ARTIFICIAL INTELLIGENCE
MACHINE LEARNING
DATA SCIENCE

Artificial Intelligence, Machine Learning and Data Science

Created through machine learning, AI is a process that involves training any system by using huge amounts of data. The trained system is then used to make inferences about new data that it has never seen. Companies use AI in mainly two ways. Many tech companies use AI to make their existing operations more powerful with things like virtual assistants. Google uses AI tech to filter out emails for users so that spam emails can skip the inbox and go directly to the

spam folder. Amazon uses AI to learn from consumers' buying habits and recommends new products to them.

Similarly, Netflix uses AI to learn from viewing habits and recommend new things to watch based on those habits. Other companies directly profit from AI by selling expertise, software, or hardware that the technology needs.

AI companies that are listed on the stock market include:

Company	AI Focus
NVIDIA (NASDAQ: NVDA)	Graphics chips and self-driving cars
IBM (NYSE: IBM)	Augmenting human intelligence across industries
Micron Technology (NASDAQ: MU)	Memory chips for data centers and self-driving cars
Amazon (NASDAQ: AMZN)	Voice-activated technology, cloud computing, and e-commerce
C3.ai (NYSE:AI)	Uses software-as-a-service to provide enterprise-scale AI applications

Global Outlook of the AI Market

In 2021, the global AI market was valued at more than $328B with projections for the market to grow and reach a valuation of over $1394B by 2029.[2] The market is expected to gain even more momentum over the years expanding at a CAGR of 20.1% during the forecast period. The rise in AI solutions can be attributed in part to the pandemic which gave rise to 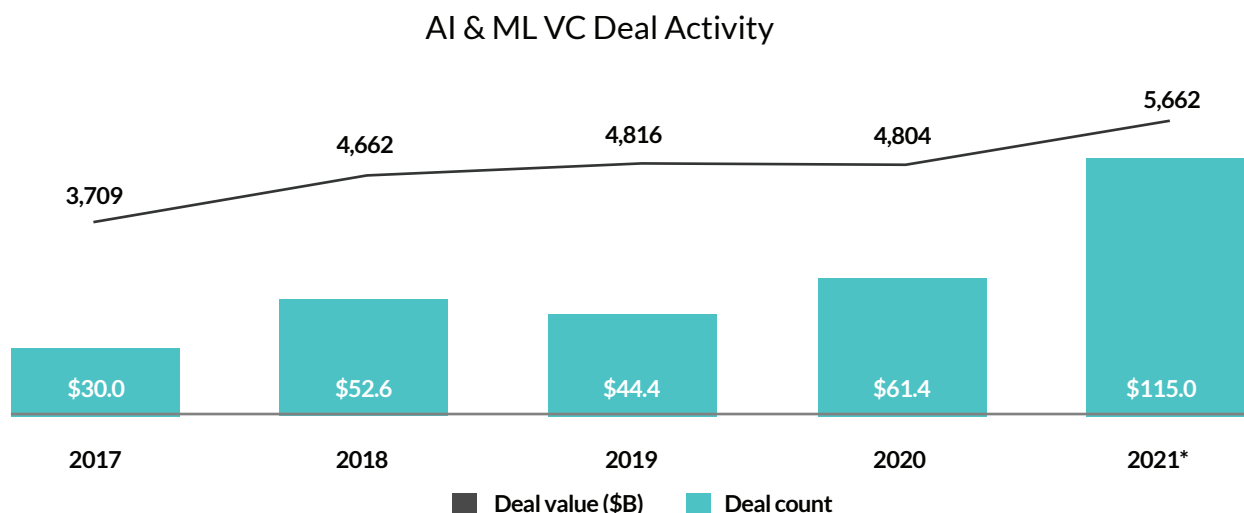the demand for new tech solutions across all sectors. One particular sector in which the demand for AI skyrocketed during the pandemic was the health sector. Integration of AI into healthtech led to a better understanding of the coronavirus, the discovery of new drugs and other numerous solutions to the problems brought on by the pandemic.
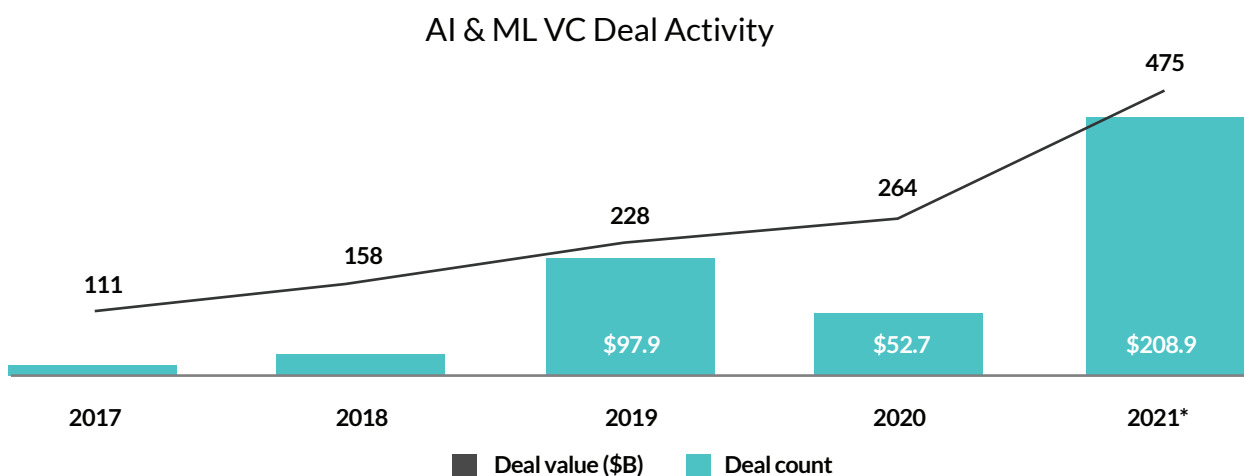

