

AI for Good

DEEP
LEARNING
LABORATORY



AI



NATIONAL CENTRE OF
ARTIFICIAL INTELLIGENCE

www.dll.seecs.nust.edu.pk

DEEP
LEARNING
LABORATORY



About Us

Deep Learning Laboratory (DLL) is a part of the National Center of Artificial Intelligence (NCAI), Islamabad, Pakistan. We are located at the National University of Sciences and Technology (NUST), Islamabad, Pakistan.

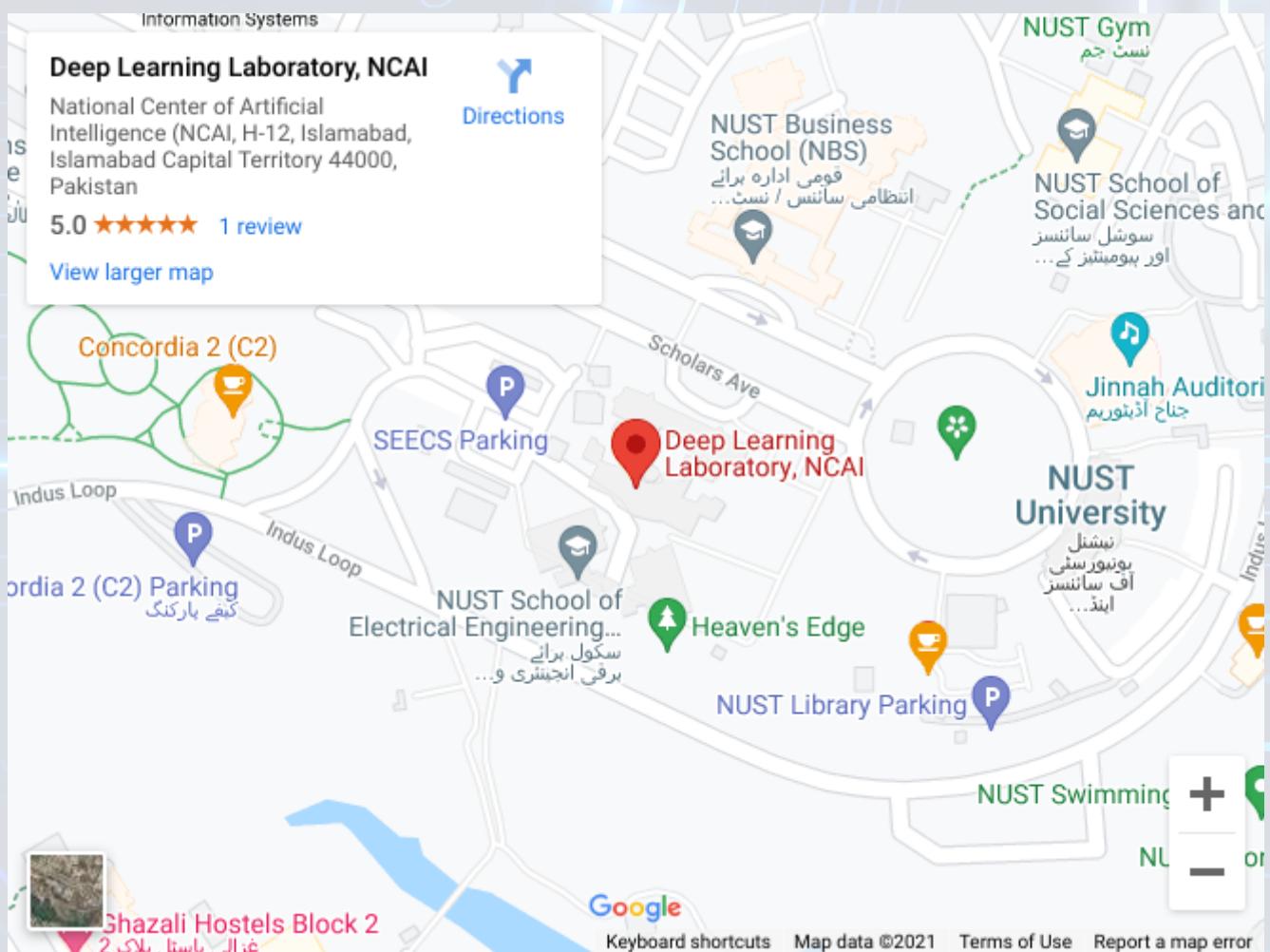
Contact Us

www.dll.seecs.nust.edu.pk

ai@seecs.edu.pk

+92-333-7729960

(Dr. Adnan Ul-Hasan)





