

Proceedings of the MMIT'25 International Conference



MMIT'25

International Conference
29 May 2025, Tashkent,
Uzbekistan www.mmit.tiue.uz



Tashkent International University of Education
Turin Polytechnic University in Tashkent

PROCEEDINGS

of the MMIT'25 International Conference

TA'LIMNING ZAMONAVIY USULLARI VA
INNOVATSION TEXNOLOGIYALAR

MODERN METHODS AND INNOVATION
TECHNOLOGIES IN EDUCATION

СОВРЕМЕННЫЕ МЕТОДЫ И
ИННОВАЦИОННЫЕ ТЕХНОЛОГИИ
В ОБРАЗОВАНИИ

29 May 2025, Tashkent, Uzbekistan

MAQOLALAR TO'PLAMI
СБОРНИК СТАТЕЙ



Tashkent International University of Education

PROCEEDINGS

of the MMIT'25 International Conference

Ta'limning zamonaviy usullari va innovatsion texnologiyalar

Modern methods and innovation technologies in education

**Современные методы и инновационные технологии в
образовании**

29 May 2025, Tashkent, Uzbekistan www.mmit.tiue.uz

MAQOLALAR TO'PLAMI

СБОРНИК СТАТЕЙ

Tashkent 2025

UO'K: 370.1

KBK: 74.00

T 17

Ta'limning zamonaviy usullari va innovatsion texnologiyalar: Xalqaro konferentsiya to'plami / To'plovchi va nashrga tayyorlovchi: M.I.Baydjanov, R.R.Bekbayev. – Toshkent: Bookmany print, 2025. – 350 b.

Mazkur to'plam "Ta'limning zamonaviy usullari va innovatsion texnologiyalari" xalqaro ilmiy-amaliy konferentsiyasini o'tkazish to'g'risida "Tashkent International University of Education" xalqaro universitetining 2025 yil 25 martdagi 01-03-05/4AF-son buyrug'iga asosan o'tkazilgan anjuman materiallari asosida tayyorlandi.

To'plovchi va nashrga tayyorlovchi:

TIUE akademik ishlar bo'yicha prorektori, f.-m.f.n., dotsent

Baydjanov Maqsudbek Islamdjanovich

TIUE Ta'lim boshqaruvi va pedagogika kafedrasi mudiri, f.f.d. (DSc), dotsent

Bekbayev Rauf Rustamovich

Bosh muharrir:

TIUE akademik ishlar bo'yicha prorektori, f.-m.f.n., dotsent

Baydjanov Maqsudbek Islamdjanovich

Mas'ul muharrir:

TIUE Ta'lim boshqaruvi va pedagogika kafedrasi mudiri, f.f.d. (DSc), dotsent

Bekbayev Rauf Rustamovich

Taqrizchilar:

Mirzo Ulug'bek nomidagi O'zbekiston Milliy universiteti

Falsafa kafedrasi professori, f.f.n.

Karimov Rahmat Rahmonovich

TIUE Ta'lim boshqaruvi va pedagogika kafedrasi professori, f.f.d. (DSc)

Saidova Kamola Uskanbayevna

TIUE Axborot texnologiyalari va matematika kafedrasi dotsenti, f.-m.f.n.

Chay Zoya Sergeyevna

Ushbu to'plam "Tashkent International University of Education" xalqaro universiteti Ilmiy-texnik kengashining 2025 yil 15 iyuldagi 6-sonli majlis qarori asosida nashrga tavsiya etilgan.