Regional Growth Rates

High
Mid
Low

Source: Mordor Intelligence

[1] https://www.fool.com/investing/stock-market/market-sectors/information-technology/ai-stocks/
[2] Artificial Intelligence Market Share | AI Industry Growth [2029]

Artificial Intelligence and Machine Learning startups raised $115B in 2021 through 5,662 fundraising deals, a sharp increase from 2020 which saw 4804 startups raising $61.4B. While the numbers look impressive, top-performing VCs dedicated over 6x more funding to early-stage Web3 and Decentralized Finance startups in Q3 of 2021.[4]

AI & ML VC Deal Activity

	2017	2018	2019	2020	2021*
Deal count	3,709	4,662	4,816	4,804	5,662
Deal value ($B)	$30.0	$52.6	$44.4	$61.4	$115.0

■ Deal value ($B) ■ Deal count

2021 also saw several AI-integrated decarons exit through the same could not be said for pure-play AI companies. 475 exits with $208.9B in exit value which was a 79.9% increase in exit count YoY.

AI & ML VC Deal Activity

	2017	2018	2019	2020	2021*
Deal count	111	158	228	264	475
Deal value ($B)			$97.9	$52.7	$208.9

■ Deal value ($B) ■ Deal count

[4] *2021 Annual Artificial Intelligence & Machine Learning Report | PitchBook*
[5] *https://pitchbook.com/news/reports/2021-annual-artificial-intelligence-machine-learning-report*
[6] *2021 Annual Artificial Intelligence & Machine Learning Report | PitchBook*

Key global players in the AI industry include Amazon, IBM, Microsoft, NVIDIA, Baidu, Oracle, SAP, and Salesforce. Meanwhile, there are 86 AI unicorns with the following being the most valued ones:

Name	Valuation	Country
ByteDance	$140B	China
Faire	$12.59B	United States
Pony.AI	$8.5B	United States
Scale AI	$7.3B	United States
Argo AI	$7.25B	United States

Zooming in on the AI market in Pakistan

The future of AI will be dependent upon its integration with corporate processes and a rise in innovation in other sectors like automation, 5G, cloud computing, etc. AI has numerous applications in big data, natural language processing, and computer vision amongst other things. Pakistan too has entered the race to incorporate AI in its business offerings. From an AgriTech firm called Indus Vision Systems that uses AI to grade fruits and vegetables to boost exports[8] to a FinTech platform called Finja which utilizes AI to offer services to a mostly unbanked chunk of the population, everyone's trying to get into the AI race.

And it's not just corporations adopting this technology but the academic sector too. In 2021, Karachi University launched a digital healthcare platform that uses AI to provide medical assistance to patients.[9] The project called HealthHands was the brainchild of the Centre for Artificial Intelligence in Health Sciences, set up at the University of Karachi.[10]

---
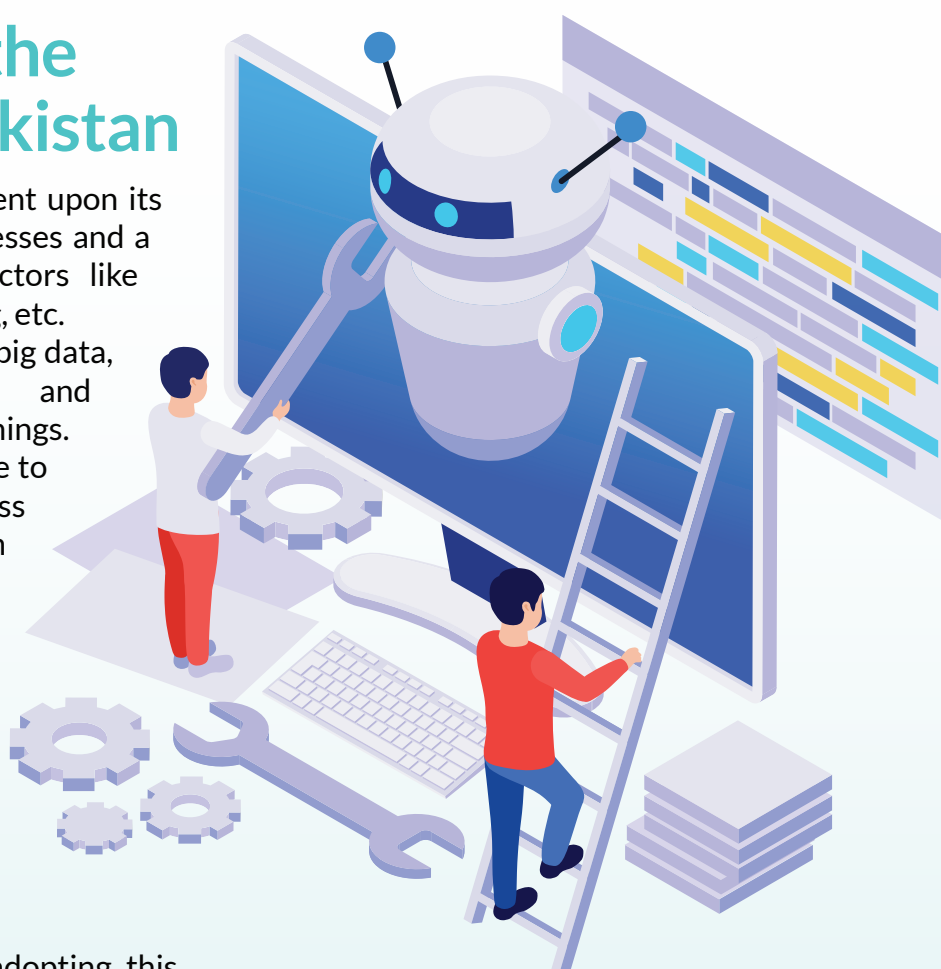
[8] Pakistani agritech firm aims to sell technology to farmers in Jordan, UAE, Saudi Arabia | Arab News PK
[9] https://pakistan.bolnews.com/latest/2021/11/ku-centre-launches-ai-backed-digital-healthcare-platform/
[10] AI termed future of Pakistan's healthcare

