ARTIFICIAL INTELLIGENCE AND THE HUMAN BIOFIELD: NEW OPPORTUNITIES AND CHALLENGES[1]

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ABSTRACT: There is an organizing field of energy intimately connected with each person, the human biofield, which holds information central to a higher order of being. It has been proposed as having mind-like properties as super-regulator of the biochemistry and physiology of the organism, coordinating all life functions, promoting homeodynamics, and key to understanding life's integral wholeness. Although brainwaves and heart waves are well characterized and clinically useful, the biofield has not yet been mapped. Artificial intelligence (AI) is essential to handle the data processing from biofield mapping of a large database of humans to elucidate the electromagnetic fields, acoustic fields, and subtle energy field components of human life. Moreover, AI could monitor health and well-being through the biofield via a variety of sensors and indicate on a daily basis which lifestyle choices would improve the biofield and enhance well-being. AI could also be programmed to manipulate the biofield to directly enhance well-being. Once the biofield is decoded, then direct communication between humans and AI through the biofield would be possible. Thus, a number of positive applications of AI to the biofield to enhance human well-being are possible.

Nonetheless, the presence of a biofield around humans presents a dilemma for AI robots, which would not possess a biofield other than the electromagnetic properties of their electronic

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components. So, even though robots may well exceed humans in certain cognitive tasks, robots would not possess a biofield, emotions, or an interior experience. Although they may be able to emulate emotions with certain facial expressions and vocal patterns, they may always be distinguished from humans as lacking the complex dynamic biofield of human beings that reflects the living state.

KEYWORDS: Biofield; Human energy field; Artificial intelligence; AI; Big Data; Electromagnetic signals; Bio-information; Emotion; Robot; Emotional intelligence.

INTRODUCTION

The human organism may be regarded as a complex, nonlinear, dynamic, self-organizing system, exchanging energy-with-information at multiple levels of organization in order to survive and thrive. The notion of an organizing field—the biofield—is imperative, because organisms function as integrative whole beings in geocosmic and man-made fields. Thus, the living state must involve a coupling between biochemistry, the biofield, and environmental fields, such as electromagnetic fields (EMFs). Organisms process information not only through the senses and biochemically-sensitive receptors, but also via their own endogenous energy fields and by means of their exquisite sensitivity to exogenous energy fields from other organisms and the environment.

This biophysical view is complementary to the biomedical view of life as biomolecules, similar to the principle of complementarity of particle-wave duality in physics. It offers a dynamic, holistic view of the organism with respect to its environment in terms of field interactions and integral flows of energy-with-information. The biofield, its history, and various iterations were recently described [1 - 4]. In this paper we focus on how artificial intelligence (AI) offers new opportunities to biofield science and its applications. We also explore how the biofield may impact AI.

The human biofield consists of a large number of electromagnetic fields that emanate from the body, spanning from the extremely low level frequencies of the brain and heart, to infrared and optical wavelengths emitted by various organs and tissues [5]. These various frequencies contain electromagnetic bio-information about the organism's status, health and well-being, stress level, and other parameters. Although a few of the innate human energy emissions—in particular, heart waves and brainwaves—are well elucidated and used clinically, the entire human biofield has never been mapped. Nor do we understand the bio-informational content associated with all the component frequencies. Mapping the human biofield is a viable project for AI because of the enormous amount of electromagnetic information and data gathering that it would

entail, plus decoding the bio-information.

Another AI application would be to monitor health and well-being directly through the human biofield, via various sensors placed on or near the body. Still another would be manipulation of the human biofield by AI toward enhancing health and well-being. Yet another would be direct communication via optical and other electromagnetic signals between AI and humans. These applications would be highly beneficial, holding promise of future breakthroughs, such as health applications and novel communication strategies.

OPPORTUNITIES FOR AI: INDIVIDUAL BIOFIELD SIGNATURES

Fast forward to the year 2030. Upon awakening, you insert one finger into a portable device to assess your health status through your biofield. The associated software analyzes your state of health and well-being in less than a minute and gives you a complete report. It highlights any changes since your last assessment, including trends toward improvement or decline. It also indicates what you should eat, drink, and what work, exercise, and relaxation plans you should implement today in order to improve or maintain your optimal well-being.

This scenario is not so far-fetched from the present, because a device, Bio-Well, already exists that assesses the human biofield through all ten fingertips. It utilizes high voltage electro-photography, a type of digital Kirlian photography, with subsequent software analysis of the induced corona discharge pattern of light emitted by each fingertip [6, 7]. (See Figures 1 and 2.)

Figure 1. Bio-Well Model 1.0 with fingertip inserted for biofield assessment.

Figure 2. Corona discharge (pattern of light) resulting from the Kirlian effect in high-voltage electro-photography.

