

Call for Papers: JFR Special Issue on 'Ergonomics and AI in Agriculture'

Ergonomics is the scientific study of relationship between a person and his/her working environment. The term environment includes his/her tools and materials, his/her method of work, ambient conditions and physical environment of work, and the organization of work. Specific to agriculture, ergonomics involves development of ergonomically improved tools and equipment; safety gadgets, biomechanical analysis to generate ergonomic design guidelines and to assess occupational health and safety issues. For most of the developing countries human workers are the most important source of farm power. Besides, they also operate animal drawn equipment, tractors, power tillers and self-propelled machinery systems. However, labor shortage for agricultural operations has led to the advent of technologies that are capable of operating with minimum human intervention. Such technologies deploy principles of robotics and artificial intelligence (AI) to handle agricultural operations like seeding, planting, weeding, fertilizer applications, crop monitoring, spraying, harvesting, etc. Such technologies are the potential solutions to meet the growing needs of the food and fiber. The robotics and AI hold a significant potential to solve the ergonomic challenges in agricultural operations specifically; navigation, localization, and targeting to address the spatiotemporal requirements of the crops. Application of high throughput sensing, Internet of Things (IoT), big data, cloud computing, and machine vision have enhanced the perception of production agriculture for intelligent and remote diagnosis and control. However, such technologies are currently in their nascent stage and their adoption can address labor shortage and to ensure timeliness and precise field operations. Therefore, integration of AI and Ergonomics to design user-friendly farm management technologies will not only reduce the human interventions but will also reduce the drudgery and occupation risks involved with agricultural operations. Additionally, such technologies can also formulate efficient management of resources for a sustainable agricultural production without compromising the environment.

Hence, the Journal of Field Robotics is calling submissions of original studies that describe the ergonomic and AI/robotic interventions for drudgery free agricultural operations. Analytical studies on their further impacts on human health, occupational risks and labor shortage are also welcomed. Reviews which are well summarized and include far-sighted prospects are also encouraged. Specific topics for this issue include but are not limited to:

- Artificial intelligence and data mining approaches for evolutionary algorithms, process planning and optimization, and operator's workplace design for agricultural tools and equipment.
- Exploration of human and technology interaction for safety and endurance in smart farming, horticulture, livestock, and fishery management operations through Virtual/Augmented Reality, Anthropometry and Biomechanics, Multiple objective optimizations, Neural Networks, and Decision Science.
- Development of autonomous systems to exclude safety concerns in farm machines based on risk simulations of overexertion, repetitive motion, slips, trips, and falls at work.

- Modes of monitoring Work Physiology, Human Performance, Human Error and worker Safety, Hazard Recognition and Mitigation strategies in real field conditions using non-invasive modalities and Artificial Intelligence.
- Novel applications of IoT and high end cloud computing networks for real time diagnostics of operator's health hazards from light, noise, heat and cold stress during work through Work Physiology and Neuro-ergonomics, Energy Expenditures, and Cardiorespiratory Responses.
- Autonomous equitable agricultural machinery systems for specially abled and female agricultural workers.
- Advances in autonomous Job Evaluation pertinent to Upper Extremity disorders and Exposure Analysis, NIOSH Lifting Equation, Strain Index for Upper Extremity, Whole-body vibration, Work posture analysis for agricultural operations.
- Application of unmanned aerial and autonomous ground vehicles to assess occupational health hazards in agricultural farms.

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Prospective authors should submit an electronic copy of their complete manuscript through the journal Manuscript Tracking System according to the following timeline schedule.

Timeline for Special Issue

Submission Start Date:	08/01/2022
Submission Deadline:	12/31/2022
Extension Given if Needed:	10/15/2022
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