Problem Statement – Memory and Mental Agility

Summary
Exercising our bodies to keep them healthy, as well as increasing strength and performance over time, has been a common practice for centuries but the importance of mental health and agility is also of great value as we live longer and lead increasingly complex lives. This focus area deals with the development of tools, games, and mnemonics designed to exercise the mind in order to improve recall, retention, and mental agility.

Background
The ability to recall and process information quickly plays a crucial role in our health and wellbeing in all stages of life. It is well known that, without novel and challenging stimuli, recall and mental agility can decline with age. This aspect of cognitive performance, however, is just a portion of the wider picture of improving memory and mental agility. There is growing interest in using memory exercises and mnemonics not only to delay the decline of mental performance, but also to enhance our current mental capacities to improve memory retention.

Artificial intelligence (AI) is poised to transform the way we address the maintenance and enhancement of our memory and mental agility. As wearable devices begin to gather more data that reflects our mental state, algorithms are being developed that can extract new insights and not only track mental performance, but also provide games and exercises to maintain or improve cognitive capabilities. Furthermore, AI-powered mnemonics and study tools are being used by students to improve memory retention and recall in academic and other testing environments.

As part of this hackathon focus area, teams are encouraged to work on solutions that address one or both aspects of memory and mental agility: combating age-related decline, and enhancement of existing mental capacity. Solutions will likely involve one or more of the following components:

- Tracking of memory/mental agility over time
- Development of exercises to improve mental performance
- Computational psychiatry: A data-driven approach to understanding mental illness: e.g. analysis of speech patterns to diagnose depression vs. other disorders, screening and analysis of patterns of social interactions to predict and track which therapeutic interventions are effective
Mount Sinai Health Hackathon
Creating Novel Technology Solutions For Healthcare

Artificial Intelligence
Expanding the Limits of Human Performance

- Addiction & remission tracking and interactive interventions

**Key Examples**
Some key examples of existing technologies developed to improve memory and mental agility include:

- **BioSensics**: a company developing wearable sensors to monitor cognitive decline over time, specifically focused on Alzheimer’s and dementia
- **Quizlet**: an edtech startup developing AI-powered study tools
- **Research from UPenn** showing that the delivery of pulses of electricity to the brain – controlled by an AI control system – can enhance human memory.