Vision

To become a disruptive solution provider and innovator to propel Pakistan in the current era of technology

Mission



To help industry and government to realize their Industry 4.0 goals

Values

We believe in excellence, empathy and networking to create a win-win solution for every stakeholder

Team



**Prof. Dr. Faisal Shafait
Director,
Deep Learning Lab, NCAI**

Professor Dr Faisal Shafait received his Ph.D. (Hons) degree in Computer Engineering from TU Kaiserslautern, Germany, in 2008. He is currently on the faculty of School of Electrical Engineering & Computer Science (SEECS), NUST. Besides, he is an adjunct professor with the School of Computer Science & Software Engineering, the University of Western Australia, where he formerly held an Assistant Professor position. He has worked for a number of years as a Senior Researcher at the German Research Centre for Artificial Intelligence, Germany, and a Visiting Researcher with Google, CA. He has coauthored over 100 publications in international peer-reviewed conferences and journals in the field of artificial intelligence, machine learning and computer vision. His research interests include Machine Learning & Computer Vision with a special emphasis on applications in Document Image Analysis & Recognition. He is an Editorial Board Member of the International Journal on Document Analysis & Recognition, and a Programme Committee Member of leading document analysis conferences, including ICDAR, DAS and ICFHR. He is also serving on the Leadership Board of IAPR's Technical Committee on Computational Forensics (TC-6). He has been awarded IAPR Young Investigator Award for his contribution in the field of AI and computer vision.

Team



Dr. Mohammad Imran Malik
Co-Director,
Ground Surveillance

Dr Muhammad Imran Malik did his Masters in Computer Science and PhD in Artificial Intelligence in 2011 and 2015 respectively from University of Kaiserslautern, Germany. He is currently an Assistant Professor at SEECS, NUST. He also worked as a visiting researcher for 3 months in Kyushu University, Fukuoka, Japan, and University of Western Australia, Perth, Australia, in 2013 and 2014 respectively. His research interests include Machine Learning & Computer Vision with a special emphasis on applications in Document Image Analysis & Recognition and his number of publications is 35.



Dr. Mohammad Shahzad
Co-Director,
Aerial Surveillance

Dr Muhammad Shahzad received his PhD degree in Radar Remote Sensing & Image Analysis at the Department of Signal Processing in Earth Observation (SiPEO), Technische Universität München (TUM), Munich, Germany, in 2016. His work was closely linked to the TerraSAR-X and TanDEM-X satellite missions, the biggest German Earth observation endeavours ever, with both scientific as well as commercial applications. Besides, Dr Shahzad also worked as a visiting research scholar at the Institute for Computer Graphics and Vision (ICG), Technical University of Graz, Austria. His research interests include processing both unstructured/structured 3D point clouds, optical RGBD data and very high-resolution radar images. His number of publications is 22.

Team



Dr. Mohammad Ali Tahir
Co-Director,
Speech Technologies

Dr Muhammad Ali Tahir joined NUST in February 2016. He has been engaged in Computer Science teaching as well as industrial consultancy projects. For one project with TPL Trakker Ltd. he developed an Urdu speech navigation system for use by Pakistani drivers. He did his MSc and Ph.D. in 2008 and 2015 respectively from RWTH Aachen University, Germany; and BE from NUST in 2003. During his PhD research, he worked on neural network architectures; as well as European Union-funded projects such as QUAERO, EU-bridge and Trans Lectures. These projects aim to bridge the language divide in a multilingual Europe, by building solutions for recognising human speech and translating into other languages. His number of publications is 13.



