



人工智能时代的高等教育变革 ——IIOE全球伙伴高峰会

Transforming Higher Education in the Age of AI
INTERNATIONAL INSTITUTE OF ONLINE EDUCATION (IIOE)
Global Partners Summit

University of Engineering and Technology (UET), Lahore
Pakistan



National Center
Pakistan

Forum 5: Digital Environment and Management of HEIs in the AI Era

Innovation and Adaptation: Navigating Challenges in the AI Era

Dr. Waqar Mahmood

Director

Al-Khawarizmi Institute of Computer Science (KICS) / IIOENC
University of Engineering and Technology Lahore,
Pakistan



Outline

- Introduction – Speaker / Institution / Country
- Digitalization of Education – Dawn of Education 4.0
- Role of AI in Education
- GenAI and re-modeling of learning frameworks
- Generativsim in education
- Challenges posed by GenAI for education
- Status of developing country - Pakistan
- National initiatives in AI and GenAI

Speaker - Prof. Dr. Waqar Mahmood

- Director Al-Khawarizmi Institute of Computer Science (2006)
- Director Center for Energy Research and Development (2014)
- Appointed as Sultan Qaboos IT Chair (2015)
- Member of PM Task Force on Science and Technology (2019)
- Director IIOENC Pakistan, Deputy Gen Sec of IIOE Secretariat
- Chair ICOSST for last 16 years (2006)
- Chair ICECE for last 7 years (2017)
- Director Technology and Business Incubation Center (2018)
- Chair IEEE Computer Society Lahore Section (2019)
- Director Process Engineering CIENA Corp USA (1997)
- Won US Expert nomination for the IEC SC86B (2000)



Institution - UET Lahore

University of Engineering and Technology, Lahore

- Oldest Public Sector University in Engineering
- 100 Years in 2020
- Faculties : 7 , Departments : 28
- Programs: UG-39, PG-55
- Enrolled students ~ 14,000+
- QS-Asian Ranking :165
- QS-World Ranking : 790



UNIVERSITY OF
ENGINEERING & TECHNOLOGY
LAHORE 100 Years of Academic Excellence



Institution - KICS

Al-Khawarizmi Institute of Computer Science

A Leading Research Institute - Established as a specialized R&D Center in ICTs

- Declared as Resource Center for the Islamic Countries by **OIC and Islamic Development Bank**
- Declared as an Institute creating Paradigm Shift in University Research by **British Council and HEC**
- Total 22 Labs including R&D, Training Centers, National Centers



Country – Pakistan (Education and Training)

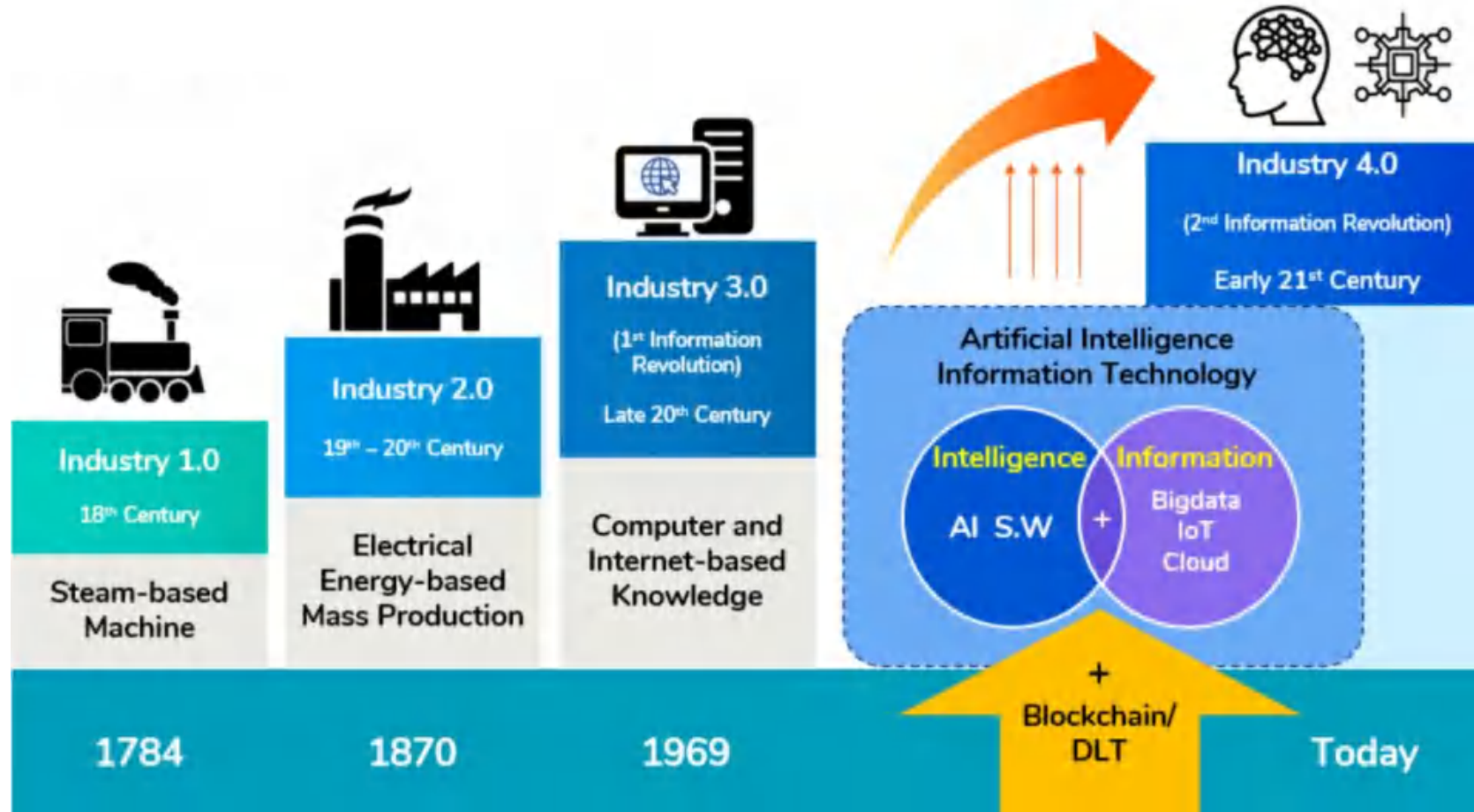
- Regulating Bodies:

- **MoFEPT** : Ministry of Federal Education and Professional Training
- **HEC** : Higher Education Commission
- **NAVTTTC**: National Vocational & Technical Training Commission

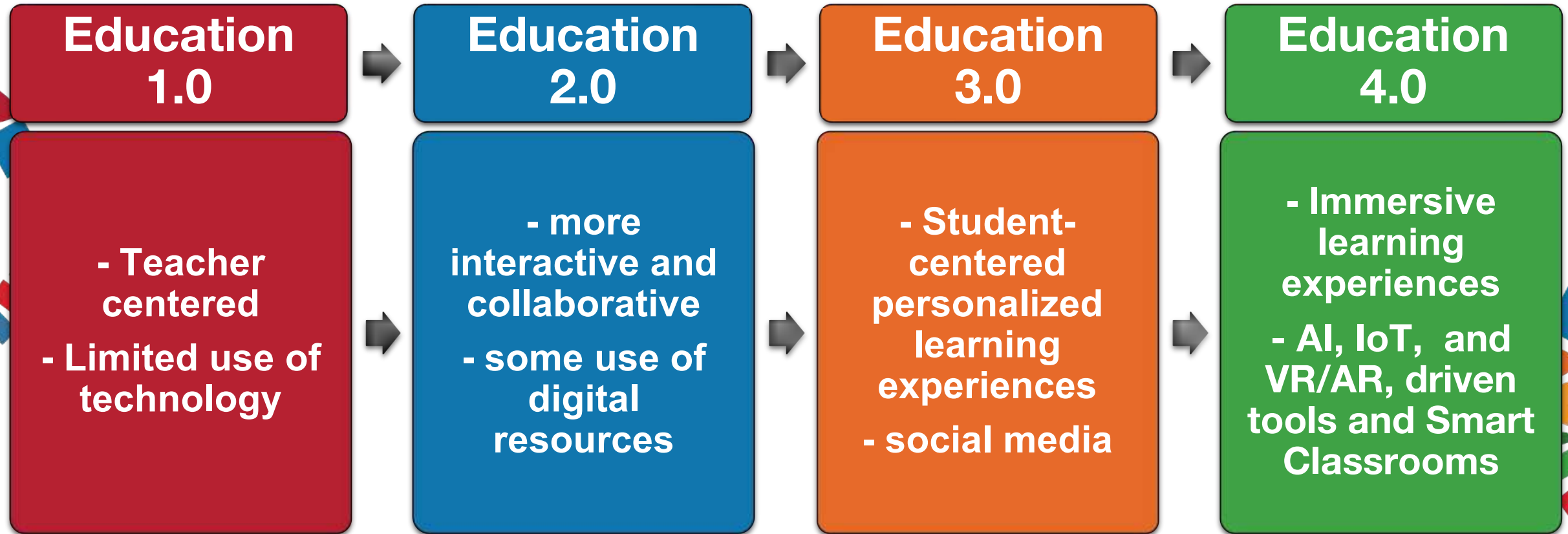
- Literacy Rate in Pakistan ~ 58.9 %
- Global ICT Index: 142
- Global Knowledge Index: 117/133
- Government of Pakistan AI Readiness Index: 92



