Department of

Artificial Intelligence

Rawalpindi Medical University

Contents

Prof Muhmmad Umar (S.I, H.I) Vice Chancellor

I trust this message finds you well. I wanted to express my sincere appreciation for the exceptional work being carried out in the AI Department at Rawalpindi Medical University. Your dedication to advancing healthcare through cutting-edge technologies has not gone unnoticed.

As we move forward, I urge you to continue your tireless efforts in harnessing the power of artificial intelligence to further enhance the quality of healthcare services at our institution. Your expertise and innovation are key to providing better and more advanced care for our patients.

Let us collaborate closely to explore new avenues, develop innovative solutions, and integrate AI seamlessly into our healthcare system. Together, we can achieve unprecedented breakthroughs in patient care, diagnostics, and treatment.

I encourage you to pursue interdisciplinary collaborations and seek external partnerships to expand our reach and impact in the healthcare sector. Your commitment to improving healthcare aligns perfectly with our university's mission, and I have no doubt that your efforts will leave a lasting legacy.

Thank you for your dedication and passion. Together, we can pave the way for a healthier and brighter future for our community.

Prof Riaz Ahmed (Director AI)

I feel honored to announce the establishment of the Artificial Intelligence Department at Rawalpindi Medical University. We are highly enthusiastic and dedicated to incorporating advanced AI technology into the field of medicine. Artificial intelligence has the capacity to greatly transform healthcare by improving the accuracy of diagnoses, optimizing treatment strategies, and simplifying administrative tasks. Our department's objective is to utilise this potential to improve patient care and promote medical research.

I cordially invite all teachers, students, and researchers to actively engage in the various initiatives organized by our department, including courses, research partnerships, and groundbreaking projects. Collectively, we may investigate the limitless potential that AI presents in healthcare and jointly contribute to the advancement of medical knowledge. We are dedicated to furnishing you with the essential resources and specialized knowledge to thrive in this dynamic and swiftly progressing domain.

I urge you to explore the forthcoming courses, workshops, and research prospects that our department will provide in the future. Continue to be attentive for forthcoming updates and announcements as we endeavour to ensure that you are well-informed about our projects. I look forward to our collaborative endeavours in navigating this thrilling path where AI plays a crucial role in enhancing healthcare.

Rawalpindi Medical University
Department of A.I

Team A.I

Prof Muhammad Umar (S.I, H.I)
Vice Chancellor of Rawalpindi Medical University

DR. FUAD AHMAD KHAN NIAZI
Co- Director A.I

Dr. Junaid Khan
Co- Director A.I

Dr Nasir Khan
Head of Radiology

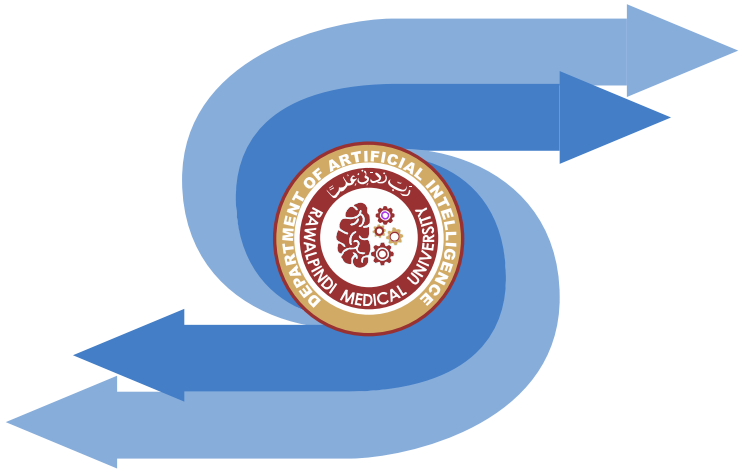
Prof Riaz Ahmed
Director AI
Chairman Rankings of RMU

Dr. Javeria
National Coordinator

Rawalpindi Medical University
Department of A.I

Mission

R MU, Department of A.I our mission in healthcare AI is to lead innovation with compassion. We strive to integrate AI seamlessly into medical practice, enhancing patient outcomes and accessibility. Through ethical AI practices and cutting-edge research, we aim to create a healthier and more equitable world



Vision

In the future of healthcare, AI is the catalyst for precision and compassion. Through personalized treatments, early disease detection, and streamlined processes, RMU Department of AI will empower patients and providers alike. Ethical AI practices and global accessibility will ensure healthcare's transformation is equitable and secure, delivering optimal care to all.

Introduction

The advent of AI, robotics, machine learning, and informatics has revolutionized the medical field in recent years. These advanced technologies have enhanced medical diagnostics, treatment planning, and patient care while simultaneously reducing costs and improving outcomes. In order to ensure that the medical professionals of Pakistan are equipped to leverage these advancements, it is proposed that Rawalpindi Medical University establish a Department of AI and Robotics. This department will provide undergraduate and postgraduate students of medicine and surgery with specialized courses and hands-on training in these emerging technologies, ensuring they are well-prepared to excel in their respective fields.

Objectives

To develop a comprehensive curriculum encompassing Department of A.I, robotics, machine learning, and informatica tailored for medical students, starting with an MS degree program
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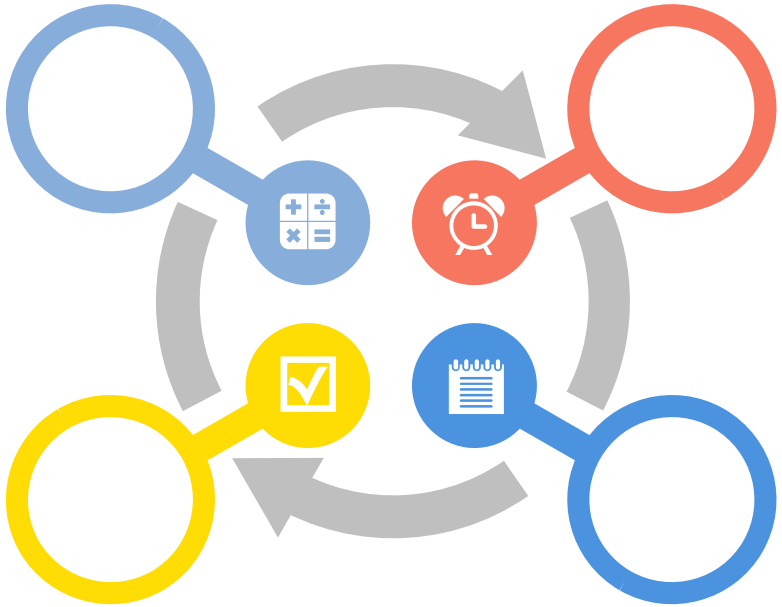


