O‘ZBEKISTON RESPUBLIKASI OLIY TA’LIM, FAN VA INNOVATSIYALAR VAZIRLIGI

MIRZO ULUG‘BEK NOMIDAGI O‘ZBEKISTON MILLIY UNIVERSITETINING JIZZAX FILIALI

ZAMONAVIY INNOVATSION TADQIQOTLARNING DOLZARB MUAMMOLARI VA RIVOJLANISH TENDENSIYALARI: YECHIMLAR VA ISTIQBOLLAR

mavzusidagi Respublika ilmiy-texnik anjuman materiallari to‘plami

(2024-yil 17-18-may)

(1-qism)

JIZZAX-2024

“Zamonaviy innovatsion tadqiqotlarning dolzarb muammolari va rivojlanish tendensiyalari: yechimlar va istiqbollar” mavzusidagi Respublika ilmiy-texnik anjuman materiallari to‘plami – Jizzax: O‘zMU Jizzax filiali, 2024-yil 17-18-may. 410-bet.

Respublika miqyosidagi ilmiy-texnik anjuman materiallarida zamonaviy innovatsion tadqiqotlarning dolzarb muammolari va rivojlanish tendensiyalari sohasidagi innovatsion tadqiqotlar aks etgan.

Globallashuv sharoitida davlatimizni yanada barqaror va jadal sur’atlar bilan rivojlantirish bo‘yicha amalga oshirilayotgan islohotlar samarasini yaxshilash sohasidagi ilmiy-tadqiqot ishlariga alohida e’tibor qaratilgan. Zero iqtisodiyotning, ijtimoiy sohalarni qamrab olgan modernizatsiya jarayonlari, hayotning barcha sohalarini liberallashtirishni talab qilmoqda.

Ushbu ilmiy ma’ruza tezislari to‘plamida mamlakatimiz va xorijlik turli yo‘nalishlarda faoliyat olib borayotgan mutaxassislar, olimlar, professor-o‘qituvchilar, ilmiy tadqiqot institutlari va markazlarining ilmiy xodimlari, tadqiqotchilari, magistr va talabalarning ilmiy-tadqiqot ishlari natijalari mujassamlashgan.

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Mazkur to‘plamga kiritilgan ma’ruza tezislarining mazmuni, undagi statistik ma’lumotlar va me’yoriy hujjatlarning to‘g‘riligi hamda tanqidiy fikr-mulohazalar, keltirilgan takliflarga mualliflarning o‘zlari mas’uldirlar.

BO‘YICHA BEMORLARNING SOG‘LIG‘INI ANIQLASH." International Journal of Contemporary Scientific and Technical Research (2023): 133-137.

UNLOCKING EMOTIONAL CUES: METHODS FOR ANALYZING HUMAN BODY MOVEMENTS IN EMOTION RECOGNITION

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Abstract: The realm of emotion recognition has been revolutionized through the analysis of human body movements. This fascinating field, deeply rooted in the intersections of psychology, technology, and performing arts, seeks to decode the intricate language of emotions conveyed through our physical movements.

Key words: Emotion recognition, Human body movements, Gesture analysis, Movement-based emotion detection, Body language, Kinematic features, Machine learning, Pattern recognition, Motion analysis, Emotion classification, Biometric signals, Pose estimation, Feature extraction, Data-driven methods, Multimodal emotion recognition.

The Language of Emotion: Body Movements as Expressive Elements

The human body is an intricate tapestry of communication, with each gesture and movement revealing a wealth of emotional information. The way we move, stand, sit, and even rest can provide valuable insight into our emotional states. This non-verbal form of communication, also known as body language, can often communicate more than the words we utter.

According to Albert Mehrabian's 7-38-55 rule, only 7% of communication is based on the spoken word. Tone of voice accounts for 38%, while an astonishing 55% is conveyed through body language. Therefore, understanding body language becomes an essential tool in interpreting human emotions.

The Intricacies of Body Language

Body language is far from being a universal language. Its interpretation can vary depending on cultural context, personal habits, and even individual personality traits. Despite this, there are some common elements that most people can identify. These include:

- *Facial expressions*: These can be very telling, as the face is often the first place we look when trying to gauge someone's emotional state.
- *Posture*: The way a person stands or sits can say a lot about their confidence and openness.
- *Gestures*: These can include everything from hand movements to the way we move our heads.
- *Eye contact*: This can signal interest, disinterest, or even aggression.

The Science of Emotion Recognition

Emotion recognition is the process of identifying human emotion, most typically from facial expressions as well as from verbal expressions. This scientific field has seen significant advancements in the last few decades, with the integration of machine learning and pattern recognition techniques.

One of the most exciting developments in this field is the use of human body movements for emotion recognition. This approach recognizes that our movements often reflect our emotional states, providing a rich source of data for emotion recognition algorithms.

The Role of Machine Learning in Emotion Recognition

Machine learning, a subset of artificial intelligence (AI), is a key driver in the advancements of emotion recognition. Machine learning algorithms enable computers to learn from and interpret data, improving their performance over time without being explicitly programmed.