ISBN 978-9910-06-139-4

ОГЛАВЛЕНИЕ

Организация образовательного процесса с интеграцией дуального образования и инновационных технологий.....	8
Modern Approaches to Educational Process Organization: Integration of Dual Education and Innovative Technologies	8
Setting up cloud based shared ARMv8 machine for Computer Architecture Education	15
The Working Principle and Polarization Curve of Hydrogen Trucks.....	18
Педагогическая компаративистика в свете глобальных перемен.....	27
Comparative pedagogy in the context of global changes.....	27
Об одной модели использования STEM методологии при организации учебного процесса.....	30
About one model of using STEAM methodology in the organization of the educational process	30
Management Innovation: Shaping the future of Business Management.....	35
O‘zbekiston Respublikasi davlat boshqaruv faoliyatida raqamli texnologiyalarni rivojlantirishning huquqiy va amaliy asoslari.....	38
Legal and practical foundations for the development of digital technologies in the activities of public administration of the Republic of Uzbekistan.....	38
LMS - ta'lim jarayonini boshqarish tizimida sun'iy intellekt qo'llanilish.....	46
Application of artificial intelligence in the learning management system LMS	46
Руководитель как лидер профессионального педагогического сообщества	50
The head as the leader of the professional pedagogical community	50
Universitetlardagi tadqiqot va ishlanmalarning ta'lim sifatiga ta'siri.....	54
Impact of university research and development on the quality of education	54
Boshqaruv samaradiligini oshirishda ta'lim texnologiyalarining roli	60
The role of educational technologies in improving management effectiveness.....	60
Meva brendi pozitsiyasini shakllantirish yo'nalishlari.....	66
Directions for the formation of a fruit brand position	66
Raqamli davrda kitob savdosi: online platformalarning o'rni va afzalliklari.....	68
Book trade in the digital age: the role and advantages of online platforms	68
“Smart home” aqlli uy markaziy boshqaruv tizimida sun'iy ong va Liveness detection texnologiyalari integratsiyasi	72
Integration of Artificial Intelligence and Liveness Detection Technologies in the Central Control System of "Smart Home"	72
Tarmoq xavfsizligini ta'minlashda marshrutlash algoritmlari va protokollari.....	76
Routing algorithms and protocols for ensuring network security	76
Protokollar yordamida VPN tarmoqning xavfsizligini ta'minlash.....	79
VPN network security with protocols	79
Ethics and Education in the Context of Karl Popper's Philosophy.....	82
Mustaqil trayektoriyali obyektlarni qayta identifikatsiyalash masalasi	85
Re-identification problem for objects with independent trajectories	85

Belgilangan hududda rfid teglarining koordinatalarini aniqlash usullari tahlili	89
Analysis of methods for determining the coordinates of rfid tags in the designated area.....	89
O'quv auditoriyalarida shaxslarning holatini chuqur o'rganish orqali baholash uchun dataset yaratish	92
Creating a dataset to evaluate the condition of individuals in educational classrooms through in-depth study	92
Improving Critical Thinking Through Effective Argumentation.....	97
Oliy ta'lim tashkilotlarida masofaviy va an'anaviy ta'lim shakllarida o'quv jarayonlarini boshqarish axborot tizimi modellari	99
Models of the information system for managing educational processes in distance and traditional forms of education in higher educational institutions.	99
Oliy ta'lim tashkilotlarida o'quv jarayoniga innovatsion texnologiyalarni tatbiq etish muammolari .	102
Problems of introducing innovative technologies into the educational process in higher educational institutions.....	102
Bridging pedagogical innovation and practice: a literature review on ict adoption in higher education	105
The Evolution of Digital Payments and Its Impact on Financial Inclusion	112
Sustainable groundwater management - problems and scientific tools.....	116
Doimiy suv berishda yer osti suvlari sathining o'zgarishini modellashtirish.....	119
Modeling the change in groundwater level under constant water supply	119
Suv nasoslar orqali yarim qurg'oqchil hududlarda sug'orish amaliyotlarini uzluksiz olib borish.....	125
Continuous implementation of irrigation operations by water pumps in semi-arid regions	125
ESP32 yordamida mini server qurilmasini yaratishning usul va vositalari.....	130
Methods and tools for creating a mini server device using ESP32	130
Innovation Management: The Impact of AI on Sustainable Development and Technology in Uzbekistan.....	135
Psixodiagnostika metodikalarini psixometrika mezonlari va uning mazmun mohiyatini o'rganish....	140
Study of the criteria of psychometrics of psychodiagnostic methods and its content.....	140
Bulutli texnologiyalar asosida masofaviy ta'lim platformalarining didaktik imkoniyatlari: tahlil va rivojlantirish modeli	146
Didactic capabilities of distance learning platforms based on cloud technologies: analysis and development model	146
Obyektlarni sinflashtirishda xatoliklarni minimallashtirishga asoslangan baholarni hisoblash algoritmlari	151
Algorithms for calculating estimates based on minimizing errors in object classification	151
Obyektlarni sinflashtirishda xatoliklarni minimallashtirishga asoslangan baholarni hisoblash algoritmlari	158
Algorithms for calculating estimates based on minimizing errors in object classification	158
Hybrid Learning Models Based on ICT: Theoretical and Applied Aspects in Uzbekistan's Higher Education.....	164
Raqamli transformatsiya va kadrlar boshqaruvi: texnologiyalar inson resurslariga munosabatni qanday o'zgartirmoqda?	175

