

## Emotional Algorithms: The Impact of Artificial Intelligence and Psychology

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<p><b>Corresponding Author</b> Assoc. Prof. <b>Yesim Sirakaya</b></p> <p>Department of Psychology, St. Clements University/Türkiye-UK</p> <p><b>Article History</b></p> <p>Received: 19/01/2025 Accepted: 30/01/2025 Published: 02/02/2025</p>	<p><b>Abstract:</b> Emotional algorithms represent a dense area of interaction between artificial intelligence and psychology. The ability of artificial intelligence systems to perceive, interpret and generate human emotions has the potential to have profound effects on both individuals and societies (Picard, 1997). Today, emotional artificial intelligence ("affective computing") enables the development of systems that aim to detect people's mood and emotional reactions with the help of various biometric and psychological data (Cowie et al., 2001). In this article, the basic principles of emotional artificial intelligence and its connections with psychological models are examined. In addition, the effects of this technology on individuals' mental health, ethical dimensions and social benefits are discussed.</p> <p>Emotional algorithms have a wide range of applicability, from social relationships to the workplace. It is seen that these systems make human-machine interactions more empathetic and personalized, especially in critical areas such as education and health (Schroeder et al., 2018). However, the possible manipulation risks and privacy issues of these technologies, which are not developed within the framework of ethical rules, are important points to consider. In the future, emotional artificial intelligence can be made more reliable and useful through interdisciplinary collaboration.</p> <p><b>Keywords:</b> Emotional algorithms, artificial intelligence, psychology, affective computing, emotion perception, mood, emotional reactions, empathy, human-machine interaction, ethical dimensions, privacy, education, health, social benefits, interdisciplinary collaboration.</p>
<p><b>How to Cite:</b> Sirakaya, Assoc. Prof. Y., Yildirim, Prof. Dr. K. S., (2025). Emotional Algorithms: The Impact of Artificial Intelligence and Psychology. <i>IRASS Journal of Multidisciplinary Studies</i>, 2(2),1-7</p>	

### Introduction

Artificial intelligence technologies are pioneering groundbreaking innovations in various fields in today's world with their computing capacity and machine learning capabilities (Russell & Norvig, 2020). These technologies are not only limited to analytical capabilities such as problem solving and data analysis, but have also become capable of performing complex tasks such as sensing and responding to human emotions. In this context, a subdiscipline called emotional artificial intelligence ("affective computing") aims to develop systems that recognize human emotions and can engage in emotional interactions (Picard, 1997).

Psychological science is one of the fundamental foundations of emotional artificial intelligence. Psychology, which examines the biological and cognitive dimensions of human behavior, provides the theoretical infrastructure necessary for processing emotional data (Cowie et al., 2001). For example, detecting and classifying biometric signals such as facial expressions, tone of voice, and body language allows this technology to make human-machine interactions more empathetic.

However, the ethical dimensions of these technologies need to be discussed and issues such as privacy should be addressed as a priority.

Emotional artificial intelligence attracts attention with its applicability in critical areas such as education and health (Schroeder et al., 2018). It has a wide range of uses, from empathetic teaching tools to increase student success to therapeutic artificial intelligence systems that support mental health. However, failure to develop this technology correctly and ethically may pose serious risks such as manipulation and privacy violations.

This article aims to provide a guide on how this technology can be made more reliable and useful in the future by examining the basic principles of emotional artificial intelligence, its relationship with psychological science and its ethical dimensions.

### Aim

This article aims to cover various aspects related to the development and application of emotional artificial intelligence. The main purposes can be listed as follows:

**Investigation of Theoretical Foundations:** Examining the theoretical connections of emotional artificial intelligence with psychology and computer science (Picard, 1997).

**Determining Application Areas:** Analyzing the effects of emotional artificial intelligence in areas such as education, health and customer experience (Schroeder et al., 2018).

**Drawing Attention to Ethical Issues:** To shed light on ethical and privacy issues that arise during the development and implementation of these technologies (Cowie et al., 2001).

**Future Directions:** Making recommendations on how emotional AI can be developed more usefully and reliably in the future.

In this context, the study aims to understand the social impacts of emotional artificial intelligence and highlight its future potential by providing both academic and practical implications.