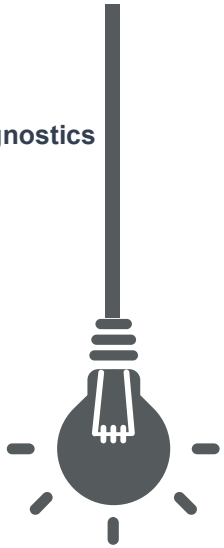
To recruit highly-qualified faculty and staff with expertise in AI, robotics, and medical applications.

To establish state-of-the-art laboratories for practical training and research in Department of A.I and robotics applied to medicine and surgery.

To foster collaboration between medical professionals and AI experts for innovation in healthcare.

General Benefits of A.I in Medical Education

Enhanced Diagnostics

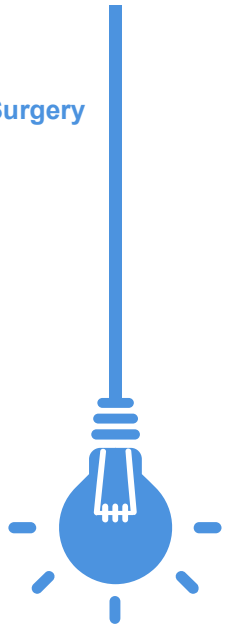


Enhanced diagnostics: AI-driven technologies such as deep learning algorithms can improve the accuracy and speed of diagnostics by analyzing complex medical data such as medical imaging and electronic health records.

Precision Medicine

AI and machine learning allow for more personalized treatment plans based on a patient's unique genetic makeup, lifestyle, and environmental factors.

Robotic Surgery

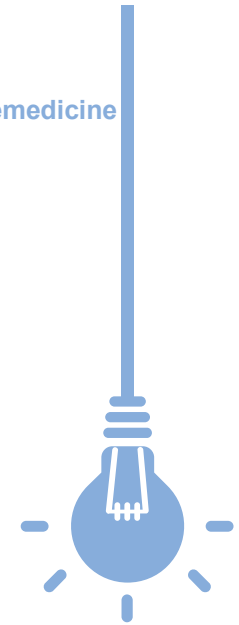


Robotics enable minimally invasive surgeries with enhanced precision, reduced blood loss, and quicker recovery times.

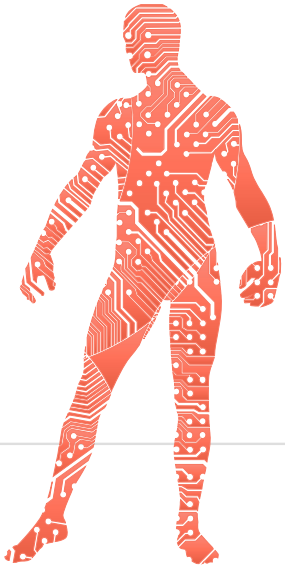
Virtual Patients Monitoring

Virtual patient monitoring: AI-powered monitoring systems can predict and prevent adverse events, improve patient safety, and reduce hospital readmission.

Telemedicine



AI and robotics can facilitate remote consultations, providing better access to healthcare for patients in remote areas.



Rationale

- Rawalpindi Medical University (RMU) aims to lead in medical education and research by establishing a Department of AI and Robotics.
- Equip students with essential skills to navigate the evolving healthcare landscape, incorporating AI, robotics, machine learning, and informatics.
- Fostering interdisciplinary collaboration and addressing healthcare challenges.

Rawalpindi Medical University
Department of A.I

Learning Outcomes for MBBS Students Taking Additional Courses in AI and Robotics

1. The addition of AI and robotics courses to the MBBS curriculum at Rawalpindi Medical University aims to prepare future medical professionals with the following learning outcomes:
2. Understanding AI and Robotics: Gain a solid foundation in AI, robotics, and machine learning principles.
3. Applying AI in Medicine: Proficiency in applying AI and robotics in medical contexts like diagnostics, treatment planning, and surgery.
4. Analyzing Medical Data: Develop skills to analyze complex medical data using AI techniques. Ethical and Regulatory Knowledge: Understand the ethical and regulatory aspects of AI and robotics in healthcare.
5. Problem-Solving Skills: Enhance problem-solving and critical thinking abilities through practical applications.
6. Interdisciplinary Collaboration: Learn to collaborate effectively with professionals from different fields.
7. Stay Updated: Stay informed about the latest research and developments in AI and robotics in medicine.
8. Specialization Preparedness: Be well-prepared for future specialization in areas like medical robotics and health informatics.

On Going Projects Rawalpindi Medical University

Artificial Intelligence
On Going Research Project

Department of Medicine & Allied, Rawalpindi Medical University

AI -Health care app as a platform/engine for determining vital Signs non -Invasively

Prof Dr Muhammad Umar
Vice Chancellor
Principal Investigator

Adnan Siddique
Co- Principal Investigator

Dr. Javeria
Co-Principal Investigator

AI -HEALTH CARE APP AS A PLATFORM/ENGINE FOR DETERMINING VITAL SIGNS NON -INVASIVELY

AI Project Summery

Dr Muhammad Umar, VC, RMU

Dr. Javeria

Dr. Adnan Siddiquie CO EZ-Shifa

Through the use of artificial intelligence (AI) in the early identification of numerous medical diseases, the study proposal of EZShifa seeks to establish a ground-breaking development in healthcare. The goal of this project is to create and implement cutting-edge AI-driven diagnostic tools that will transform the way doctors diagnose and treat patients' health problems. This research aims to increase the accuracy, speed, and efficiency of medical diagnostics through the use of AI algorithms, resulting in better patient outcomes and altered healthcare practices.