Digital transformation and human resource management: how are technologies changing the attitude towards human resources?	175
Tarix darslarida madaniyatlararo kompetensiyani shakllantirishda pedagogik texnologiyalar	179
Pedagogical technologies in the formation of intercultural competence in history lessons	179
Yashil iqtisodiyotni innovatsion boshqarishda xavf-xatarlarning ta'siri va uni kamaytirish yo'llari ..	182
Impact of risks in innovative management of the green economy and ways to reduce it	182
Ta'limda zamonaviy axborot-kommunikatsiya texnologiyalari	186
Modern information communication technologies in education	186
Sun'iy intellekt va avtomatlashtirishning muhandislik ta'limida qo'llanilishi	189
Application of artificial intelligence and automation in engineering education	189
Xalqaro moliya munosabatlarini rivojlantirishda raqamli texnologiyalardan foydalanish istiqbollari	191
Prospects for the use of digital technologies in the development of international financial relations ..	191
Mathematics in the Treatise by Baha ad-Din al-Amili "The Essence of Arithmetic", his Contemporaries and Followers.....	196
Aerodinamik tahlilda sun'iy intellekt va uch karrali integralning integratsiyasi	204
Integration of artificial intelligence and triple integral in aerodynamic analysis	204
The impact of information technologies and the digital economy on economic development	209
The state of the local internet commerce market and the importance of its development	213
Digital diplomacy and its role in the development of small and medium-sized innovative entrepreneurship in the Republic of Uzbekistan	216
Zamonaviy ta'limda gadjetlarning roli.....	220
The role of gadgets in modern education	220
Системный подход в управлении госпитальной школой	223
A systematic approach to hospital school management.....	223
Школа – мастерская гуманности	227
School – workshop of humanity.....	227
Sun'iy intellekt ilovalarining ta'lim jarayonida foydalanilishi	229
Use of artificial intelligence applications in the educational process.....	229
Совершенствование речевой компетенции студентов филологических направлений при помощи дидактических игр.....	233
Enhancing the Speech Competence of Philology Students through Didactic Games	233
ИИ и разработчики: деградация умений или рост эффективности?	236
AI and developers: degradation of skills or increased efficiency?.....	236
Лидерство и стиль управления: как выбрать эффективную стратегию	244
Leadership and Management Style: How to Choose an Effective Strategy.....	244
Модели управления качеством образования в Узбекистане и Сингапуре	248
Educational systems of Uzbekistan and Singapore: historical and contemporary contexts.....	248
Влияние бихевиористских методов на формирование учебной дисциплины.....	255
The influence of behavioral methods on the formation of academic discipline.....	255