In the context of emotion recognition, machine learning algorithms can be trained to recognize patterns in body movements that correlate with specific emotions. They can then use these patterns to predict emotional states in new data.

Understanding Body Movements: Key Factors for Emotion Recognition

When it comes to recognizing emotions from body movements, several key factors come into play:

Kinematic Features

Kinematic features refer to the properties of body movements, such as speed, acceleration, and trajectory. Different emotions can cause variations in these features. For instance, happiness might be associated with more energetic movements, while sadness might be reflected in slower, more sluggish movements.

Gesture Analysis

The analysis of gestures involves studying specific movements of the body, such as waving a hand or nodding the head. Different gestures can carry different emotional connotations, providing valuable clues for emotion recognition.

Pose Estimation

Pose estimation involves determining the position of various parts of the body in an image or video. By analyzing body poses, it's possible to infer certain emotional states.

Feature Extraction

Feature extraction involves processing raw data to extract meaningful information, which can then be used as input for machine learning algorithms. In the context of emotion recognition, this could involve extracting kinematic features, analyzing gestures, or estimating body poses.

Movement-Based Emotion Detection: Current Research and Developments

Multiple research initiatives are currently exploring the potential of movement-based emotion detection. A study conducted by Penn State researchers developed an annotated human movement dataset to improve the ability of AI to recognize emotions conveyed through body language. The team used 1,600 human video clips, each annotated with the Laban Movement Analysis (LMA), a method for describing and interpreting human movement.

Another study led by a team at Ben-Gurion University explored emotion recognition based on body motion, focusing on "naturalistic settings" and a broad collection of motion parameters. The research suggested that machine learning models are valuable for emotion recognition in real-life scenarios, laying the groundwork for further advancements in the field.

Meanwhile, researchers at BetterUp have been delving into the importance of understanding body language in the workplace, arguing that it can foster better peer bonding, build trust, and improve overall communication.

Conclusion: The Transformative Potential of Emotion Recognition

The ability to accurately recognize emotions has profound implications for a wide range of fields, from mental health to human-computer interaction. By decoding the language of body movements, researchers are opening up new possibilities for understanding and responding to human emotions.

However, as with any technology, the use of emotion recognition raises important ethical considerations. As we move towards a future where machines can read our emotional states, it is crucial to ensure that this technology is used responsibly and respects individual privacy.

Emotion recognition through human body movements represents a significant stride in the field of artificial intelligence. As these technologies continue to advance, they bring us one step closer to a future where machines can better understand and respond to human emotions, paving the way for a more intuitive and empathetic era of human-machine interaction. Through the integration of machine learning, pattern recognition, and a deep understanding of human emotion, we stand on the brink of a significant breakthrough in emotion recognition technologies.

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ANDROIDDA MODEL VIEW PRESENTER (MVP) ARXITEKTURASI

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Annotatsiya: Model View Presenter (MVP) arxitekturasi Android dasturlashda juda mashhur. Bu arxitektura, dasturlash loyihasini qisqa va aniq bo'lishi, kodni test qilishni osonlashtirish, va interfeysni modeldan ajratishni maqsad qiladi. Bu arxitekturada, komponentlar haqida to`liq ma’lumotlar keltirib o’tilgan.

Kalit so‘zlar: Model, View, Presenter, Arxitektura (Architecture), Foydalanuvchi Interfeysi (User Interface), So'rov (Query), Murojaat (Request), Ma'lumot (Data), Bog'lanish (Binding), Test (Testing).

Androidni ishlab chiqishning boshlang’ich bosqichida, o’rganuvchilar kodlarni shunday yozadilarki, dasturning barcha logik jarayonlari MainActivity klassida joy oladi. Ilovalarni ishlab chiqishning bunday yondashuvi Android activity ning UI ni ham, dastur ma’lumotlarini qayta ishlash mexanizmini ham bir biriga yaqinlashishiga olib keladi. Bunday mobil ilovalarni saqlash va kengaytirishda ham qiyinchiliklar tug’iladi. Dasturlarning saqlanishi, o’qilishi, kengaytirilishi va qayta ishlab chiqishida uchraydigan bunday muammolarni oldini olish uchun dasturchilar kodni qatlamlarga ajratishni afzal ko’rishadi. Dasturiy arxitektura patternlarni qo’llagan holda, dastur kodini tartibga solish uchun vazifalarni bo’limlarga ajratish lozim[1].

Ushbu maqolada keltiriladigan Model-view-presenter (MVP) haqidagi ma’lumotlarga to’xtalishdan oldin arxitektura tushunchasiga ozroq ta’rif berib o’tsak. Agar biz dasturni bir nechta qoidalarga asoslanib qurayotgan bo’lsak, tegishli funksiyalarni ishlatib va ma’lum bir protokollar bilan ularni ishga tushirsak buni biz “Arxitektura” deb nomlashimiz mumkin.