Besides KU, other universities in Pakistan that are providing AI education include NUST which has been ranked as the top university for this particular field in Pakistan.[11]

According to the Huawei Global Connectivity Index which ranks countries according to ICT investment, ICT maturity, and digital economic performance, Pakistan ranked 74 out of 79 countries. One of the factors used

for rating is the four technology enablers which include AI, Cloud, IoT, and Broadband. On the AI scale, Pakistan scored 24 which is less than the global average of 30.[12]

Motive held its 1st inaugural conference in Pakistan called AI Connect which featured some of the top AI researchers from all over the world.[13]
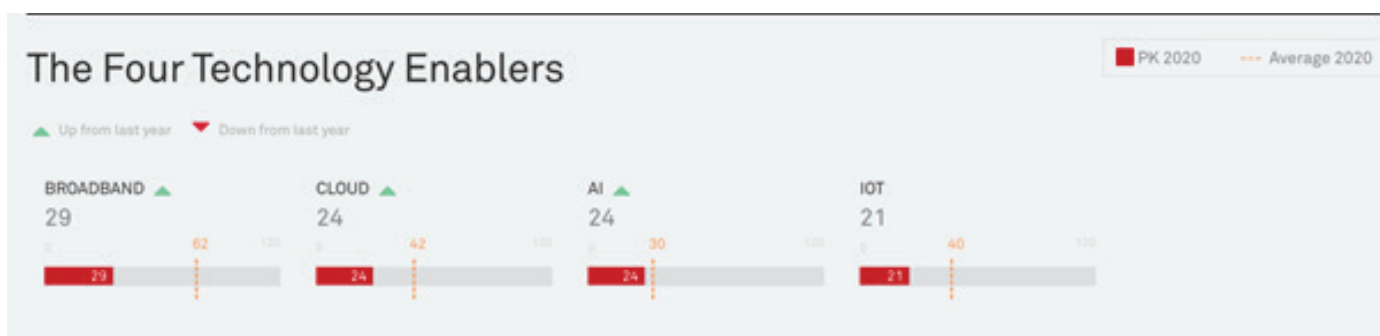
Government Initiatives to Promote AI Adoption

The government too has undertaken numerous initiatives to boost the usage of AI in Pakistan. The most notable of the lot is the Presidential Initiative for Artificial Intelligence and Computing. Launched by the President of Pakistan Dr.Arif Alvi, it aims to promote education, business opportunities, and research in the fields of Blockchain, Internet of Things, Artificial Intelligence, and Cloud Native Computing. It was also announced in December 2021 that the Government of Pakistan would soon unveil a national AI policy.[15]

With the fast-paced growth of the IT sector in Pakistan which is currently contributing approximately $3B or 1% to the GDP, the

inclusion of AI-related products and services is only going to boost this number. A national AI policy is a crucial stepping stone into any country's smart future. All indications have pointed to China becoming the worldwide leader in AI research by 2030 by contributing almost half of the total AI contribution to the global GDP. Countries like India, the USA, Russia, and the EU have already introduced their own AI policies so they too can become global leaders in this area.[16]

Another initiative by the government for the promotion of research into AI technology is called the National Centre of Artificial Intelligence. Nestled under the government's Vision 2025, the center was inaugurated in

---

[11] *AI Usage and Its Scope in Pakistan - Paradigm Shift*
[12] *Country Profile for Pakistan - 2020 Global Connectivity Index.*
[13] *Motive Brings Pakistan's First AI Conference 'AI Connect'*
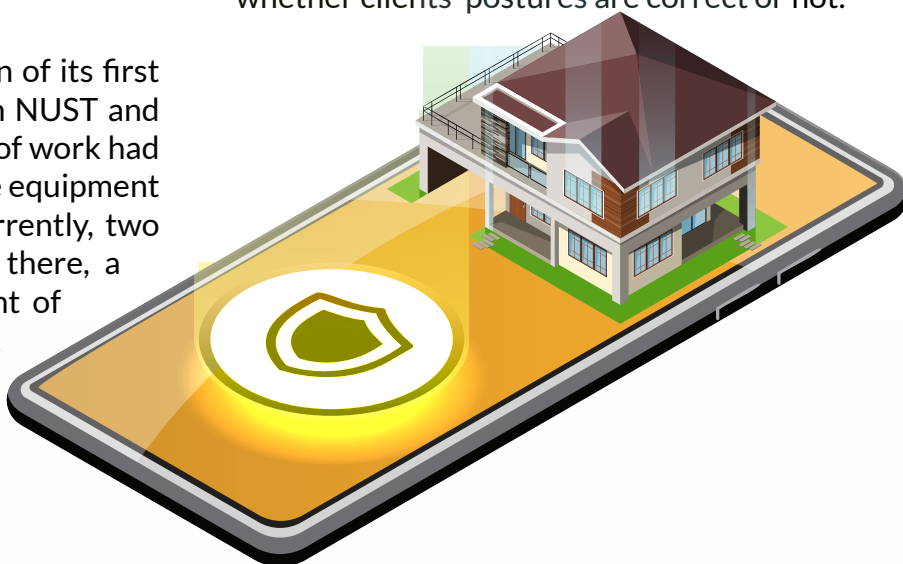[14] *Country Profile for Pakistan - 2020 Global Connectivity Index.*
[15] *Pakistan to introduce its first National AI policy - Global Village Space*
[16] *https://nation.com.pk/2021/06/27/the-need-for-a-national-ai-policy/*