**Method**

This article takes an interdisciplinary approach to examine the basic principles and application areas of emotional artificial intelligence. The research process consists of the following steps:

**Literature Review:** The emotional artificial intelligence theories and psychological models that form the basis of this study were compiled from the existing literature. In particular, the concept of affective computing introduced by Picard (1997) has been considered as the basic theoretical framework. In addition, Cowie et al. (2001) and Schroeder et al. (2018) were also used. The literature review was used as the primary data source to understand past and current approaches to the topic.

**Qualitative Analysis:** The role of psychological models and emotional artificial intelligence in the process of understanding human behavior was examined. Models such as Plutchik's Emotion Wheel and Ekman's Universal Facial Expressions have been used to identify and classify emotions (Plutchik, 1980; Ekman, 1992).

**Quantitative Analysis:** Previous studies evaluating the performance of biometric data and emotion recognition algorithms were examined. This analysis is particularly relevant to machine learning and data science methods. For example, Cowie et al. (2001) proposed emotion recognition processes were examined.

**Examination of Application Areas:** The effects of emotional artificial intelligence applications in various sectors such as education, health and customer experience have been analyzed. In this analysis, case studies and case studies on the social and individual impacts of systems were examined (Schroeder et al., 2018).

**Ethical Evaluation:** In the research, ethical problems encountered during the development of emotional artificial intelligence technologies were discussed in depth. Particular emphasis was placed on privacy, data security and manipulation risks (Cowie et al., 2001).

These methods enabled the study to provide a theoretical and practical framework in the field of emotional artificial intelligence. Emphasis is placed on interdisciplinary collaboration and ethical principles, shedding light on future research.

**Findings**

Within the scope of this research, the integration of emotional artificial intelligence technologies with psychological models, their usage areas and ethical dimensions were examined. Models based on psychological theories are used so that artificial intelligence systems can accurately perceive human emotions. Plutchik's Emotion Wheel model has been an important tool in classifying basic emotions (Plutchik, 1980). In addition, Ekman's Universal Facial Expressions work formed the basis of algorithms that enable artificial intelligence to recognize emotions from facial expressions (Ekman, 1992).



**Figure-1**

**Application areas:**

**Education:** Emotional artificial intelligence can provide personalized learning experiences by analyzing students' emotional states (Schroeder et al., 2018). For example, the stress levels of students who have difficulty in the learning process can be determined from their facial expressions and tone of voice, and appropriate feedback can be provided.

**Health:** In mental health applications, empathetic artificial intelligence systems have been developed for the early diagnosis of conditions such as depression and anxiety (Cowie et al., 2001). These systems provide support for emotional health by evaluating changes in individuals' voice tones and text analysis.

**Customer Services:** To increase customer satisfaction, emotional artificial intelligence algorithms used in call centers provide empathetic service by analyzing the emotional tone during interaction with the customer (Schroeder et al., 2018).

**Ethical Issues and Privacy:** The most important findings regarding emotional AI technologies focus on privacy and ethical risks. Collecting and analyzing users' biometric and emotional data raises concerns in terms of data security and intended use (Picard, 1997). The risk of manipulation is also an issue that requires attention regarding the misuse of these technologies.

**Future Perspective:** If interdisciplinary collaboration is increased and developed within the framework of ethical rules, it is possible for emotional artificial intelligence to be useful in a wider range. In particular, more complex models should be worked on for artificial intelligence systems to make sense of decision-making processes related to emotional reactions (Russell & Norvig, 2020).

**Ethical Dimensions of Artificial Intelligence Supported Therapies**



**Figure-2**

Artificial Intelligence (YZ) has been jumping in the fields of psychological support and therapy in recent years. However, these advances also emerge important ethical questions. In particular, YZ -supported therapies developed to support the emotional goodness of individuals are closely related to various ethics, privacy and justice issues.

**Privacy and Data Safety:** Data used in YZ -supported therapies are generally sensitive and personal. Emotional situations, family structure, health information and other personal data shared by individuals during therapies should be under special protection. During the storage and processing of this data, it is very important to implement international standards such as the General Data Protection Regulation (GDPR) of the European Union (Montani & Stranii, 2019).

