

PROCEEDINGS

37th Symposium

“AI in Pakistan”

September 6th, 2025

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1. Message from the President

My Dear Fellows and Readers,

السَّلَامُ عَلَيْكُمْ وَرَحْمَةُ اللَّهِ وَبَرَكَاتُهُ

With the great feeling of accomplishment and satisfaction, on behalf of The Pakistan Academy of Engineering (PAE), I present to you the proceedings of the **37th Symposium** of The PAE on the topic of **“AI in Pakistan”**, held on **September 6th, 2025**, at PAE, Gulshan-e-Iqbal, Karachi.

First I would like to thank

Prof. Dr. Yasar Ayaz, Chairman National Center of Artificial Intelligence (NCAI), National University of Sciences and Technology (NUST) Islamabad, Pakistan.

Dr. Jawwad A. Shamsi, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan.

Engr. Dr. Muhammad Burhan Khan, Associate Professor of Electrical Engineering, FAST NUCES, Karachi.

Dr. Muhammad Khurram, Professor, Department of Computer and Information Systems Engineering (CIS), NEDUET, Karachi, Pakistan.

Here I would also acknowledge the support of the Council members & Staff of The Pakistan Academy of Engineering (PAE) for their relentless support and assistance.

Finally, I hope that the readers will find the document useful and will gain knowledge and insight in the context of this complex and critical topic.

Very sincerely yours,



Engr. Prof. Dr. Brig. Nasim Akhtar Khan (R) SI(M)
President,
The Pakistan Academy of Engineering (PAE)

2. Programme of the 37th Symposium



The Pakistan Academy of Engineering

On behalf of the President, **Engr. Prof. Dr. Brig. Nasim Akhtar Khan (R) SI(M)**, and the Council Members of the Pakistan Academy of Engineering, we cordially invite you to grace the 37th Symposium on "**AI in Pakistan**" The event details are as follows:

Date: Saturday, September 6, 2025

Time: 10:00 AM – 1:30 PM (GMT +5)

Platform: In-person and Online via Zoom

Link: <https://us06web.zoom.us/j/89482364670>

The program will feature distinguished speakers who will shed light on A.I. in Pakistan.

Attached is detailed information about the program, including the schedule and the distinguished speakers who will address the event.

Thank you for considering our invitation, and we eagerly await your presence at this prestigious event.

Sincerely,

Prof. Dr. Muhammad Imran Aslam,

Executive Secretary,

Pakistan Academy of Engineering.

Tel.: +92 213 483 17 26, Tel.2: +92 213 341 821 05

E-mail: pae-executivesecretary@pacadengg.org

Website: <http://www.pacadengg.org>

2. Programme of the 37th Symposium



The Pakistan Academy of Engineering

37th Symposium: **A.I. in Pakistan**

scheduled on **Saturday, September 6, 2025**

Online via Zoom

Programme

Details	Time
1. Recitation from the Holy Quran <i>By Mr Hafiz Mustafa Ahmed Sharief, Manager Operations, The Pakistan Academy of Engineering, Karachi, Pakistan.</i>	1000 hrs
2. Presidential Address <i>By Dr – Ing. Jameel Ahmad Khan, The President, The Pakistan Academy of Engineering, Karachi, Pakistan.</i>	1005 hrs
3. Current Status of A.I. and policies in Pakistan <i>By Prof. Dr. Yasar Ayaz, Chairman National Center of Artificial Intelligence (NCAI), National University of Sciences and Technology (NUST) Islamabad, Pakistan.</i>	1010 hrs
4. Impact of A.I. on Employment in Pakistan <i>By Dr. Jawwad A. Shamsi, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan.</i>	1050 hrs
5. Impact of A.I. on Productivity in Pakistan <i>By Engr. Dr. Muhammad Burhan Khan, Associate Professor, Electrical Engineering, FAST-NUCES, Karachi.</i>	1130 hrs
6. Organisational Arrangement necessary for A.I. Absorption in Pakistan <i>By Dr. Muhammad Khurram, Professor, Department of Computer and Information Systems Engineering(CIS), NEDUET, Karachi, Pakistan.</i>	1210 hrs
7. Discussion and Closing Remarks	1250 hrs

3.1. Welcome Address of 37th Symposium by President PAE, Engr. Prof. Dr. Brig. Nasim Akhtar Khan (R) SI(M)

37th Symposium: “AI in Pakistan”

scheduled on Saturday, September 06th, 2025

Address of the President

Engr. Prof. Dr. Brig. Nasim Akhtar Khan (R) SI(M)

Respected Speakers,

My dear fellow Engineers,

Honourable Guests,

Ladies and Gentlemen!

SALAMUN ALA MANIT-TABA’AL-HUDA

I am extremely pleased to see you online.

Defending Pakistan in the AI Era is our prime objective. Participation in the technology competition is, therefore, imperative. Automatic Systems are being transformed to Autonomous Systems. The Software engineers of the future will, themselves, be software. AI is transforming the coding of computer programmes.

AI signifies the latest Technological Disruption. The world experienced in the past the disruption of industrial revolution, computing era and emergence of smartphone technology. When IBM began work to create Deep Blue in 1989, AI was in a funk. By the 2000s, the computer industry was evolving to make a neural net viable. By the early 2010s neural nets reached new heights. DeepMind’s AI can control super-heated Plasma inside a fusion reactor, application of AI to hard science problems. DeepMind’s AI predicts almost exactly when and where it is going to rain.

AI Global Market forecast for 2025 is US \$ 35.87B for Direct Revenue and US \$ 58.97B for

3.1. Welcome Address of 37th Symposium by President PAE, Engr. Prof. Dr. Brig. Nasim Akhtar Khan (R) SI(M)

Continue...

Enabled Revenue. AI is clearly supercharging the future. Many organisations are already using AI internally in their day-to-day operations, in areas like cybersecurity, customer service, finance and manufacturing. Data is the fuel that powers AI. There are many challenges of implementing AI. Common pitfalls should be avoided. The desire for near-instantaneous decision-making is moving the AI to the edge. AI is learning how to create itself. The rapid development of AI that can train itself also raises questions about how will we can control its growth.

Google plans to integrate LaMDA into its main search portal in order to create a conversational interface that allows people to retrieve any kind of information-text, visual, audio-across all Google's products just by asking.

In the year 2021 the Chinese tech giant Huawei built a 200-billion-parameters language model called PanGu. The Beijing Academy of AI announced Wu Dao 2.0, which has 1.75 trillion parameters.

There is a wake-up call for the AI in drug discovery committee. An international security conference explored how artificial intelligence (AI) technologies for drug discovery could be misused for denovo design of biochemical weapons.

Running a healthcare system is like juggling bees. AI is helping treat healthcare as if it is a views.

supply chain problem. The benefits of AI are concentrated in areas where data is available.

Ladies & Gentlemen!

3.1. Welcome Address of 37th Symposium by President PAE, Engr. Prof. Dr. Brig. Nasim Akhtar Khan (R) SI(M)

Continue...

The Pakistan Academy of Engineering took to itself to develop the Artificial Intelligence Strategy for Pakistan. Globally, about 42 AI experts of Pakistani origin were networked over the last six months as

PAE AI Vision Group. They have prepared a Plan for Making Pakistan a major player in AI Software and Services Export.

The Government of Pakistan issued “**National Security Policies of Pakistan 2022-2026**”. The Ministry of Information Technology & Telecommunication has moved “**Personal Data Protective Bill, 2020**” as consultation Draft. The National Assembly enacted the **National Information Technology Board Act, 2022**. The President of Pakistan made and promulgated the Ordinance “**Pakistan Ordinance on Artificial Intelligence (AI) 2021**”.

The intent of the Government to promote AI is visible. What we need is to develop expeditionary to centralise and manage the use of AI integrating the demands both for security of the country and economy of the nation.

Ladies & Gentlemen!

I sincerely hope you will enjoy to listen to our learned speakers on the very complex subject.

I thank Prof. Dr. Yasar Ayaz, Dr. Jawwad A. Shamsi, Mr. Farhan Raza, and Dr. Muhammad Khurram, who very kindly consulted to grace the event by bringing forth their considered views.

Thank you.

3.2. "Current Status of A.I. and policies in Pakistan"

by

Prof. Dr. Yasar Ayaz, Chairman National Center of Artificial Intelligence (NCAI), National University of Sciences and Technology (NUST) Islamabad, Pakistan.

6th Sept 2025

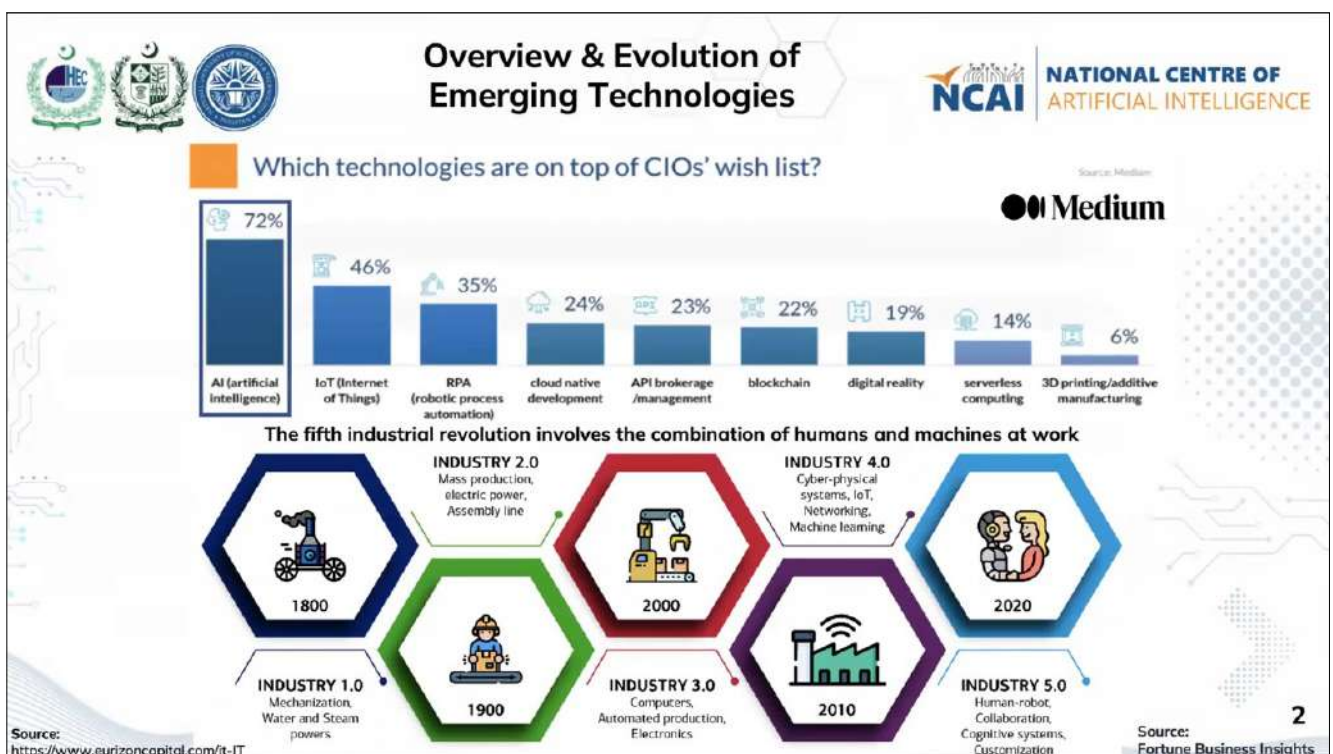
CURRENT STATUS OF AI AND POLICIES IN PAKISTAN



Prof. Dr. Yasar Ayaz
(Pride of Performance)
CPD/Chairman
National Center of Artificial Intelligence (NCAI)
NUST, Islamabad



1



3.2. "Current Status of A.I. and policies in Pakistan"

by **Prof. Dr. Yasar Ayaz**, Chairman National Center of Artificial Intelligence (NCAI), National University of Sciences and Technology (NUST) Islamabad, Pakistan.