Dr. Adnan Ul-Hasan
Team Lead,
Deep Learning Lab, NCAI

Dr Adnan Ul-Hasan did his Ph.D. from TU Kaiserslautern and German Research Center of Artificial Intelligence (DFKI) in 2016. His research expertise are in the field of Text Recognition from documents and other media. He contributed in Kallimachos project, which aimed at digitizing Old German script of 15th century. He has conducted pioneering research in Urdu text recognition for printed text, handwritten text, video text and in natural images. His research interests include text recognition, deep learning, information retrieval, natural language processing and explainable AI. He has published over 35 research publications. He has 10+ years of experience in developing AI algorithms for text recognition and information retrieval systems.

Team

05

PHD IN AI

10

AI AND SW DEVS

06

PH.D. STUDENTS

03

MS STUDENTS

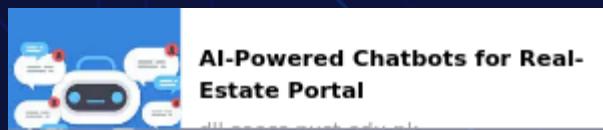
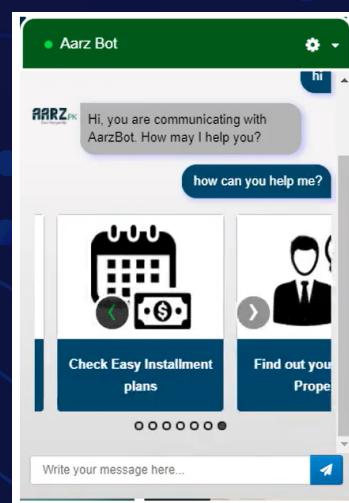
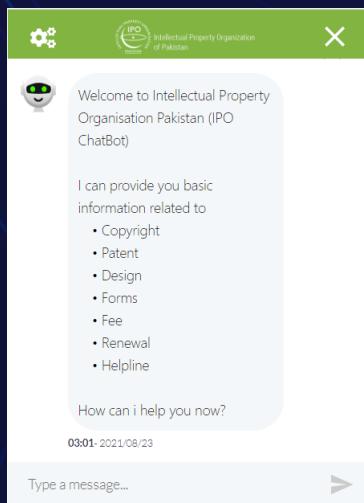
Our Projects and Products.