The project's main objective is to build EZDiags, a powerful AI-powered platform that will deliver precise and timely diagnostic assessments in a variety of medical sectors. EZDiags will be a flexible tool for healthcare professionals, allowing them to make better informed decisions and optimize treatment programs by recognizing common illnesses as well as diagnosing unusual and difficult problems.

In order to create and train AI models that can analyze medical data, photos, and reports, the project entails substantial collaboration with medical professionals, data scientists, and software engineers. Early illness identification, accurate diagnostic findings, and the supply of medical experts with actionable suggestions are all features of the platform.

The initiative stresses a patient-centric approach in addition to technology innovation by concentrating on the real-world application of AI diagnostics within healthcare institutions. By assuring the smooth integration of AI technologies into current processes, EZShifa aims to close the gap between cutting-edge technology and standard medical practice.

Not only does the suggested study have the potential to greatly increase the accuracy of medical diagnoses, but it also promises to solve problems with healthcare such as a lack of resources, a lack of time, and the requirement for speedy and accurate decision-making. By utilizing AI, EZShifa seeks to equip healthcare professionals with a game-changing tool that improves patient care, enables early intervention, and advances healthcare as a whole.

In conclusion, the EZShifa research project uses AI technology to reimagine the landscape of medical diagnostics. The initiative hopes to bring in a new era of accuracy, efficiency, and accessibility in healthcare through the development of EZDiags, which will eventually benefit patients and healthcare professionals alike.

Update till now:

AI Project Summery

Data Analysis with Charts and Ranges + Requirements for Accuracy

Title: AI HEALTH CARE APP AS A PLATFORM/ENGINE FOR DETERMINING VITAL SIGNS NON-INVASIVELY

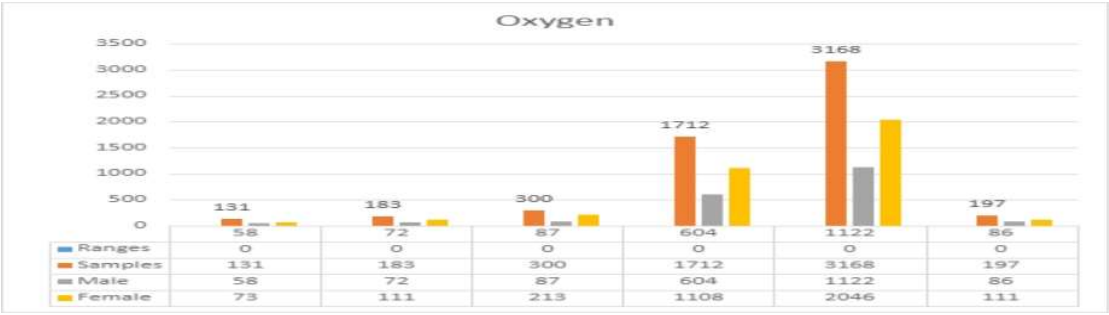
Vital signs include:

- **Blood pressures**
- **Temperature**
- **pulse**
- **Oxygen saturation**
- **Blood sugar levels**

Data record from December 2022 till May ,2023

Sample Data Collected: **5776**

Ranges	50-60	61-70	71-80	81-90	91-100	101-110
Samples	194	1053	2027	1724	702	180



Required Ranges to optimize the AI Engine: Normal Range Data is required. Sample Data Collected: **53**

Ranges	90-91	92-93	94-95	96-97	98-99	100-101
Samples	131	183	300	1712	3168	197

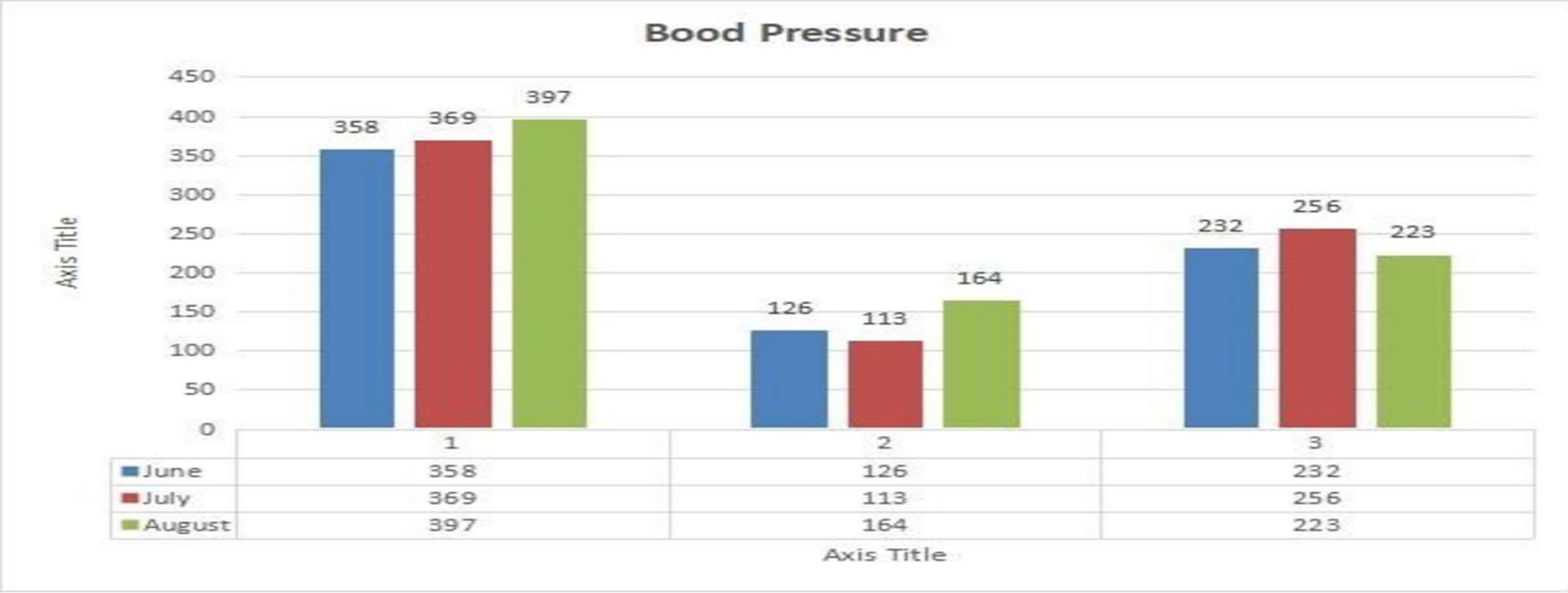
Vitals Monitoring Graphical Representation Pulse