Continued...



Artificial Intelligence

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“Data is the new oil.”
~ Clive Humby
Source: [Euronextcapitol](#)

“AI is the new electricity.”
IDC Andrew Ng, Baidu
Source: [Fortune Business Insights](#)

“Just as electricity transformed almost everything 100 years ago, today I actually have a hard time thinking of an industry that I don’t think AI will transform in the next several years.”

— Andrew Ng

3



AI in Numbers

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The Global AI market size is expected to grow **26.6%** every year from 2025 to 2031
Source: [statista](#)

AI Will Contribute Over **\$19.9 Trillion** to the Global Economy by 2030
Source: [IDC](#)

AI market volume is expected to reach **\$1.01 Trillion** by 2031
Source: [Forbes](#) [statista](#)

As AI evolves, **400 million workers could be displaced because of AI** between 2016 and 2030, AI-related advancements may affect around 15% of the global workforce.
Source: [McKinsey & Company](#)



Forbes
Around **4 in 5** companies deem AI to be a top priority in their business strategy
Source

Precedence RESEARCH
By 2034, the global AI in Aerospace and Defense Market is projected to exceed **\$65 Billion**

Revenue from AI software market worldwide is expected to reach **\$223.35 billion** by 2028
Source: [RESEARCH AND MARKETS](#)
THE WORLD'S LARGEST MARKET RESEARCH STORE

Artificial Intelligence is expected to create **133 Million** new Jobs by 2030
Source: [McKinsey & Company](#)

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3.2. "Current Status of A.I. and policies in Pakistan"

by **Prof. Dr. Yasar Ayaz**, Chairman National Center of Artificial Intelligence (NCAI), National University of Sciences and Technology (NUST) Islamabad, Pakistan.

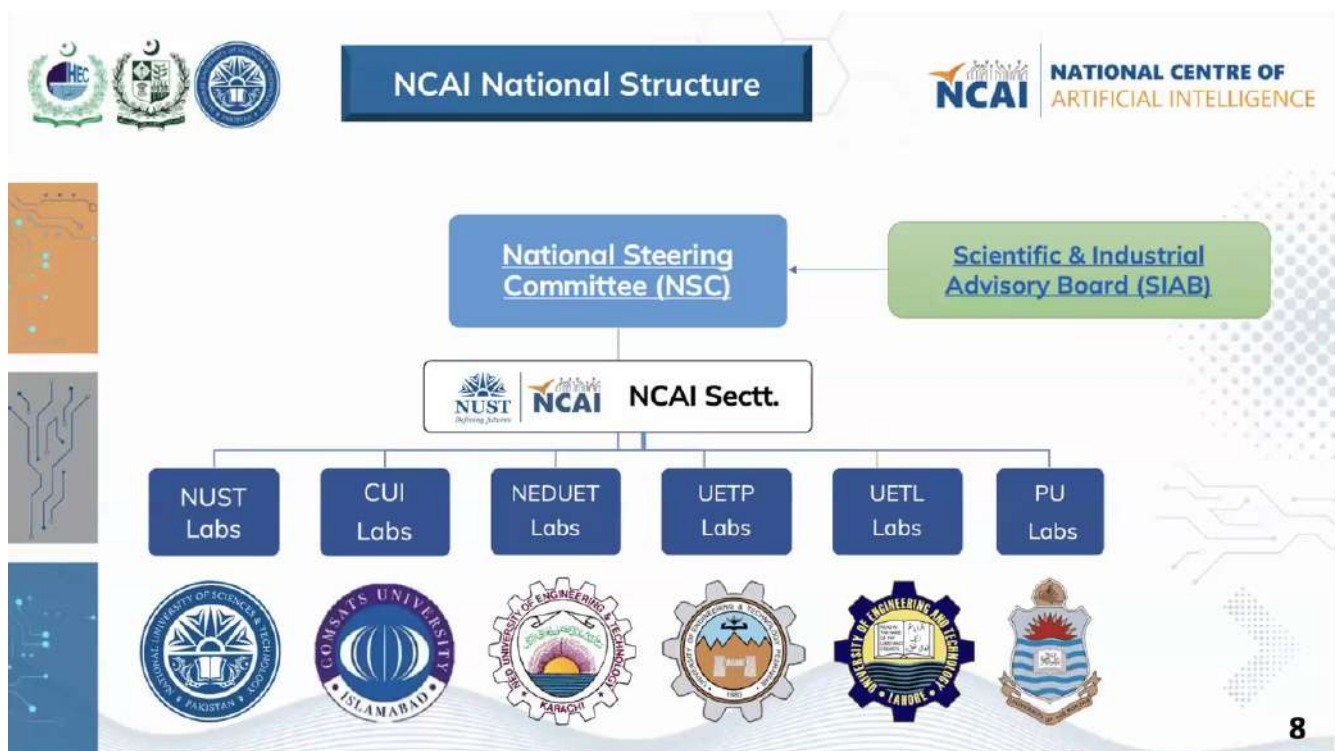
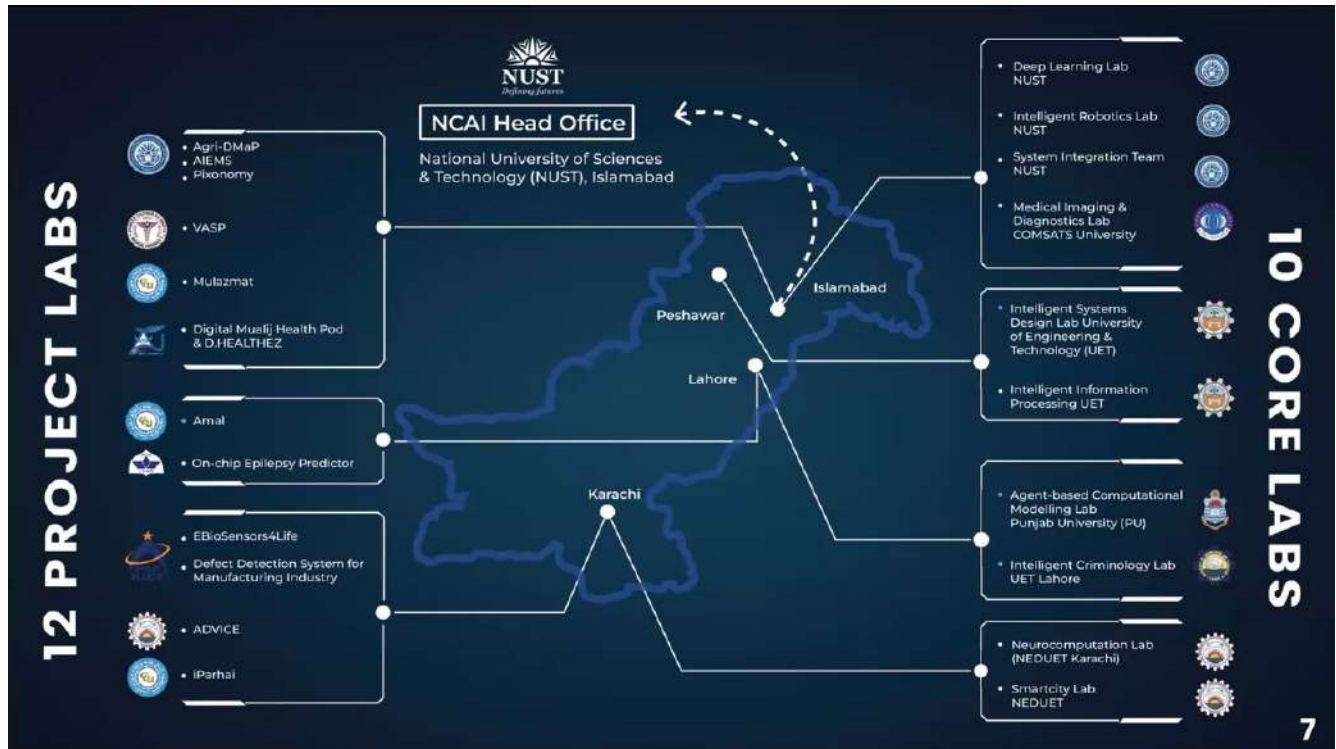
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3.2. "Current Status of A.I. and policies in Pakistan"

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Continued...



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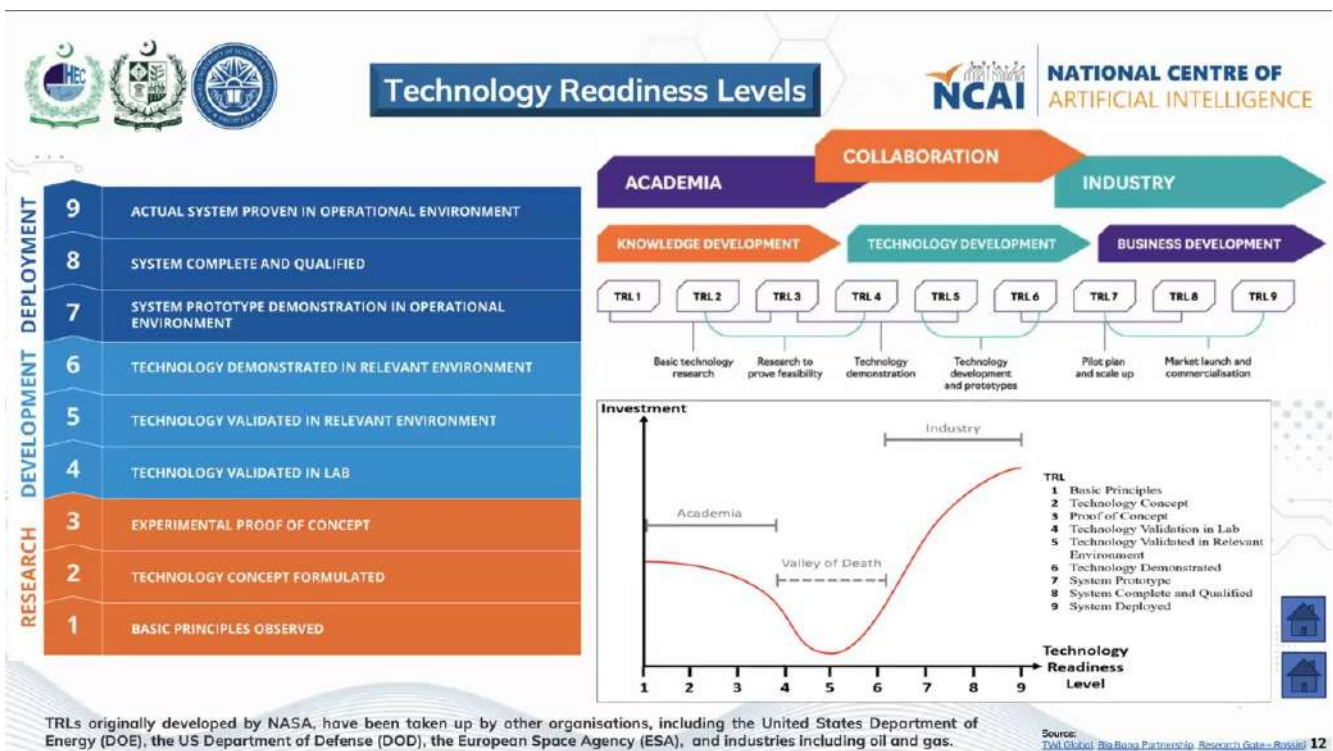
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Continued...