ИИ и разработчики: деградация умений или рост эффективности?	258
The Mathematical Legacy of Baha al-Din al-Amili: An Analysis of Problems from the Treatise “Khulasat al-Hisab” (The Essence of Arithmetic)	258
Применение STEAM –подхода в преподавании управленческих дисциплин	262
The use of the STEAM approach in teaching management disciplines	262
Новые ориентиры HR-менеджмента в условиях развития зелёной экономики.....	265
New guidelines for HR management in the context of the development of the green economy	265
Анализ теории обучения Джона Дьюи в прагматизме и экзистенциализме	268
Analyzing John Dewey's learning theory in pragmatism and existentialism	268
Роль искусственного интеллекта в развитии мировой экономики.....	271
The role of artificial intelligence in the development of the global economy	271
Использование мультимедийных средств в учебном процессе.....	275
The use of multimedia tools in the educational process.....	275
Сравнительный анализ методов оценивания в истории педагогики.....	278
Comparative analysis of assessment methods in the history of pedagogy	278
Практическое применение когнитивистской теории обучения.....	283
Practical application of cognitive learning theory.....	283
Морфологический анализ каракалпакского языка с помощью нейронных сетей	285
Morphological analysis of the Karakalpak language using neural networks	285
Научно-методические подходы к урокам физической культуры в условиях инклюзивного образования.....	289
Scientific-methodological approaches to physical education lessons in inclusive education	289
Об одной модели модернизации учебного процесса	291
About one model of modernization of the educational process	291
Современные информационно-коммуникационные технологии в образовании: опыт Узбекистана	295
Modern information and communication technologies in education: the experience of Uzbekistan...	295
Ta'limda zamonaviy axborot-kommunikatsion texnologiyalar	298
Modern informationcom-munication technologies in education	298
Yashil iqtisodiyotga o'tishda xorijiy investitsiyalarning ahamiyati hamda rivojlanish dinamikasi: Markaziy Osiyo davlatlari misolida	301
The role of foreign investment in the transition to a green economy and development dynamics: the case of Central Asian countries	301
Будущее образования: педагогические теории на стыке истории и цифровых технологий.....	307
The Future of Education: Pedagogical Theories at the Intersection of History and Digital Technologies	307
Разработка интернет-магазина на платформе WordPress: функциональная модель и практическая реализация.....	311
Development of an Online Store on the WordPress Platform: Functional Model and Practical Implementation	311
Проект Yostate: создание онлайн-магазина одежды.....	316

Project Yostate: creating a stylish online clothing store	316
Ta'limda zamonaviy axborot-kommunikatsiya texnologiyalari va sun'iy intellekt: istiqbollar va amaliy yechimlar	321
Modern information and communication technologies in education and artificial intelligence: prospects and practical solutions.....	321
Применение метода множителей Лагранжа при нахождении условного экстремума функции двух переменных	324
Application of the Lagrange multiplier method in finding the conditional extremum of a function of two variables	324
Современные информационно-коммуникационные технологии в образовании, адаптация персонала к информатизации образовательного процесса	328
Modern information and communication technologies in education, staff adaptation to informatization of the educational process	328
Zamonaviy ta'lim, pedagogika va steam: integrativ yondashuvlarning ilmiy-asosiy tahlili	333
Scientific and basic analysis of modern education, pedagogy and steam: integrative approaches	333
Adabiyotlar ro'yxati.....	335
Tolali optik aloqa tizimlarini tadqiq qilishda qo'llaniladigan paket dasturlar tahlili	336
Analysis of package programs used in the study of fiber optic communication systems	336
GeoUtr dasturida optik kirish tarmoqlari abonentlariga xizmatlar ko'rsatish.....	340
Provision of services to subscribers of optical access networks in the GeoUtr program	340
Globallashuv sharoitida yoshlarda g'oyaviy immunitetni shakllantirishning pedagogik asoslari	345
Pedagogical foundations of the formation of ideological immunity in young people in the context of globalization.....	345
Ta'lim muassasalarini boshqarishda ustozlikning roli	349
The role of mentorship in the management of educational institutions	349

“SMART HOME” AQLLI UY MARKAZIY BOSHQARUV TIZIMIDA SUN'IY ONG VA LIVENESS DETECTION TEXNOLOGIYALARI INTEGRATSIYASI

Ahmedova Iroda Nurmuhamedovna¹, Nozima Abdurashid qizi Abdulamitova²,
Maftuna O'tkir qizi Jo'raboyeva³, Muhammad Dilshod o'g'li Axmedov⁴

Toshkent xalqaro ta'lim universiteti

E-mail: ¹akhmedovairoda11@gmail.com, ²nabdulamitova24@gmail.com,
³maftunajorabayeva803@gmail.com, ⁴meduzgi@gmail.com