Data Record from June till August 2023

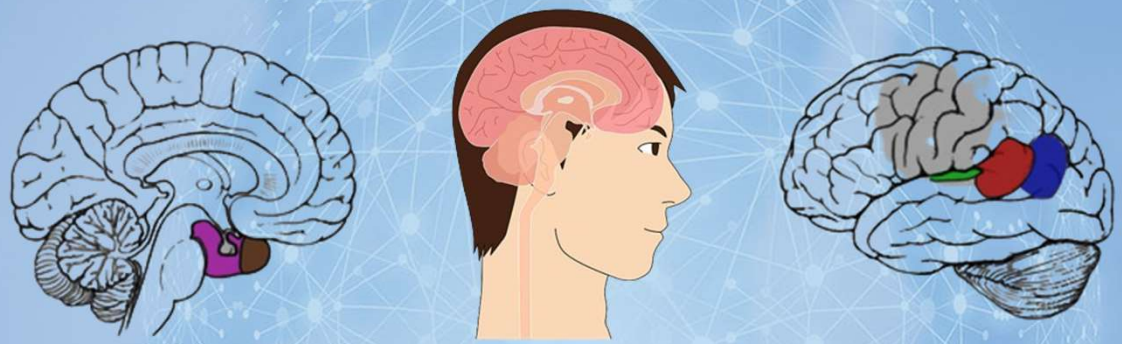
Vitals	June	July	August
Pulse	368	369	397
Male	127	113	164
Female	240	256	223

AI Project Summery

Vitals	June	July	August
Blood Pressure	358	369	397
Male	126	113	164
Female	232	256	223



Artificial Intelligence
On Going Research Project



Department of Radiology Holy Family Hospital

Electronic triage of cerebral hemorrhages on non contrast CT

Dr. Junaid Kalia
Principal Investigator

Dr. Nasir Khan
Co-Principal Investigator

AI -HEALTH CARE APP AS A PLATFORM/ENGINE FOR DETERMINING VITAL SIGNS NON -INVASIVELY

AI Project Summery

Dr Junaid Kalia

Dr. Nasir Khan

Artificial intelligence (AI) offers the opportunity to transform image interpretation from qualitative and subjective task effortless quantifiable and reproducible task.

Intracranial hemorrhage is one of the fatal neurological emergencies that requires immediate detection and timely intervention to save the lives of the patients and to avoid any long-term neurological deficits

There are a limited number of neuroradiologists in developing countries and it is sometimes impossible to get an urgent CT scan report in an emergency setting.

minor hemorrhages can be overlooked which can significantly change the choice of interventions and the care that a patient would receive.

The aim of this project is to

1) To develop a deep learning algorithm for automated detection of intracranial hemorrhage that can assist physicians in rapid triaging the patients in busy trauma centers.

2) To evaluate the accuracy and efficiency of model in providing rapid and better healthcare by deploying it.

3) Further explore uses of deep learning to improve radiological triage to decrease latency of care.

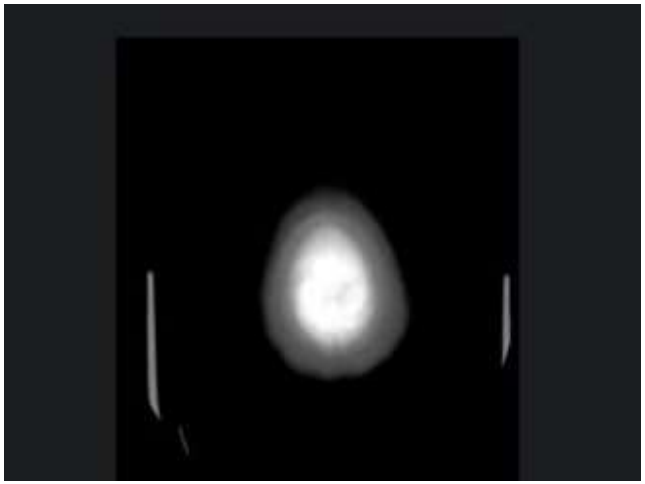
	Total	Percentage
Total CT Brains	8578	
Total Bleeds	737	8.6%
Total Traumatic	91	12.3%
Total Non-Traumatic	646	87.6%

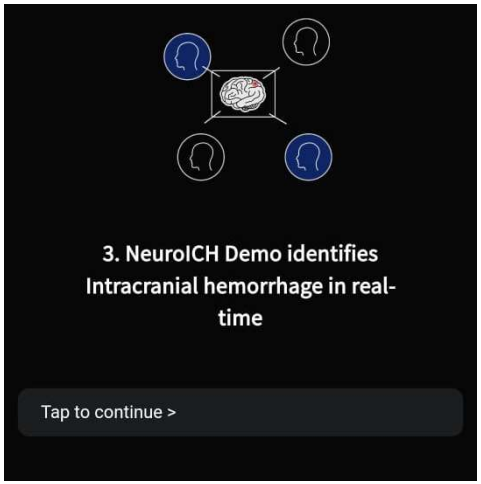
FUTURE VISION

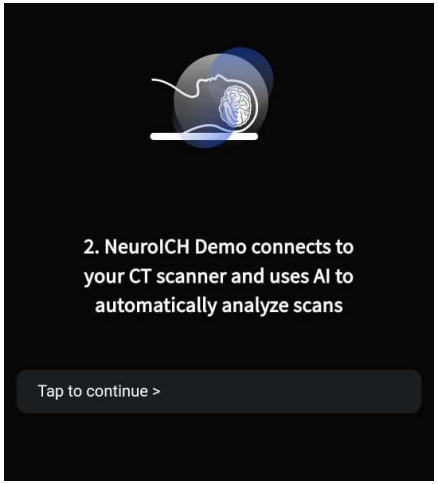
Integrate AI system into radiology workflow as a “second reader” that can improve diagnostic confidence of radiologists and potentially increase detection of subtle and minor hemorrhages which can be otherwise missed by a radiologist in busy clinical practice.