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Continued...



Safe Smart Cities

Vehicle Counting & Classification



Vehicle Counting & Number Plate Detection



Smart Parking System



Number Plate Detection & Recognition



Vehicle Recognition System



Lost And Found Identification System



Crowd Behavior Detection



Firearm detection System



Deployed at Lahore (PSCA) & Mardan (KPK) Safe City Projects

- Campus Security Solution devised with the bid for UET Narowal Campus Security submitted as part of Narowal Safe City Project
- Proposal shared for NUST Campus Security as well

Mardan Safe City Project






3rd August 2022

Subject: Letter of Appreciation

This letter is to acknowledge that Intelligent Criminology Research Lab, under National Center of Artificial Intelligence at Khurram Institute of Computer Science, UET Lahore has been developing "Lost and found" in collaboration with developers of Punjab Safe Cities Authority (PSCA) Lahore at PSCA HQ, Quaiton Lahore Lahore.

The major points of the developed product being tested, include:

- Registration of missing and found persons informed by Citizens/Officials
- Match missing/Found persons against the stored database
- Priority list of matched persons is shown with % of similarity
- A face matching engine is developed using in-house algorithms
- Web APIs for integration with existing systems

We appreciate NCAI team's successful contribution for development of the systems in collaboration with PSCA software development team and thank them for their continuous efforts and support. We are looking forward for further collaborations.


(Tariq Malik)
 Chief Technology Officer (CTO)

Action Detection System



Suspicious Activity Recognition







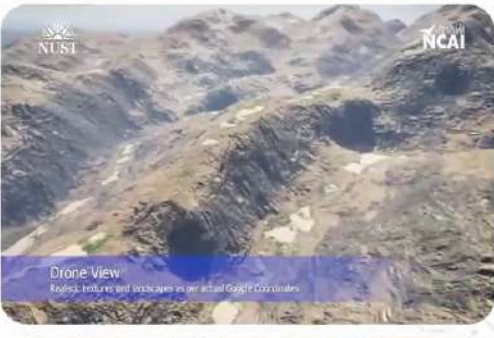
Infantry Tactical Simulator



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Drone View
Realistic features and landscapes as per actual ground conditions







Realistic Avatars
Adaptive AI with multiple difficulty levels

3.2. "Current Status of A.I. and policies in Pakistan"

by Prof. Dr. Yasar Ayaz, Chairman National Center of Artificial Intelligence (NCAI), National University of Sciences and Technology (NUST) Islamabad, Pakistan.

Continued...



AI in Media Analytics


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Development of In-house AI modules:

- Face Recognition
- Urdu & English Speech Recognition
- Urdu & English Speech transcription
- Text/ticker recognition Urdu and English
- Brand/advertisement Recognition
- Content and Sentiment Analysis

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AI-Driven Decision Support System for Pakistan Judiciary

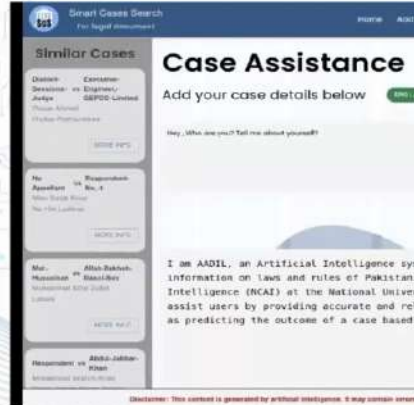

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Collaboration with Law & Justice Commission (LJC) on AI for Judiciary

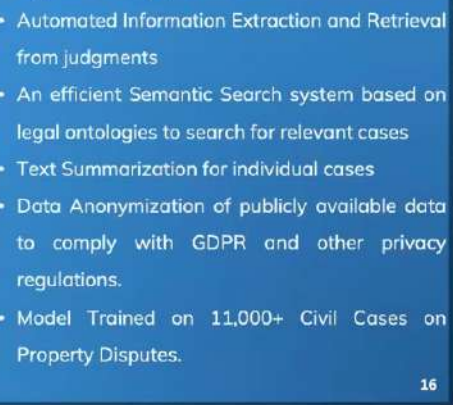




PROJECT DEMO DELIVERED TO SUPREME COURT
(GOM PKR PC-1 Submitted)
MoU with SCP is approved and will be signed soon for Project Implementation







Features:

- Digitization of paper records
- Automated Information Extraction and Retrieval from judgments
- An efficient Semantic Search system based on legal ontologies to search for relevant cases
- Text Summarization for individual cases
- Data Anonymization of publicly available data to comply with GDPR and other privacy regulations.
- Model Trained on 11,000+ Civil Cases on Property Disputes.

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3.2. "Current Status of A.I. and policies in Pakistan"

by **Prof. Dr. Yasar Ayaz**, Chairman National Center of Artificial Intelligence (NCAI), National University of Sciences and Technology (NUST) Islamabad, Pakistan.

Continued...



NCAI Strategic Engagements



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NAB AI PORTAL

Accountability Powered by AI



DG NAB Rawalpindi & Islamabad Office is working jointly with NCAI to develop a NAB AI Portal aiming to solve the following issues:

- 1 Increasing volume and complexity of financial crimes
- 2 Limitations of manual tracking & paper-based review
- 3 Urgent requirement for automation, anomaly detection, & visualization tools





NAB Islamabad, Rawalpindi embrace advanced AI technology

AI systems being utilized to analyse complex financial data and activities in major corruption cases, say sources

By Web Desk | June 22, 2025



AI in Tourism, Culture & Heritage



NATIONAL CENTRE OF ARTIFICIAL INTELLIGENCE

NRPU Grant - National Research Program for Universities (NRPU) HEC grant for heritage preservation through AR/VR





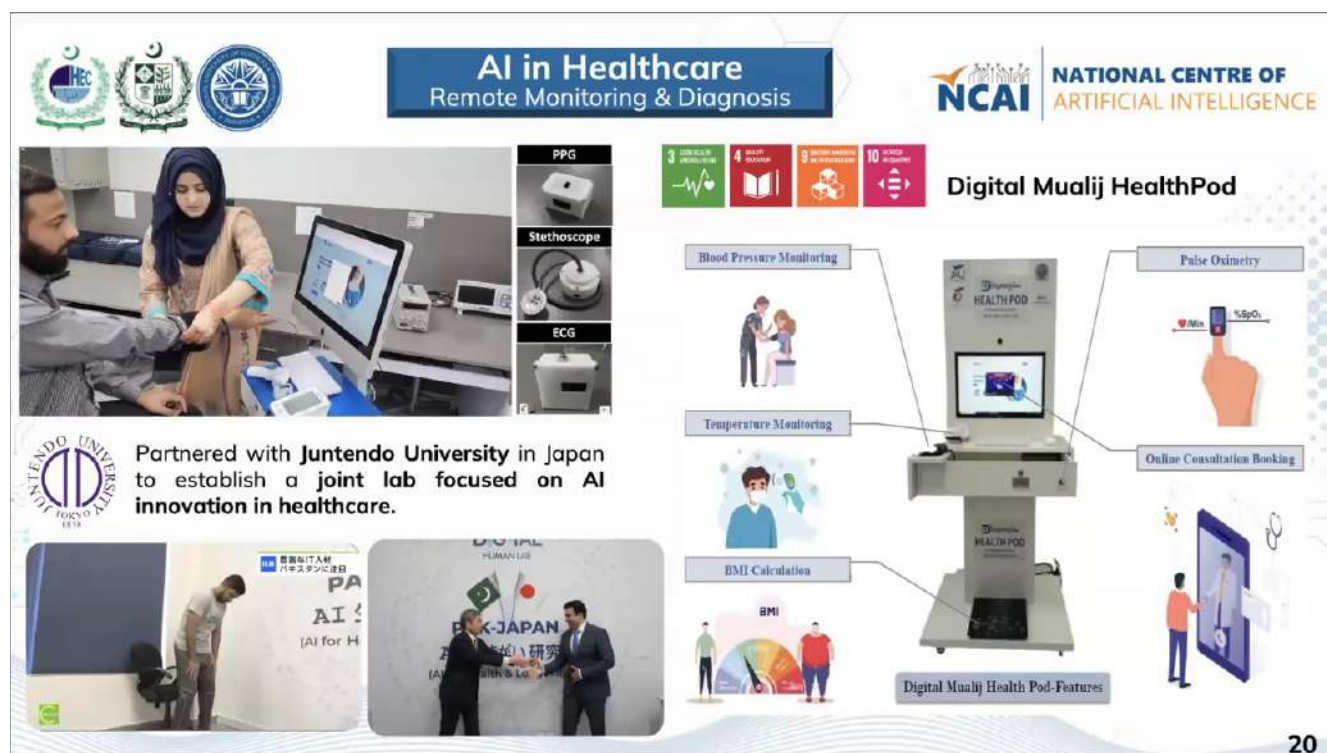


PRESERVING CULTURE HERITAGE WITH AR & VR

3.2. "Current Status of A.I. and policies in Pakistan"