NUST in 2018. It is affiliated with some of the leading universities in Pakistan and its research fund has granted seed money to numerous startups using AI to solve everyday problems.

Pakistan also saw the inauguration of its first AI Lab as a collaboration between NUST and CPEC. As of 29th May 2022, 75% of work had been completed while 100% of the equipment had been installed in the lab. Currently, two projects are under development there, a pilot project with the Government of Pakistan called Cogniser V-1 Intelligent Video Analysis and a commercial project called

GymBot. The Cognizer V-1 aims to generate warnings for dangerous behavioral patterns such as suicide or terrorist activities while the GymBot is an auxiliary tool that monitors whether clients' postures are correct or not. [17]

Industries	Companies
Healthcare	Xylexa, Xpertflow, HealthHands
Public Services	E-vaccs, Tax Dosti, AuratRaaj
Gaming And Animation	Saremco Tech, Cubix, Caramel Tech Studios
Fintech	ABC Data, Unikrew, Sahal VERIFAI, Finja
Retail And E-commerce	DAO Proptech, Hanker Technologies, Deal Smash, Lasting Sales, Peekaboo Guru, Fetch Sky
Edtech	Dot & Line, Sabaq, Knowledge Platform, Edkasa, Jazz Smart Schools Project, Orenda, OrbitEd, Naseem Education
Digital Marketing	Logo Design.Net, Mountainise, Botsify, Saremco Tech, Codistan, Penumbra, Revolution Flame
News And Credit Ratings	baseH Technologies, S&P Global, Sabhi
R&d And Trainings	Karachi dot AI, KICS UET Lahore (AILR), Research Center for Artificial Intelligence
Multiple Industries	Liquid Technologies, Revolve AI, Teradata, Afiniti, Byte Legions, Mercurial Mind (Pvt.) Ltd., Love for Data, BYTECORP, Analytics.com, ioptime, Snapthat, apricot studio, Stifle, Bilytica, BlueEast, Datics AI, Xeven Solutions, Techmate Tech LLC, VentureNox, CodesOrbit, Ahdus Technology, Code Junkie, Red Buffer, DiveDeepAI, AppRocket, Algo Republic, RNS Solutions, AliTech Solutions,
Agritech	Radical Growth Solutions, ZamindarTech, Aqua Agro, Crop 2x, Industrial Vision Systems

[17] *Work on Pakistan's first Artificial Intelligence lab under CPEC picks momentum*

XYLEXA

Xylexa

XYLEXA, Inc is a computer-aided diagnostic (CADx) healthtech platform that uses Artificial Intelligence and an image processing approach to assist caregivers with automated, accurate, timely, and cost-effective medical image diagnoses. They offer advanced diagnostics as the decision support system for radiologists and second opinions for patients across the globe. In parallel with medical imaging diagnostics, their researchers are applying AI and data analytics on human genomics and other data prediction of cancer and diagnosing various other ailments.[18]

Motive

Motive is a fully integrated suite of products for connection and automation of operations. Their AI-powered applications automate vehicle and equipment tracking, driver safety, ELD compliance, and more. They are serving more than 120,000 companies all over the world in several different industries including construction, oil and gas, food and beverage, trucking and logistics, passenger transit, delivery, field service, and agriculture.

RAI
Revolve AI

Revolve AI specializes in providing intelligent solutions that help companies boost their revenue by using Artificial Intelligence and Machine Learning. They have created AI-powered solutions for numerous industries including healthcare, retail, automotive, banking, agriculture, and e-commerce. Besides AI, they also aid their clients with computer vision, social intelligence, audio analysis intelligence, reinforcement learning, and predictive analysis. [19]

[18] http://www.xylexa.com/
[19] https://revolveai.com/

Love for Data

Love For Data is an emerging predictive analytics company that works with businesses by utilizing publicly available data and incorporating it with organizational data to come up with actionable insights. Their cost-effective platform aggregates, organizes, and analyzes millions of data points across multiple data sources and provides access to these insights through dashboards, reports, visualization, and Application Program Interfaces (APIs). Their clients successfully use their data services to better understand competition, monitor their brand, optimize their processes and personalize their offerings.[20]

ByteCorp

ByteCorp is an AI and Product Development Consultancy that enables the use of data-driven products and solutions for its customers, so they can receive the promised value and growth in return for their investment. They help clients with Product Development, AI Consultancy, R&D, and Design Consultancy. They have helped multiple co-founders raise a few seed rounds, and have also raised a pre-seed on one of their products. To date, ByteCorp is working on products with a collective funding of more than $20 million.[21]