Context Aware Chatbots

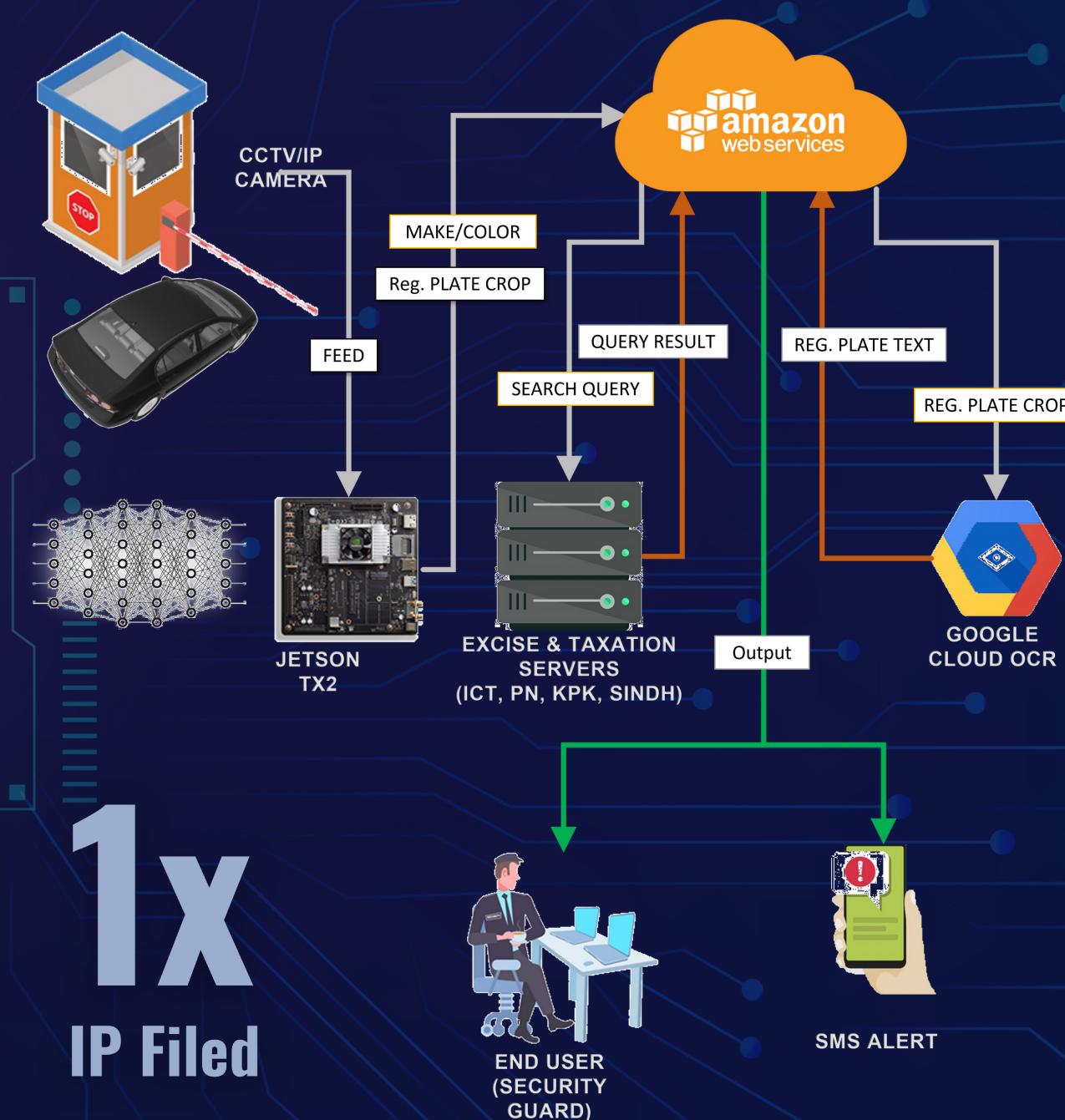
5X
IP Filed



An AI powered Personalized Conversational agent that facilitates online customers by using long-term conversational context and “Managed Forgetting”



Vehicle Recognition and Verification



1X
IP Filed

Automatic real-time vehicle Registration number detection and recognition embedded device using machine learning and computer vision based techniques. It detects vehicle and its registration number from live feed of the already installed IR video cameras