From Bio-Well measurements on various human subjects over time, it has been found that individuals exhibit a level of uniqueness in their energy fields, a distinct "biofield signature." In relation to this, there are two distinct approaches from Kantian philosophy that were introduced into psychology by Allport [8]. *Nomothetic* knowledge is based on objective phenomena, whereas *idiographic* knowledge is that describing subjective phenomena. Although humans in general may display certain characteristics according to general rules, the study of individuals with their unique characteristics is idiographic. With biofield dynamics reflecting a level of individuality, and constantly changing due to shifts in consciousness, internal fluctuations, and changes in the environment, we are dealing with one of the most sublime aspects of life that transcend the mechanistic realms (that constitute the only strictly reproducible biological parameters). AI would be able to perform image processing and pattern recognition toward distinguishing one's biofield signature as a new trait that could be used as an individualistic identifier [9]. With AI, security traits of identification, authenticity, and verification of the individual would be possible through biofield assessment [10], such that biofield identification might become a new biometric technique.

Although Bio-Well software analysis of the human biofield is presently based on a limited database of human subjects with variable health, considerably more research could be done to augment our understanding of the biofield and how the fingertips reflect the whole. A large database consisting of measurements on numerous human subjects, healthy and ill, could be developed to provide a more substantial foundation for this device and its subsequent generations. AI is readily able to handle Big Data, to compile and analyze it and make predictions including diagnosis of illness based on biofield data from a large population worldwide, using machine learning to generate classification rules. In relation to this, biofield diagnostic systems using skin surface

electrodes have already been shown to successfully detect breast cancer with accuracies comparable to the standard techniques of mammography and ultrasound [11].

Individual human health and well-being could be effectively monitored each day to observe early changes in health. Thus, daily biofield assessment could become a telemedicine information technology [12]. Moreover, healing from an ailment could be followed through biofield assessment. Complete healing would be when distortions and deviations in the biofield disappear along with other physical markers of the ailment. It is even possible that AI could specify and/or deliver an intervention that would restore a healthy biofield.

Beyond healing, personal training via biofield biofeedback conducted via AI may promote the experience of extraordinary mind-body states, such as are often experienced through regular meditation, qigong, or yoga practice. With help of AI, beginners might achieve certain biofield states quickly, typically attained by yogis and other masters only after years of training. Use of novel devices and software to promote extraordinary states of consciousness is popularly known as "consciousness hacking". Special exercises could be developed that train biofield sensitivity, too, an ability utilized by psychics and energy healers. It is conceivable that years of mind-body-spirit practice and achievement may be accelerated by using AI applications based on the biofield to promote personal growth and spiritual evolution.

OPPORTUNITIES FOR AI: MAPPING THE BIOFIELD

The Human Genome Project that mapped the human genome led to the rather uninspiring result that humans are made up of approximately 20,000 genes---even less than in a grain of rice. Moreover, mainstream biology has spent billions of dollars over decades to elucidate the numerous biomolecules and biochemical reactions comprising the human body. By contrast, no mainstream organization has taken the lead to systematically explore and map the human biofield, which is perhaps the most complex dynamic field in the universe. While an increasing body of evidence demonstrates the relevance of energy and informational fields in biology [3, 4], a Human Biofield Project has not yet been undertaken [1, 2]. However, if implemented, such a project has broad implications with groundbreaking potential to contribute to a new level of understanding of life, health, illness, healing, and psychospiritual evolution, as well as to lead to novel diagnostic and therapeutic approaches.

The Human Biofield Project is an enormous undertaking with more complexity than the Human Genome Project, as the various frequency emitters range in size and complexity from ionic and atomic to molecular, organelle, cellular, tissue, organ, whole organism, and larger scale living systems. Moreover, the biofield is dynamic and ever-

changing in response to the rhythms of life, shifts in consciousness, and changes in the environment. The electromagnetic frequencies emitted from the body span across a vast range of the electromagnetic spectrum, from extremely low frequency (brain and heart waves) to infrared, visible light, ultraviolet, and gamma radiation from the potassium-40 isotope, and each of these signals would be expected to carry bio-information [5]. Along this broad range of frequencies, the field intensities are generally extremely low, such that numerous state-of-the-art detectors would be needed to measure them [5]. There are also endogenous magnetic and electric fields of life associated with nerve activity, membrane potentials, and voltage-gated membrane channels, to name a few [4]. Additionally, acoustic waves from the heart and blood flow constitute another dimension of the biofield [13]. Then there are other types of fields with properties distinct from conventional electromagnetic fields such as longitudinal waves [14] and subtle energies [15] that also comprise the biofield. Novel detectors would be required to measure these components. A comprehensive approach to mapping the biofield and maintaining a database of information would require sophisticated AI. Big Data would be involved in gathering, encoding, storing, and searching an enormous body of information generated by numerous scientists worldwide.