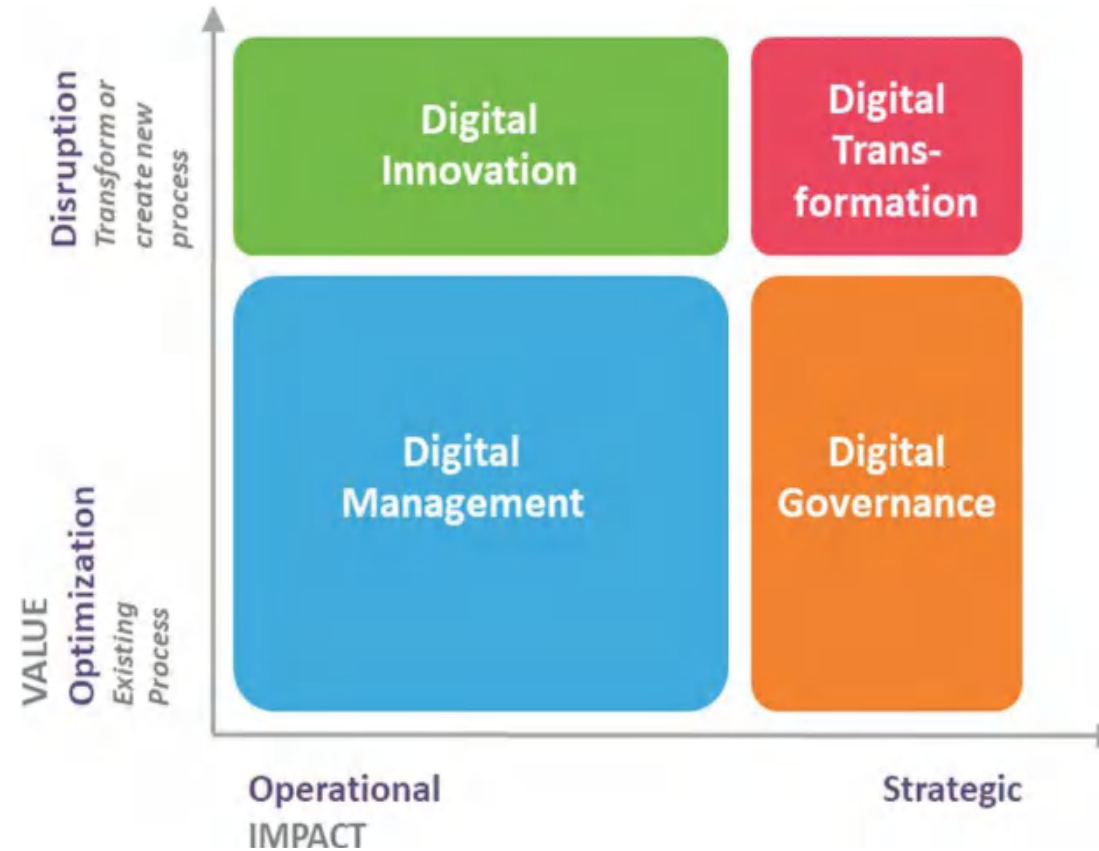
Industry 1.0 to 4.0



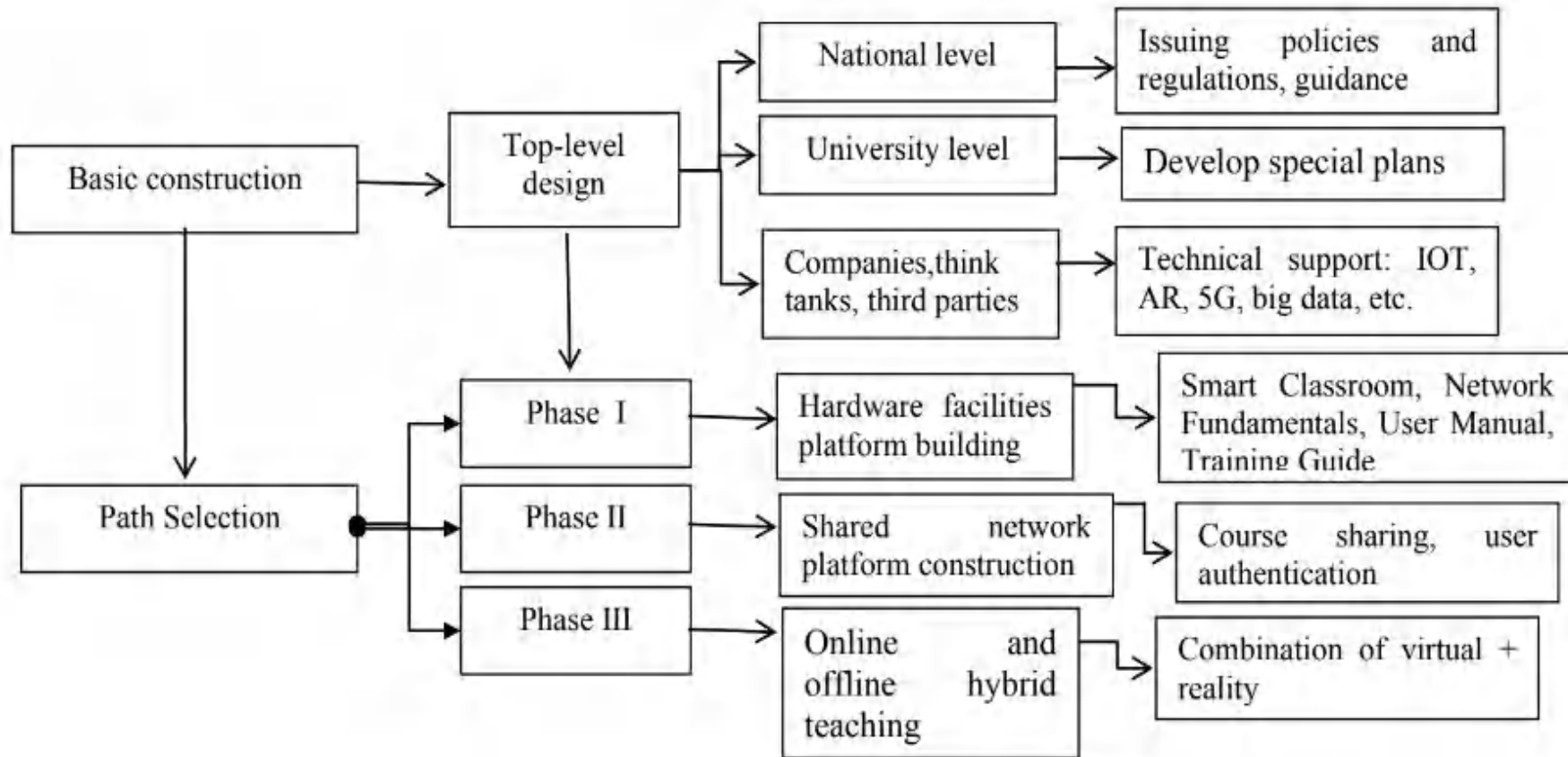
Digitalization of Education - 1.0 to 4.0



HEI Digital Capability and Maturity



Digital Transformation Echo System



Role of AI Enabled Services in HEIs

- Automation and improved efficiency
 - Both administrative and academic tasks
- Personalization in learning
 - Tutoring (Chatbots, Social Robots), Smart content, day-night accessibility and response
 - Intelligent tutoring for assignment checking, exam assessment including subjective questions, virtual environments, AR/VR
- Improved admissions
 - Targeted and personalised recruitment, efficient record keeping
- Prediction of student's
 - Performance, employability, early dropout risk assessment