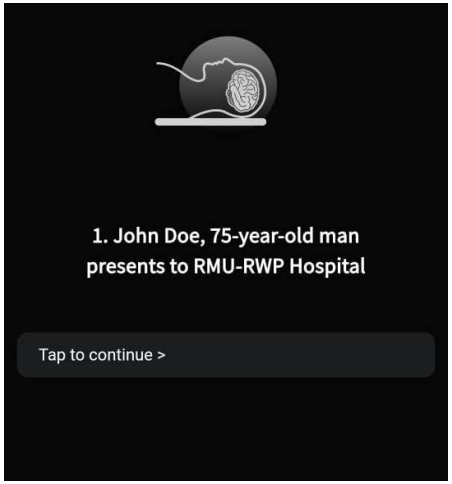
AI Project Summery

	2023				2022				2021				2020				2019			
	Bleeds		Total Bleeds	Total CT Brains	Bleeds		Total Bleeds	Total CT Brains	Bleeds		Total Bleeds	Total CT Brains	Bleeds		Total Bleeds	Total CT Brains	Bleeds		Total Bleeds	Total CT Brains
	Traumatic	Non-traumatic			Traumatic	Non-traumatic			Traumatic	Non-traumatic			Traumatic	Non-traumatic			Traumatic	Non-traumatic		
Jan	0	19	19	184	1	7	8	125	0	12	12	151	2	5	7	100	0	12	12	146
Feb	0	9	9	186	2	11	13	143	0	17	17	165	0	9	9	143	0	18	18	180
Mar	0	11	11	127	0	17	17	177	1	12	13	176	1	15	16	119	0	16	16	154
Apr	1	3	4	78	4	7	11	147	0	7	7	173	0	15	15	78	0	9	9	155
May	5	5	10	147	0	8	8	146	0	14	14	100	0	8	8	73	0	11	11	133
Jun	3	5	8	114	0	15	15	155	1	5	6	138	2	14	16	114	6	11	17	129
Jul	6	15	21	154	2	9	11	102	3	8	11	131	3	13	16	131	0	15	15	183
Aug	1	9	10	185	0	8	8	156	2	6	8	124	1	16	17	137	1	15	16	156
Sep	5	6	11	176	1	17	18	178	2	8	10	123	1	9	10	211	0	6	6	136
Oct	4	6	10	109	5	9	14	184	0	9	9	113	2	9	11	165	6	11	17	167
Nov			0		3	32	35	250	0	7	7	134	0	13	13	159	5	5	10	163
Dec			0		6	21	27	220	0	11	11	151	2	16	18	176	1	10	11	148
Total	25	88	113	1460	24	161	185	1983	9	116	125	1679	14	142	156	1606	19	139	158	1850
Percentage	22.1	77.9	7.7		12.97	87.0	9.3		7.2	92.8	7.4		8.97	91.02	9.7		12.02	87.97	8.54	



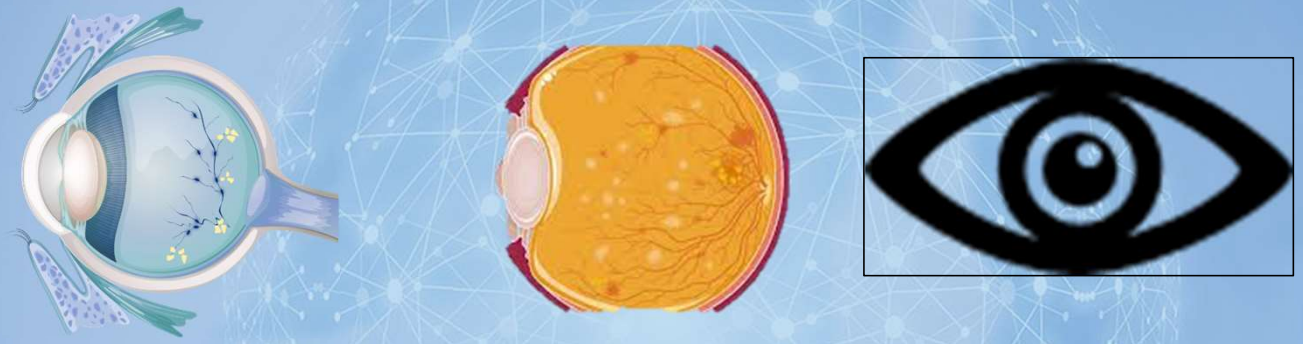

3. NeuroICH Demo identifies Intracranial hemorrhage in real-time
Tap to continue >


2. NeuroICH Demo connects to your CT scanner and uses AI to automatically analyze scans
Tap to continue >


1. John Doe, 75-year-old man presents to RMU-RWP Hospital
Tap to continue >


4. The stroke team receives push notifications to their phones
Tap to continue >

Artificial Intelligence
On Going Research Project



Department of Ophthaimology Holy Family Hospital

Efficacy of Artificial Intelligence in Grading the Severity of Diabetic Retinopathy

DR. FUAD AHMAD KHAN NIAZI
Principal Investigator

DR. MASOOD AHMED
Co-Principal Investigator

AI Project Summery

Efficacy of Artificial Intelligence in Grading the Severity of Diabetic Retinopathy

Dr Fuad Khan Niazi

Dr. Masood Ahmed

Our research aims to assess the effectiveness of Artelus DRISTi V2 A.I software in grading diabetic retinopathy, compared to human experts. Given its significance in managing vision impairment in diabetic patients, this proposal explores AI's potential to enhance diagnostic accuracy and patient outcomes.