Botsify

Botsify is a fully managed chatbot platform. Their AI chatbot builder has had over 4 million users and has created over 83000 chatbots. The company provides a fully customizable chatbot platform, helps with its deployment, and lets clients see an in-depth analysis of its performance. Notable clients of Botsify include TRAX, Jazz, WHO, and the Ministry of National Health Services, Regulations, and Coordination.[22]

[20] https://www.lovefordata.com/
[21] https://www.bytecorp.io/
[22] https://botsify.com/
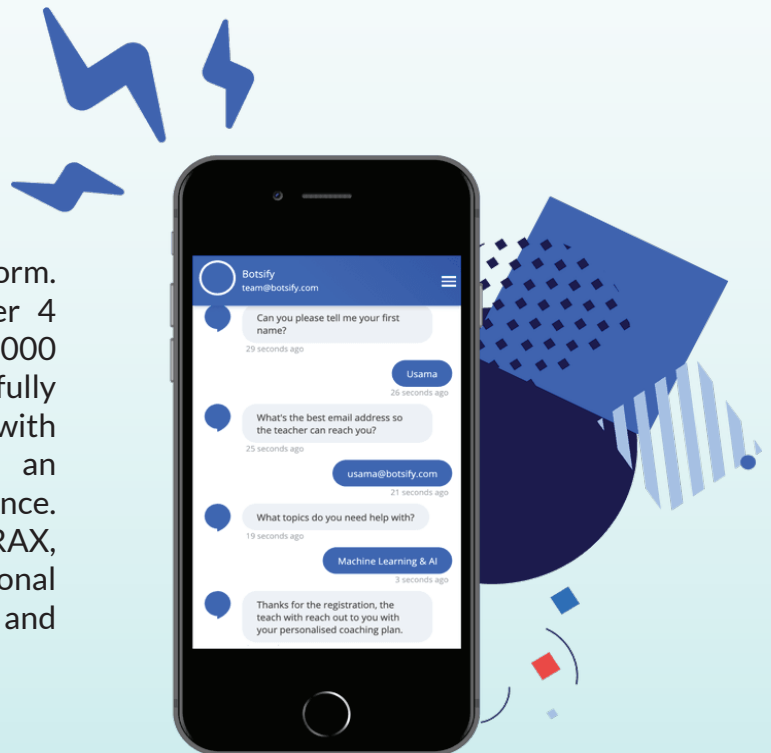
Crop2x

Crop2X offers data-driven crop monitoring solutions to help farmers and agricultural companies double the growth of their crops. Crop2X combines Artificial Intelligence and Ag-specific tools for providing data-driven insights on soil, land, and weather conditions to increase yields and reduce operational costs. They provide real-time monitoring and consultation regarding soil, fertilizer content, water management, pest prediction, and control.[23]

Naseem Education

Naseem is a research-backed startup working on Artificial Intelligence and Education. They build on the latest developments in artificial intelligence, neuroscience, and learning sciences to empower trainers and learners with the right set of tools. Their products are based on experiments that are generated from user evaluations. With more than 20 years of experience in education and technology, every member of their team has worked or is currently working closely with schools, universities, corporates, NGOs, and governments to design and develop customized Ed-Tech products.[24]

---

[23] https://crop2x.com/
[24] https://naseem.education/
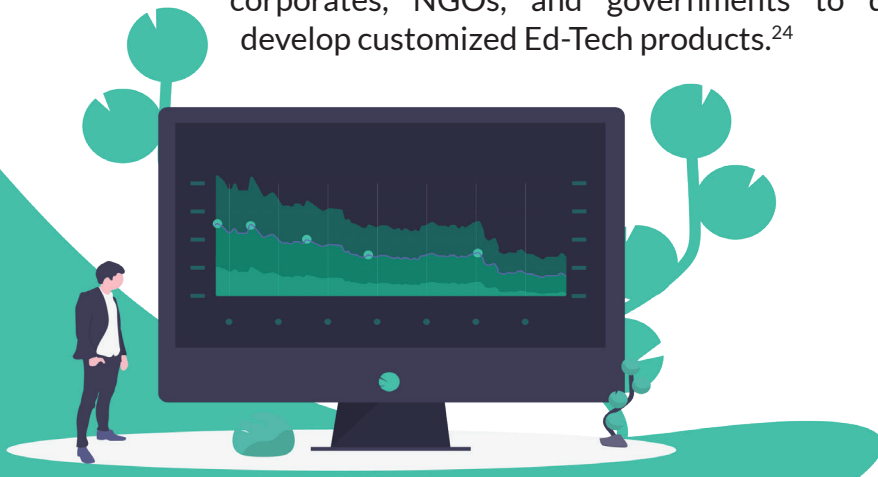
DealSmash