AI Driven Decision Support System for Pakistani Judiciary

Data Driven Verdicts

Recommends the likely outcome of a petition

Relevant Case Retrieval

Finds similar cases from the existing knowledgebase

Forensic Tools

Verifies persons, texts, signatures, etc. for online court proceedings



Speech to Text

Creates the courtroom proceedings of a given session

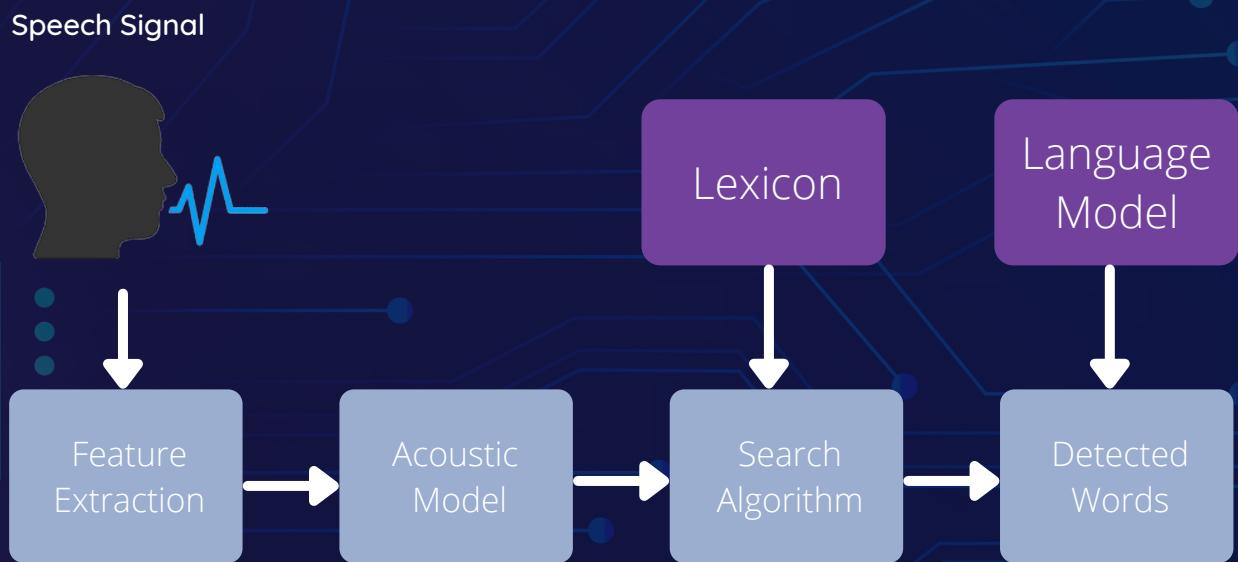
Knowledgebase and Data Anonymization

Digitizing the existing records to be consumed by AI algorithms. Anonymizing for privacy regulations

AI Driven Judicial Support System will help realize the vision of speedy justice for the common people of Pakistan. It will enable all courts of Pakistan to process petitions and conflicts efficiently and to disburse the justice as quick as possible.



Automatic Speech Recognition



Speech is the most natural form of communication. ASR allows computers to understand human speech. ASR is useful especially for developing countries with less literate population.

SPEECH TRANSCRIPTION

Speech transcription is widely used to get a record of audio data from any media channel.



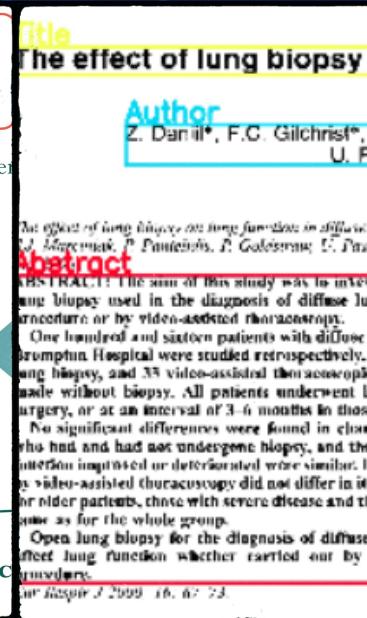
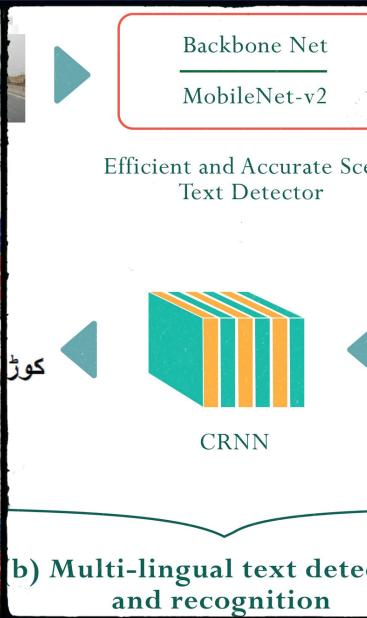
VOICE BASED APPS

Many speech assistants like Google Assistant and Apple Siri use the power of ASR to provide voice-based navigation and control over ones devices.

CALL ANALYTICS

ASR is widely used in call data analytics. It can help optimize and improve the current processes in any customer-oriented processes.

Text Recognition & Information Retrieval



Text recognition is the core step in many practical systems, such as, automated email processing, information retrieval, form processing, Entity recognition, etc. We have 15+ experience in developing Urdu text recognition algorithms for text in printed, handwritten, natural images, videos, etc.