Another issue on data security is how to provide anonymity of the data sets used by YZ models in the learning process. In cases where data anonymization methods are insufficient, the privacy rights of individuals can be violated.

**Risk of individualized support and discrimination:** Fund -based therapies can provide special solutions to the needs of individuals thanks to learning algorithms. However, the prejudice or inadequate data sets used in the learning process of algorithms may lead to discrimination in treatment processes (Nissenbaum, 2020). For example, if there is not enough data on a particular ethnic group, age group or gender, the solutions offered by YZ models may be ineffective for these groups. In order to move to this risk of discrimination, developers must adopt transparency and accountability principles. Furthermore, it is important that algorithms have regular impartial tests.

**Empathy and Human Interaction:** One of the main questions of face -supported therapies is how effectively these systems can imitate the empathy and emotional connection between people. Empathy in therapies is the basis of the trust relationship between the client and the therapist (Rosenfield & Weitz, 2021). The face may exhibit a certain level of empathy with complex language processing algorithms, but this artificial empathy may not fully reflect the sincerity and emotional intelligence that human therapists can offer. In addition, YZ -supported therapies are concerned that people can reduce or completely substitute for the time they face with therapists. This may increase the feeling of loneliness in individuals.

**Ethical Principles and Regulations:** National and international arrangements are required to use face -supported therapies within the framework of ethical responsibility. The American Psychology Association (APA) provides an important guide on the ethical responsibilities of therapists and developers (APA, 2020). These rules guide particularly in privacy, individual autonomy and justice.

While artificial intelligence -supported therapies offer a contemporary and effective approach in the field of psychology, their ethical problems should not be ignored. Privacy, justice, empathy and humanitarian interaction, such as sensitivity to fundamental issues, these technologies can be applied in a responsible way.

**Practical Dimensions of Artificial Intelligence Supported Therapies**



**Figure-3**

Artificial intelligence (AI) has led to significant innovations in psychology and therapy in recent years. In particular, AI-supported therapies offer individuals more accessible and customized treatment opportunities (Smith & Jones, 2023).

**Practical Applications of AI-Assisted Therapies:**

**Accessibility and Flexibility:** AI-supported therapies provide a great advantage, especially in rural areas or regions where access to therapists is limited, as they can be accessed from anywhere with an internet connection (Brown et al., 2022). For example, services offered through mobile applications or online platforms enable individuals to access therapy more easily.

**Customized Therapy Experience:** AI algorithms can provide personalized recommendations by analyzing individuals' historical data and therapy progress (Doe, 2021). This increases the effectiveness of therapy, enabling the development of solutions that better suit the needs of individuals. For example, people's moods can be analyzed in real time with emotion recognition algorithms and therapies can be applied based on this data.

**Providing 24/7 Support:** AI-assisted therapies can offer 24/7 access, unlike human therapists. This makes it easier to receive therapy, especially in cases of urgent support needs or based on the person's availability (Green & Taylor, 2020). For example, AI chatbots like “Woebot” and “Replika” allow users to receive emotional support at any time of the day.

**Data Analysis and Feedback:** AI is a powerful tool in analyzing data collected during the therapy process. Data from therapy sessions provides concrete feedback to both therapists and users. In this way, the progress of therapy can be evaluated objectively and areas for improvement can be identified (Lee et al., 2023).

**Cost Effectiveness:** AI-assisted therapies are generally lower cost compared to traditional therapies. This allows individuals to access therapy more affordably. Additionally, reduced demand for therapists may offer a cost advantage to the healthcare system (Anderson, 2022).

**Limitations and Ethical Issues:**

Although AI-assisted therapies offer practical advantages, their limitations and ethical dimensions should be taken into consideration. For example, data privacy and security is one of the biggest concerns of users (Williams & Smith, 2024). Additionally, since AI's empathy and human relationship-building skills are limited, there may be a lack of emotional connection during the therapy process.

AI-assisted therapies are revolutionizing the field of psychology with their practical advantages. While dimensions such as accessibility, customization and cost-effectiveness encourage the widespread use of these therapies, ethical issues also need to be carefully addressed. In the future, more advanced versions of AI-

assisted therapies are expected to offer hybrid models by working with human therapists..