DOI: 10.61587/mmit.tiue.uz.v1i1.157

Annotatsiya. Maqolada Aqlli uy (Smart Home) markaziy boshqaruv tizimlarida sun'iy ong (AI) va Liveness Detection integratsiyasi tahlil qilindi. Smart home tizimlari rivojlanayotgan sari, ularning xavfsizlik, moslashuvchanlik va foydalanuvchi identifikatsiyasiga bo'lgan ehtiyoj ortib bormoqda. Liveness detection shaxsning haqiqatda mavjudligini tekshirish orqali xavfsizlikni oshirsa, suniy ong esa tizimning intellectual boshqaruvni taminlaydi. Ushbu maqolada ikki texnologiyaning smart home markaziy boshqaruv tizimiga qo'shilish jarayoni, ularning ishlash tamoyillari va integratsiyaning samaradorligi tahlil qilingan.

Kalit so'zlar: *Smart Home, Sun'iy ong, Liveness Detection, aqlli uy, xavfsizlik, autentifikatsiya, yuzni aniqlash, ovozni tanish, Deepfake, IoT, biometrik himoya.*

INTEGRATION OF ARTIFICIAL INTELLIGENCE AND LIVENESS DETECTION TECHNOLOGIES IN THE CENTRAL CONTROL SYSTEM OF "SMART HOME"

Akhmedova Iroda Nurmuhamedovna¹, Nozima Abdurashid qizi Abdulamitova²,
Maftuna O'tkir qizi Jo'raboyeva³, Muhammad Dilshod o'g'li Axmedov⁴

Tashkent International University of Education

E-mail: ¹akhmedovairoda11@gmail.com, ²nabdulamitova24@gmail.com,
³maftunajorabayeva803@gmail.com, ⁴meduzgi@gmail.com

Abstract. This article analyzes the integration of artificial intelligence (AI) and Liveness Detection technologies in the central control systems of smart homes. With the advancement of smart home systems, the need for security, adaptability, and user identification is increasing. Liveness Detection enhances security by verifying a person's real presence, while artificial intelligence ensures the intelligent management of the system. This article explores the integration of these technologies into the central control system of smart homes, their working principles, and their effectiveness.

Keywords: *Smart Home, Artificial Intelligence, Liveness Detection, Smart Home, Security, Authentication, Face Recognition, Voice Recognition, Deepfake, IoT, Biometric Protection*

Kirish

Texnologik yuksalish natijasida aqlli uy tizimlari foydalanuvchilarga qulaylik, xavfsizlik va avtomatlashtirilgan boshqaruvni taqdim etadi. Markaziy boshqaruv tizimi bu tizimning yuragi bo'lib, u barcha IoT qurilmalarini yagona ecotizimga umumlashtiradi va foydalanuvchilarning ehtiyojlariga moslashadi. Ammo, kiberxavfsizlik va maxfiylik bilan bog'liq muammolar hali ham dolzarb bo'lib qolmoqda. Bugungi kunda SMART-texnologiyalarning asosiy vositalarini IoT (Internet of things) – buyumlar interneti tashkil etmoqda. Buyumlar interneti IoT (Internet of things) bu - maxsus elektronika, dasturiy ta'minot, sensorlar, qabul qiluvchi va uzatuvchi qurilmalarning o'zaro ma'lumot almashinuvidan iborat tarmoq tizimi bilan jihozlangan sun'iy intellekt yordamida masofadan boshqariluvchi maishiy texnikalar, transport vositalari va boshqalar [1]. “Smart Home” tizimlari nafaqat turli IoT qurilmalarini boshqarishi balki ularning xavfsizligini ham ta'minlashi kerak. Liveness Detection (biometrik tizim himoyasini ta'minlash)

texnologiyasi esa bizga foydalanuvchi ovozi, yuz harakati va boshqa biometrik ma'lumotlarni real vaqt rejimida tekshirish orqali xavsizlikni oshirib beradi. Masalan, yuzni aniqlash texnologiyasi 5% ehtimollik bilan xatoga yo'l qo'yishi mumkin, ammo agar unga xuddi shunday ko'rsatkichga ega bo'lgan ovoz orqali identifikatsiyani qo'shsak, xato ehtimoli 0,25% gacha kamayadi. Bu texnologiya sun'iy ong (Artificial Intelligence - AI) bilan integratsiya qilinishi orqali aqlli uy tizimlarining yanada xavfsiz va ishonchli bo'lishiga olib keladi.