VIDEO TEXT RECOGNITION

Text in videos can be used in extracting useful information such as news trends, top personalities, channel narrative, etc.

INFORMATION EXTRACTION

Text recognition from scanned documents helps in retrieving relevant information like medical history, patient information, equipment specs, etc.

DIGITAL LIBRARIES

OCR has helped created Google Books, the largest online collection of digital copies of books printed on papers.

<http://www.urduocr.com/>

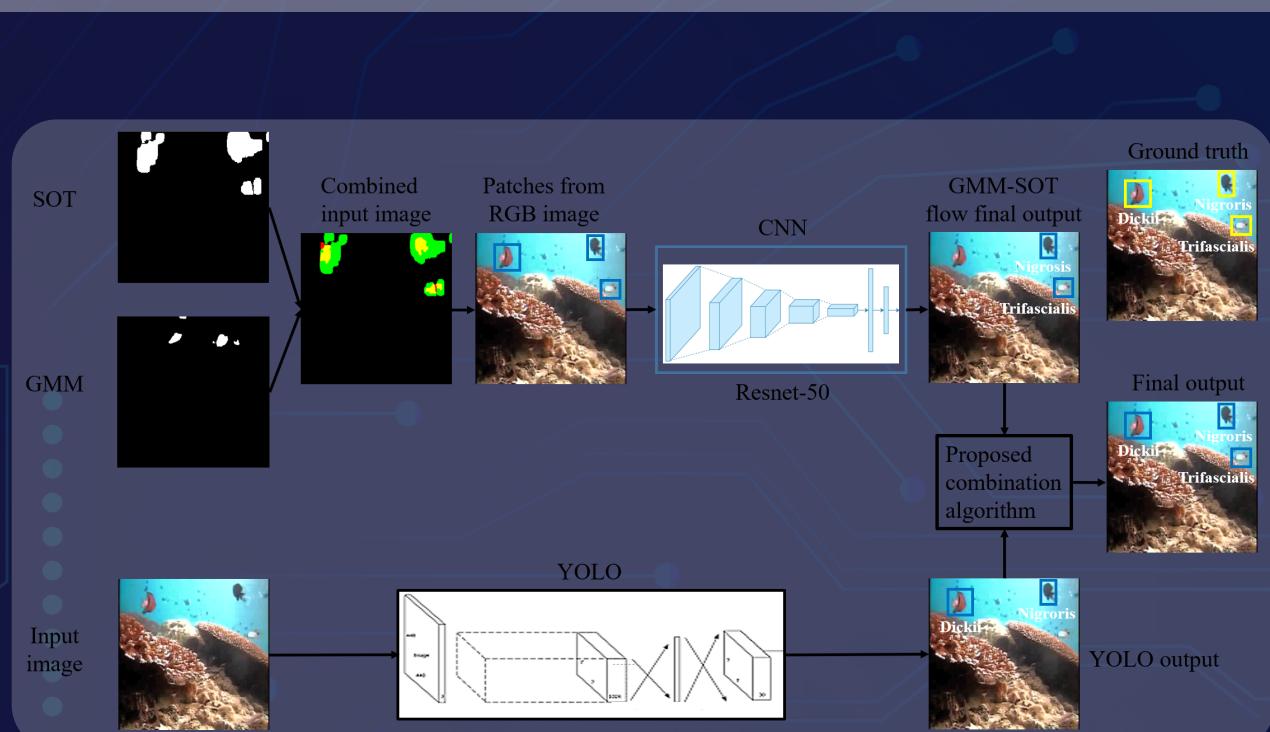
URDU HANDWRITING

Urdu HWR helps recognizing handwritten Urdu text in documents, such as, cheques, forms, post, etc.

HERITAGE PRESERVATION

Text recognition enables us to preserve our cultural and national heritage (historical documents) for future generations.

Underwater Fish Classification & Tracking



Underwater Computer Vision is an emerging field that enables the use of AI in preserving marine life and help scientists to study the movement patterns of fish under different conditions and seasons.

