TECH OFFER

Ultrasensitive Biomarker Detection and AI-Analysis for Alzheimer's Disease

KEY INFORMATION

TECHNOLOGY CATEGORY:

Healthcare - Pharmaceuticals & Therapeutics
Healthcare - Diagnostics
Healthcare - Telehealth, Medical Software & Imaging

TECHNOLOGY READINESS LEVEL (TRL): TRL6
COUNTRY: SOUTH KOREA
ID NUMBER: TO175136

OVERVIEW

Dementia, particularly Alzheimer's disease, is a significant socioeconomic burden in aging societies. Traditional blood tests are unable to detect Alzheimer's biomarkers despite that the biomarkers appear 10-20 years before the appearance of cognitive decline symptoms. A groundbreaking ultrasensitive blood biomarker detection technology has been developed to overcome this limitation. This patented technology detects disease biomarkers at femtogram (fg/mL) levels, achieving sensitivity over 10,000 times higher than conventional methods.

In addition to advanced biomarker detection, a comprehensive lifelog data collection technology has been integrated. Using smart rings and other wearable devices, extensive lifelog data is gathered, including sleep patterns, activities, and urine test results. This multimodal data collection supports the creation of the world's largest Asian Senior Cohort, targeting over 30,000 individuals for the next 5 years.

A key component of this innovative approach is the AI-based data analysis for the diagnosis and prognosis of dementia and cognitive dysfunction. AI algorithms analyze the comprehensive datasets, providing precise diagnostic insights and predicting disease progression. This AI-driven analysis, combined with ultrasensitive biomarker detection and detailed lifelog data, forms a robust data platform for early diagnosis, continuous monitoring, and personalized healthcare solutions.

By focusing on these cutting-edge technologies, this platform offers a holistic and precise approach to managing cognitive health in super-aging societies. This innovative solution supports precision medicine and provides a comprehensive method for the early detection and ongoing management of dementia and other age-related diseases.

TECHNOLOGY FEATURES & SPECIFICATIONS

This technology offers substantial improvements over current cognitive health management practices through several unique features:

1. Ultrasensitive Biomarker Detection: Unlike conventional methods, which often lack sensitivity, this technology detects Alzheimer's biomarkers at femtogram (fg/mL) levels. This capability enables detection up to decades before cognitive symptoms manifest, facilitating early intervention and significantly improving treatment outcomes.
2. Comprehensive Lifelog Data Integration: Utilizing smart rings and wearables, the technology continuously gathers detailed lifelog data such as sleep patterns and physical activities. This holistic monitoring approach provides a comprehensive view of an individual's health status, enabling personalized healthcare strategies tailored to specific patient needs.
3. AI-Driven Precision Healthcare: Integrated AI algorithms analyse multimodal datasets with over 90% accuracy for diagnosing and predicting cognitive dysfunction. This AI-driven analysis enhances diagnostic precision, monitors disease progression effectively, and optimizes treatment plans based on real-time data insights.
4. Establishment of Large-Scale Research Cohorts: The technology facilitates the creation of extensive Asian Senior Cohorts, supporting longitudinal studies and clinical trials. This infrastructure is pivotal for advancing research in drug discovery, validating biomarkers, and developing innovative medical devices aimed at enhancing dementia management.

POTENTIAL APPLICATIONS

This integrated technology revolutionizes cognitive health management in aging societies by combining ultrasensitive biomarker detection, comprehensive lifelog data collection, and precise AI-driven analysis for proactive healthcare solutions.

Early Diagnosis: The technology's ultrasensitive biomarker detection enables early identification of Alzheimer's disease, potentially decades before symptoms appear. This early detection supports timely interventions, improving treatment outcomes and quality of life for patients.

Continous Monitoring and Personalized Care: Integrating lifelog data from smart devices allows for personalized healthcare strategies tailored to individual health profiles and the continuous monitoring of daily activities, sleep patterns, and vital signs facilitates proactive management and optimization of treatment plans based on real-time data insights.

Tailored Treatment Strategies: AI-driven analysis of multimodal datasets provides valuable insights into disease progression and treatment efficacy. This capability aids healthcare professionals in monitoring cognitive decline, adjusting therapeutic approaches, and delivering timely interventions to enhance patient care outcomes.

Research and Development Platform: The establishment of a large-scale Asian Senior Cohort and extensive lifelog data collection

creates opportunities for advanced research in drug discovery, biomarker development, and validation of medical devices. This platform supports longitudinal studies and clinical trials, offering a robust framework for investigating correlations between biomarkers, lifestyle factors, and cognitive health outcomes

MARKET TRENDS & OPPORTUNITIES

The market potential for this technology is substantial, driven by the increasing prevalence of dementia and the growing elderly population globally. The Alzheimer's Disease International estimates that over 50 million people worldwide currently live with dementia, with numbers projected to nearly triple by 2050. This demographic shift underscores the urgent need for innovative technologies that can improve early detection, management, and treatment outcomes.

UNIQUE VALUE PROPOSITION

This technology's unique value proposition lies in its groundbreaking sensitivity in biomarker detection which allows for early detection of cognitive decline and dementia much earlier than presentation of clinical symptoms. Integrated lifelog allows for a holistic monitoring approach which provides a comprehensive view of an individual's health status, enabling personalized healthcare strategies tailored to specific patient needs. In addition, integrated AI algorithms analyse multimodal datasets with over 90% accuracy for diagnosing and predicting cognitive dysfunction. This AI-driven analysis enhances diagnostic precision, monitors disease progression effectively, and optimizes treatment plans based on real-time data insights.

Lastly, the technology provides an opportunity for the creation of extensive Asian Senior Cohorts, supporting longitudinal studies and clinical trials. This infrastructure is pivotal for advancing research in drug discovery, validating biomarkers, and developing innovative medical devices aimed at enhancing dementia management.