Date Collection

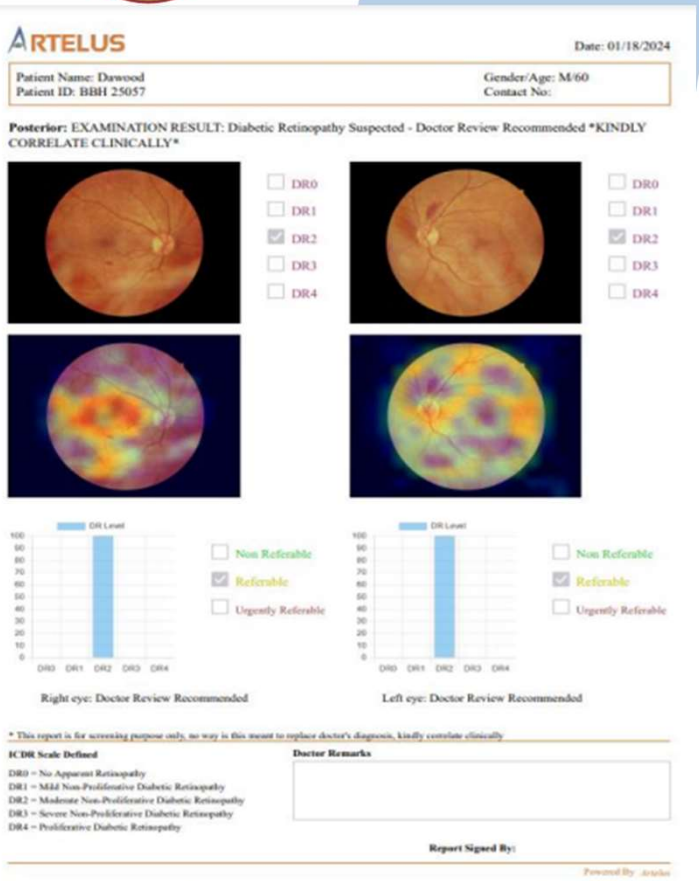
747 Patients have been have been screened till now.

 Males: 308 Females: 439

Diabetic Retinopathy was suspected in 141 pts.

 Males: 55 Females: 86

A.I Software Generated Report ICDR Scale Defined: DR0: No Apparent Retinopathy DR1: Mild Non-Proliferative Diabetic Retinopathy DR2: Moderate Non-Proliferative Diabetic Retinopathy DR3: Severe Non-Proliferative diabetic Retinopathy DR4: Proliferative Diabetic Retinopathy



AI Project Summery

Department of Artificial Intelligence(A.I)
Rawalpindi Medical University

S.#	Topic	Presenter
1	AI in Healthcare	Dr. Sania Waheed - USA
2	Digital technology and AI	Dr Sohail Aman - USA
3	RMU AI initiative	Prof Dr Riaz Ahmed
4.	Artificial Intelligence in Dermatology	Dr Babar Rao USA -
5	AI as a diagnostic tool for diabetic retinopathy	Dr. Fuad Ahmad Khan Niazi
6	AI applications in Family Medicine	Dr Hisham Haq, USA
7	Navigating The Horizon of Artificial Intelligence (AI) in Medical Education and Clinical Research	Dr. Rehan Ahmad Khan


VISION
Golden Jubilee Celebrations
6th RMU International
Scientific Conference
17-23 Dec, 2023
50
Years
Journey
of
Excellence
in Medical
Education
IAS
ARTIFICIAL INTELLIGENCE IN ELECTRO
TRIAGE OF CEREBRAL HEMORRHAGES
NON-CONTRAST CT BRAIN

AI Data Centers Development at Rawalpindi medical University

Introduction

The presence of a data center within a medical university is paramount, exerting a multifaceted influence across academic and clinical domains.

Serving as the nucleus of information management, it underpins the institution's research, education, and patient care endeavors.

Through systematic data collection and storage, the data center provides a rich tapestry of patient records, clinical trials, and research findings.

This not only fuels innovation but also contributes to the advancement of medical knowledge and the development of novel treatments.

Moreover, the data center supports quality improvement initiatives by enabling the collection of performance metrics and facilitating data-driven decision-making.

It also plays a pivotal role in managing clinical trials, from patient recruitment to data analysis, ensuring the integrity and efficiency of research endeavors.

Overall, the data center serves as an indispensable asset to the medical university, fostering research and excellence.

Data Management Policy

Rawalpindi Medical University fully acquaints with the value and importance of protecting personal, medical and research related information. It is fully committed to encourage and endorse transparency and accountability by demonstrating compliance with principles set out in its regulations.

A robust Research Data Management Policy is formed that is mandatory for validation and establishment of good research practice and procedures. It will not only ensure proper recording, maintenance, storage and security of research data and its appropriate access but also will make evident that intellectual property rights (IPR) are protected

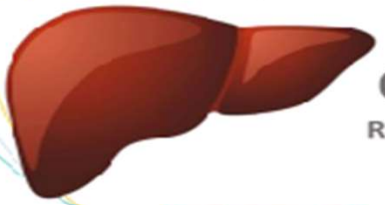
Data of Diseases Collected

- Hepatitis C
- Dengue
- Oncology
- Covid-19

SPECIALIZED CLINICS

Rawalpindi Medical University (RMU) offers specialized clinics for hepatitis, oncology, breast cancer, and diabetes. These clinics provide comprehensive care, including diagnosis, treatment, and follow-up. They are equipped with modern facilities and staffed by expert medical professionals, ensuring high-quality care and support for patients battling these complex diseases.