MARINE ECOLOGY ESTIMATION

Speech transcription is widely used to get a record of audio data from any media channel.



FISH ABUNDANCE AND BIOMASS ESTIMATION

ASR is widely used in call data analytics. It can help optimize and improve the current processes in any customer-oriented processes.

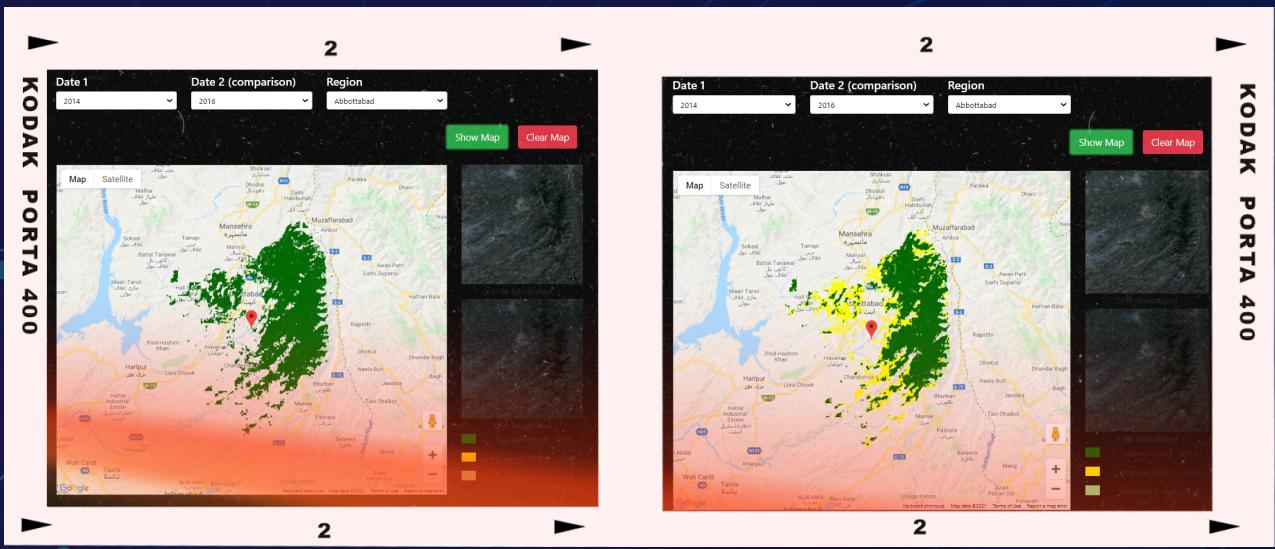
PRESERVATION OF ENDANGERED SPECIES

Many speech assistants like Google Assistant and Apple Siri use the power of ASR to provide voice-based navigation and control over ones devices.

