MOSAIC

MULTIMODAL OBJECTIVE SENSING TO ASSESS INDIVIDUALS WITH CONTEXT

INTELLIGENCE VALUE

The MOSAIC program aimed to advance the Intelligence Community's ability to evaluate an individual's psychological drivers, cognitive abilities, and mental resilience to predict their job performance.

The Intelligence Community (IC) evaluates members of its workforce periodically throughout their career. Current tools to assess the psychological and cognitive fitness of a candidate or employee include interviews, cognitive assessments, and self-reporting questionnaires. Although highly predictive of job performance, these tools have limitations including: the inability to capture dynamic and contextually-based attributes influenced by personal, social, and environmental factors.

MOSAIC aimed to use advances in mobile, wearable, and environmental sensors to develop continuous assessments of an individual's professional performance, and psychological and physiological well-being throughout their career. In phase I of the program, performers collected real-world, contextually rich data from sensors, mobile apps, and software from volunteer participants. In Phase II of the program, performers made their rich data sets available to the research community.

The MOSAIC program ran from July 2017 to December 2020. Some key accomplishments include:

- Sensor and survey data were collected from over 1,400 participants in studies ranging in duration from two months to one year.
- Data sets consist of sensor data collected under real-world conditions paired with daily psychological, health, personality, and cognitive surveys.
- Procedures for achieving very low attrition in study participants have been published.
- MOSAIC established standardized formats and guidelines for curating complex multimodal data.
- Curated datasets are available to government partners as well as the broader research community via links to performers' data repositories accessible through MOSAIC's Open Science Framework webpage.

PRIME PERFORMERS

- Lockheed Martin
- The University of Notre Dame
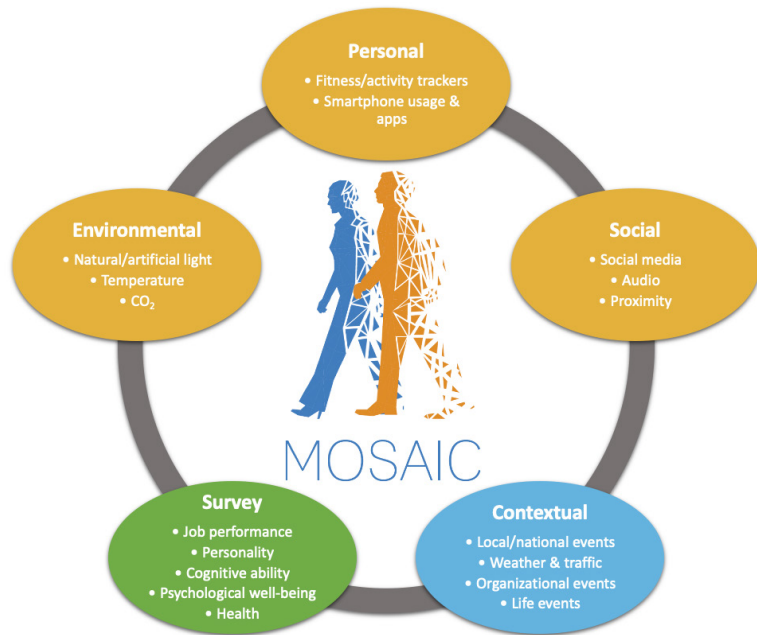- The University of Southern California
- The University of Memphis

TESTING AND EVALUATION PARTNERS

- MITRE
- Massachusetts Institute of Technology Lincoln Laboratory

KEYWORDS

- Behavioral science
- Cognitive psychology
- Human performance
- Mobile computing
- Context sensing
- Signal processing

MOSAIC combines unobtrusive, passive, and persistent sensing with contextual details and survey instruments with high reliability and validity

Personal
- Fitness/activity trackers
- Smartphone usage & apps

Social
- Social media
- Audio
- Proximity

Contextual
- Local/national events
- Weather & traffic
- Organizational events
- Life events

Survey
- Job performance
- Personality
- Cognitive ability
- Psychological well-being
- Health

Environmental
- Natural/artificial light
- Temperature
- CO_2

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