DealSmash is a data analytics company providing consumer insights and analytics to brands while providing shoppers targeted offers and rewards on products based on their interests and buying patterns using Artificial Intelligence. Shoppers earn free shopping vouchers and cashback by scanning and sending valid shopping receipts via the DealSmash app. The company collects and analyzes shopping data from receipts to provide brands with valuable consumer insights.[26]

iParhai

iParhai provides AI-based adaptable and adaptive learning either through mobile or web. It allows learners to learn what they are capable of learning (adaptive) and in a manner, they wish (adaptable learning). An AI-based content recommendation engine is used, which delivers content according to the level of the individual learner. Adaptable learning facilitates the delivery of the right content through the implicitly preferred mode of content delivery.[27]
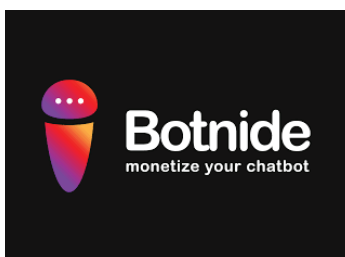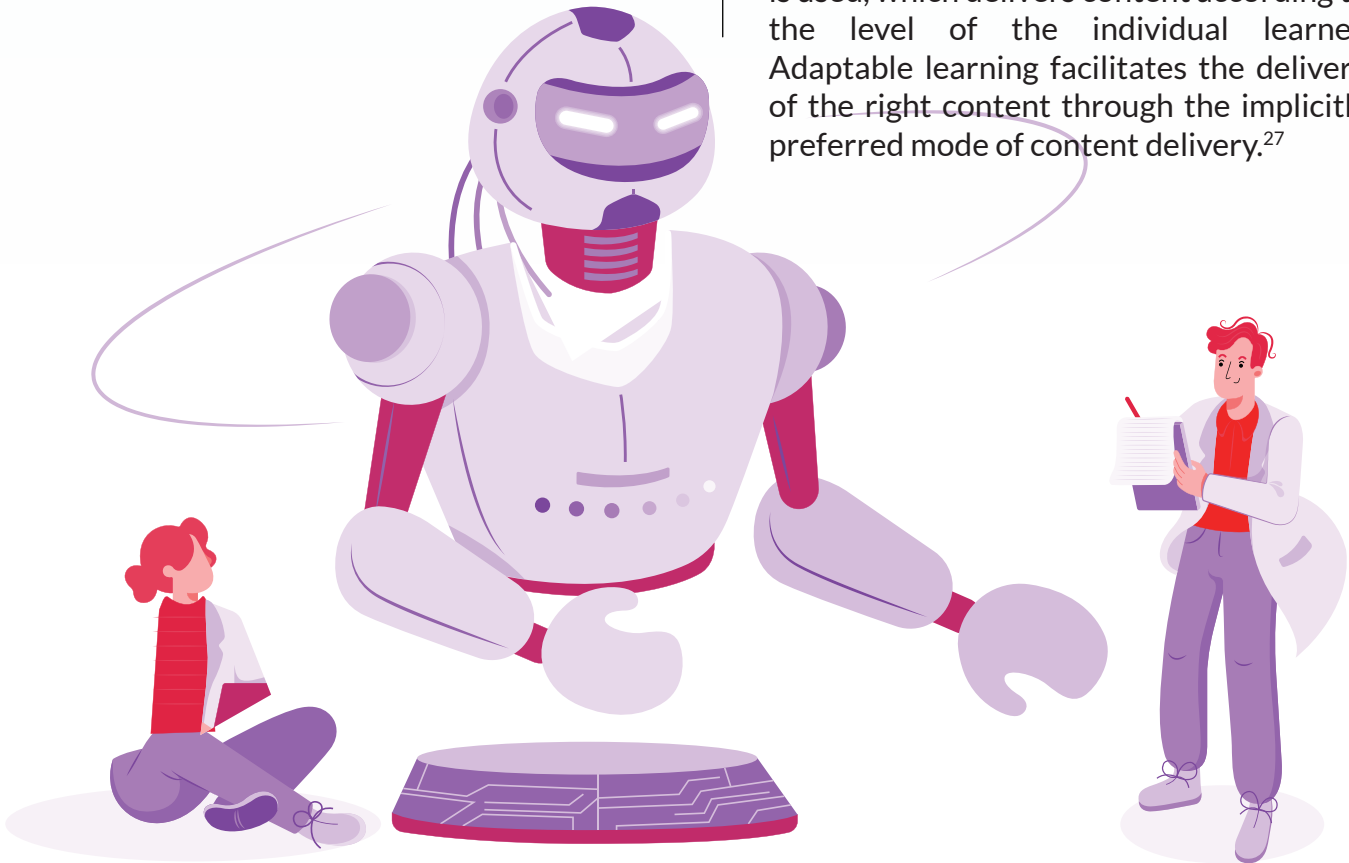
Botnide

Botnide helps companies integrate AI-powered chatbots into their Facebook pages. Their chatbot helps businesses generate orders and resolve customer queries within Facebook Messenger. They help businesses with the complete journey from product showcase to easy checkout methods.[28]

---

[26]https://saleboard.pk/
[27]https://iparhai.com/iParhai/
[28]https://botnide.com/

TensorMinds

Tensorminds Private Limited is an Artificial Intelligence, Deep Learning, Big Data Analytics, Data Warehousing, & Business Intelligence Company. They specialize in Vision-AI, Sound-AI, Natural Language AI and Prediction AI. They have products and solutions for Container Terminal Automation, Media Monitoring and Analytics Automation, Automation of Medical Diagnosis through medical imagery and sounds, Voice Action and Natural Language based Business Intelligence Solutions, Automated Robotic Call Center Solutions, Solutions Safe and Secure Places, Product Quality Control Automation, Automation of Vehicle Access Management, and Face Recognition Solutions.[29]

Panacloud.ai

Panacloud is the world's first integrated API Ownership Economy, Crowdfunding, and Development Platform. It trains mobile/web developers, UI/UX designers, and Machine Learning engineers. The trained individuals then go on and build innovative applications for startups and corporations. One of their most notable clients is Meezan Bank for whom they built the Al-Meezan app.[30]