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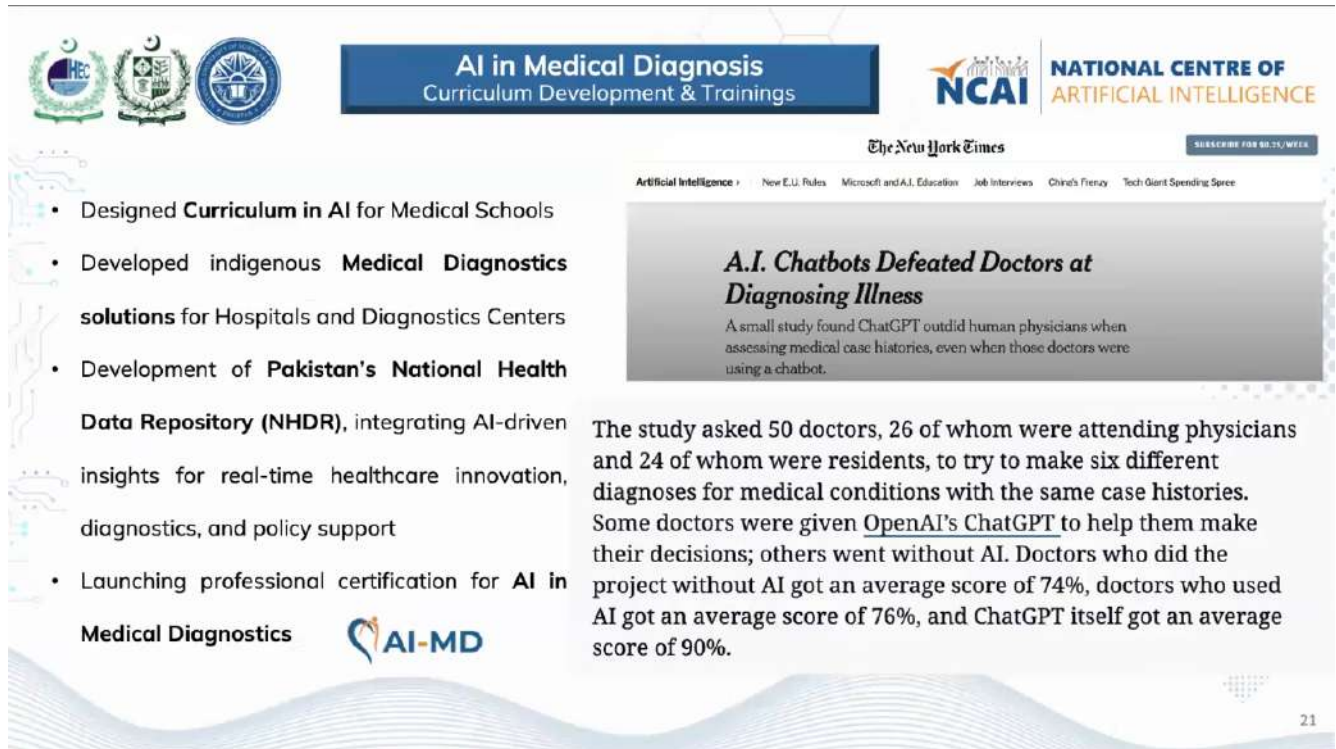


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3.2. "Current Status of A.I. and policies in Pakistan"

by **Prof. Dr. Yasar Ayaz**, Chairman National Center of Artificial Intelligence (NCAI), National University of Sciences and Technology (NUST) Islamabad, Pakistan.

Continued...



This slide features logos of HEC, NUST, and NCAI at the top. The main title is "AI in Medical Diagnosis Curriculum Development & Trainings". On the left, a list of achievements is presented: "Designed Curriculum in AI for Medical Schools", "Developed indigenous Medical Diagnostics solutions for Hospitals and Diagnostics Centers", and "Development of Pakistan's National Health Data Repository (NHDR), integrating AI-driven insights for real-time healthcare innovation, diagnostics, and policy support". Below this list is the text "Launching professional certification for AI in Medical Diagnostics" and the "AI-MD" logo. On the right, a screenshot of a New York Times article titled "A.I. Chatbots Defeated Doctors at Diagnosing Illness" is shown, with a summary of the study's findings. The slide is numbered 21 in the bottom right corner.

- Designed **Curriculum in AI** for Medical Schools
- Developed indigenous **Medical Diagnostics solutions** for Hospitals and Diagnostics Centers
- Development of **Pakistan's National Health Data Repository (NHDR)**, integrating AI-driven insights for real-time healthcare innovation, diagnostics, and policy support
- Launching professional certification for **AI in Medical Diagnostics**

AI-MD

A.I. Chatbots Defeated Doctors at Diagnosing Illness
A small study found ChatGPT outdid human physicians when assessing medical case histories, even when those doctors were using a chatbot.

The study asked 50 doctors, 26 of whom were attending physicians and 24 of whom were residents, to try to make six different diagnoses for medical conditions with the same case histories. Some doctors were given OpenAI's ChatGPT to help them make their decisions; others went without AI. Doctors who did the project without AI got an average score of 74%, doctors who used AI got an average score of 76%, and ChatGPT itself got an average score of 90%.



This slide features logos of HEC, NUST, and NCAI at the top. The main title is "Socio-Technical Systems Education". Below the title, it says "ENHANCING HUMAN PERFORMANCE IN COMPLEX SOCIO-TECHNICAL SYSTEMS". The central image shows a ship's bridge with the text "Digital Twin of Ships" is a virtual replica of a physical ship, powered by real-time data and simulations. To the right, there are logos for the European Union, Horizon Europe, and a group of flags. The slide is numbered 22 in the bottom right corner.

Socio-Technical Systems Education

ENHANCING HUMAN PERFORMANCE IN COMPLEX SOCIO-TECHNICAL SYSTEMS

Digital Twin of Ships is a virtual replica of a physical ship, powered by real-time data and simulations.

Horizon Europe
THE NEXT EU RESEARCH & INNOVATION PROGRAMME 2021-2025

3.2. "Current Status of A.I. and policies in Pakistan"

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Continued...

REALTIME ATTENTIVENESS MEASUREMENT SYSTEM FOR CLASSROOMS

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- Goal:** Use AI and computer vision to enhance classroom engagement.
- Components:** AI cameras, metrics analysis, and alerts for teachers.
- Benefits:** Improve learning outcomes and teaching strategies.

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AI in Education - EduTech

**NATIONAL CENTRE OF
ARTIFICIAL INTELLIGENCE**

- AI-Enhanced Training Modules:**
 - AI for personalized learning
 - Adapt the difficulty of exercises based on individual progress and provide real-time feedback.

Welcome to iParhai

- iParhai is a unique e-learning solution to all the modern educational problems.
- It provides AI based adaptable and adaptive learning both through mobile & web.

Awards/Achievements/Recognition

- USAID Award
- Young Entrepreneurship Summit Award
- P@SHA ICT Award

Learning

- School/College Education
- Professional Courses
- University Education
- Entrance Exams

Benefits

- Artificial Intelligence Based Learning
- Affordable Learning
- Interactive Learning
- Tuition Replacement

Accessibility

- Web and Mobile
- 24X7

Worksheets
Videos
Games
Read Alouds

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3.2. "Current Status of A.I. and policies in Pakistan"

by **Prof. Dr. Yasar Ayaz**, Chairman National Center of Artificial Intelligence (NCAI), National University of Sciences and Technology (NUST) Islamabad, Pakistan.

Continued...



AI in Education

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- Developed a PC-1 for AI-based education integration, a **6.3 billion PKR** initiative
 - Focus on AI curriculum integration and teacher training
 - Enhance AI literacy across Pakistani schools
 - Inspired by successful models in China and the UAE

Expected Outputs

- 100 AI Labs established
- 1,000+ teachers trained
- 50,000+ students introduced to AI
- Curriculum localized in Urdu/regional languages
- LMS platform deployed with offline capabilities

Curriculum Development and AI Integration in Schools

- Key discussions with the **National Curriculum Committee**
 - Significant refinements in the curriculum design
 - Holistic plan that spans from **Grade 1 onwards to Grade 12**
 - Working group formed as part of the **National Curriculum Review Committee**
 - Identified **key content and tools** for the curriculum
 - AI Design Thinking Labs** have been proposed



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Training and Capacity Building

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**AI for Leaders**

First batch successfully conducted, request for AI for Leaders 2.0 is also received from the participants

Certified Gen AI for Leaders

**Certified Artificial Intelligence Professional (CAIP)** –
4x batches successfully conducted
5th, 6th, 7th batches launched in August 2025

**NAVTEC Training – Conducted Trainings in Prime Minister Youth Skill Development Program**
1st Batch of 175 Students trained, 2nd Batch of 50 Students trained, 3rd Batch of 80 Students trained, 4th Batch of 25 Students trained from AJ&K 5th Batch of Agriculture Sector of 75 students is going to start soon

**AI NEXUS Accelerator and AI & Robotics Summer Bootcamp**
AI, Leadership & Entrepreneurial Summer Bootcamp for O/A Level Students
38 Students trained in Batch 1 and 72+ students trained in Batch 2

**Summer Internship Program (SIP 2025) for Cadet College Hassanabdal**
Certified AI in Medical Diagnostics Soon to be launched
Certified AI Marketing Strategist Conducted for 10x Riphah Int'l Uni

NEW

**AI Development Professional (AIDP)**
First Batch of 11 Students trained under online training from Okara Garrison & University of Bologna (Italy)

NEW



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3.2. "Current Status of A.I. and policies in Pakistan"

by **Prof. Dr. Yasar Ayaz**, Chairman National Center of Artificial Intelligence (NCAI), National University of Sciences and Technology (NUST) Islamabad, Pakistan.

Continued...



3.2. "Current Status of A.I. and policies in Pakistan"

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Continued...

