analysis AI system. This system is capable of diagnosing areas that human pathologists may not be able to detect visually, offering revolutionary diagnostic capabilities.

AI Interpretation and Visualization: The solution provides a quantified score indicating the malignancy level of the thyroid nodule. It also highlights key areas within the tissue slide where the tumor is located using a localized heatmap, identifying major regions that affect malignancy.

Optimal User Convenience: This solution offers a web-based service to ensure accessibility and user convenience, allowing medical professionals to access diagnostic tools and results from any location with internet connectivity. It supports hybrid deployment in both on-premise and cloud environments, providing flexibility to optimize user settings and service provision based on institutional needs. Additionally, this solution includes a custom-developed pathology image viewer and management system that supports various formats, enabling users to explore, manage, and review image information efficiently.

POTENTIAL APPLICATIONS

Clinical Unmet Need: This technology addresses significant clinical unmet needs by providing accurate and timely diagnosis of thyroid nodules, reducing the number of indeterminate cases and minimizing the need for unnecessary surgeries. This improves patient outcomes and reduce healthcare costs.

Personalized Cancer Treatment: This solution can be instrumental in the development of personalized cancer treatment plans. By accurately diagnosing the malignancy of thyroid nodules, healthcare providers can tailor treatment plans to the individual patient's condition, optimizing therapeutic efficacy and minimizing side effects.

Cancer Metastasis Risk Prediction: By analyzing biopsy images and identifying malignant characteristics, this technology can help predict the risk of cancer metastasis. This early detection capability enables proactive management and monitoring of patients at high risk of cancer spread.

Telepathology and Remote Diagnostics: The web-based and cloud-supported nature of the solution makes it ideal for

telepathology applications. Pathologists can remotely analyze biopsy images and provide consultations, expanding access to expert diagnostics in underserved areas.

Integrated Diagnostic Platforms: The solution can be integrated into comprehensive diagnostic platforms that combine imaging, molecular testing, and AI analysis. These platforms can offer a holistic view of a patient's condition enabling more accurate and comprehensive diagnosis.

MARKET TRENDS & OPPORTUNITIES

The technology targets a rapidly growing medical device market, particularly within the AI segment. The Singapore medical device market, recognized as a healthcare hub in the APAC region with world-class medical standards and infrastructure, is projected to reach \$1.2 billion by 2028, with a compound annual growth rate (CAGR) of 6.3%. Additionally, the AI medical device segment is expected to achieve a remarkable CAGR of 45.8% by 2030, indicating the increasing integration and utilization of AI technology in the healthcare sector.

UNIQUE VALUE PROPOSITION

Cost-Effectiveness: The significant cost savings compared to traditional molecular diagnostic test make this technology financially advantageous for both patients and healthcare providers.

Integration and Usability: The ease of integration into existing systems and the support for remote diagnostics address practical implementation challenges, making the solution highly usable and scalable.

Comprehensive Coverage: The ability to diagnose indeterminate cases and support remote diagnostics extends the reach and impact of the solution, offering substantial improvements over current methods.