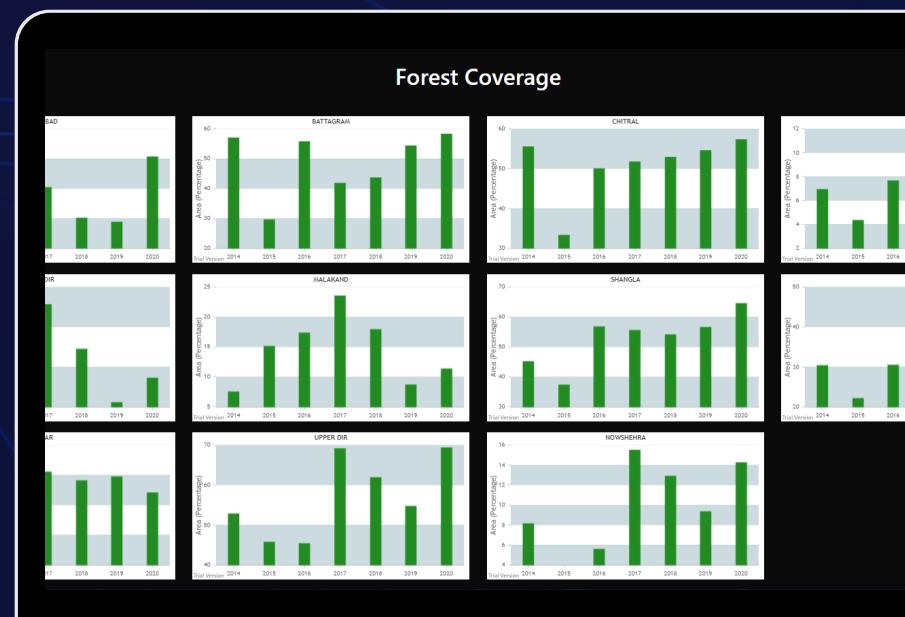
Forest Change Detection & Monitoring



Forest Monitoring and Change Detection using Remote Sensing Data



To develop a system that is able to quantitatively monitor forests of Pakistan to enable thorough assessments of local forest conditions e.g., degradation and deforestation caused by theft, urbanization or natural factors such as arid climate, heavy dependence on irrigation water, etc. by employing state-of-the-art machine learning techniques.



6X
IP Filed

Medium.ai (our spin-off)



TV Stream



Medium.ai



Analytics and Alerts



**Media Houses,
Ad Agencies,
Regulators,
MNCs**



Audio/Video Analytics (AV Analytics)

- **Media Radar**

- 24/7 live monitoring/surveillance of selected channels
- Audio-keyword detection
- Text detection and recognition
- Person detection and recognition
- Alert Generation
- User friendly Software

- **Media Analyzer**

- Automatic Content Extraction - speech, text, faces
- Brand Recognition - Contents and Statistics
- Audit Reports - Air-time, Brand-time, Spot Analysis
- Mapping of TRPs to the Contents

- **Media Mood**

- Media Trend Analysis
- Breaking News Winner
- Media Sentiment
- Channel's narrative analysis
- Content Recommendation

Our Services

- We are a team of AI Experts
- We have access to the best talent in the country
- We love to solve difficult problems

Technology Development

We have access to the finest talent in the country when it comes to Artificial Intelligence, Computer Vision, Machine/Deep Learning, Data Science and Natural Language Processing. Having knowledge of product development for our own startups, we have experience for all steps of a product life-cycle. These capabilities makes us stand out from the rest of the competition.

We are therefore your best choice as a technology partner.

- Smooth on-boarding
- Best talent matching to your specific need
- Cost-effective and high quality work
- Engagement negotiations are fast and flexible
- Can Do attitude for every challenging task

Skill Development

We are your one stop training provider to upgrade your team in Artificial Intelligence and related technologies, . Our network of highly qualified (mostly PhDs in niche technology) will enable your team to discover their true potential to sky-rocket your growth.

We provide on-premise corporate trainings according to your specific needs.

We also provide expert consultation services to oversee your in-house AI projects.



AI Lounge (our Spin-off) is on a mission to make AI Education accessible to masses in Pakistan and beyond.

Our Network

We believe in the power of
NETWORK

Our Network



NATIONAL CENTRE OF
ARTIFICIAL INTELLIGENCE



German
Research Center
for Artificial
Intelligence



TECHNISCHE UNIVERSITÄT
KAISERSLAUTERN



Talk to US!

ai@seecs.edu.pk



Dr. Adnan Ul-Hasan,
Team Lead
adnan.ulhassan@seecs.edu.pk
+92-333-7729960



Tayab Ali,
Business Development Manager
tayab.bdm@ncai.nust.edu.pk
+92 333 9961713

www.dll.seecs.nust.edu.pk

AI for a better tomorrow

DEEP
LEARNING
LABORATORY



Deep Learning Laboratory,

National Center of Artificial Intelligence (NCAI),

School of Electrical Engineering and Computer Science,

National University of Sciences and Technology (NUST),

H-12, Islamabad, Pakistan



**NATIONAL CENTRE OF
ARTIFICIAL INTELLIGENCE**

www.dll.seecs.nust.edu.pk