→ **Improved student retention and satisfaction**

Redefining Learning in the GenAI Age

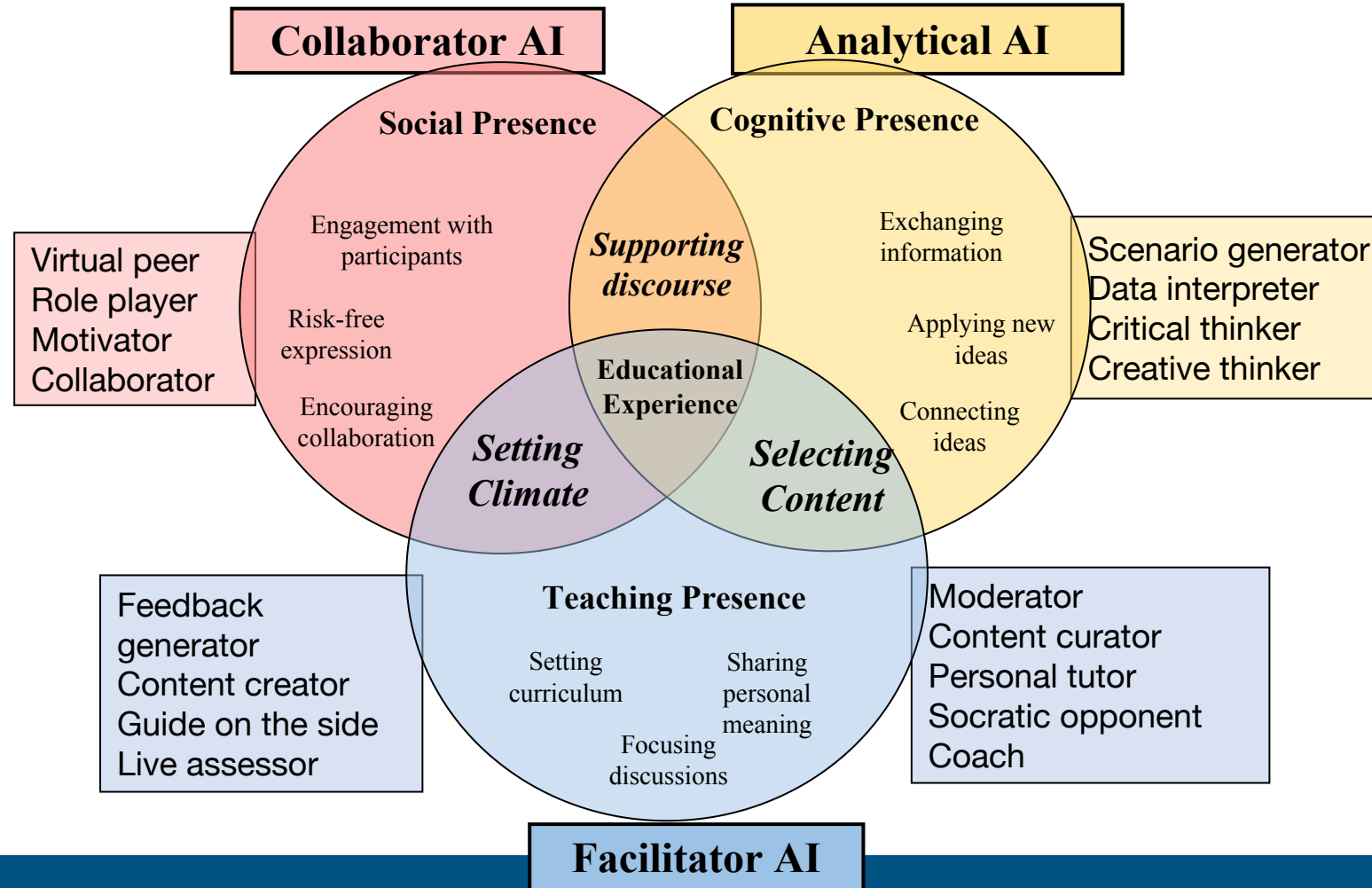
- **Education 4.0:** Model of education leveraging Digital and AI Tools for Personalized, Adaptive and Inclusive Learning with active pedagogies assessed with project-, challenge- and competency-based approaches
- **Students:** Role changed from passive learner to Active Agents in their own learning in a connected digital networks
- **Instructors:** Role changed from knowledge disseminator to curator, facilitator and data analyst
- **Learning Spaces:** No longer binary on-campus to online, instead changed to smart and connected learning spaces facilitated by digital and AI ecosystems of tools

Generativism – The New Hybrid Revolution

Knowledge is generated in collaboration with GenAI, through learning activities that are codesigned with, facilitated by, and assessed with GenAI

- Generativism can be summarized as:
 - Co Design of Learning Experience in collaboration with GenAI
 - Co-develop of learning activities and assessments in collaboration with GenAI
 - Assessment as learning process in collaboration with GenAI
- **Chatbots:** OpenAI's ChatGPT, Google's bard, Microsoft's bing chat, perplexity and anthropic's Claude
- **AI tutors:** Khan academy's Khanmigo, Snapchat's AI buddy, Pi, & Poe
- **Image-generating:** DALL-E and Midjourney

Mapping Gen AI to Digital Education Framework (CoI)



Mapping GenAI to Learning Design Framework

Learning type: Acquisition

Learning through acquisition is what learners are doing when they are listening to a lecture or podcast, reading from books or websites, and watching demos or videos

GPT, Bard, Claude, Perplexity, private LLMs, Plug-ins

Learning type: Collaboration

Learning through collaboration embraces mainly discussion, practice, and production. Building on investigations and acquisition it is about taking part in the process of knowledge building itself

AI characters + friends, agents

Learning type: Discussion

Learning through discussion requires the learner to articulate their ideas and questions, And to challenge and response to the ideas and questions from the teacher, and/or from their peers

AI moderators + experts

Learning type: Investigation

Learning through investigation guides the learner to explore, compare and critique the texts, documents and resources that reflect the concepts and ideas being taught

LLM output + critique

Learning type: Practice

Learning through practice enables the learning to adapt their action to the task goal and use the feedback to improve their next action. Feedback may come from self-reflection, from peers, from the teacher.

