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POTENTIAL OF ARTIFICIAL INTELLIGENCE CENTAURS FOR MEDICAL DIFFERENTIAL DIAGNOSIS IN HUMAN SPACEFLIGHT

Abstract

Artificial intelligence (AI) has long been considered to assist or replace the role of medical diagnosis. Such attempts emphasize the benefits of computer algorithms being able to utilize vast medical databases and high processing power. At the same time, clinical and commercial use of AI for medical diagnosis has been limited to special fields and has not seen widespread use due to limitations in information collection, and the time delay between observation and inquiry.

Some researchers have thus promoted the idea of AI as an assistant to medical procedures rather than a replacement for the human component, but this approach still lacks utilizing the full potential of AI to process data and identify patterns. This approach also tends to use basic Bayesian logic for diagnoses of diseases, and is competitive only for identifying rare diseases or rare presentations of more common illnesses.

Systems that use AI and human analysts on equal parts, or centaurs, have been shown to be the new frontier of AI utilization. A centaur's human component presents the direction of analysis and allows the centaur to traverse unfamiliar datascapes and connect rationale across multiple fields. The centaur's AI component provides a detailed analysis of the suggested direction at speed, and evaluates the feasibility of the proposed cross-disciplinary logic.

Space medicine provides a useful frontier to test AI centaurs. Compared to other medical environments, astronauts are rigorously tracked on a variety of biosensors that alleviate the information collection gap found in traditional clinics. The rare mission profiles and the wide area of possible injuries also mean that spaceflight medical officers will be selected more for the breadth than the depth of their medical practice.

This research proposes that medical AI centaurs will present the ideal solution for spaceflight medical procedures, at least for conducting rapid differential diagnoses of astronaut patients. The paper will identify how such a proposed system will work in spaceflight, and how it will allow for greater medical redundancy in longer-term space missions.