NCAI Partners

International

- SDAIA (Saudi Data & AI Authority)
- UNESCO
- WORLD BANK GROUP
- Meta AI
- Horizon Europe
- CAICT (China Academy of Information and Communications Technology)
- DAAD (German Academic Exchange Service)
- HACETTEPE UNIVERSITESI
- Carleton University
- Coventry University
- Durham University
- EXETER

National

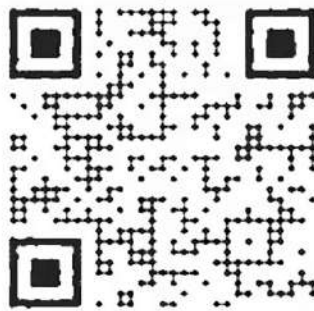
- 17 PARTNERSHIPS FOR THE GOALS
- SUPARCO
- NAVTC
- PCRWR
- SPCAI
- FWO
- Shifa International Hospitals Ltd.
- IDC

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Prof. Dr. Yasar Ayaz
(Pride of Performance)
Chairman / CPD
National Center of Artificial
Intelligence (NCAI), Pakistan

Scan me!



cpd@ncai.nust.edu.pk

<https://ncai.pk/>

yasar@smme.nust.edu.pk



@dr.yasar.ayaz

@ncai.pk



@DrYasarAyaz

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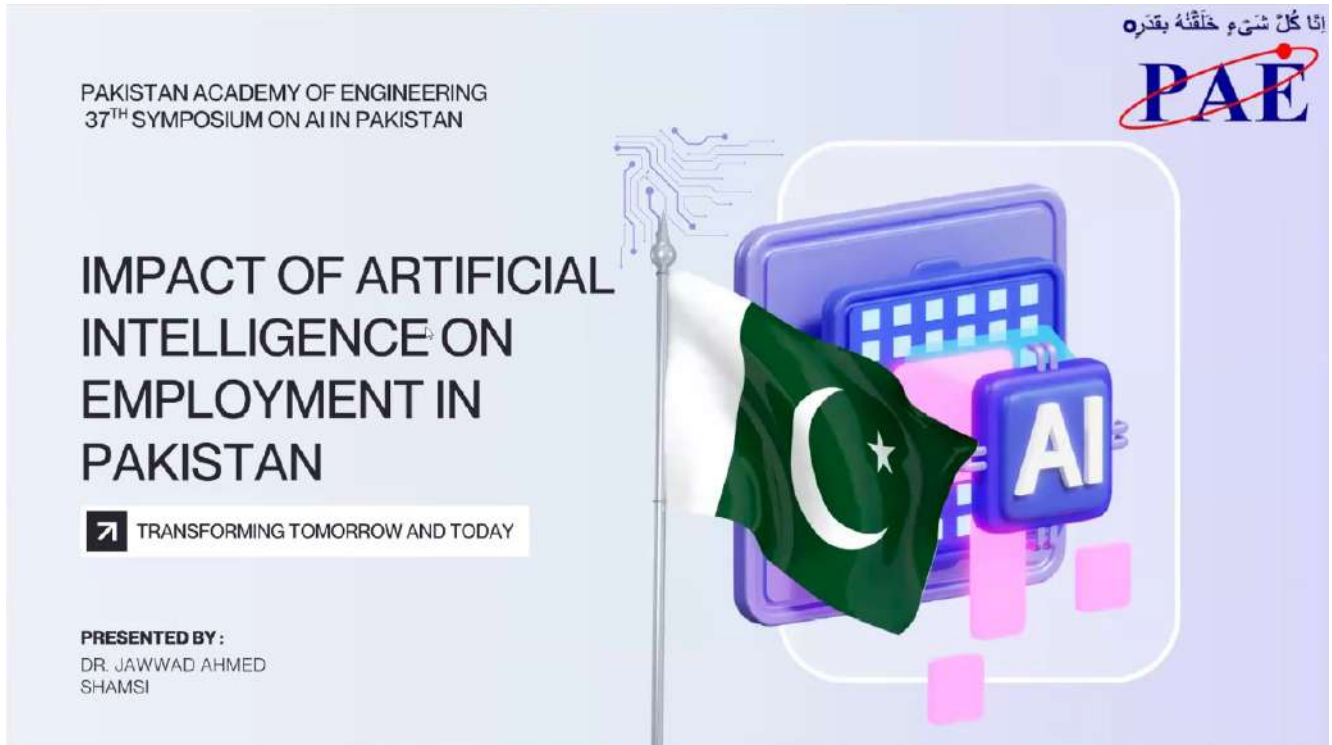
THANK YOU
DISCUSSION SESSION

30

3.3. "Impact of A.I. on Employment in Pakistan"

by

Dr. Jawwad A. Shamsi, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan.



3.3. "Impact of A.I. on Employment in Pakistan"

by Dr. Jawwad A. Shamsi, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan.

Continued...

WILL AI TAKE AWAY JOBS, OR CREATE NEW ONES?



WHAT IS ARTIFICIAL INTELLIGENCE?

- Machines that learn, adapt, and make decisions
- Examples: ChatGPT, self-driving cars, fraud detection



3.3. "Impact of A.I. on Employment in Pakistan"

by **Dr. Jawwad A. Shamsi**, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan. **Continued...**

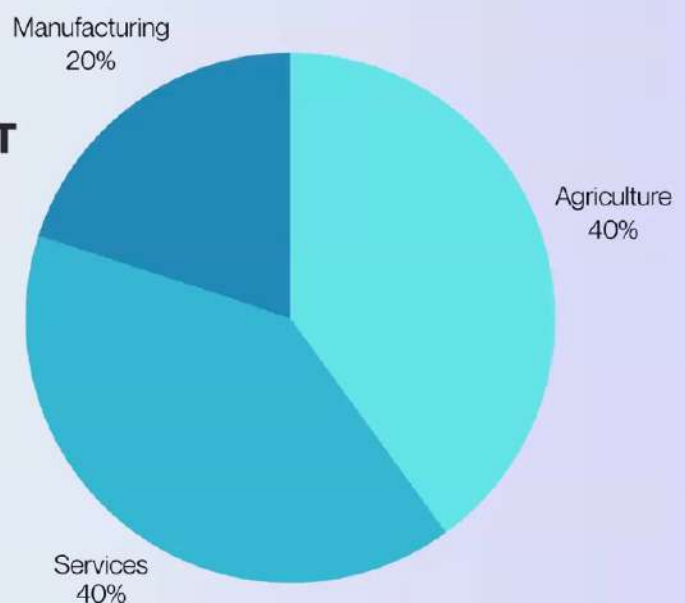
GLOBAL AI MOMENTUM

- AI adoption accelerating worldwide
- World Economic Forum: By 2030, 375M workers may need re-skilling
- New careers emerging every year



PAKISTAN'S EMPLOYMENT LANDSCAPE

- Youth = large population
- Employment Breakdown
- Informal Economy



3.3. "Impact of A.I. on Employment in Pakistan"

by **Dr. Jawwad A. Shamsi**, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan.

Continued...

CURRENT APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN PAKISTAN

01 AI AND FINTECH

02 AI IN ECOMMERCE

03 AI IN EGRICULTURE

04 AI IN EDUCATION

05 AI IN HEALTHCARE

06 AI I MANUFACTURING

AI IN FINTENCH



01 CHATBOTS AND CUSTOMER
SUPPORT

02 FRAUD DETECTION

03 CREDIT RISK SCORING

3.3. "Impact of A.I. on Employment in Pakistan"

by Dr. Jawwad A. Shamsi, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan. ***Continued...***

AI IN ECOMMERCE



- 01 **PRODUCT RECOMMENDATIONS**
- 02 **INVENTORY MANAGEMENT**
- 03 **LOGISTICS OPTIMIZATION**

AI IN AGRICULTURE



CROP MONITORING VIA DRONES

SMART IRRIGATION

YIELD PREDICTION

3.3. "Impact of A.I. on Employment in Pakistan"

by Dr. Jawwad A. Shamsi, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan.

Continued...

PERSONALIZED LEARNING PATHS

AUTOMATED GRADING

EXAM MONITORING: PROCTORPARHAI



AI IN EDUCATION

DIAGNOSTIC IMAGING

TELEMEDICINE PLATFORMS

DRUG DISCOVERY



AI IN HEALTH CARE

3.3. "Impact of A.I. on Employment in Pakistan"

by **Dr. Jawwad A. Shamsi**, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan. **Continued...**

QUALITY ASSURANCE

SAFETY CONTROL

PRECISION



AI IN MANUFACTURING

JOBS AT RISK (GLOBAL VIEW)

ROUTINE & REPETITIVE ROLES MOST VULNERABLE



- DATA ENTRY
- CLERICAL
- TELEMARKETING

3.3. "Impact of A.I. on Employment in Pakistan"

by **Dr. Jawwad A. Shamsi**, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan. **Continued...**

JOBS AT RISK (PAKISTAN)



**BPO/CALL
CENTERS**

**CLERICAL
WORK**



**ASSEMBLY LINE
MANUFACTURING**

BASIC ACCOUNTING



CASE STUDY: OUTSOURCING/ BPO



CALL CENTER WORK AUTOMATED
BY AI CHATBOTS



PAKISTAN BPO SECTOR
VULNERABLE



BUT HIGHER-VALUE ANALYTICS
ROLES EMERGING

3.3. "Impact of A.I. on Employment in Pakistan"

by **Dr. Jawwad A. Shamsi**, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan. **Continued...**

CASE STUDY: BANKING



- AI FRAUD DETECTION → FEWER MANUAL CHECKS
- SHIFT FROM CLERKS → DATA ANALYSTS & COMPLIANCE OFFICERS
- LOAN APPROVALS

INFORMAL ECONOMY CHALLENGE



- MANY JOBS NOT DOCUMENTED
- AI ADOPTION MAY WIDEN URBAN-RURAL GAP
- DIGITAL LITERACY REMAINS LOW

3.3. "Impact of A.I. on Employment in Pakistan"

by Dr. Jawwad A. Shamsi, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan. ***Continued...***

EMPLOYMENT TRANSFORMATION & OPPORTUNITIES

JOBS BEING TRANSFORMED

- Teachers (AI tutors assist)
- Doctors (AI diagnostics support)
- Farmers (AI weather/crop insights)



3.3. "Impact of A.I. on Employment in Pakistan"

by **Dr. Jawwad A. Shamsi**, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan. *Continued...*

NEW JOB CATEGORIES

- AI engineers, data scientists
- Prompt engineers
- AI ethicists, auditors



AI engineers
data scientists
prompt engineers
AI ethicists
auditors

AI & URDU LANGUAGE MODELS

- Huge demand for local language AI
- Opportunities in NLP & dataset creation



ChatterGPT

موسق بیساکمل

Resplow!

3.3. "Impact of A.I. on Employment in Pakistan"

by Dr. Jawwad A. Shamsi, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan. ***Continued...***

GIG ECONOMY SHIFT

- Pakistani freelancers using AI tools
- Demand on Upwork/Fiverr for AI-powered services



AI + AGRICULTURE EXAMPLE

- AI soil sensors & weather forecasting
- Farmers increase yields



3.3. "Impact of A.I. on Employment in Pakistan"

by **Dr. Jawwad A. Shamsi**, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan. **Continued...**

AI + HEALTHCARE

- Radiology scans analyzed by AI
- Doctors get second opinion instantly



AI + PROGRAMMING

- Programmer using AI for development
- AI based software development and testing

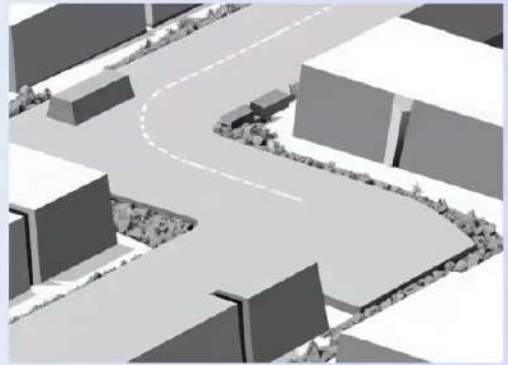


3.3. "Impact of A.I. on Employment in Pakistan"

by **Dr. Jawwad A. Shamsi**, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan. **Continued...**

KEY CHALLENGES

- Skills gap
- Brain drain
- Low R&D investment
- Limited policy framework



OPPORTUNITIES

EYECON AI

AI-based anomaly detection

- Youth as digital workforce
- Startup ecosystem growing
- Global outsourcing shift



3.3. "Impact of A.I. on Employment in Pakistan"

by **Dr. Jawwad A. Shamsi**, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan.