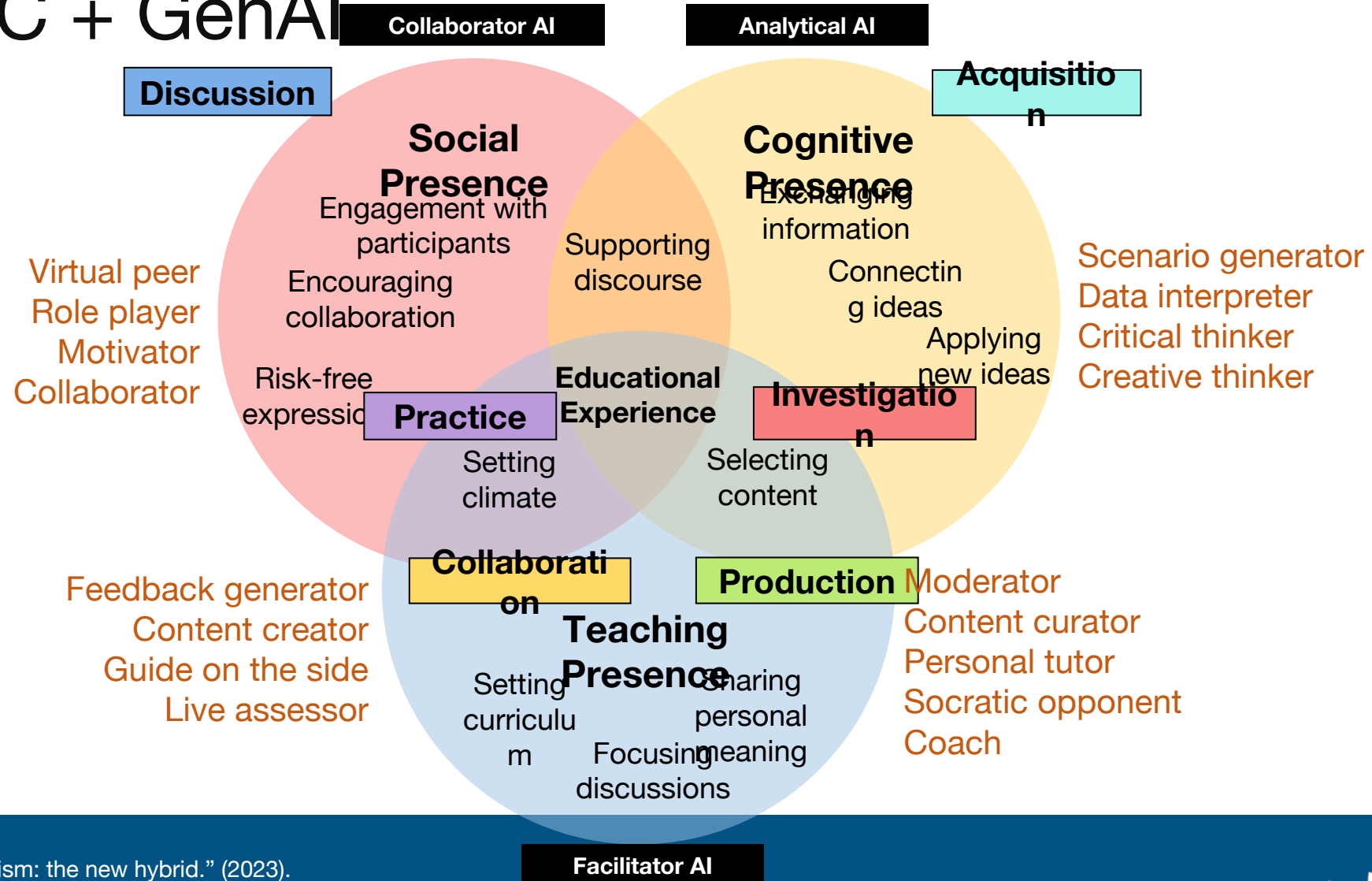
Testing with AI tools

Learning type: Production

Learning through production is the way the teacher motivates the learner to consolidate what they have learned by articulating their current conceptual understanding and how they used it in practice

Synthetic media + AI tools, advanced data analysis

Col + ABC + GenAI



Outcome of Generativism

- Generativism - a collaborative (human + GenAI) approach to learning and assessment design
- GenAI - should enable
 - more interaction, more active learning, more personalisation
 - rather than increasing automation in education
- The focus for educators needs to be on
 - active, collaborative and constructive learning
 - rather than the generation of content
- Generativism offers an approach to designing and delivering learning experiences that are
 - Social, collaborative, community-oriented and human-centred
 - In collaboration with GenAI

GenAI Challenges faced by HEIs

The GenAI tools are increasingly automating basic writing and artwork creation, forcing HEIs and their policy makers to re-think learning and assessment models

- **Regulations:** It requires planning of appropriate regulations, policies and human capacity development to ensure that GenAI genuinely benefits and empowers teachers, learners and researchers. HEIs are finding it difficult to catch up with the pace of development to form appropriate policy and regulatory framework
- **Dependency on Tools:** Increased usage of GenAI tools for writing and creative activity may develop reliance and dependency on the tools -
undermining and compromising development of intellectual skills -
Usurping human thinking

