






QUNIE Corporation:


# AI support system introduction in Tunisia






01/21/2022

SDGs Team









Domestic Telecom

Domestic Telecom

Mobile Services

Innovation

System Integration  
Managed services

Global IT Systems Integrator

Data Center, Network  
and Managed Services

Security Services

Digital Business



**\$105 billion** in revenue\*



**\$14 billion** in operating income\*\*



Direct presence in **88 countries**



Over **275,000 employees**



Network coverage in **196 countries**



**200+** data centers worldwide



Business Consulting  
Services

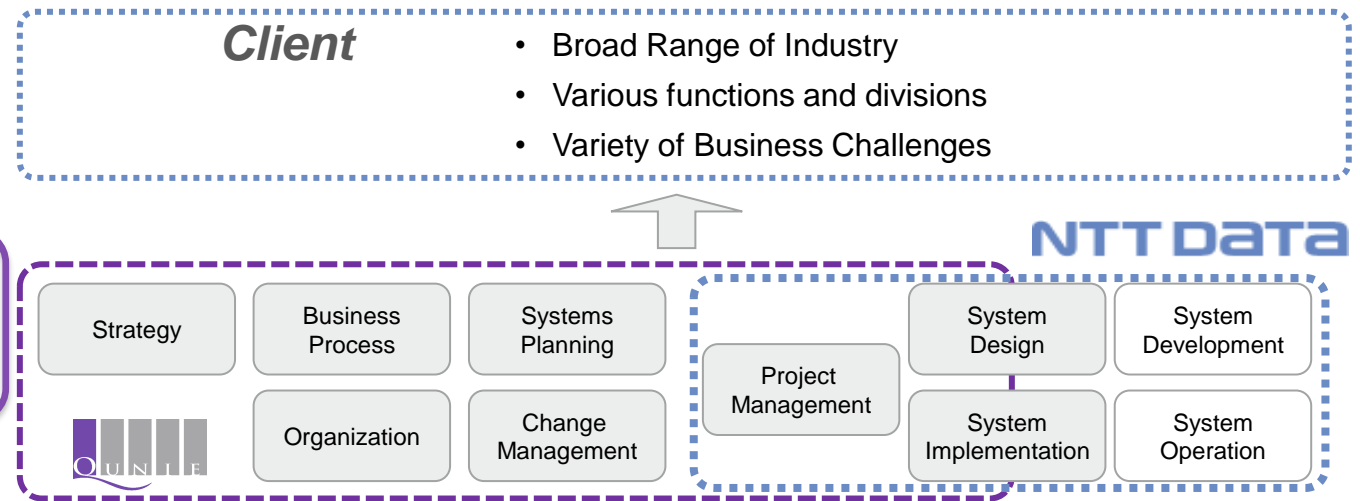
Qunie completes NTT Data Group as a “business innovation partner” by working with clients in a broad range of business challenges and utilizing various group (NTT Data) strengths

## Visions

- The core business unit in the NTT Data Group, in realizing to become a “business innovation partner.”
- A group of professional consultants that forwards client’s effort for a change, by “working with client” to the end.

## Missions

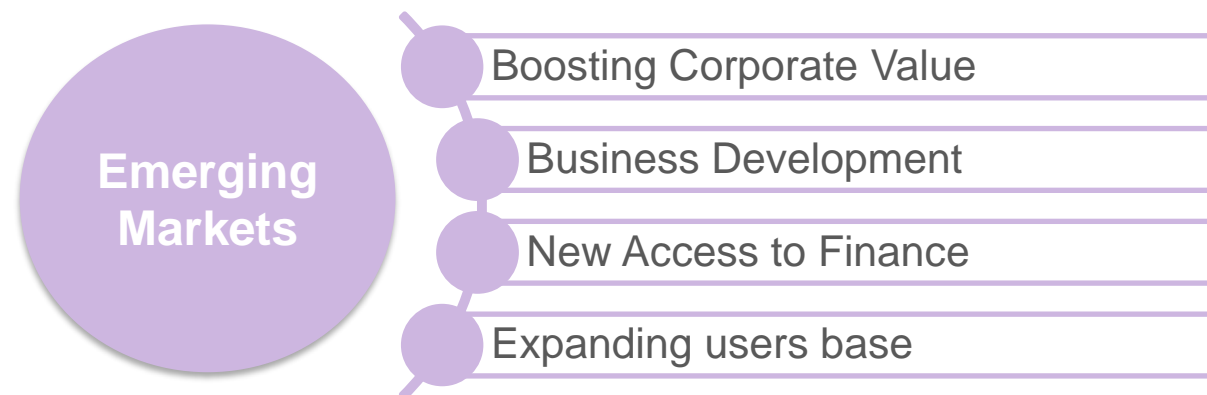
- To assist client in broad range of corporate functions, not limited to IT division, by providing a broad range of business consulting services – mostly focusing on “upstream” processes.
- To broaden the client base for NTT Data Group while enhancing the total value of the services NTT Data Group can provide.





- QUNIE has built its SDGs Team in order to provide its clients with consultants experienced in projects development and social impact evaluation in Emerging Markets & Developing Economies (EMDE) .
- The SDGs Team members come from various horizons: international consulting firms, JICA, finance institutions, private companies, NGOs...and have cumulated more than 150 projects in Africa, South Asia, South East Asia. Their expertise cover a wide range of industries: Industrial, Finance, Public sector, Private Sector development, Agriculture, