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SOCIOMORPHIC NEUROMODELING IN ACADEMIC EMOTIONOLOGY AS AN INTEGRATION OF NEUROCOGNITIVE AND PSYCHOLINGUISTIC KNOWLEDGE IN ARTIFICIAL INTELLIGENCE

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Abstract. The article analyzes the problems of academic emotionology as an applied branch of emotionology (the science of emotions) based on the use of sociomorphic neuromodeling, viewed through the prism of academic discourse in the educational system. For the first time, the proposed concept of sociomorphic neuromodeling is aimed not only at explaining, but also at applying a socially inherited mechanism of emotional response in a particular ethnic environment, which is reflected in the specifics of neuro-psychophysiological signals as a "deep" language. The main angle of the analysis is due to a non-discrete approach to assessing emotivity in communication and emotions in the speech and behavioral matrix of a modern native speaker. The authors consider the evidence of the proposed hypothesis verifying it with the work carried out on the emotivity analyzer of the speech and behavioral profile of a carrier a natural intelligence carrier and a "smart assistant" as a carrier of artificial intelligence. This representation allows us to undertake methodological holism towards the visual representation of emotions within NLP. The proposed "deep" neurocognitive designer of a "smart assistant" for social engineering rests on understanding neuromodulators activities as the neuro-psycholinguistic mechanisms of the human brain, which makes available the prospects for the development of the analyzer and the possibility of the proposed interface usage. The suggested refinement of the gradation of natural emotional intelligence and emotional artificial intelligence solves the issues of the general theory of emotions, which is an important step for further development of robotic humanoid systems based on the biomimetic concept. *Authors' contribution.* M. Talanov – development of a bioinspired "smart assistant" program, development of a mathematical model, writing part of the project; I.S. Karabulatova – general idea, development of the gradation of emotional intelligence, analysis of the history of the issue of psychometric research, writing a part, drafting instructions, editing; V. Erokhin – development of processes for biosensors and bioelectronics in the framework of neuromorphic computing; conducting experiments for bioinspired computing; clarifying terminology; J. Vallverdú – development of a project design using new intellectual solutions, development of a cognitive model, writing of a part of the project.

Key words: academic emotionology, neurocognitive modeling, sociomorphic neuromodeling, biomimetics, artificial intelligence with neuromodulatory architecture, emotive communication, neuro-psychophysiological communication, NLP.

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СОЦИОМОРФНОЕ НЕЙРОМОДЕЛИРОВАНИЕ В АКАДЕМИЧЕСКОЙ ЭМОТИОЛОГИИ КАК ИНТЕГРАЦИЯ НЕЙРОКОГНИТИВНЫХ И ПСИХОЛИНГВИСТИЧЕСКИХ ЗНАНИЙ В ИСКУССТВЕННОМ ИНТЕЛЛЕКТЕ

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Аннотация. В статье впервые анализируются проблемы академической эмотиологии как прикладного раздела эмотиологии (науки об эмоциях) на основе использования социоморфного нейромоделирования, рассматриваемого сквозь призму академического дискурса в образовательной системе. Предлагаемое авторами понятие социоморфного нейромоделирования нацелено не только на объяснение, но и на применение социально наследуемого механизма эмоционального реагирования в той или иной этносреде, что находит свое отражение в специфике нейропсихофизилогических сигналов как «глубинного» языка. Основной ракурс анализа обусловлен недискретным подходом к оценке эмотивности в коммуникации и эмоций в речеповеденческой матрице современного носителя языка. Выдвинутая в статье гипотеза опирается результаты работы над анализатором эмотивности речеповеденческого профиля носителя естественного интеллекта и «умного помощника» как носителя искусственного интеллекта. Такое представление позволяет реализовать методологический холизм к визуальному представлению эмоций в рамках НЛП. Описанный авторами «глубинный» нейрокогнитивный конструктор «умного помощника» для социального инжиниринга опирается на понимание нейропсихолингвистических механизмов деятельности человеческого мозга с использованием нейромодуляторов, благодаря чему становятся доступными перспективы развития анализатора и возможности использования предлагаемого интерфейса. Предложенное уточнение структуры естественного эмоционального интеллекта и эмоционального искусственного интеллекта позволит решить некоторые вопросы общей теории эмоций, что является важным шагом для дальнейшей разработки роботизированных человекоподобных систем на основе биомиметической концепции. *Вклад авторов.* М. Таланов – разработка биоинспирированной программы «умного помощника» и математической модели; И.С. Карабулатова – выработка общей идеи проекта, разработка градации эмоционального интеллекта, анализ истории вопроса по психометрическим исследованиям, систематизация материала в виде схем и таблиц, составление инструкции; В. Ерохин – разработка процессов для биосенсоров и биоэлектроники в рамках нейроморфных

вычислений, проведение экспериментов для биоинспирированных вычислений, уточнение терминологии; Дж. Валверду – подготовка дизайна проекта с применением новых интеллектуальных решений и когнитивной модели.

Ключевые слова: академическая эмотиология, нейрокогнитивное моделирование, социоморфное нейромоделирование, биомиметика, искусственный интеллект с нейромодуляционной архитектурой, эмотивная коммуникация, нейропсихофизиологическая коммуникация, NLP.

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Introduction

The rapid leap in research in the neurocognitive sciences and the subsequent fundamental discoveries in understanding the mechanisms of natural intelligence [Nosovets et al., 2023; Verkhlyutov et al., 2019] predetermined the emergence of new ideas and opportunities both in the field of biological cognitive systems and neuro-psycholinguistics, which began to be used in artificial intelligence training aimed at implementing learning strategies for humans. These successes serve as the foundation for the development of innovative digital technologies that include neurocognitive elements. They allow you to improve the quality of education and quickly adapt to new information that is based on emotions [Bachler, Segovia-Lagos, Porras, 2023; Baimakhan et al., 2024; Ponsonnet, 2022].

The postulation of the theory of emotions and the need for a fundamental differentiation of the concepts of emotionology was stated by V.I. Shakhovsky at the end of the twentieth century [Shakhovsky, 1983]. Recent data highlight a previously underestimated aspect underlying the entire architecture of cognitive processes and including such a multidisciplinary concept as emotions.

We consider the psycho-emotional sphere from the perspective of **sociomorphic neuromodeling**, which appears to us as the structure of a super-complex metagraph within the framework of metagraph theory [Basu, Blanning, 2007; Gapanyuk, 2024], which includes parameters of the socio-emotional field [Shakhovsky, 2019].

A universal metagraph-based model for designing relationships between different types of data was first proposed by A. Basu and R. Blanning in 2007 in an attempt to define a universal algorithm for managing complex systems [Basu, Blanning, 2007]. For a full-scale representation of the object through additional identifiers, various tags, labels and tags for marking vertices and arcs (edges) are included in the metagraph information. Large blocks, designated in the structure of complex graphs as the vertices of multigraphs in one scheme or another, are interconnected by various kinds of systems of relationships, which are called edges or arcs of multigraphs. Such structures have been explained in experimental science through graph theory, which refers to a kind of virtual unity of the objects under consideration (vertices) and the relationships between these objects (edges), which is important in the future for creating systems for automatic complex analysis of texts, emotions, actors, information targets, etc.

Materials and methods

Scientific works consistently demonstrate that emotions are a key element of natural intelligence and adaptive behavior [Damasio, 2008; Picard, Vyzas, Healey, 2001]. Attempts have been made to create emotional architectures such as CogAff [Sloman, 1994] and LIDA [Franklin et al., 2014]. These models simulate emotional processes, but they lack a unified structure for integrating emotional design into computational processes due to the difficulty of comparing neuropsychological, linguistic, and neurobiological markers with defining the boundaries of each labeled concept.

Our proposed model uses a different approach, focusing on neuromodulators such as norepinephrine (NA), dopamine (DA), and serotonin (5-HT), which are "key players" in brain reward and inhibition processes, respectively [Battistoni, Erokhin, Iannotta, 2019], they form

the basis for various educational and training programs processes in comparison with ethno-sociocultural speech and behavioral standards (Fig. 1).

The results of the model computation (Fig. 1) are based on calculations of neurohumoral status dynamics in 21 intermediate states of the model, including 3 levels of DA, 5-HT and NA, for 8 hours. It was revealed that the maximum computing power consumed falls on such intermediate states that arise between Anxiety, Anger, Interest and Surprise. Therefore, these intermediate states are important for modeling an intellectual assistant as an emotionally empathic device in academic discourse. However, the maximum electrical activity corresponds to the state of greatest irritation [Talanov et al., 2019]. Such a psycho-emotional status of recipients of new information in the course of directed discourse enables asserting a more complex multidimensional dynamic figure, which is enclosed in the so-called "cube of emotions" by H. Lövheim [2012], as the emotion of surprise, which is important for obtaining new knowledge and has maximum electrical activity of the brain, is located in terms of computing power consumed between such psycho-emotional states such as anxiety, anger, interest, and surprise. The emotion of surprise, awakening an ethno-linguo-cultural shock in the recipients, creates favorable patterns for the perception of new information [Karabulatova et al., 2023].

Accordingly, the use of these neuromodulators, in our opinion, allows us to create a more subtle learning system capable of controlling "fight or flight" actions, which, in turn, is aimed at facilitating the implementation of various learning procedures [Karabulatova et al., 2024; Talanov et al., 2017; Zubanova, Didenko, Karabulatova et al., 2023], and introduces the problem into the neuro-linguistic spectrum of relevant digital research in the field of emotional intelligence [Talanov, Toshchev, 2015].

The proposed sociomorphic modeling in academic emotionology is seen in the engineering application of neuro-psycholinguistic technologies in social engineering, which implies the development of engineering solutions with a reproducible algorithm of application due to the evidence-based basis of natural language data processing. This makes it possible to model an emotionally empathic intellectual assistant in

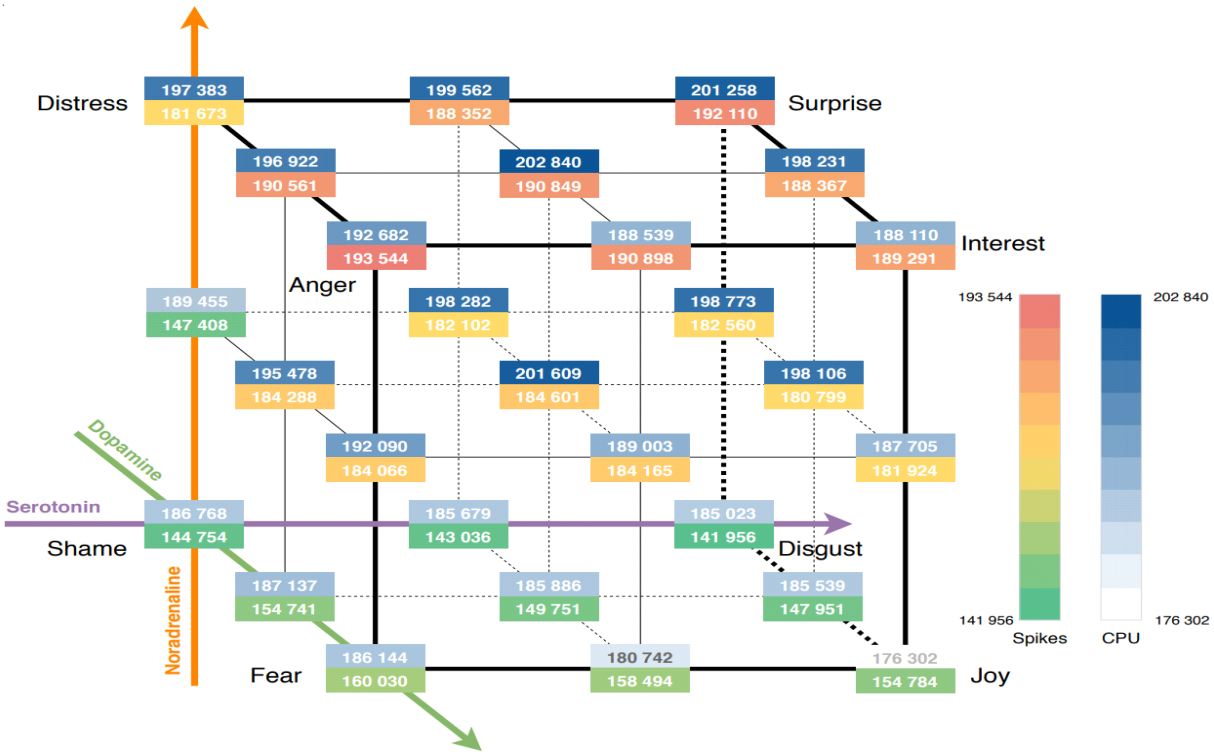

Fig. 1. Verification of a biomimetic concept for a neuro-linguistic model of emotional intelligence design

Note. Source: [Talanov et al., 2019].

academic discourse with the reproduction of a wide range of educational discourse processes similar to the educational process based on human intelligence at the time of processing a message in natural language.

According to the criterion of the problem being solved, the proposed digital humanitarian technologies form several blocks of significant clusters with a tendency to expand them:

1. Automatic text processing technologies, thanks to which the text fabric of academic discourse becomes linguistically transparent, which allows it to be further used for machine learning and automatic analysis using digital tools of lexical, morphological, syntactic, discursive, emotive analysis, etc.

2. Technologies and models that help construct the knowledge map of academic discourse: thesauri, ontologies, metagraphs, engineering tools for verifying entities, attributing topics, semantic connections, emotional assessments and relationships.

3. Technologies aimed at recognizing and modeling assessments of the perception of the target audience and the emotional layer of academic discourse based on affective calculations and various tools of sentiment analysis, psychometric measurements of emotions.

4. Technologies aimed at modeling the processes of extracting meaning from textual data of academic discourse for further processing in line with machine learning, taking into account modification, which allows creating models of understanding and interpreting academic discourse in the natural language of human communication with the tools of paraphrasing and summarization.

5. Technologies developed in classical psycholinguistics and digital humanities for effective modeling of human communicative behavior, which implies the use of both verbals, non-verbal and paraverbal layers in communication, which ensures the creation of an emotionally empathic intellectual assistant for teacher.

Inspired by the works of A. Damasio [2008], M. Minsky [2007], A. Sloman [1994], and P.O. Haikonen [2014], we adopted a bio-inspired perspective for the realization of psycho-emotional states in computing systems.

The implementation of the proposed approach is presented in this simplified diagram where: the linguistic input is done through Broca's area and the output is motor cortex → spinal cord. Here we can select central NA, DA and 5-HT parts of the limbic system that are not linearly independent in contrast they influence each other: 5-HT inhibits DA and NA, while DA and NA modulate each other and NA excites 5-HT. Overall three subsystems modulate the thalamocortical loop (Fig. 2).

In our schematic, we underscore the pivotal role of the thalamocortical loop, detailing the modulatory (both excitatory and inhibitory) projections from cortical columns to the thalamus that forge critical feedback loops for the processing and routing of information across various cerebral regions, including the prefrontal cortex, Broca's area, and the motor cortex. These loops undergo modulation by three primary monoaminergic systems: DA, 5-HT, and NA, and are referred to as "emotional loops." These emotional loops, capable of persisting for durations extending from several minutes to hours post-

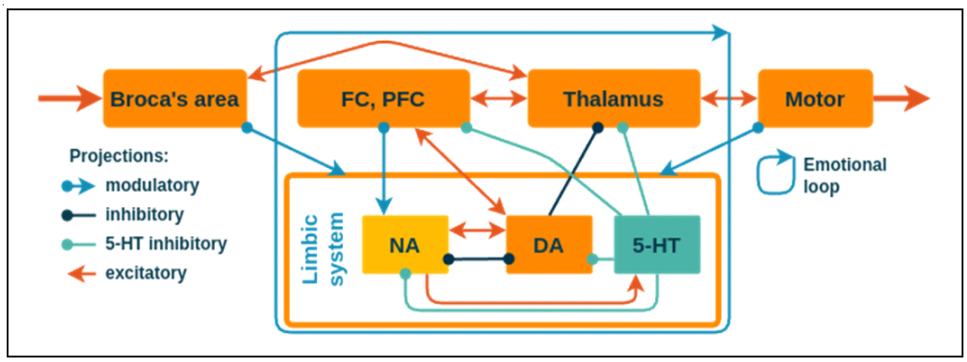

Fig. 2. Emotional feedback loop

Note. The frontal/prefrontal cortex feedback loops are neuromodulated by three subsystems of the limbic system: DA, 5-HT, NA. Inputs from Broca's area and outputs in the motor cortex.

interaction with an antagonist, are linked to reflective and imaginative processes as described in the concept of "emotional machine imagination" [Minsky, 2007]. Such dynamics facilitate the recalibration of synaptic weights within the brain's neural network, heralding a self-training regimen enriched by emotional content integrated into both reflective and self-reflective processes.

Results and discussion

The first attempt to introduce artificial intelligence technologies into the field of education dates back to the 1970s, when the SCHOLAR program was proposed, which became the prototype of an intelligent learning system [Izmailova, 2024].

The creation of an emotionally empathic intellectual assistant for a teacher is based on the idea of a game simulator, the neuromodeling of which is inspired by data from the pleasure and reward center in the human brain [Buscicchi, van der Deijl, 2023]. However, the creation of such a robotic training program, which involves learning in an emotionally charged form of play, requires attention to understanding the inner boundaries of personality. In this regard, such an intelligent assistant brings language learning simulators closer to professional simulators that use a system of penalties for violating rules and making mistakes. Despite the fact that the use of professional exercise machines with pain is considered effective [Lee et al., 2021], we believe that stimulating comfort and pleasure zones is an underestimated factor, which is confirmed by the increase in alexithymia and autism among children and adolescents.

The use of emotive neuromodeling in academic learning discourse has a dominant effect, contributing to the build-up of new cognitive connections during the continuous "translation" of natural physical reality data into digital and vice versa, strengthening dopamine anticipation connections when exposed to new information. In view of this, the introduction of digital twins takes a priority position [Gapanyuk et al., 2024; Shahat, Hyun, Yeom, 2021], which uses the brain's ability to link the physical object itself, its visual, verbal and/or other representation together, which allows the digital analog to influence objective reality.

In this regard, it is advisable to talk about **academic emotionology** as a new branch of emotionology and neuropedagogy, which uses deep mechanisms of emotional involvement to ensure effective management of the process of mastering new knowledge. It is no coincidence that A. Wierzbicka notes some inconsistency in the definition of concepts related to emotions and emotivity, seeing this as a big problem for successful research communication [Wierzbicka, 2010].

In the situation of academic emotionology, in most cases, as a rule, the implicit presence of some kind of probabilistic punishment is implied, which takes into account our subconscious mind during the period of intensive preparation and study, as a result of which mechanisms for supporting inner comfort in the form of "silence," as well as in the form of both conscious and unconscious countering learning based on serotonin and norepinephrine.

However, ignoring emotions and excluding them from the educational context leads to a poorer understanding of the educational process, despite the recognition that emotions such as surprise and joy are inherent in the process of cognition [Karabulatova et al., 2023], and in the formation of natural and artificial bilingualism, the role of emotions becomes a priority [Chen, Chung-Fat-Yim, Marian, 2022; Chung-Fat-Yim et al., 2022]. Here, the Western model of learning as such, which originates from the well-known saying "In much wisdom there are many sorrows", comes into dissonance with the Eastern point of view on the nature of cognition and on reacting when confronted with something new [Karabulatova et al., 2024]. For example, Buddhist principles of nonviolence show some parallels with AI ethics, because ahimsa empathy eliminates discrimination, just as AI strives for fact-checking and justice [Hagendorff, 2020; Hongladarom, 2020].

Based on this, the very concept of morality, postulated in Western culture, starting from the principles of sentimentalism and existentialism, is interpreted as an emotional response to the actions of others, which served as a starting point in psychology, linguistics, and ethnography for understanding empathy through the nature of morality and the values of the ethno-cultural moral and ethical code in the speech-behavioral matrix [Liu et al., 2025].

An analysis of scientific studies on foreign language teaching models in China shows that the

consideration of the emotive-emotional neuromodeling factor is not well developed, or even completely ignored when calculating the effectiveness of educational strategies in the educational process [Ni Lulu, Zhang Manman, 2022]. Thus, the claimed "increasing the research potential of teachers based on the innovation of learning processes" [Ni Lulu, Zhang Manman, 2022, p. 33] in most pedagogical works, it is not a supported metaphor, although it should imply the use of accurate assessment tools and mathematical calculations of the probabilistic volume of research potential, including taking into account psycho-emotional means of influence. However, since the model itself is often missing, this makes it difficult to assess the effectiveness of the proposed methods, which actualizes our research as demonstrating the vector of implementation of models for evaluating the effectiveness of learning materials.

At the same time, the implementation of communication skills in native and foreign languages not only on everyday but also professional topics is conditioned by the dynamic development of the neurohumoral system, which requires the elaboration of existing models with the proposal of new emotional models in the educational process from the perspective of ensuring the environmental friendliness of the methods used to preserve a healthy psyche and the boundaries of different forms of identity.

EmoAI is based on the simulation of empathy, which is in demand in the field of robotics, focused on communication as a companion, so the leading principle here is to verify the maximum possible range of human emotions and then respond to them with empathy, such as chatbots and/or "smart assistants." As an example, the Empath emotional artificial intelligence developed with a built-in mechanism for recognizing emotions based on the acoustic characteristics of a sounding voice in real time, and the algorithm works independently of the language of recognized speech [Shlyapnikov, 2022]. As the developers themselves point out, the Empath API and SDK tools have proven their relevance in more than 50 countries in various sectors of the socio-economic sphere: from call centers and smart voice assistants to automotive, shipbuilding and psychiatric care [Vocal...]. Some tools of empathic AI, such as the AI companion XiaoIce [Zhou et al., 2020], are aimed at using emotional connection to meet the human need for communication, attachment and social communication, belonging to certain cohort groups.

Based on the understanding of the leading role of empathy in teaching, improved digital technologies have been created in many countries with an emphasis on psycho-emotional factors in teaching, actualizing empathic triggers that enhance one's own vision of linguistic and cultural specifics through the teacher's style, selection of illustrative material, and selection of techniques.

The use of virtual media in academic discourse promotes memorization, but it can make it difficult to form both communicative multilingual competence and subject-expert competence due to a misunderstanding of the regulatory mechanism of higher nervous activity, which is influenced not only by psychophysiological, age-related features, but also by ethno-sociocultural patterns in the worldview of actors in the educational process. The use of digital analogues of other linguistic cultures demonstrates the fact that the problems of family and social education, as well as the environment, can be leveled when immersed in a different linguistic culture, because the conciseness and intensity of the rhythm of modern learning give priority to a concise presentation of information. This, in turn, affects the psychophysiological basis of speech, which becomes excessively labile when assimilating new information, which allowed researchers to talk about the pseudo-patho-psycholinguistic phenomenon of modern communication [Karabulatova et al., 2021], which reveals certain parallels with AI hallucinations, such as: fragmented reasoning, increased euphemia, colorful metaphor, causal disorders-investigative relationships, erroneous judgments, "leaps of thought," etc. These communicative markers of the psycho-emotional state correspond to the modern behavior of actors in academic discourse (see Table). It should be emphasized that we are talking about the norm of speech communication without affecting the module of patho-psycholinguistics, which indicates the transformation of cognitive processes in the younger generation, Internet users, under the influence of IT technologies.

In this regard, the use of digital analogues in academic discourse reveals difficulties due to the

influence of Internet communication on real communication, including between humans and machines. At the same time, the discovered pseudo-patho-psycholinguistic deviations demonstrate the interdependence of biofeedback formation when modeling multiple intelligence in the course of academic discourse, demonstrating the psycho-emotional dynamics of the learning process based on pedagogical neuro-targeting, which is actively used in technologies for managing speech and behavioral strategies in real society [Temirgalinova et al., 2021; Yan et al., 2024].

Research in the field of emotivity of educational discourse in Russia reveals a large gap compared to work in the world of neuropedagogy, which is due to the historical and cultural context. In 1936, the conduct and publication of the results of psychometric research in the ethno-socio-cross-cultural aspect came under a total ban. The theory of psychometry itself as a tool for modeling speech and behavioral standards in the transforming conditions of the Soviet era was declared a bourgeois relic and forgotten, because experimental measurements conducted in the young republics of Central Asia revealed differences in the intellectual and thinking activity of the peoples of the region (in particular, among Uzbeks) due to rigid patterns in the cerebral cortex to an ethno-socio-culturally determined repertoire of stimuli that provide the specifics of information accumulation and processing in the cerebral cortex [Kurek, 2004; Luria, 2002].

Psychometric studies revealed the absence of illusions of perception of Gestalt figures in many Central Asian ethnic groups, which led to an understanding of the nature of neurocognitive dissonance in intercultural communication, since it was not assumed that abstract figures, well understood by representatives of different European peoples, would create such great

Pseudo-patho-psycholinguistic features of modern communication correlated with AI hallucinations

№	The ratio of signs and meanings	Ranking of respondents by country, %			
		Greece	Australia	Russia	Kazakhstan
1	Narrowing of lexical meaning	25	37	20	18
2	Excessive detail	28	32	31	29
3	The dominance of excessive abstraction with a tendency to generalize judgments	27,95	27,38	16,86	27,8
4	The priority of choosing to use abstract vocabulary words	30,24	31,18	30,71	30,71
5	The desire to construct neologisms and form new meanings for words from the active vocabulary due to post-interpretation	37,7	28,2	23,54	33,42
6	The priority of using emojis, graphemes, and other creolized semiotic signs in communication	42	50,9	49,4	44
7	The predominance of the use of combinations of different semiotic signs in communication	16,7	17,2	5,1	3,8
8	The priority of using excessive specification in the evidence base of judgments	29,3	31,5	14,8	43,19
9	Using the strategy of pretentiousness of statements as a means of uniqueness of style and attracting the attention of a potential target audience	31,3	34,1	26,7	29,9
10	The use of paradoxical statements as a psycho-emotional device in communication	41,1	43,4	34,7	36,8
11	Using the technique of constantly slipping from one topic to another as a psycho-emotional strategy in modern communication	27,3	46,23	33,12	32,18
12	Using the technique of alogization as a modern psycho-emotional strategy in the communicative process	14,3	13,32	12,7	11,91
13	The dominance of formalisms and clichés in communication	9,87	13,89	23,41	7,89
14	The impact of hypertext Internet communication in the implementation of over-connectivity	7,3	11,81	12,58	22,7
15	The priority of actualizing hidden meanings and persistence	14,51	17,33	21,22	21,38
16	Emphasis on the use of inadequacy in judgments	27,81	39,2	24,55	24,38
17	Actualization of reasonableness as a new normotypic feature of modern communication	29,31	35,3	28,26	21,34
18	The predominance of expressive syntax as a new emotional norm of communication	31,81	49,6	37,35	29,82

Note. Source: [Karabulatova et al., 2021, p. 1520].

difficulties. As a result, these studies became the basis for the subsequent development of academic emotionology and neuropedagogy in the aspect of differentiation of ethnocultural approaches in education [Kurek, 2004; Stern et al., 2022].

Based on this, the upper level of the academic emotionology architecture is presented as a multicomponent system focused on detecting emotions in scientific and pedagogical discourse, followed by social management of the recipient's emotional state in the classroom (Fig. 3).

It cannot be said that these blocks are limited only by the specified connections and are not interconnected by additional peripheral connections that are present in the multidimensional representation. So, we can draw separate edges from the block of verifying our own emotions to the block of social engineering in the aspect of self-education and self-improvement. At the same time, the complex graph "Emotion verification" can be spatially linked to the graph "Emotion detection." Emotives can also be classified taking into account the factor influencing the development of critical and creative types of thinking, which are necessary not only in scientific research, but also in educational practice.

Besides, the modeling of the psycho-emotional state of the audience can also take place through both verbals, non-verbal and paraverbal means of emotive engineering performed by the teacher. However, for example, E.A. Antonova, like most researchers in the humanities, simply notes that non-verbal means in Russian as a foreign language classes contribute to the effective enrichment of vocabulary among foreign students, without taking into account the determinative role of academic emotionology in this case [Antonova, 2019].

However, this is not the mistake of individual researchers, but the traditional adherence to established principles in scholasticism and Russian linguodidactics, in particular, which did not consider emotionogenic factors in educational discourse separately due to the weak development

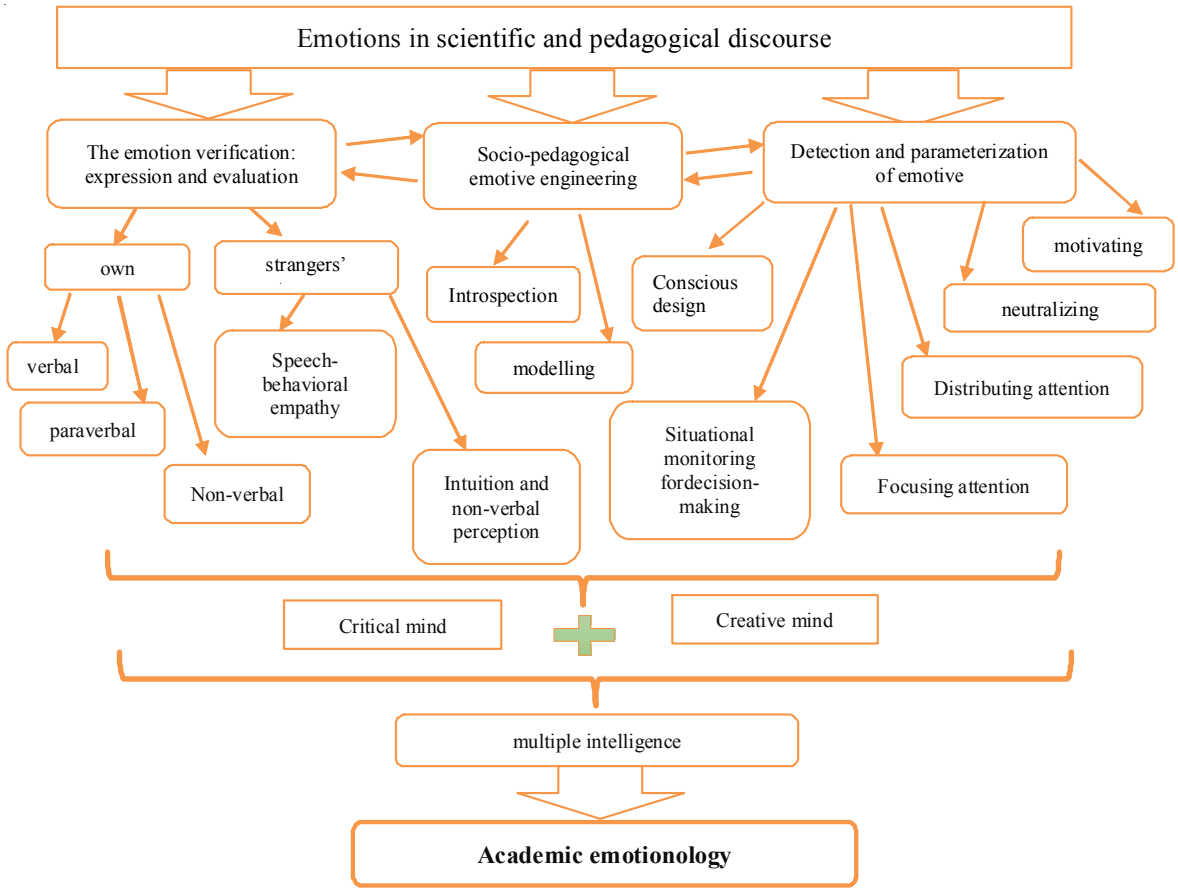

Fig. 3. The upper level of the architecture of academic emotionology as a system of complex graphs of the controlled psycho-emotional state of actors in the coordinates "teacher + student"

of emotiology as a scientific field and the belittling of the role of emotions in the educational process [Shakhovsky, 2019]. The transition of active educational communication to the virtual learning space actualizes the graphical transmission of psycho-emotional states in order to more accurately understand the emotions experienced in the addressee-addressee system, which takes the development of emotional artificial intelligence to a new level and understanding of natural emotional intelligence, focusing on the following objectives emotivity settings in virtual communication.

The complex graph of situational monitoring of emotions includes enlarged blocks that can be detailed. Any life situation experienced as a personal crisis affects the inner picture of the individual's world with the marking of an additional positive and/or negative evaluative attitude (Fig. 4).

It can be seen from Figure 4 the very variety of life situations provoking psycho-emotional perception and evaluation is due not only to exogenous factors, but also to the specifics of the manifestation of psycho-emotional reactions predetermined by awareness of the transformation and/or destruction of the internal coordinate system, the permissible boundaries of the space of the personal "I" as a kind of structured myth-a story about oneself and for oneself under the influence of some third force. In our opinion, the allocation of sociomorphic modeling is predetermined by epigenetic consequences, as a result of which previously acquired life experience and environmental influences actualize the manifestation of some genes and drown out the effect of those that lose their relevance due to various traumatic events [Roseboom, 2019]. Consequently, the "deep" language that the body uses to convey to a representative of another, usually younger generation, encodes the historical and cultural experience of the family, society, people and the state, in order to provide strategies that ensure vitality and resilience. In other words, the very concept of "internal resources" is beginning to take on a new meaning.

At the same time, each of these blocks can have a gradation of evaluative perception in both the negative and positive ranges, which must be taken into account when creating EmoAI based on sociomorphic modeling in emotional natural

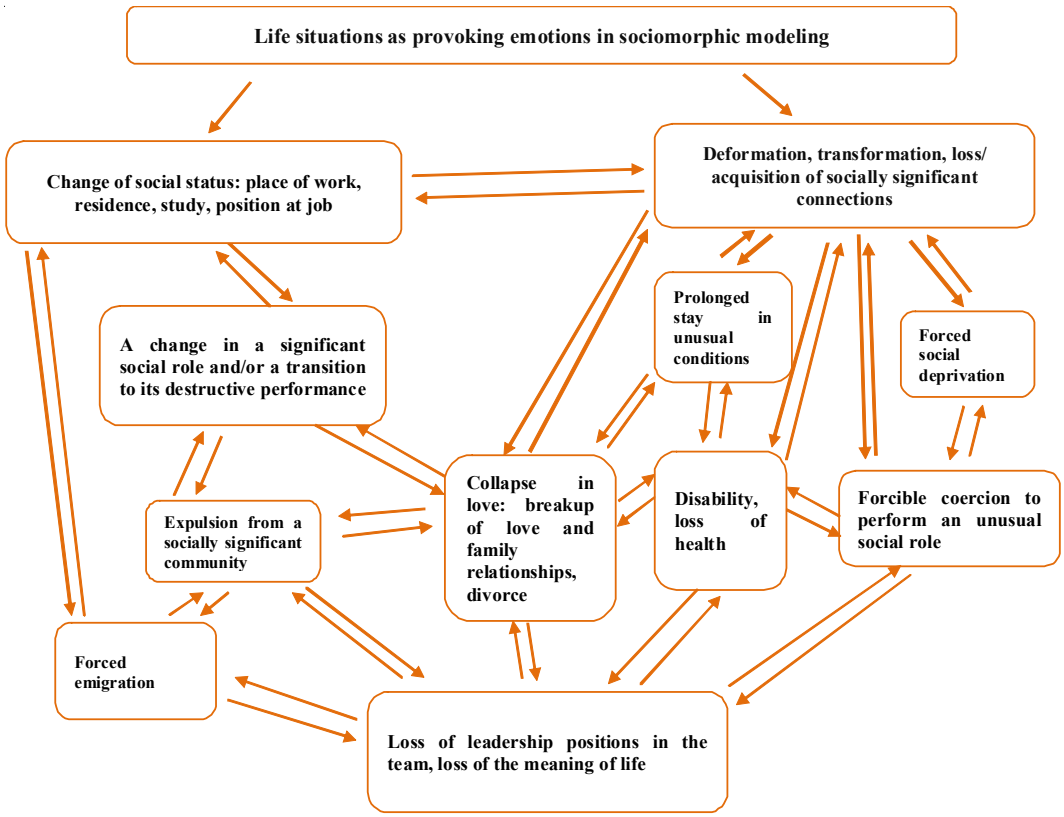

Fig. 4. The upper level of the architecture for monitoring life situations as provocatives of emotionalization in sociomorphic modeling

intelligence. With respect to this, the interpretation of actions can proceed both from the position of the victim (always overcoming something, with an emphasis on the negativization of surrounding circumstances), and from the position of the hero (perceiving any negative as a point of realization of one of the probabilities of acquiring a positive experience, or inner strength).

Such a module as a whole can be important and useful in analyzing the speech and behavioral stereotype of a hero in fiction with a metaphorical transfer to behavior in everyday life, becoming a powerful emotionogenic factor that reinforces a specific type of behavior in a particular ethno-culture. In this regard, artistic parables related to the culture of filial piety can be cited as an example of an emotionogenic factor that forms emotional intelligence, which demonstrates the success of modeling emotional reactions in difficult life situations, the patterns of which were developed back in the heyday of Confucius' teachings.

The prerequisites for the emergence of modern academic emotionology can serve as the principles of filial piety and brotherly virtue developed in Ancient China, which have been reproduced in Chinese society for many centuries, using such an important element of cognitive behavioral neurodidactics as the "desire for praise," based on a dopamine basis in cultivating motivation to commit socially approved acts, supported by socially psychological engineering of Chinese society, allowing you to regulate your emotional sensitivity to the socio-emotional effects of praise.

The results of modern instrumental research in the field of neurobiology and neuro-psycho-physiology have demonstrated the effectiveness of perceiving sincere appreciation in both positive and negative ways, while neuroimaging has confirmed that flattery is decoded with a large fan of interpretation and is perceived as an unreliable response, little trustworthy.

Thus, communicative multicultural and multi-subject competence in academic discourse is directly dependent on the psycho-emotional perception of educational material, allowing it to accelerate understanding and mastering [Franklin et al., 2014] at a new stage in the development of academic emotionology.

The Fourth Industrial Revolution and the active use of various IT technologies have highlighted the importance of neuro-psychophysiological research on language and speech [Khokhlova, 2017; Rusalov, 2012]. This is a new round in the debate about the nature of man, about the principles of his consciousness and thinking, about ways of objectifying the world, as well as about methods of neuro-psychoemotional influence and human management in the structure of social engineering, which were raised in his research by A.R. Luria, whose pioneering works of the early twentieth century still have not lost their relevance [Luria, 2002].

An understandable misunderstanding of the processes of evolution of neurocognitive brain structures at the stage of the formation of science, the lack of opportunities for conducting neurobiological in-depth experiments led to the impossibility of developing cross-cultural pedology, which began to develop rapidly within the framework of academic emotionology and neuropedagogy already in the 21st century, based on well-calibrated tools for determining the neuro-psychophysiological parameters of language, speech and thinking development in different ethnic and racial groups [Li, English, Kulich, 2021; Stern et al., 2022].

The significance of the experimental developments of A.R. Luria and L.S. Vygotsky is determined by the fact that they became the basis for the development of test systems for measuring IQ and psychometric principles of scientific organization of work [Luria, 2002]. Although objective, reliable psychological tests were later banned, and those enthusiasts in the field of psychology, neurology, and psychiatry who continued to develop social testing Patho-Psychology were publicly censured and forcibly isolated within the framework of "punitive medicine" [Kurek, 2004, p. 24]. Meanwhile, psychiatrist A.B. Zalkind, who was later severely ostracized, made a fundamental prediction about the high degree of neuroplasticity of the cerebral cortex, directing and controlling which it is possible to achieve a possible change in conditioned and unconditioned reflexes, which echoes modern neurotargeting and linguistic marketing [Korsakov, 2010], justifying sociomorphic modeling of the speech and behavioral standard.

The possibility of modeling is predetermined by the selection of several types of signals that are perceived by the nervous system in real time from the external environment, either in the direction of an auditory, color-light, or electromagnetic speech

signal, perceived as visual and/or written, or a neuromuscular impulse, or a surge of the neurohumoral sphere (as acts of neuro-psychophysiological communication) which have, in addition to the main informational value, an additional emotive value, which was defined by us as an emoticeme [Karabulatova et al., 2023]. The presence of additional emotional coloring can play a crucial role in the perception of information, allowing it to be decoded at a specific emotive locus.

Consequently, the scope of emotional intelligence is much broader than it appears in the simplified model, which, using modern ML approaches that analyze neural data, is divorced from understanding neuro-psycholinguistic processes that somehow affect the outcome in the form of prediction and the creation of classifiers [Rao, 2019]. The non-always conscious verification of the components of this external signal, however, in real time allows them to be sequentially transformed using the nervous system into an internal binary code, which is then decoded during conscious processing, prioritizing the selection of information in the "dangerous – not dangerous" coordinates, which ensures the effectiveness of its perception and understanding [Blouw et al., 2019]. A strict standard of script communication in the online space is becoming dominant in communication with "smart assistants," as a result of which speech becomes dry, formalized and emotionless. This mechanistic nature of communication is mitigated by the use of a variety of emoticons that act as a kind of psycho-emotional refuge, allowing a modern person to hide from the oppressive burden of the requirements of the standard imposed on communication by modern society in conditions of transparency of digital reality and tracking by various regulatory organizations.

Today, the scientific world has come to the need to detail the very subject of AI, which is positioned not only as a new branch of the science-intensive industry, but is also considered the most promising area of AI research. However, the enthusiastic attitude towards the development of emotional models as some kind of technological IT innovations in the development of effective human-machine communication often omits some important points of the most scientific foundation of natural emotional intelligence, not to mention emotional AI models, believing that combining big Data technology and deep Learning methods with using artificial neural networks (ANN) capable of self-learning and representing a simplified analogue of natural neural networks, developed based on machine learning. Recall that the algorithm itself is aimed at obtaining and processing both the data originally embedded in it, and at obtaining new information with subsequent processing to justify and support effective decision-making in the increasingly complex conditions of the modern augmented reality world.

In this regard, the conditional design of a sympathetic intelligent agent acting as a lecturer-teacher can be represented as a complex hierarchically organized dynamic system with the ability to actively learn and self-learn (Fig. 5).

Figure 5 shows the high-level architecture of an intelligent agent acting as a lecturer. The intellectual agent: 1) recognizes the student's emotions; 2) creates a model of the student's psycho-emotional state; 3) displays the student's psycho-emotional state through subjective experience on its model of the psycho-emotional state; 4) generates an emotional response to the respondent (student) [Karabulatova, Talanov, Vallverdú, 2024].

Thus, we propose to create an intelligent agent capable of maintaining an emotional dialogue with students, projecting not only educational information, but also emotionally colored content, which should increase the immersiveness of learning and, as a result, its quality.

Further analysis will make it possible to create a complex multigraph model, which would include: 1) a model of the history of emotivity in pedagogical discourse; 2) a model of the biological basis of emotions; 3) a model of psychological parameters of emotions; 4) a model of neurophysiological parameters of emotions; 5) a model of sociological variables of emotions; 6) a model of linguistic characteristics of emotions, etc.

At the stage of the pre-project analysis, it is necessary to first perform a full-scale and comprehensive analysis of the phenomenon of empathy, which will fully identify the markers of emotional response on different planes, after which it is possible to build instructions and models for training artificial intelligence and neural networks.

Thus, the historical block of the phenomenon of empathy unfolds in the variants of ideas about emotions in the European, Russian and Chinese

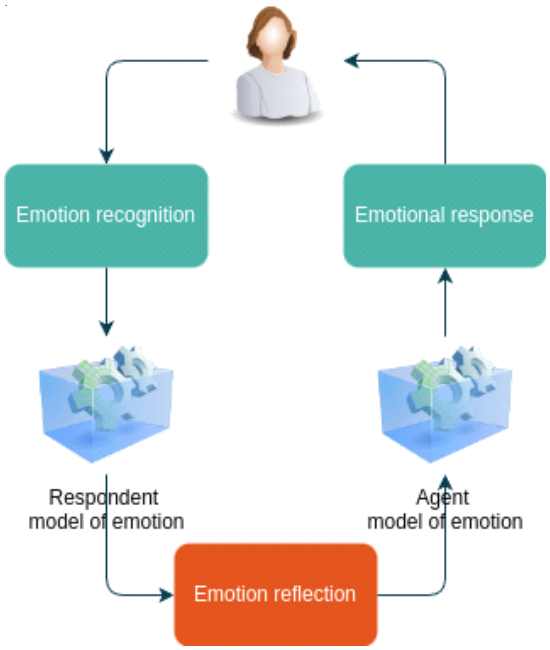

Fig. 5. The representation of an empathic emotive intellectual agent/lecturer

civilizational paradigms. The difficulty is due to the fact that already in the 6th – 4th centuries BC in the ancient Chinese civilization questions of conflict and emotionality of behavior were raised, which allowed Confucius in the treatise "Conversations and Judgments" to give the basics of ecological and healthy communication: "Don't do to others what you don't want to do to yourself." Confucius emphasized that "when you talk to a person you can't talk to, you're wasting your words. A wise man does not make mistakes in people and does not lose his words"/ "当你和一个你不能说话的人说话时，你是在浪费你的话。 智者不犯错误，不失言语" [Tao te Ching, 2023, p. 68].

Similar ideas were expressed in ancient Greece by Plato and Aristotle. Later, E. Kant entered into a time-delayed polemic with the philosophers of antiquity. It is from here that the most polarized points of view regarding the consideration of the phenomenon of emotionality and its essence, as well as the traditions of views on emotions as something instinctive, beyond the scope of human regulation, originate.

The use of emotive neuromodeling in academic discourse has a dominant effect, contributing to the build-up of new cognitive connections during the continuous "translation" of natural physical reality data into digital and vice versa, strengthening dopamine anticipation connections when exposed to new information. The regulation of psychoemotional response is based on the recognition of the variability of individual empathy, which reveals close links with the semantic peaks of triggers that are widely represented in the ethnosociocultural context of the academic space.

Conclusion

From the standpoint of the evolutionary development of the human species, decoding of emotional-emotive interaction is implemented according to the residual principle, therefore, the creation of intelligent systems to support academic discourse is directly dependent on the psycho-emotional response to incoming information.

The need to use emotional intelligence data in academic discourse is due to the observed trivial phenomena of a decrease in the quality of defensive reactions in the form of fatigue or the development of hypnotic trance in the target audience, which makes it difficult to perceive information that is decoded as an atypical or evolutionarily unusual signal. The introduction of "smart assistants" in educational discourse revealed gaps in the theory of emotions, which necessitated the identification of academic emotionology as a new branch of applied linguistics.

Despite the postulation of the need to detail the subject of AI itself, which is positioned as a

new branch of the science-intensive industry, digital academic emotionology is considered as the most promising area of AI research in optimizing educational discourse.

However, the enthusiastic attitude towards the development of emotional models as some kind of technological IT innovations in the development of effective human-machine communication often omits some important points of the most scientific foundation of natural emotional intelligence, not to mention emotional AI models. The combination of big data technology and deep learning methods using artificial neural networks capable of self-learning and representing a simplified analogue of natural neural networks is being developed based on machine learning.

Recall that the algorithm itself is aimed at obtaining and processing both the data originally embedded in it, and at obtaining new information with subsequent processing to justify and support effective decision-making in the increasingly complex conditions of the modern augmented reality world. In this regard, the development of new principles for the integration of neurocognitive knowledge and emotional-emotive models in modern academic emotionology is becoming a new research challenge, thanks to which we can examine in more detail the structure of the blockchain in education based on graphs that make up the features of different types of emotional intelligence to ensure effective learning of educational material. In other words, from each simple conclusion it is possible to reach an understanding of the general definition of a specific terminological concept.

The output graphs that appeared as a result of text analysis have various differences. Due to the presence of various kinds of conclusions and conclusions in the text, and using two-digit and multi-valued types of logic, it is possible to perform operations with background knowledge matrices. However, there is a problem of constructing a single metagraph that could show a common "tree" of the definition of a particular term from a set of features.

The proposed empathic emotive intellectual agent/lecturer is able to accumulate various models of knowledge representation about emotions and their emotive representations in different ethno-cultures, social groups and sciences. At the same time, we recognize that today building a "single tree" is not an easily feasible task due to the presence of various types of logic (such as modal, temporal, etc.), for which it will be necessary to create new "trees" of inference. In this respect, in order to implement the idea, we found it necessary to segment into different areas of knowledge about emotional intelligence, taking into account the hierarchy and chronotope and the vagueness of the input data.

Further analysis will make it possible to create a complex multigraph model, which includes: 1) a model of the history of emotions; 2) a model of the biological basis of emotions; 3) a model of psychological parameters of emotions; 4) a model of neurophysiological parameters of emotions; 5) a model of sociological variables of emotions; 6) a model of linguistic characteristics of emotions; 7) a model of non-verbal parameters of emotion expression (kinesics, facial expressions); 8) a model of paraverbal parameters of realization emotions (voice pitch, voice saturation, etc.).

The pre-project analysis determines the priority of a full-scale and comprehensive consideration of the phenomenon of emotional intelligence in its subtypes. This allows you to fully identify markers of emotionality and emotivity at different levels, after which it is possible to build instructions and a multi-level model for teaching emotional artificial intelligence and a neural network, which allows you to implement a high-level architecture of an AI lecturer capable of generating an adequate emotional response to communication with a student.

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