Maqolada sun'iy ong bilan Liveness Detection texnologiyalari integratsiyasi tamoyillarini o'rganish asosida ushbu metodologiyani "Smart Home" aqlli uy tizimida qo'llanishini tahlil qilish maqsad qilib olindi.

Natijalar va muhokama

Liveness Detection foydalanuvchining ovozi, yuzi, nafas olish ritmi, harakatlari va hatto atrof muhit sharoitlarini ham real vaqt rejimida tekshiradi. Sun'iy ong esa ushbu ma'lumotlarni qayta ishlaydi va tizimga qaror qabul qilish imkonini beradi [2]. Integratsiyaning asosiy elementlari:

Shubhali holatlarni aniqlash - kimdir yozib olingan ovoz yoki Deepfake neyron texnologiyasi orqali yaratilgan soxta biometrik ma'lumotlar tomonidan tizimni aldamoqchi bo'lsa, sun'iy ong anomalialarga asoslangan holda xavfsizlik tekshiruvini o'tkazadi.

Yozib olingan ovoz va Deepfake hujumlari aniqlash - inson jonli ovoz torlarida tabiiy mikro tebranishlar mavjud, lekin sun'iy ovozda esa yo'q.

Tovushning kontekstual o'zgarishi - haqiqiy inson gapirganda nafas olishi, sust yoki tez aytilgan so'zlar tabiiy tarzda o'zgaradi, lekin sun'iy ovozda bu bir xil bo'lishi mumkin.

Ko'p faktorli tekshirish - agar sun'iy ong ovozda shubhali belgi sezsa, qo'shimcha savollar berib, ovoz egasining tezkor javoblarini tahlil qiladi.

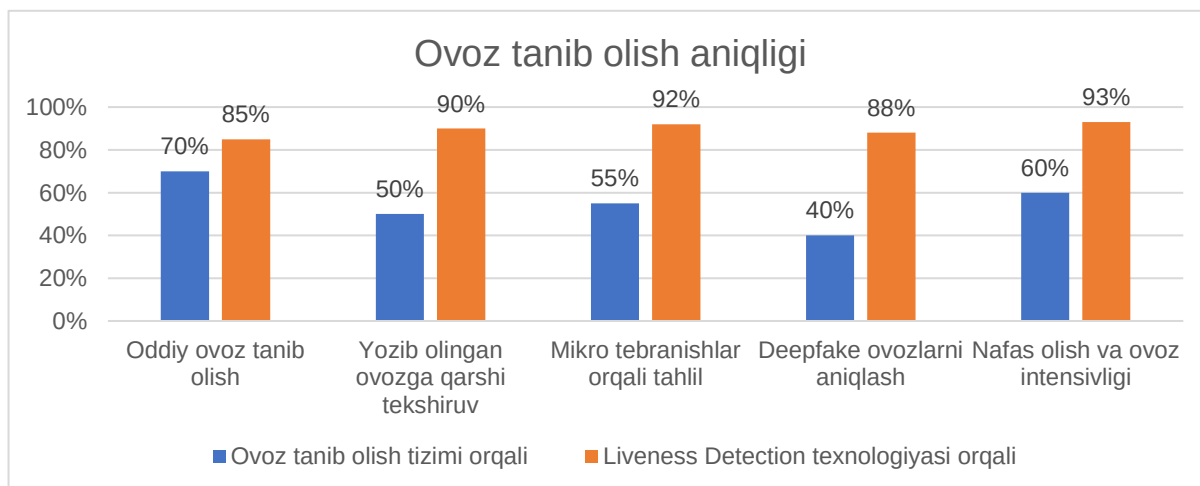
Yuzni aniqlash va Deepfake tekshiruvi - oddiy kamera faqat rasmni ko'radi, lekin infraqizil yoki 3D sensorlar haqiqiy va soxta yuz ekanligini ajratib beradi.