Besides electroencephalography (EEG), and heart wave measurements that are well established, small-scale approaches to elucidating other aspects of the biofield have been made. One is measurement of biophoton emission, counting single photons emitted from various regions of the human body [16]. Infrared thermography is yet another approach used in research and medical imaging. Understanding how the human biofield is affected by exogenous fields such as wireless radiation from numerous devices in the environment is another question. Assessing the impact of pulsed microwaves as used in mobile phones and WiFi applications on the biofield has hardly been explored. Mapping the human biofield in health, stressed conditions, and disease states are all critical for biological understanding and clinical applications. The biofield's holographic nature, in which parts of the body, such as the fingertips and external ear may contain information about the whole, is yet another dimension of the biofield. Development of the biofield database is critical to being able to detect and predict future disease as well as to understand more about ordinary and extraordinary mind-body states.

Once the human biofield is mapped and decoded, then direct communication between humans and AI through the biofield would be possible. Because the biofield changes with shifts in consciousness, robots would presumably be able to "read" the human biofield directly and respond more rapidly than ever before.

THE BIOFIELD POSES UNIQUE CHALLENGES FOR AI

The other side of the coin is to consider how the biofield may impact AI, especially after AI has been applied to map it. AI developers want not only super-smart robots that surpass human intelligence. Presently there is considerable interest in making AI more acceptable to humans by having AI display "emotional intelligence." Some robots have already been programmed to "read" human emotions via visual data processing of facial expressions and by analyzing human vocal signals, such that AI may then "fool" humans into believing that they "understand" them by crafting appropriate responses. One notable example is the robot, "Sophia" by Hanson Robotics in Hong Kong, which can conduct what appears to be an expressive conversation with humans. The robot has a realistic humanoid appearance, and the range of the robot's facial expressions are facilitated by its artificial rubber skin, which is mechanically manipulated. In an interview by the journalist Charlie Rose, "Sophia" made some nonsensical replies, but surprised the television producers with some meaningful spontaneous responses [17]. A key milestone in this effort was reached in October, 2017, when "Sophia" was awarded citizenship in Saudi Arabia [18], thus becoming the first robot to have a nationality, and with that, possibly "human" rights.

Some maintain that Sophia is little more than a "chat-bot" with a pretty face. Beyond handling enormous amounts of data and performing various tasks, can AI truly embody human qualities—emotions, intuition, consciousness, subconscious mind, and creative insight? We maintain that Sophia is only simulating an emotional response. Considering the standard process of information input, processing, and information output, despite robots' capabilities to analyze their own responses and extrapolate, it seems impossible that AI would ever become anything more than mere software applications, even with new learning built into its software algorithms.

Can we distinguish between the artificial emotions of AI and the natural emotions of humans? This demarcation could be a very important one to distinguish between future robots and humans, especially as robots become more humanoid in appearance and more sophisticated in their psycho-social behavior to emulate humans. In relation to this, our laboratory has been studying human subjects in extraordinary psycho-energetic states as part of our investigation of the human biofield. We discovered a radiant energy component of the biofield that is beyond conventional electromagnetism, a "subtle energy" that correlates with the dynamic expression of human emotions. We developed a prototype of a detector that is shielded from conventional energy fields but nonetheless registers changes in its operating parameters that correlate with dynamic emotions (emotions that change over time). Our detector shows the largest responses when a human subject is mindful in the present moment, highly aroused, experiencing positive emotions (love, joy, etc.), and thus, in a heightened psycho-physiological state.

We assess changes both in the strength and valence (positive and negative) of subjects' dynamic emotions each second and record the results in real-time using computer data acquisition. No probes or electrodes on the body are used. The prototype can register responses at least 5 meters from human subjects. This detector should be able to sense the difference between artificial emotions, which are feigned by some robots, and natural ones, which have biofield emanations associated with them.

Until the invention of our Dynamic Emotional Field detector, one could only rely on subjective experience of emotions. We maintain that this detector will be able to distinguish between AI and humans experiencing natural emotions. Of course, AI will be emitting fields associated with computer circuitry, which would be conventional electric, magnetic, and electromagnetic fields that would not be sensed by our detector. If someone wanted to build the dynamic fields of emotions into AI, that would be a future possibility, but by then, other aspects of the human biofield that have been elucidated may distinguish between AI and humans. So, the biofield is expected to be an important marker of natural life compared to AI, with emotions as the keystone.

CONCLUSIONS

The human biofield is perhaps the most complex dynamic field in the universe, rich in bio-information, so it might also pose the greatest challenge to AI to elucidate. Nonetheless, AI as a tool would make deeper inquiry and understanding of the human biofield possible. It would be worthwhile applying AI to develop the Human Biofield Project, to map the human biofield and understand its nuances in health, stress, disease, healing, and extraordinary mind-body states. AI could also facilitate automatic biofield measurement and its interpretation for health and well-being in telemedicine and create new biofield biometrics. AI might deliver new biofield therapies as particular frequencies make appropriate recommendations for lifestyle changes to positively impact the biofield.

On the other hand, AI is challenged by discoveries of a human biofield. Not possessing a human-like biofield, robots could be distinguished from humans no matter how sophisticated AI becomes. Although AI will exhibit electromagnetic fields associated with its electronics, the absence of dynamic emotions as a measured component of the biofield will remain a characteristic that forever distinguishes between humans and AI, since AI can only emulate emotions.

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