GenAI Challenges faced by HEIs

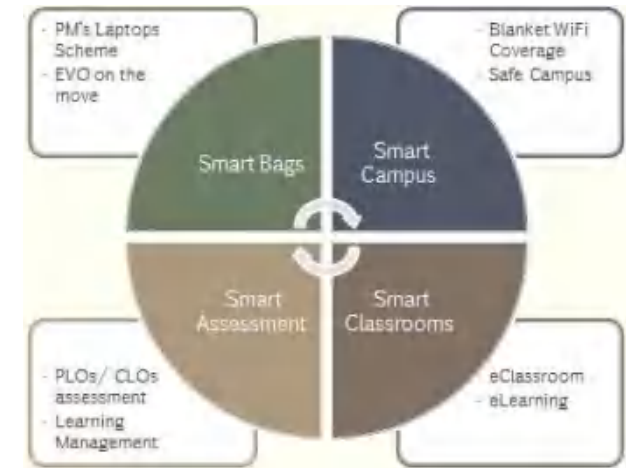
- Educators and Students may believe in the GenAI outputs that may be are
 - Superficial, inaccurate or even harmful
 - Have inherent biases that reflect norms, culture standards and social customs of some distant population
 - Violating someone's intellectual property right
 - Using data created by other GenAI models
- Therefore, the output should never be accepted at its face value
 - Rather require critical assessment
- This will require institutional implementation of
 - Ethical principles for responsible use and critical assessment of output
 - Guidance and training
 - Prompt engineering capacity building
 - Detecting GenAI related plagiarism

Developing Countries – Digitalization Barriers and

Category	Barriers
Environmental	Budgetary constrains, Regulatory framework and legal issues
Strategic	Lack of - strategic planning -holistic vision -action plan and institutional policy
Organisational	Lack of – agility -coordination between departments, Narrow View of investment,
Technological	Lack of adequate IT infrastructure, Integration of digital technologies in educational systems, Security and privacy risks, Data fragmentation, Legacy systems and third-party Systems
People (Skills and Human Resources)	Lack of -digital literacy -leaderships for changes -time due to workload of academic staff, Inadequate IT support service
Cultural	Resistance to change and risk aversion, Attitudes and beliefs, Conservative/Bureaucratic

National Initiatives in Pakistan

- Digital Pakistan Policy 2018 (ICT Education)
 - Ensure inclusive and equitable quality ICT education and promote lifelong learning process for all
 - Bridge the industry academia gap
 - Promote integration of computing courses in all curricula
- HEC Vision 2025
 - IT Embedded Higher Education
 - Virtual Education: 3500 Interactive lectures/seminars
 - Smart Universities, EduCloud and Services, HEMIS, EduTV
 - Development of local language GPT
 - AI course made compulsory in all undergrad programs



National AI Policy (Draft)

Vision: To Embrace AI by appreciating Human Intelligence and stimulating a Hybrid Intelligence ecosystem for equitable, responsible, and transparent use of AI

- Presidential Initiative for Artificial Intelligence & Computing (PIAIC)
- Center for Artificial Intelligence and Computing (CENTAIC)
- National Center of Artificial Intelligence (NCAI)
- Sino-Pak Center for Artificial Intelligence (SPCAI)

PakGPT to be developed having local language support and intended use for education industry

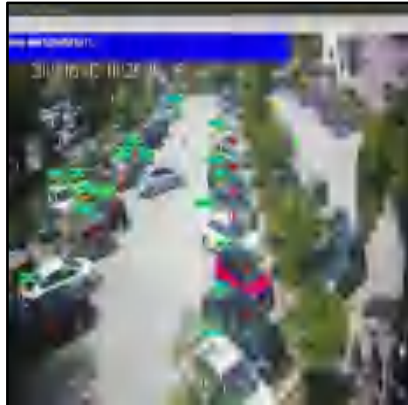
AI developments at KICS and UET Lahore

- Computer Vision & Machine Learning Lab (CVML)
- Bioinformatics Research Lab (BRL)
- Data Science Research Lab (DSL)
- Information Dissemination Lab (IDL)
- Center for Language Engineering (CLE)
- IoT Security Research Lab
- High Performance Computing Lab
- Next Generation Networks Lab

CVML (Surveillance/Quality/Security/Sports)