Continued...



POLICY & INSTITUTIONAL ROLE



- Reskilling & vocational training
- AI-friendly regulations
- Public-private partnerships



ROLE OF INDIVIDUALS



- Continuous learning mindset
- Hybrid skills (domain + digital + soft skills)
- Leverage online learning platforms

iparhai: **AI-based adaptive learning**

ProctorParhai: **Online Assessments**

- AI based vigilance
- AI-based Grading
- AI-based feedback



3.3. "Impact of A.I. on Employment in Pakistan"

by **Dr. Jawwad A. Shamsi**, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan. **Continued...**



Syslab.ai

- iParhai
- ProctorParhai
- EyeconAI



iParhai

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Discover the power of engaging and accessible online courses for all. Dive into a world of interactive learning experiences, where education comes alive through games, quizzes, and more.

Chatbot  **Recomendations**  **Virtual Learning Environment**



3.3. "Impact of A.I. on Employment in Pakistan"

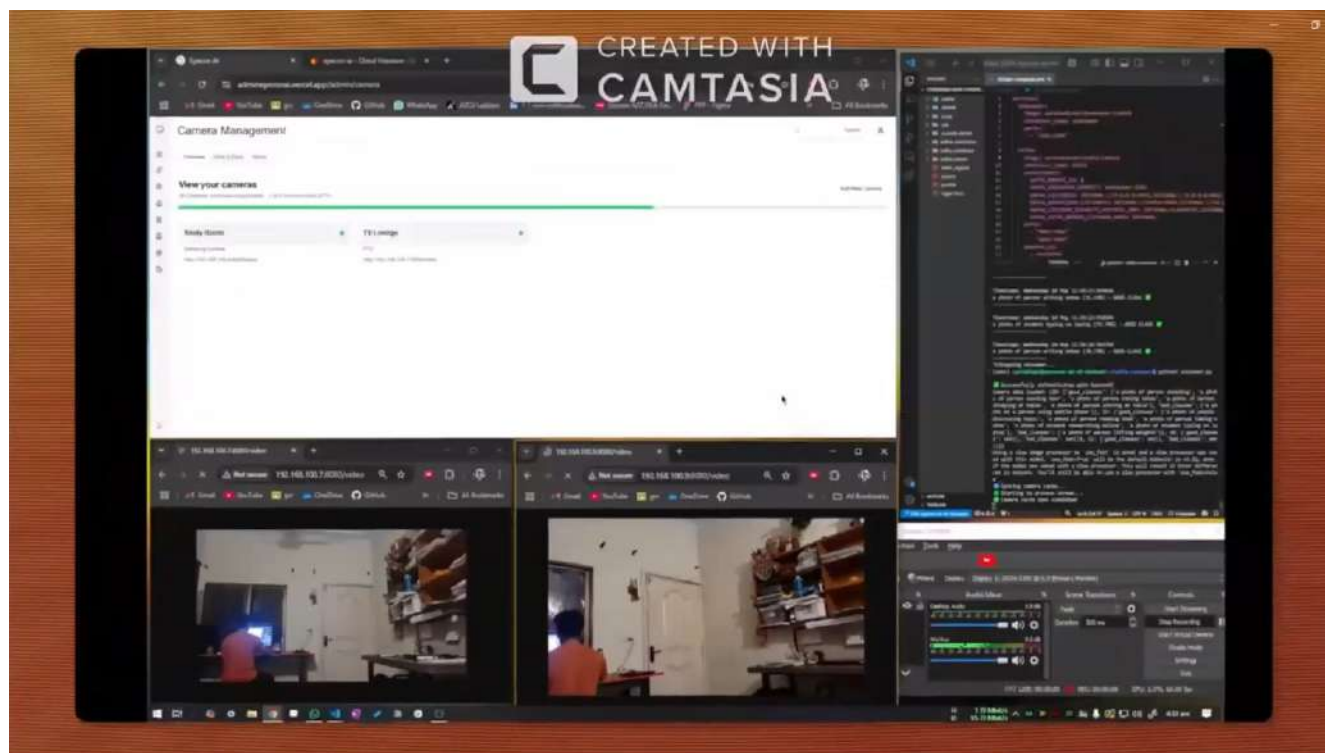
by **Dr. Jawwad A. Shamsi**, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan.

Continued...

PROCTORPARHAI FEATURES

A comprehensive AI-powered SaaS framework for conducting assessments

AI-based Proctoring	AI-based Grading	AI-based Question Creation	AI-based Feedback
			



3.3. "Impact of A.I. on Employment in Pakistan"

by **Dr. Jawwad A. Shamsi**, Professor & Dean - Faculty of Computer Science, FAST – NUCES,
Karachi, Pakistan. **Continued...**



THE FUTURE OF WORK

- Humans + AI = "Co-existence economy"

AI handles repetitive, humans lead with creativity & empathy

+



3.3. "Impact of A.I. on Employment in Pakistan"

by Dr. Jawwad A. Shamsi, Professor & Dean - Faculty of Computer Science, FAST – NUCES, Karachi, Pakistan. ***Continued...***

CLOSING THOUGHT & CALL TO ACTION

- AI will not replace humans. But humans using AI will replace those who don't.
- Call to action: Learn. Adapt. Innovate.



THANK YOU SO MUCH

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3.4. “Impact of A.I. on Productivity in Pakistan”

by

*Engr. Dr. Muhammad Burhan Khan, Associate Professor, Electrical Engineering,
FAST-NUCES, Karachi*



About Me & My Perspective



Consultant & Co-founder, Eyecon AI: Deploying cutting-edge computer vision solutions for Pakistani industries, and helping businesses optimize processes, from the factory floor to the supply chain.



Academia: National University of Computer and Emerging Sciences, Karachi Campus.



My Passion: Bridging the gap between Pakistan's industrial potential and the transformative power of AI.

3.4. "Impact of A.I. on Productivity in Pakistan"

By Engr. Dr. Muhammad Burhan Khan, Associate Professor, Electrical Engineering, FAST-NUCES, Karachi *Continued...*

The Productivity Challenge

Pakistan's Industrial Potential is Undeniable. But...



We face persistent challenges in efficiency, quality control, and resource management.



Traditional methods are hitting a ceiling. Incremental improvements are no longer enough.



The Question: How do we achieve a quantum leap in productivity to compete globally?

AI: Not Magic, It's a Tool

What is AI in a business context?

It's the ability for machines to:



Learn from Data:

Analyze vast amounts of information (e.g., production logs, sensor readings, images).



Recognize Patterns:

Identify trends, anomalies, and correlations invisible to the human eye.



Predict & Automate:

Make intelligent forecasts and automate complex decisions.

Think of it as the ultimate assistant, amplifying human capability.

3.4. "Impact of A.I. on Productivity in Pakistan"

By Engr. Dr. Muhammad Burhan Khan, Associate Professor, Electrical Engineering, FAST-NUCES, Karachi *Continued...*

The Core Impact: AI on the Factory Floor

More Automation

- Beyond SCADA
- Analytics / infographics
- Wholistic approach towards automation and optimization

Predictive Maintenance

- **Before AI:** Fix machines when they break. (Reactive, costly downtime)
- **With AI:** AI analyzes sensor data (vibration, temperature) to predict failures *before* they happen. (Proactive, planned maintenance)

Quality Control Automation

- **Before AI:** Manual inspection. (Slow, inconsistent, prone to human error)
- **With AI:** Computer vision systems inspect products at high speed with over 99% accuracy. (Fast, consistent, reliable)

Case Studies (Pakistan ONLY)

- AI based object counting and tracking
- AI based HRM
- AI based learning management and assessment in academia
- AI based process optimization in manufacturing industry and banks
- AI based documents management
- AI based traffic management
-
-

3.4. "Impact of A.I. on Productivity in Pakistan"

By Engr. Dr. Muhammad Burhan Khan, Associate Professor, Electrical Engineering, FAST-NUCES, Karachi

Continued...

Beyond Manufacturing: A National Impact

The same principles apply across Pakistan's key sectors:



Agriculture:

AI-powered drones analyze crop health to optimize fertilizer and water usage, boosting yields.



Logistics & Supply Chain:

AI optimizes delivery routes, saving fuel and time, and manages warehouse inventory with unprecedented accuracy.



Services (BPOs/Call Centers):

AI chatbots handle routine queries, freeing up human agents for complex issues, improving customer satisfaction.

The Hurdles on Our Path

Adopting AI is a journey, not a switch. The key challenges for us are:

- **The Data Gap:** AI needs high-quality, structured data. Many industries are still in the early stages of digitization.
- **Lack of Awareness**
- **False Cost Perception:** High initial investment in hardware and talent can seem daunting.
- **The "Change" Mindset:** Overcoming the resistance to move away from "how we've always done it."



3.4. "Impact of A.I. on Productivity in Pakistan"

By Engr. Dr. Muhammad Burhan Khan, Associate Professor, Electrical Engineering, FAST-NUCES, Karachi

Continued...

A 3-Point Roadmap for an AI-Powered Pakistan

Industry

- **Start Small, Think Big.** Pilot AI projects in one area.
- **Invest in Data Infrastructure.** Digitize your processes.
- **Upskill Your Workforce.** Train your existing teams.

Academia

- **Modernize Curricula.** Focus on data science & practical AI.
- **Forge Industry Partnerships.** Create real-world capstone projects.
- **Promote Research.** Fund applied AI research for local problems.

Government

- **National AI Strategy.** Create a clear, supportive policy.
- **Incentivize Adoption.** Offer grants or tax breaks for AI projects.
- **Ensure Data Privacy.** Build trust with clear data protection laws.

The Future: Human + AI Symbiosis 🤝



The goal of AI is not to replace humans, but to **augment** them.



AI handles the **repetitive, data-intensive** tasks.



Humans focus on **strategy, creativity, and complex problem-solving**.



This partnership leads to more **engaging jobs**, safer work environments, and a massive boost in **collective productivity**.

3.4. "Impact of A.I. on Productivity in Pakistan"

By Engr. Dr. Muhammad Burhan Khan, Associate Professor, Electrical Engineering, FAST-NUCES, Karachi ***Continued...***



Questions?

- Let's build a more productive Pakistan, together.
- Engr. Dr. Muhammad Burhan Khan
burhan.khan@nu.edu.pk
eyeconai.com

3.5. “Organisational Arrangement necessary for A.I. Absorption in Pakistan”

by

Dr. Muhammad Khurram, Professor, Department of Computer and Information Systems Engineering (CIS), NEDUET, Karachi, Pakistan.



What does AI Absorption mean?

- Adoption of AI technologies across sectors

- Integration into workflows, decision-making, and services
- Effective utilization to drive productivity, efficiency, and innovation

Why Pakistan Needs It?