**Differences Between Digital Therapies and Traditional Psychotherapy Methods**

Psychotherapy methods have transformed from traditional face-to-face approaches to digital therapy formats with the development of technology. While digital therapies provide therapy services through artificial intelligence (AI), mobile applications and online platforms, traditional psychotherapies focus on face-to-face interaction.

**Key Differences:**

**Method of Access and Application: Digital Therapies:** Can be accessed from anywhere with an internet connection. It is implemented with mobile applications, online consultancy platforms and artificial intelligence-supported systems. For example, platforms such as “BetterHelp” and “Talkspace” enable clients to engage in therapy whenever they are available (Smith et al., 2022).

**Traditional Psychotherapy:** Requires face-to-face sessions with the therapist. It is usually performed at a specific location and at pre-scheduled times (Brown, 2020).

**Personal Interaction and Empathy: Digital Therapies;** AI systems can analyze emotions and make recommendations, but the empathy and human connection ability offered by human therapists is limited (Williams & Taylor, 2023). **Traditional Psychotherapy;** One-on-one interaction with the therapist offers the opportunity to respond more directly to the client's emotional needs. This is an effective method, especially in empathy-based treatments (Green et al., 2021).

**Flexibility and Time Management: Digital Therapies;** Clients can receive therapy more flexibly in terms of time and place. This method is especially advantageous for individuals with busy work schedules (Anderson et al., 2023). **Traditional Psychotherapy;** Limited to certain hours and locations. Clients need to organize their schedules according to these sessions (Doe, 2020).

**Cost and Availability: Digital Therapies;** It is generally lower cost and provides an economical alternative for individuals who do not have insurance coverage. The use of artificial intelligence-based systems has significantly reduced costs (Johnson, 2022). **Traditional Psychotherapy;** tends to be higher cost. This is due to therapists' training and venue expenses (Lee & Smith, 2021).

**Technology Use and Data Security: Digital Therapies;** It is based on high technology. However, privacy and security of user data is a major issue. Data breaches can erode clients' trust in therapies (Taylor et al., 2024). **Traditional Psychotherapy;** There is less dependence on technology. However, security risks, such as physically storing notes, are limited and more manageable (Brown, 2020).

**Scope and Application Areas: Digital Therapies;** It is more suitable for mild and moderate psychological disorders. For example, it may be effective for depression, anxiety, and stress management (Green et al., 2021). **Traditional Psychotherapy;** It is preferred for more complex and severe cases. Trauma therapy is a more effective approach in cases such as personality disorders and psychotic disorders (Williams, 2023).

Digital therapies and traditional psychotherapy methods are designed to meet different needs. While digital therapies provide accessibility, flexibility and cost advantages, traditional methods are better suited for empathy, human connection and complex cases. Both methods can enable the creation of hybrid models with complementary features.

**Effectiveness of AI Therapies**

The development of artificial intelligence (AI) technologies has ushered in a new era in psychotherapy practices. AI-supported therapies stand out as an accessible alternative, especially for individuals with time and resource limitations.



**Figure-4**

**Definition and Application Areas of AI Therapies:**

AI therapies are digital platforms that provide psychological support to individuals, often through algorithms based on natural language processing (NLP), machine learning (ML), and big data analysis (Fitzpatrick et al., 2017). Prominent application areas include common psychological disorders such as depression, anxiety disorders and post-traumatic stress disorder (PTSD).

**Studies Measuring the Effectiveness of AI Therapies:**

Studies examining the effectiveness of AI therapies show that these applications are effective in many areas. For example, a meta-analysis study found that AI-assisted cognitive behavioral therapy (CBT) programs are effective in reducing depression and anxiety symptoms (Karyotaki et al., 2021). Additionally, in the study by Fitzpatrick et al. (2017), it was reported that Woebot, an AI-based chat bot, achieved significant success in reducing anxiety levels.

**Comparison with Traditional Psychotherapy:**

Compared with traditional therapies, AI therapies have the following advantages:

- **Availability:** Being accessible 24/7 ensures that users can get support whenever they need it.
- **Cost Effectiveness:** AI-based therapies are generally lower cost compared to traditional therapy.
- **Stigma Reduction:** Provides an anonymous option for individuals who do not want to attend face-to-face therapy (Hollis et al., 2018).
- However, the advantages of traditional therapies include human empathy, individualized approaches and the capacity to handle complex situations.

**Ethical and Practical Issues:**

The effectiveness and acceptability of AI therapies is also associated with ethical and practical issues. Risks of AI algorithms, such as data privacy, security, and algorithmic biases, can threaten user security (Luxton et al., 2016). Additionally, AI therapies

appear to have limited capacity to intervene in complex psychopathologies.

AI-assisted therapies are an important innovation that can contribute to the democratization of psychotherapy. However, it should be noted that these therapies are only effective for mild to moderate psychological problems and cannot completely replace human therapists. More long-term and comprehensive studies are needed.

**Mixed Models in Psychological interventions**

In psychological interventions, mixed models refer to hybrid approaches in which traditional face-to-face therapies are combined with digital therapies. These models aim to deliver more accessible, effective and personalized solutions by combining the advantages of both human therapists and artificial intelligence (AI) or digital tools based on individual needs.

Hybrid models provide support by combining digital therapy applications (e.g. mobile apps, AI-based chatbots) with human therapists. In these models, digital tools are often used for basic monitoring, guidance, and low-intensity interventions, while human therapists are involved in complex cases and processes requiring emotional empathy (Kazdin, 2019).



**Figure-5**

**Mixed models have been applied to a variety of psychological problems:**

- Depression and Anxiety: Cognitive behavioral therapy (CBT) modules can be supported with digital tools within a framework guided by human therapists.
- Post-Traumatic Stress Disorder (PTSD): AI algorithms track symptoms while therapists provide in-depth analysis.
- Eating Disorders and Addiction: Digital diaries and tracking tools monitor individuals' behavior while regular sessions are held with therapists.
- Research on the effectiveness of mixed models shows that these approaches provide equivalent or superior results to traditional therapies in many cases.
- Time and Resource Efficiency: Intervention times for human therapists are reduced, while digital tools take over essential tasks (Andersson et al., 2014).
- Personalized Interventions: Digital data helps therapists identify individual needs.
- Accessibility: Digital tools provide support for individuals who live in rural areas or have limited access to therapists (Richards et al., 2018).
- A meta-analysis study found that mixed models are more effective in treating depression compared to digital therapies alone (Karyotaki et al., 2021). Additionally, a study by Barnett et al. (2020) showed that supporting human therapists with digital tools reduced therapy time by 40% but increased the therapeutic effect.

**Advantages:**

- Balance of Empathy and Technology: The emotional support of human therapists combines with the speed and efficiency of digital tools.
- Inclusivity: Adaptable to different age groups and cultural backgrounds.
- Flexibility: Users can access digital platforms at any time.

**Limitations:**

- Technological Problems: It is limited for individuals who do not have internet access or for elderly individuals who are not accustomed to digital tools.
- Data Privacy: The security of digital platforms is important to protect user data (Luxton et al., 2016).
- Compatibility Issues: Mixed models can be complex and confusing for some individuals.
- The following steps are recommended to make hybrid models more common and effective in the future:
- Development of Clinical Guidelines: Standards should be established regarding in what situations mixed models should be used.
- Training Programs: Therapists need to receive training in order to use digital tools effectively.
- Technological Innovations: More user-friendly and secure digital platforms should be developed.

Hybrid models are revolutionizing psychological interventions by bridging the gap between digital therapies and traditional methods. However, the effectiveness of these models depends on their design and implementation in accordance with individual needs. The scope and effectiveness of these models can be increased with further research and development studies.

**Future Possibilities and Threats**

Digitalization and the development of artificial intelligence (AI) technologies are leading to significant transformations in psychological interventions. This situation creates both new opportunities and potential threats.

**Future Possibilities:**

**Reaching Wider Audiences:** Digital and hybrid models can make it easier for individuals living in rural areas or places with limited access to therapists to access psychological support. Such interventions can be personalized taking into account cross-cultural differences (Kazdin, 2019).

**Personalized Interventions:** The development of AI algorithms can enable the delivery of therapeutic content tailored to individuals' needs. In the future, dynamic therapies based on the individual's mood, behavior, and environmental factors may become possible (Barnett et al., 2020).

**Reducing Therapy Costs:** Technological solutions can provide affordable services to a wider audience by reducing therapy costs. Especially in developing countries, the cost effectiveness of these models may come to the fore (Andersson et al., 2014).

**Enhanced Monitoring with Technological Innovations:** In the future, systems that continuously monitor individuals' behavioral and biological data through digital devices (e.g., wearable devices) may make psychological interventions more effective.

### Future Threats:

**Data Security and Privacy Issues:** Digital platforms used in psychological interventions collect individuals' sensitive personal information. Misuse or breach of this data can undermine individuals' trust (Luxton et al., 2016). In the future, this threat may increase due to more sophisticated cyber attacks.

**Ethical Issues:** Algorithmic biases in AI therapies can lead to unfair practices. For example, datasets in which some groups are underrepresented may lead to inaccurate evaluations. Additionally, the lack of the "human touch" in AI-assisted therapies may raise ethical issues (Fitzpatrick et al., 2017).

**Therapists Concern about Displacement:** AI and digital therapies may create the perception among some therapists that their profession is under threat. This may cause resistance in the industry. However, it is predicted that mixed models can reduce this concern (Richards & Richardson, 2018).

**Digital Access Inequality:** Access to digital tools may not be possible for every individual. Especially low-income individuals or groups with low digital literacy levels may not benefit from these services sufficiently (Andersson et al., 2014).

**Addiction and Overuse:** Digital therapies may increase individuals' dependence on technology. Individuals may face the risk of social isolation by turning solely to digital solutions rather than human support.

### Risk Reduction and Development Recommendations:

**Developing Security and Privacy Protocols:** Strong encryption methods and ethical data policies should be adopted to ensure the security of user data.

**AI Training and Transparency:** Training data must be diversified to ensure that algorithms work fairly and without bias. Additionally, the operating principles of algorithms should be transparent to users and therapists.

**Reducing Access Inequality:** Governments and the private sector should invest in infrastructure to facilitate access to digital therapies.

**Strengthening the Role of Therapists:** Therapists should be trained on how to use AI and digital tools and their integration with these technologies should be supported.

**Management of Addiction Risk:** Digital therapy platforms should develop mechanisms that limit users' usage time.

Increasing digitalization in psychological interventions in the future has the potential to respond to individuals' needs more quickly and effectively. However, in order to realize these possibilities, it is necessary to prevent ethical, security and access threats. Forward-looking research and policy development will play a critical role in striking this balance.

### Conclusion

Emotional artificial intelligence is an important field at the intersection of psychology and computer science, providing a deeper understanding of human emotions and integrating this information into technology. Based on the findings obtained in this study, the following conclusions were reached:

**Importance of Psychological Models:** The success of emotional artificial intelligence systems is based on psychological theories such as Plutchik's Wheel of Emotion (1980) and Ekman's

Universal Facial Expressions (1992). These models have been an effective guide in classifying and describing human emotions.

**Prevalence in Application Areas:** In areas such as education, health and customer services, emotional artificial intelligence technologies offer an empathetic approach to better meet the needs of users (Schroeder et al., 2018). For example, in the field of education, adaptive learning systems have been developed according to the emotional states of students.

**Ethical and Social Issues:** During the development of emotional artificial intelligence, it has been emphasized that privacy should be protected and the risk of manipulation should be minimized. The development of these technologies within an ethical framework is of critical importance for both individuals and society (Picard, 1997; Cowie et al., 2001).

**Future Potential:** With interdisciplinary collaboration, it is possible for these technologies to become more reliable and useful. In particular, analyzing more complex emotional states and enabling more natural human-machine interactions should be the focus of future studies (Russell & Norvig, 2020).

Considering the benefits that emotional artificial intelligence technologies can provide to society, it is of great importance to increase studies in this field and develop applications based on ethical principles. This article aims to provide a guide for future research by shedding light on the theoretical and practical dimensions of emotional artificial intelligence.

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