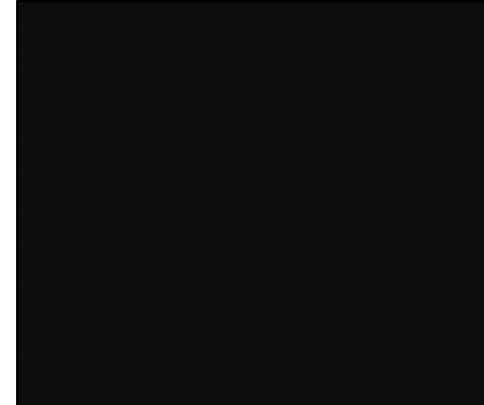
Vehicle analytics



Automatic Parking System



Crowd Segmentation/



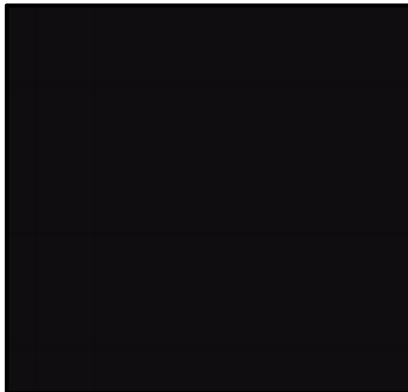
Walk Through/Mounted Attendance System



Object Detection



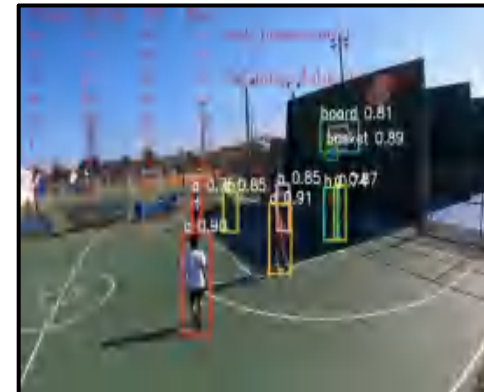
Production Monitoring



PPEs Monitoring



Fire and smoke Detection

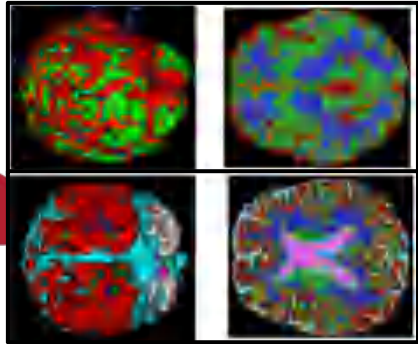


Basketball Analytics



Weapon detection

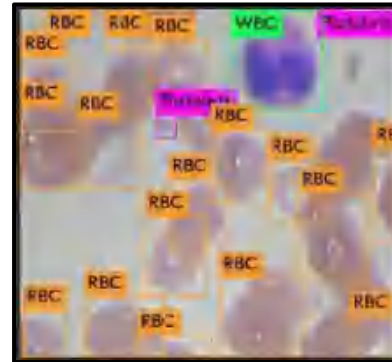
BRL (Health/Robotics/Agriculture)



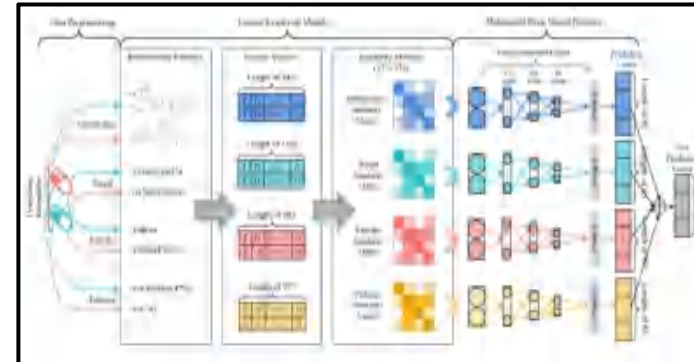
Disease (Liver, Brain etc) Classification



Spine Curvature Estimation
(ICCBS- UOK , Karachi)



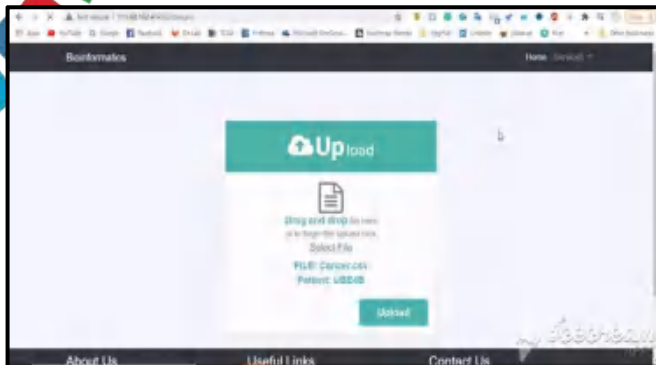
Blood Cells Segmentation
(Chughtai Lab, Lahore)



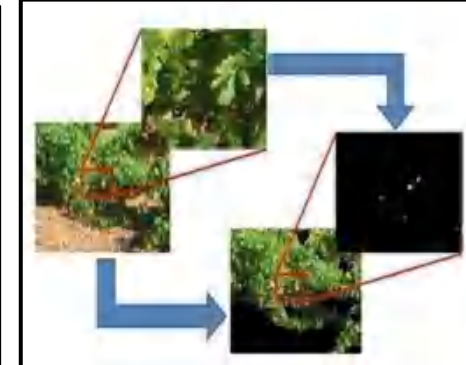
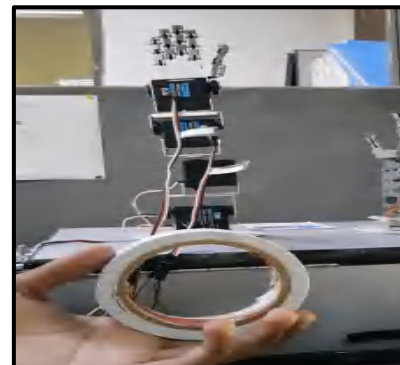
Drug-Drug Interaction Event Prediction
(Shaukat Khanum Hospital, Lahore)



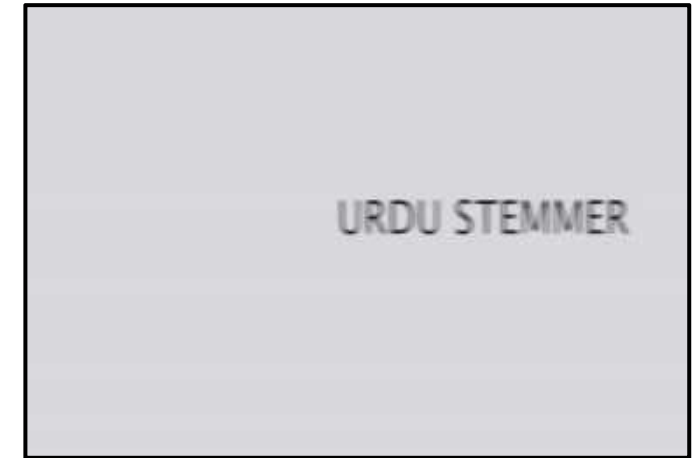
Plant Disease Detection &



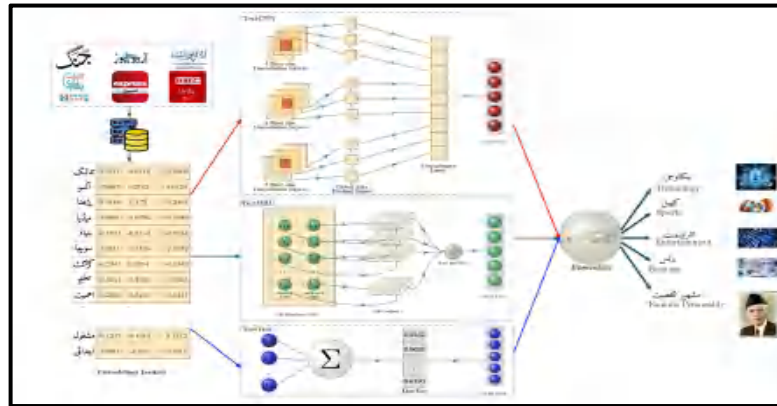
Cancer Classification
(Shaukat Khanum Hospital, Lahore)