- Enhance global competitiveness in the digital economy
- Drive economic growth through innovation-led industries
- Support national progress in health, agriculture, education, and governance

3.5. "Organisational Arrangement necessary for A.I. Absorption in Pakistan"

By Dr. Muhammad Khurram, Professor, Department of Computer and Information Systems Engineering (CIS), NEDUET, Karachi, Pakistan

Continued...

Supporting Innovation with AI

AI as a Catalyst for Innovation

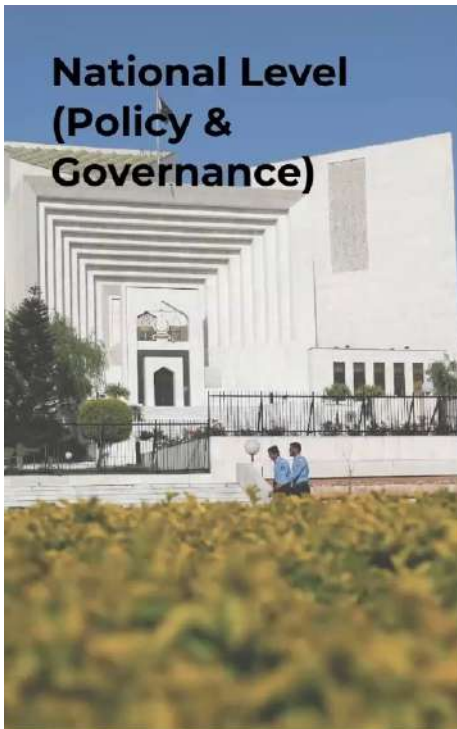
- Healthcare: AI-driven diagnostics & drug discovery
- Agriculture: Smart irrigation, crop monitoring, yield prediction
- Finance: Fraud detection, algorithmic trading, customer chatbots
- Transport: Traffic optimization, smart mobility, autonomous vehicles

Need for Policy Support

- R&D incentives and grants for AI startups
- Government-backed innovation funds
- Establish AI incubation & acceleration centers



National Level (Policy & Governance)



National AI Commission / Authority



- National AI Authority to Oversee policy, funding, regulation, standards
- Alignment with Priorities → Agriculture, health, finance, education, security

AI Policy & Roadmap



- AI Roadmap (10–15 years) aligned with Digital Pakistan Vision
- Clear adoption targets for public & private sectors

Legal & Ethical Frameworks



- AI Ethics & Accountability
- Data Privacy Laws
- Tailored policies for each sector

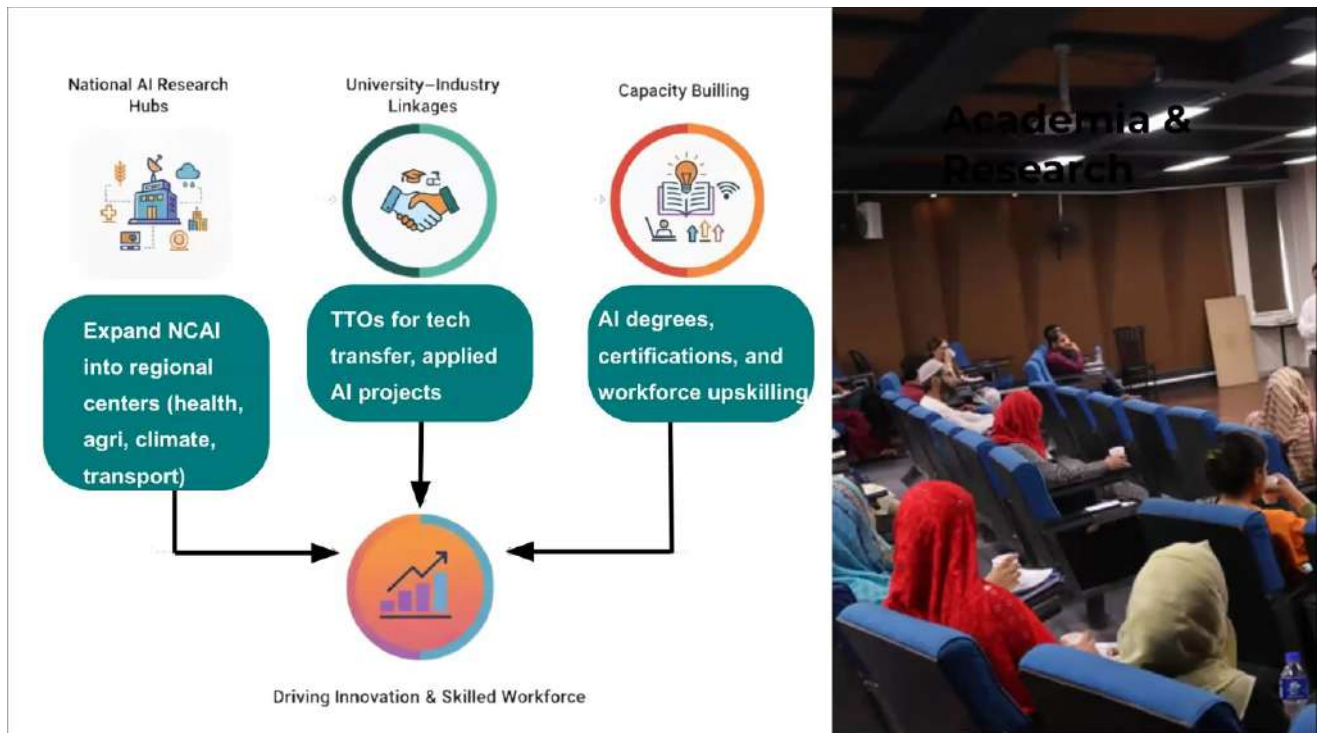
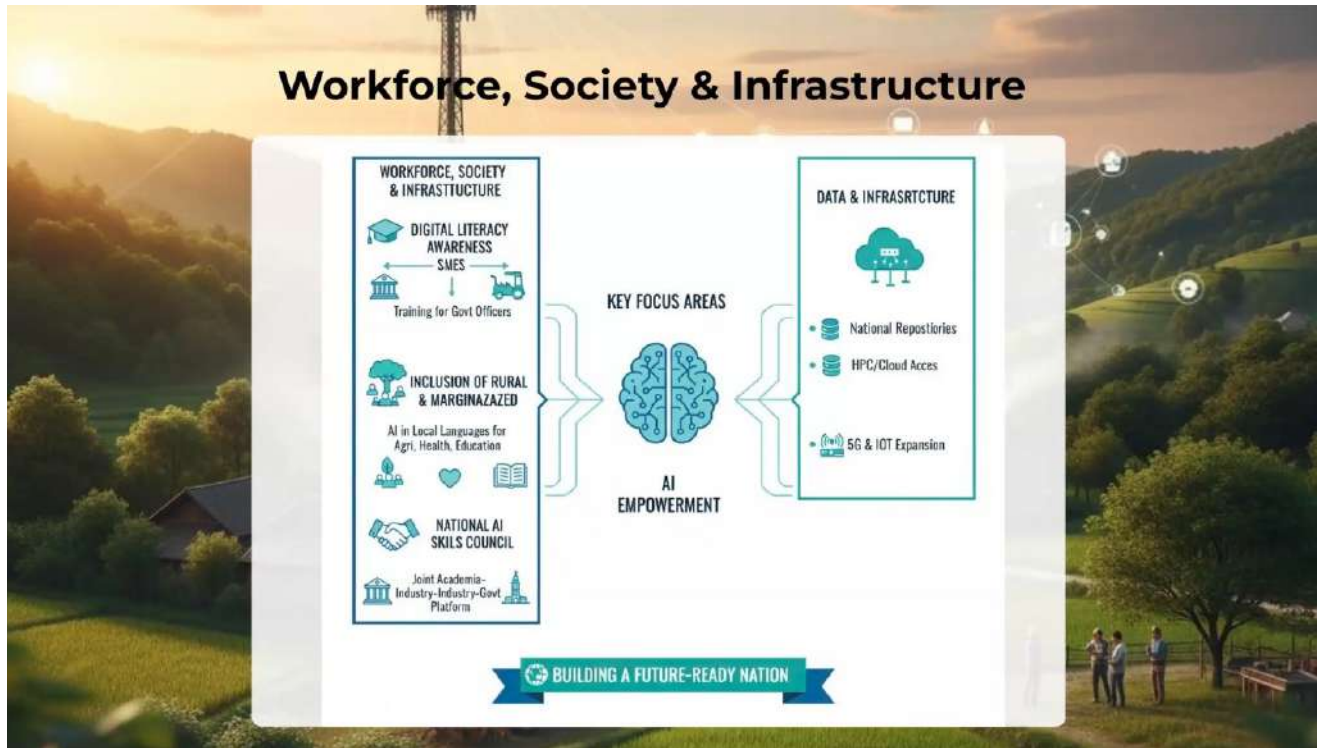


National Progress and Global Competitiveness

3.5. "Organisational Arrangement necessary for A.I. Absorption in Pakistan"

By Dr. Muhammad Khurram, Professor, Department of Computer and Information Systems Engineering (CIS), NEDUET, Karachi, Pakistan

Continued...



3.5. "Organisational Arrangement necessary for A.I. Absorption in Pakistan"

By Dr. Muhammad Khurram, Professor, Department of Computer and Information Systems Engineering (CIS), NEDUET, Karachi, Pakistan

Continued...

Government-Funded Startups in Pakistan

National Incubation Centers (NICs) in Pakistan – Funded by Ignite & MoITT

8 operational NICs
(Islamabad, Lahore,
Peshawar, Karachi,
Hyderabad, Quetta,
Faisalabad, Rawalpindi)
+ new NIC Sialkot in
pipeline.



Government-Funded Startups in Pakistan

AI Startups in Pakistan Supported by Ignite (Agritech, Health & Utilities)

- Mera Maweshi – AI-based cattle disease diagnostics app for farmers; improves livestock health & milk production.
- Bakhbar Kissan (BK) – Precision agriculture with AI, drones & satellite imagery for optimized yield.
- Crop2X – AI + IoT water monitor reducing water use by 50% and increasing crop yield.
- Electrocure – AI + IoT solution to combat electricity theft, reducing losses by up to 90%.
- WonderTree – AI-powered AR/VR therapy & special education for children (2,500+ active users).
- Dot – Wearable devices using data-driven AI analytics for mental health diagnostics.
- Naseem – AI-based digital tutor for primary school students.



3.5. "Organisational Arrangement necessary for A.I. Absorption in Pakistan"

By Dr. Muhammad Khurram, Professor, Department of Computer and Information Systems Engineering (CIS), NEDUET, Karachi, Pakistan

Continued...

Government-Funded Startups in Pakistan

Impact of Ignite's National Incubation Centers (NICs) FY 2023–24 Impact:

222 startups incubated, 207 graduated.

PKR 500M+ investment raised.

PKR 2B+ revenue generated.

Since inception (till FY 2023–24):

- 882 graduates → PKR 23.7B investments & PKR 17.64B revenue.