---

[29]https://www.tensorminds.net/
[30]https://www.panacloud.ai/
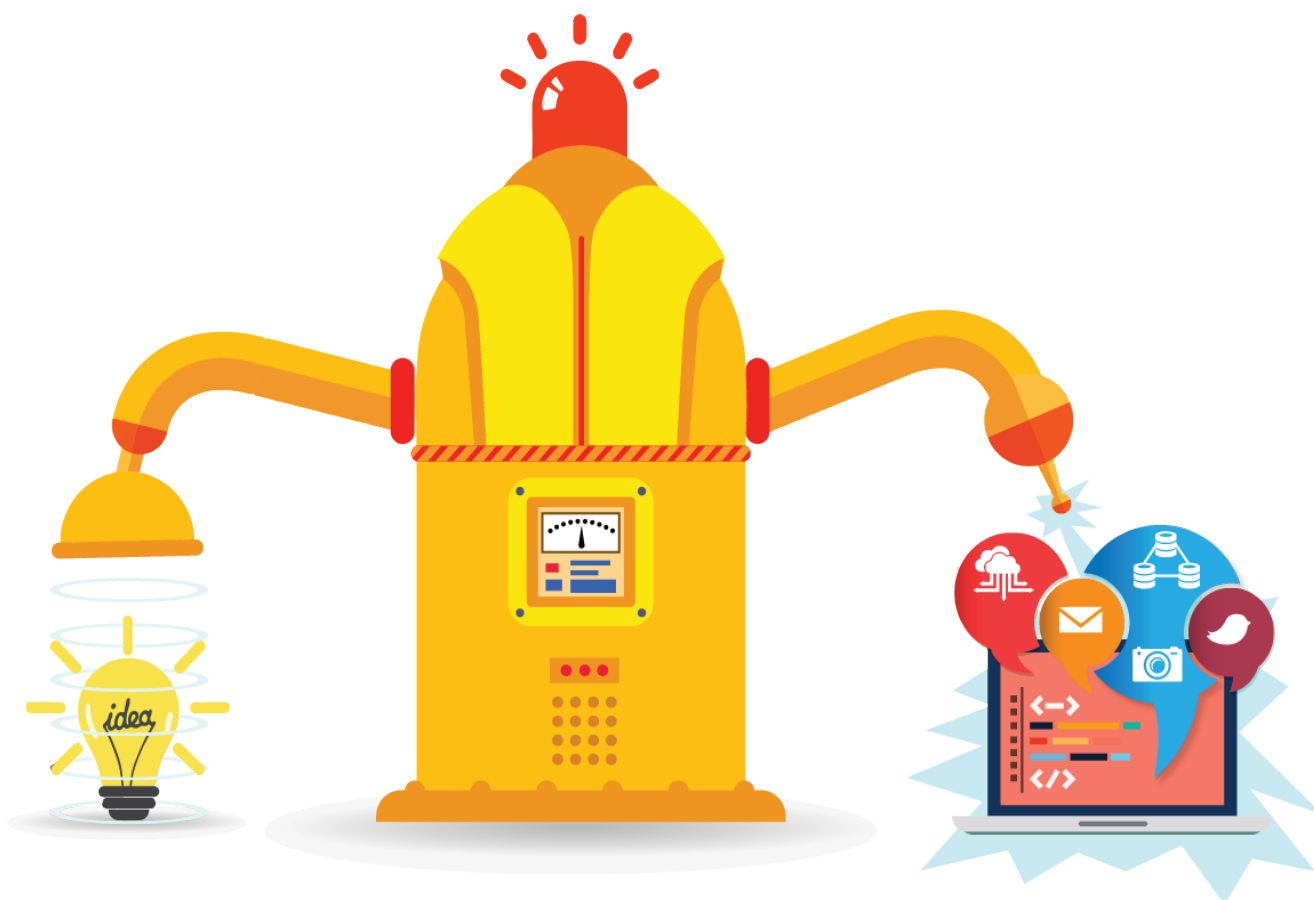
SLOSH
AI-SOLUTIONS

SloshAI

SLOSH AI Solutions is working on developing radiology solutions to increase the capacity and efficiency of the current workflow of hospitals. Their tools are powered by Artificial Intelligence and triage technology. Their tools include CXR Thorax which helps in triaging chest x-rays between normal and abnormal using AI and BT-CAD which also uses AI for segmenting out brain tumors.[31]

Snapthat

SnapThat

SnapThat helps businesses create more value by leveraging its platform to build and ship AI. Their services include Algorithm Design, Model Building, and Model Optimization. They have deployed over 56 models and launched 7 solutions using their platform.[32]