Mikro ifodalarni (Micro-expression) tekshirish - odamlar gapirayotganda yoki o'ylayotganda ko'z pirlpiratishadi va yuz mushaklari tabiiy harakatga keladi bu esa shaxsning jonli ekanligini tasdiqlaydi.

Yorug'lik va refleksiya analizi - sun'iy ong yuz skaneri orqali ko'z, teri va atrof muhitdagi yorug'lik refleksiyalarini tahlil qiladi.

Qo'shimcha autentifikatsiya talabi - agar tizim jiddiy shubha sezsa, qo'shimcha tekshiruv uchun eshik yoki tizimga kirishni vaqtincha bloklaydi va qo'shimcha kod yoki biometrik tasdiq so'raydi.

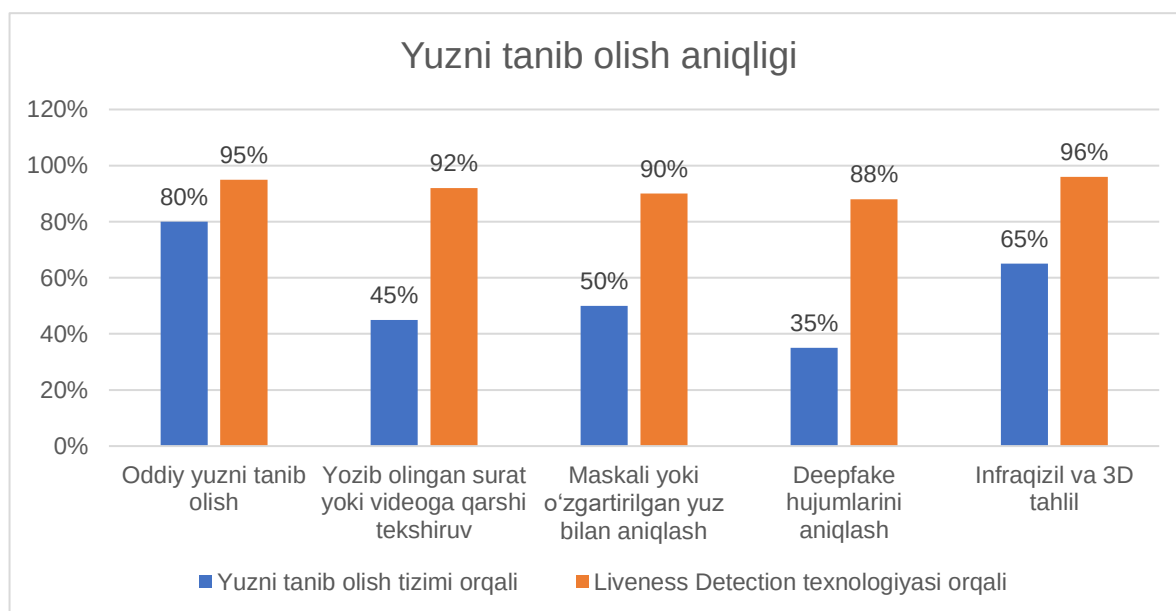
"Smart Home" aqlli uy tizimida AI yordamida ovoz tanib olish aniqligi tekshiruvi Liveness Detection texnologiyasini qo'llanilishini natijasi o'rganildi (1-rasm).



1-rasm. Ovoz tanib olish aniqligi

Tekshiruv turi ko'rsatkichlarini tahlili qilish shuni ko'rsatadiki, Liveness Detection ovoz tanib olish aniqligini sezilarli darajada oshiradi va yozib olingan ovoz, Deepfake, va sun'iy manipulyatsiyalarga qarshi sezuvchanlik 40–60% dan 85–93% gacha oshgan [3]. Ovoz tanib olish tizimlarining samaradorligi aniqlik, ishlash tezligi va real vaqt rejimidagi javob berish qobiliyati bilan o'lchanadi. Bu omillar tizimning foydalanish qulayligi, xavfsizlik darajasi va hujumlarga chidamliligiga ta'sir qiladi.