Startups with Significant Investments

- Bykea (NIC Karachi): Pakistan's leading ride-hailing & logistics startup → raised \$22M+ in funding (Prosus Ventures, MEVP, Sarmayacar).
- Swag Kicks (NIC Karachi): \$1.2M seed (E-commerce).
- OkayKer (NIC Karachi): \$700K seed (AutoTech SaaS).
- ElectroCure: \$46M investment offer + £200K GSMA grant (Smart grid, AI & IoT).
- EasyFresh (NIC Islamabad): \$250K (AgriTech).
- Mauqa Online (NIC Islamabad): VC-backed, employing 100,000+ workers.
- WonderTree: AR/VR for special education, deployed in hospitals & schools.



AI and Entrepreneurship Today

AI-Powered Tools for Entrepreneurs

Content & Communication



Gemini



perplexity



Claude

ChatGPT / Claude / Gemini

- Business planning, market research, financial projections
- Automated customer support (chatbots, FAQs)
- Marketing content: blogs, ads, and social media posts



Jasper

Notion AI / Jasper AI

- Workflow automation and knowledge management
- Drafting proposals, reports, and presentations
- AI-driven copywriting for campaigns and websites

3.5. "Organisational Arrangement necessary for A.I. Absorption in Pakistan"

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Continued...

AI and Entrepreneurship Today

AI-Powered Tools for Entrepreneurs

Coding & App Development

 **GitHub Copilot**

 **replit**

GitHub Copilot / Replit Ghostwriter

- Accelerated coding & debugging
- App and website prototyping
- Reduces development time and cost

 **Lovable** 

Lovable.dev / Bolt.new

- Builds full-stack web apps instantly with AI (front-end, back-end, database) — ideal for startups & MVPs
- Bolt.new → Next-gen AI coding environment that generates, edits, and explains code in real time — speeds up prototype building and deployment

AI and Entrepreneurship Today

AI-Powered Tools for Entrepreneurs

Design & Creativity

MidJourney / DALL-E / Stable Diffusion

- Logo design, product mockups, ad creatives
- Branding and marketing visuals at low cost
- Product visualization before manufacturing

 **runway**

 **synthesia**

RunwayML / Synthesia

- AI-generated videos for marketing & training
- Create professional content without expensive studios
- Virtual avatars for presentations or customer interaction

 **Canva AI TOOLS**

 **Adobe Firefly**

Canva AI / Adobe Firefly

- AI-enhanced graphic and video design
- Social media templates, pitch decks, and ads
- Easy for non-designers to create professional visuals

3.5. "Organisational Arrangement necessary for A.I. Absorption in Pakistan"

By Dr. Muhammad Khurram, Professor, Department of Computer and Information Systems Engineering (CIS), NEDUET, Karachi, Pakistan

Continued...

AI and the Gig Economy

What is the Gig Economy?

Flexible, project-based, short-term work enabled through digital platforms.

Freelancer in Pakistan

- Using AI tools Freelancers can improved productivity and output
- Increased output from 2-3 → 7-8 projects weekly.
- Earnings doubled within 6 months.
- Attracted more international clients with faster delivery.

INITIATIVES FOR AI IN FREELANCING & GIG ECONOMY

AI EMPOWERMENT



AI UPSKILLING PROGRAMS

- Short courses and certifications for freelancers on AI AI-powered productivity tools.



FREELANCER SUPPORT HUBS

- Government-or private-led centers offering AI training, menteship, and shared resources



INTEGRATION IN PLATFORMS

- Local freelancing portals integrating to help workers deliver higher-quality projects



DIGITAL PAYMENT & INFRASTRUCTURE SUPPORT

- Simplify cross-border for freelancers to scale AI-driven services



PUBLIC-PRIVATE PARTNERSHIPS

- Collaboration with global freelancing platforms (Upwork, Fiverr, etc.) to run AI bootcamps for Pakistan's workforce



AWARENESS CAMPAIGNS

- Educating freelancers on how AI can boost efficiency in: Writing, Design, Design, Coding Digital Marketing

FUELING THE FUTURE OF WORK

Pakistan's Ignite Initiatives for Freelancers & Digital Workforce

DigiSkills.pk

- Pakistan's largest online training platform (launched 2018).
- 4.55M+ trainings delivered (1.18M in FY 2023-24 alone).
- 15 market-relevant courses (SEO, E-commerce, Graphic Design, Data Analytics, etc.).
- Contributed \$827M to IT exports (till Dec 2022).

Southern Balochistan Program

- 12,800+ enrollments (65% male, 35% female).
- 3 fully equipped labs (Gwadar, Turbat, Khuzdar).
- Focus on freelancing & IT skills for underserved regions.

CodiSkills Program

- Hackathons & hands-on workshops in major cities.
- 3,500+ participants (2023-24) including students, ICT professionals, govt officers.
- International certification support (e.g., OSCP).

3.5. "Organisational Arrangement necessary for A.I. Absorption in Pakistan"

By Dr. Muhammad Khurram, Professor, Department of Computer and Information Systems Engineering (CIS), NEDUET, Karachi, Pakistan

Continued...

3:25:58

Major technologies enabling AI in different industries

This slide represents major technologies enabling artificial intelligence in different industries. It covers machine learning, natural language processing, computer vision, robotics and edge computing.



Machine learning	Natural language processing (NLP)	Computer vision	Robotics	Edge computing
- Enables computers to learn from data without being explicitly programmed - It is used in industries like healthcare, finance, and retail for applications like fraud detection, customer segmentation, and personalized recommendations	- Enables computers to understand, interpret, and generate human language - It is used in industries like customer service, education, and media for applications like chatbots, language translation, and sentiment analysis	- Enables computers to interpret and analyze images and videos - It is used in industries like automotive, manufacturing, and healthcare for applications like quality control, object detection, and medical imaging	- Enables the design, development, and operation of robots - It is used in industries like manufacturing, logistics, and healthcare for applications like assembly line automation, warehouse management, and surgical robotics	- Enables the processing of data closer to the source rather than in a centralized cloud - It is used in industries like retail, transportation, and smart cities for applications like real-time analytics, autonomous vehicles, and smart traffic management

India's AI Strategy (NITI Aayog)

The full form of NITI Aayog is the National Institution for Transforming India Aayog. NITI Aayog is the apex public policy think tank of the Government of India, serving as the nodal agency for catalyzing economic development and fostering cooperative federalism through a bottom-up approach involving state governments. It was established on January 1, 2015, replacing the Planning Commission.



- | | | | |
|--|---|--|---|
| 1.
AI for All" (2020)
→ National AI policy to make AI inclusive and accessible for all citizens. | 2.
Priority Sectors →
Focus on healthcare, agriculture, education, smart mobility, and fintech as key drivers of AI adoption. | 3.
Responsible AI for Youth → Nation wide initiative that trained 11,000+ school students in basic AI skills and awareness. | 4.
Long-term Vision → Harness AI not just for economic growth and innovation, but also for social empowerment and inclusive development. |
|--|---|--|---|

www.reallygreatsite.com

3.5. "Organisational Arrangement necessary for A.I. Absorption in Pakistan"

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Continued...

Centers of Excellence (CoEs)

Established in IITs and top research institutes to drive applied AI research.

Industry Partnerships

Active collaborations with Microsoft, Google, Intel, and others for AI-powered solutions.

Startup Ecosystem

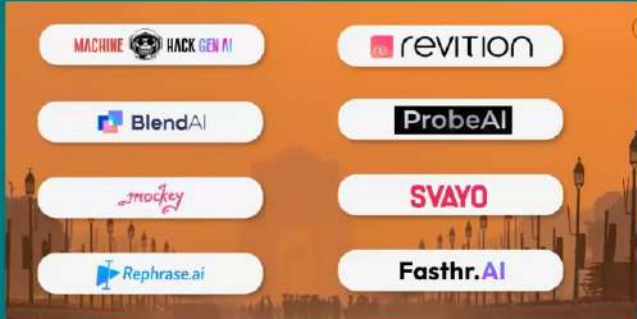
India ranks among the top 5 global AI startup hubs, supported by strong funding and policy backing.

Outcome

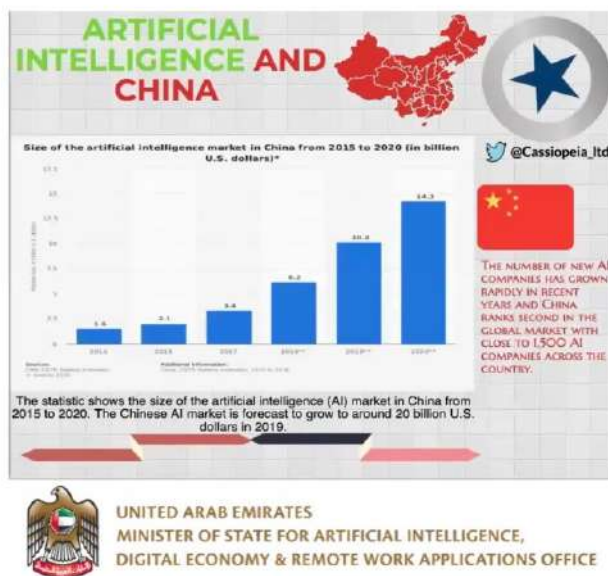
Rapid AI adoption in fintech, healthtech, agritech, and mobility startups, boosting innovation and global competitiveness.

India's Institutional & Industry Push

Top Generative AI startups in India



Supporting Innovation with AI



Mini Case Study – UAE's AI Strategy

- 2017: First country to create a Ministry of AI.
- Prioritized AI education, smart cities, and public services.
- Partnerships with global tech firms to accelerate adoption.
- Result: AI is now central to UAE's

Mini Case Study – China's AI Plan (2017–2030)

- Declared AI a national priority with a target to lead the world by 2030.
- Heavy investment in AI R&D, robotics, and smart manufacturing.
- Strong government–industry–military collaboration for innovation.
- Result: China leads in AI patents, facial

3.5. "Organisational Arrangement necessary for A.I. Absorption in Pakistan"

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Continued...

AI and Education

Early Childhood Learning

Adaptive content adjusts difficulty based on performance, ensuring better engagement.

AI Tutors & Gamified Education

1. Virtual AI tutors provide 24/7 support for students.
2. Gamification makes learning interactive and fun, improving retention and creativity.



Conclusion

AI Absorption = More than Technology

It requires organizational readiness, policies, and cultural change.

What We Must Build

- Strong Policy & Governance frameworks.
- Reliable Infrastructure & Data Ecosystem.
- Continuous Skills Development & Education Reform.
- Culture of Innovation & Entrepreneurship.

The Goal

A future-ready workforce that drives a sustainable AI-powered economy.

3.5. "Organisational Arrangement necessary for A.I. Absorption in Pakistan"

By Dr. Muhammad Khurram, Professor, Department of Computer and Information Systems Engineering (CIS), NEDUET, Karachi, Pakistan

Continued...

Thank You!

Prof. Dr. M Khurram

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