Hepatitis Clinic



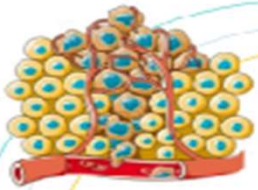
Over 8000
Registered Patients

Diabetes Clinic

Over 36000
Registered Patients

Oncology Clinic

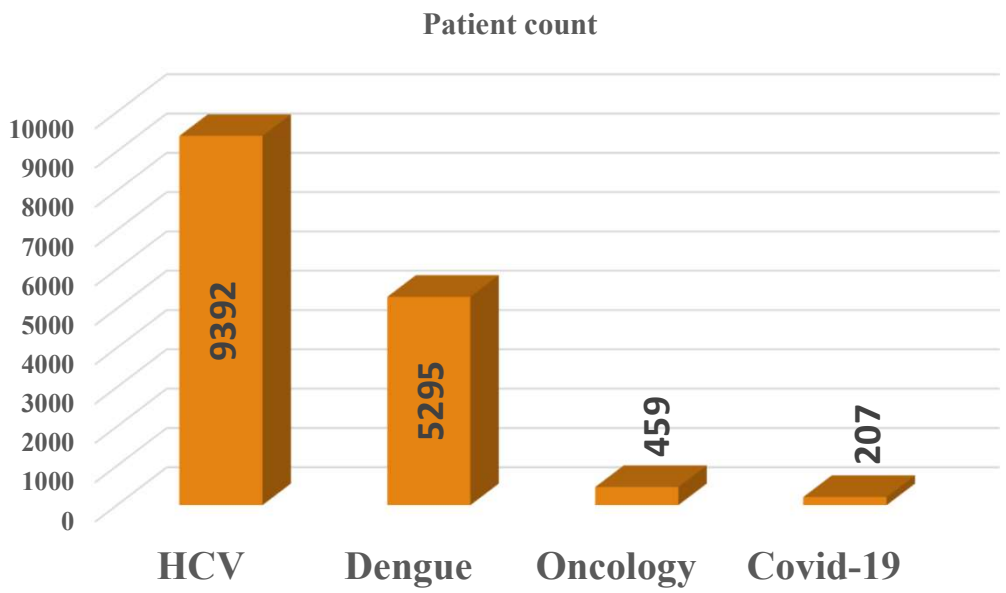
Over 500
Registered Patients



Breast Cancer Clinic

Over 3000
Registered Patients

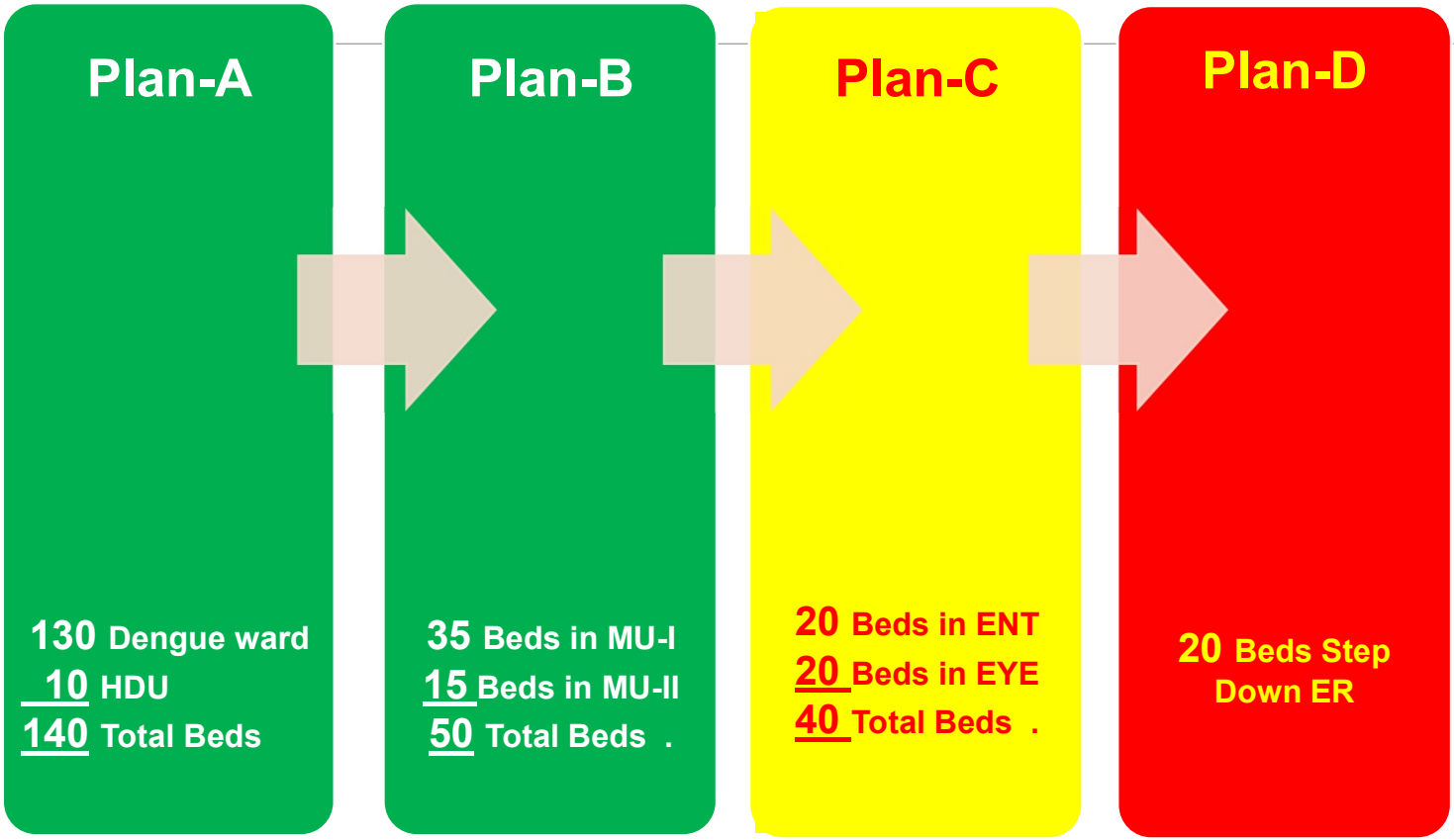
Data collection in Progress for Diseases
Number of Patient Count



