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# Electrocardiographic Signal Based Artificial Intelligence Framework for Myocardial Infarction

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## Introduction

Acute ischemic stroke and intracerebral haemorrhage are two of the most common causes of neurological disease in the elderly, exposing millions to neurological abnormalities and physical impairments. Ischemic injury disrupts the functional network architecture of cortical regions, resulting in poor motor and cognitive performance. Stroke-related neurological damage increases disability, functional recovery and quality of life. Furthermore, cognitive impairment can reduce the efficacy of post-stroke therapy and significantly increase the risk of psychiatric illnesses such as depression and anxiety.

Patients with physiological impairment have a much higher economic impact than those who do not. Exact assessment of factors that predict cognitive and functional outcomes is required for making medical decisions, developing realistic rehabilitation objectives and programmes and appropriately directing patients. Cortical activity is essential for identifying stroke patients. The neuroelectrical activity of stroke-affected cortical lobes destabilises the entire neural system. A stroke's common and long-term consequences include functional motor and cognitive impairments. They play a significant role in the progression of physical disability, the slowing of physical rehabilitation and the deterioration of quality of life following a stroke.

## Description

Classic psychological and neurological tests cannot be performed immediately following a stroke due to medical issues (such as varying levels of arousal, pain, uncertainty and fatigue) and activity impairments (such as motor, linguistic and sensory deficits) that make it difficult for the patient to face physical tests. Electroencephalography (EEG) is a non-invasive imaging technology with low spatial resolution but high temporal resolution. An EEG wave can detect irregularities in brain rhythms caused by a stroke, making it a useful and alternative diagnostic tool for cognitive assessments [1-3]. The physiological signal can be used in everyday life as a tool for real-time physiological monitoring and early prognosis.

The advancement of the internet of things (IoT), wearable devices, digital twins, cyber-physical systems, big data and Healthcare 4.0 in medicine has heightened interest in a real-time biosignal-based patient monitoring system. Big-ECG, a cyber-physical cardiac monitoring system, was proposed for stroke prognosis and patient monitoring after a stroke. HealthSOS, a real-time health monitoring system for stroke prognostics that includes an eye-mask embedded portable EEG device, data analytics and a medical ontology-based health advisor service, was proposed.

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A healthcare "digital twin" framework for stroke diagnostics using a wearable EEG and investigating neurological parameters in various mental states has been proposed. A portable EMG device, cloud-based data processing, data analytics and a health advisor service for stroke patients were investigated as part of an EMG and pressure insole-based gait monitoring system. Machine learning (ML) and deep learning have largely driven the recent successful adoption of artificial intelligence (AI) in healthcare and medical facilities (DL). ML and DL have transformed the way we approach real-world tasks that were previously performed by humans [4,5]. These models are powerful tools that can be used for a variety of tasks such as classification, clustering, recommendation, ranking and forecasting.

## Conclusion

However, due to their diversity and nature, these techniques are complex and difficult to interpret. Most ML models operate as "black box" models, in which we provide some input to the model and it returns some output at the end. With the advancement of remote sensing technology, change detection can now be performed using a variety of platforms, including satellites, manned aircraft and Unmanned Aerial Vehicles (UAVs). At the time change detection algorithms based on UAV data can be applied to 3D derived data, such as point clouds, or to 2D orthoimages.

## Acknowledgement

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## Conflict of Interest

Authors declare no conflict of interest.

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