Pest Detection and Identification

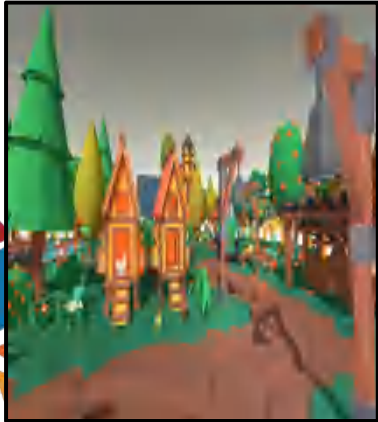


Urdu Stemmer



Urdu News Categorization

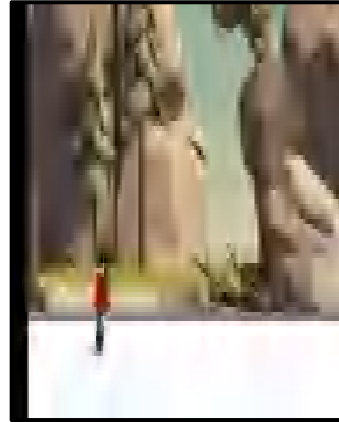
IDL (Entertainment/Education/Healthcare)



The Town



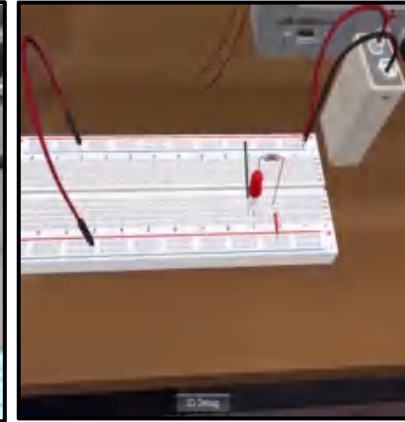
Card Game



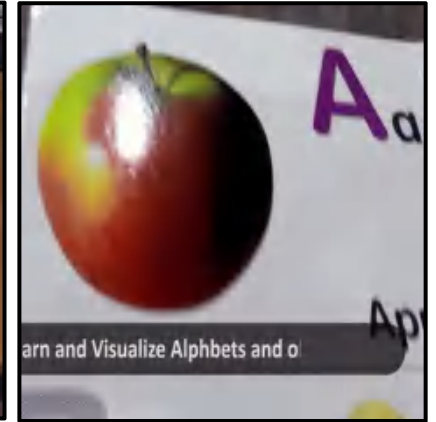
Jungle Jumper



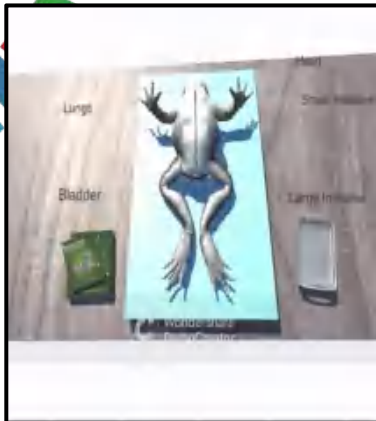
VR Chemistry Lab



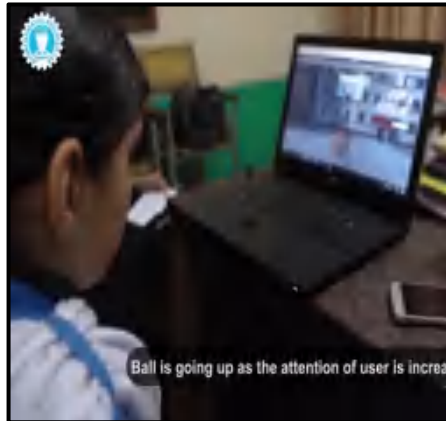
VR Electronics Lab



E Qaida



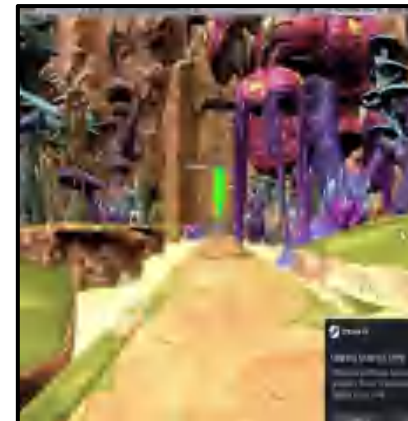
Frog Dissection



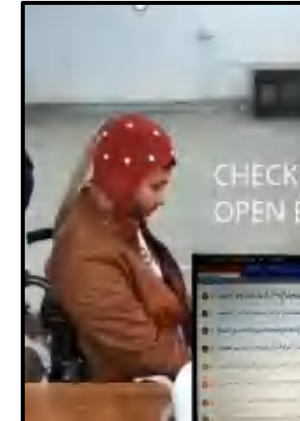
VR Based Neurogaming



Nyctophobia



VR Based Neurogaming



BCI-VR
Wheelchair
Simulator



VR Exposure Therapy
for Claustrophobia



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AI x Education

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谢谢

Thanks

Merci

Спасибо

Gracias