“Smart Home” aqlli uy tizimida AI yordamida yuzni tanib olish texnologiyasi (Face Recognition) odamning yuz xususiyatlarini tahlil qilish va autentifikatsiya qilish uchun ishlatiladi. Yangi yuz tasviri ma'lumotlar bazasidagi oldingi ma'lumotlar bilan solishtirishda Euclidean Distance yoki Cosine Similarity kabi algoritmlar ishlatiladi. Yuzni tanib olish tizimlari oddiy holatda 80–90% aniqlikka ega, lekin Liveness Detection bilan bu 95% va undan yuqoriga ko'tariladi (2-rasm) [4]. Yuzni tanib olish tizimida Liveness Detection texnologiyasini qo'llanishi xavfsizlikni oshirish uchun katta imkoniyatlarga ega bo'lib, rasm yoki Deepfake orqali aldashga qarshi chora ko'rish uchun, hamda 3D skanerlash, infraqizil tahlil va mikro harakatlarni aniqlashni yanada ishonchli qiladi.



2-rasm. Yuzni tanib olish aniqligi

Sun'iy ong va Liveness Detection texnologiyalari integratsiyasining real hayotda qo'llanilishi samarasi quyidagi holatlar misolida ko'rish mumkin:

- Aqilli eshik va kirish nazorati: sun'iy ong va Liveness Detection orqali avtomatik eshik ochish.
- Ovozli buyruqlar xavfsizligi: foydalanuvchining shaxsiy ma'lumotlariga faqatgina u ruxsat berganda kirish.
- Ichki havfsizlik tizimlari: harakat va yuz ifodalarini tahlil qilib, zo'ravonlik yoki favqulodda holatlarni oldindan aniqlash.

Liveness Detection texnologiyasini integratsiya qilish o'z samarasini autentifikatsiya jarayonining tezligi va aniqligiga ta'sir ko'rsatishi aniqlandi. Liveness Detection texnologiyasini qo'llangan va qo'llanmagan holatlarda xavfsizlik tizimiga ta'siri o'rganildi (Jadval 2).

Jadval 2

Mezon	Liveness Detection qo'llangan holat	Liveness Detection qo'llanmagan holat
Aniqlik	92%	65%
Autentifikatsiya tezligi	2.1 soniya	3 soniya
Soxta ijobiy (false positive)	4%	15%
Soxta salbiy (false negative)	3%	12%

Xulosa

Liveness Detection (hayotiylikni aniqlash) texnologiyasining integratsiyasi ishlash samaradorligini oshirish bilan birga autentifikatsiya jarayonini tezroq va ishonchliroq qiladi. Bu texnologiya foydalanuvchilarning shaxsini tasdiqlashda qo'shimcha xavfsizlikni ta'minlab, firibgarlikning oldini olishga yordam beradi. Masalan, oddiy yuzni tanish tizimlari surat yoki video orqali aldanishi mumkin bo'lsa, Liveness Detection haqiqiy odamni tanib, bunday hujumlarga qarshi samarali himoya yaratadi.

Suniy ong va Liveness Detection integratsiyasi orqali "Smart home" tizimlarining umumiy samaradorligi va xavfsizligi sezilarli ravishda oshadi hamda zamonaviy ehtiyojlarga javob beradigan yuqori darajali himoyani taminladi.

Adabiyotlar

1. Goodfellow, I., Bengio, Y., & Courville, A. (2016). Deep Learning. MIT Press.
2. Russell, S., & Norvig, P. (2010). Artificial Intelligence: A Modern Approach. Prentice Hall
3. Bengio, Y., Lecun, Y., & Hinton, G. (2015). Deep Learning for AI. Nature.
4. Zhao, Z., & Liu, X. (2021). Liveness Detection for Face Authentication. IEEE Transactions on Information Forensics and Security.

An abstract graphic featuring a complex network of interconnected nodes and lines, resembling a molecular structure or a digital network, set against a dark blue background. The nodes are represented by circles of varying sizes, and the lines are thin, light blue, creating a web-like pattern that fills the upper two-thirds of the page.

**Tashkent International University of Education
Turin Polytechnic University in Tashkent
29 May 2025, Tashkent, Uzbekistan www.mmit.tiue.uz**