- ❖ **Radiology**
- ❖ **Pathology**
- ❖ **ICU infections**
- ❖ **Diabetes**
- ❖ **Diabetic Retinopathy**

AI Data Center at RMU

Ramp up Plan for Dengue Clinical Management 2024



Ramp-up Plans	Total Beds
Plan-A	140
Plan-B	50
Plan-C	40
Plan-D	20
Total	**250**

COVID & Dengue

Healthcare Delivery

Brief Overview – 04 Surges

23-03-2020 – 30-08-2021

Hospital Name	Patients Admitted				Confirmed				Ventilator				Deaths			
	1st wav	2nd wav	3rd wav	4th wav	1st wav	2nd wav	3rd wav	4th wav	1st wav	2nd wav	3rd wav	4th wav	1st wav	2nd wav	3rd wav	4th wav
HFH	1383	1163	1229	941	550	743	842	748	84	111	98	45	128	230	208	113
BBH	3399	3562	3436	1397	1083	360	504	356	119	35	09	04	196	67	125	81
RIUT	1280	395	1146	492	1280	395	1146	492	116	34	77	06	127	92	273	91
DHQ	146	111	192	210	146	111	192	141	07	05	18	11	07	02	11	13
Grand Total	**6208**	**5231**	**6003**	**3040**	**3059**	**1609**	**2684**	**1737**	**326**	**185**	**202**	**66**	**458**	**391**	**617**	**298**
									5.25 %	**3.53 %**	**3.36 %**	**2.35 %**	**7.38 %**	**7.47 %**	**10.28%**	**9.80 %**

Total Admitted: **20482** Total Vent **779**

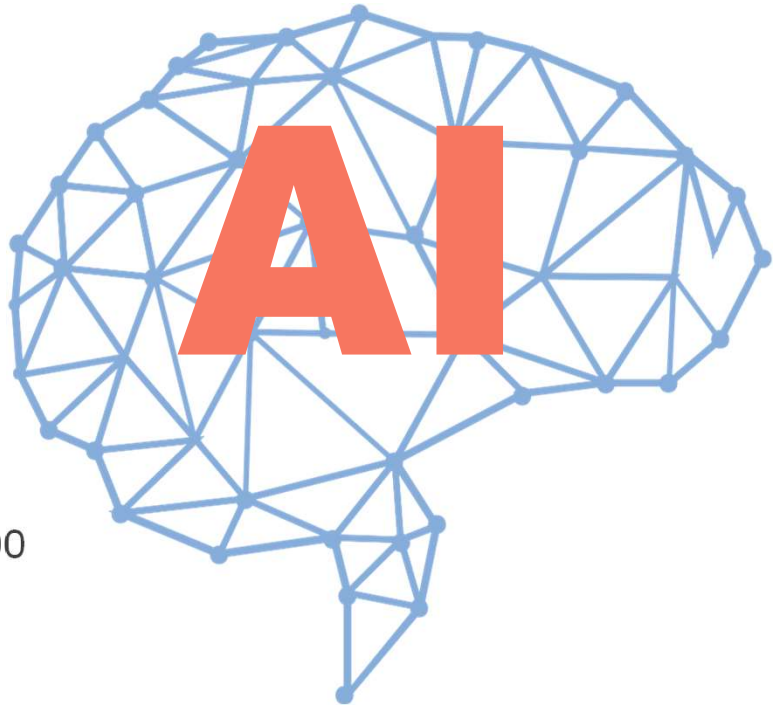
Total Confirmed **9089** Total Deaths **1764**

Collaborative Projects based on Artificial Intelligence with National Centre of Artificial Intelligence NCAI-NUST and Neurocare AI Academy

S#	Project Titles	PI and Co-PI	University/institution and Collaboration	Proposed Budget	Start Date
7.	Decentralized AI Video Surveillance System	Prof Yasir Ayaz	RMU and NCAI-NUST	Rs. 14971756	2023
8.	Pancreatic Cancer Detection using Deep Learning for ROSE during EUS guided FNAC	Prof Yasir Ayaz and Dr Umer Asghar Dr Tayyaba Ali	RMU and NCAI-NUST	Rs. 13,549,804	2023
9.	Innovative imaging Artificial Intelligence (AI) based diagnostic tools for detection of stroke paradigm with clinical validation on local datasets	Prof Nasir Khan and Dr Ume Kalsoom	RMU and Institute of Health Innovation and Education, Neurocare AI Academy	Rs. 1.1 Million	2023

Projects Submitted based on Artificial Intelligence

S #	Project Titles	PI and Co-PI	University/institution and Collaboration	Proposed Budget	Start Date
1.	Medical Aid Teaching Rescue emergency support system	DR ASIF MAQSOOD BUTT DR OMAIMA ASIF	RMU & EZ SHIFA + IST	6.0 Million	2023
2.	Pre, Post and Epidemic Communication, Strategies to Improve Patient's Health Care, Surveillance and Tracking System in Pakistan: An Integrated Model	DR ASIF MAQSOOD BUTT Dr Omaima Asif & Humna Asif, Prof Muhammad Umar Prof Muhammad Iftikhar Adnan Siddique	RMU & EZSHIFA + IST	3.5 Million	2023
3.	SDGS 2030 HEALTH CARE DELIVERY MODEL	DR ASIF MAQSOOD BUTT Dr Omaima Asif & Humna Asif, Prof Muhammad Umar Prof Muhammad Iftikhar Adnan Siddique	RMU & EZSHIFA + IST	3.5 Million	2023
4.	E^3MC^2 Management of climate, environment, energy & economy waste auto treatment machine supported by combined source of energy	DR ASIF MAQSOOD BUTT Dr Omaima , Prof Muhammad Umar , Dr Huma Shafique, Dr Omaima Asif , Humna Asif	RMU & NUST	In progress	2023
5.	THIRD GENDER HEALTHCARE INITIATIVE ''	MINAHIL HASSAN DR ASIF MAQSOOD BUTT	RMU % RCAP	HEC SAEED GRANT	2023



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