---

[31]https://slosh.ai/#/home
[32]https://www.snapthat.ai/

Proxima AI

Proxima AI provides custom Machine Learning development. Their solutions include Data Engineering, Machine Learning, custom Chatbots, and Data Analytics. Some of their projects include Eldes which aims to popularize the use of sign language, Fly-Fut which uses a computer vision model to pre-identify the events of a game and CREZER SA which introduces AI components on CCTV cameras that detects only people.[33]
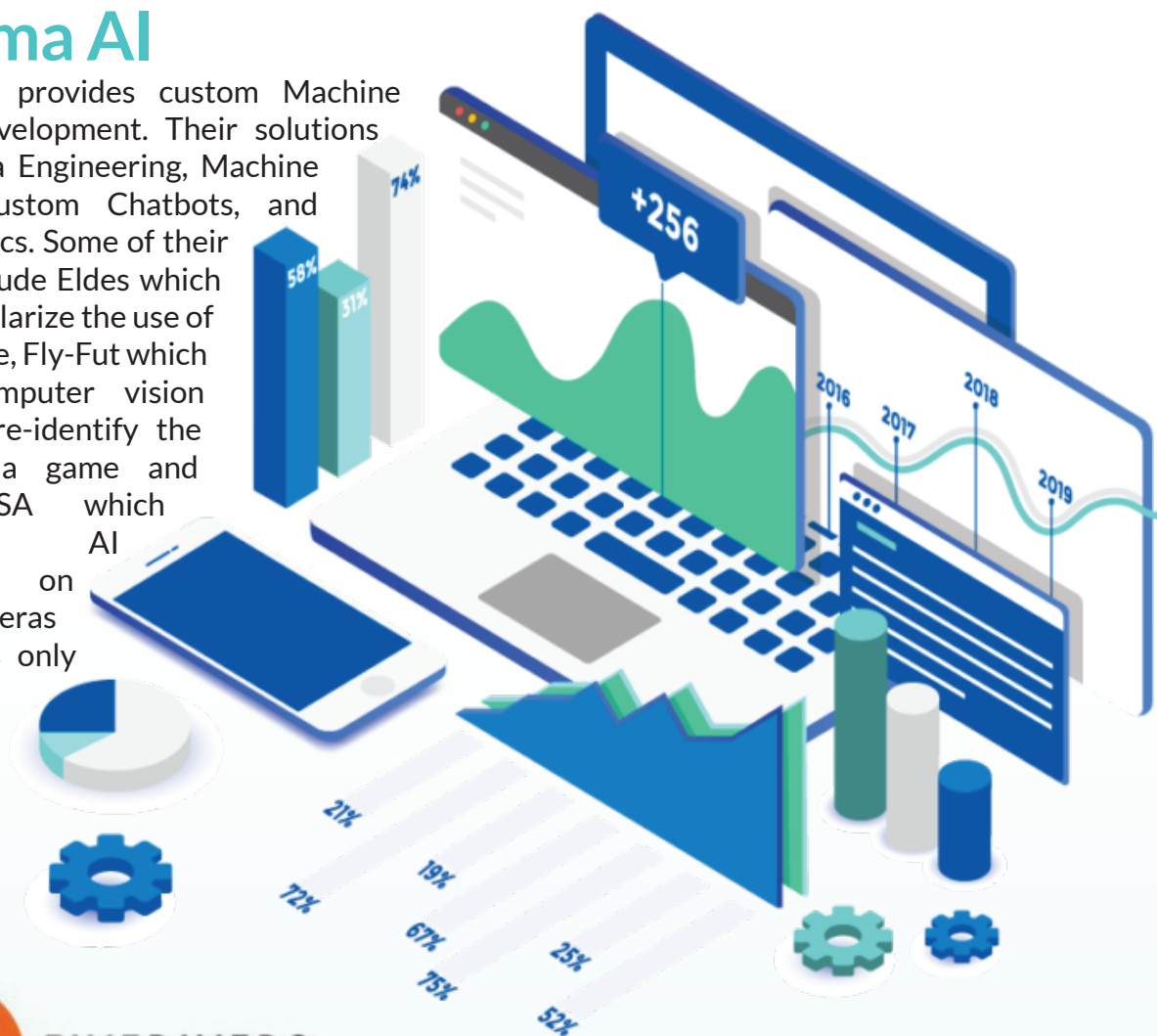
FiveRivers Technologies

FiveRivers has been at the cutting edge of technology since 2003, pioneering Virtualization and Systems Management technology for Enterprise and Embedded systems, developing globally top-ranked mobile applications downloaded tens of millions of times, and winning international awards for their work. They leverage qualitative and quantitative Data Analytics to deliver actionable insights, improve decision-making processes and help businesses attain a competitive advantage by capitalizing on potential gaps in the market.[34]

---

[33] https://www.proxima.pk/
[34] https://www.fiveriverstech.com/

TALK TO US

**DO YOU RUN A BUSINESS
IN THE ARTIFICIAL INTELLIGENCE,
MACHINE LEARNING AND DATA SCIENCE?**

GET IN TOUCH WITH YOUR DETAILS NOW AT

MKT@PSEB.ORG.PK

AND WE'LL TAKE IT FROM THERE.

ALSO EMAIL US FOR ANY COMMENTS, SUGGESTIONS
OR ERRORS IN THIS WHITEPAPER.

FOR MORE INFORMATION ON
REGISTERED COMPANIES, PLEASE VISIT

HTTPS://TECHDESTINATION.COM

ABOUT THIS INDUSTRY ROUNDUP

Pakistan Software Export Board developed this paper by hiring services of independent consulting firms to prepare this roundup on Pakistan's Artificial Intelligence, Machine Learning and Data Science sector. The paper focuses on Pakistan-based companies in this vertical and apprises the reader of the expertise available in Pakistan in the Artificial Intelligence, Machine Learning and Data Science domain.

DISCLAIMER

A product of TECH destiNATION Media

Comissioned by:

Ministry of Information Technology & Telecommunication
DIGITAL PAKISTAN

PAKISTAN
PSEB
SOFTWARE EXPORT BOARD

TECH destiNATION PAKISTAN

P@SHA
Pakistan Software Houses Association for IT & ITES

Developed by:

epiphany

cybervision INTERNATIONAL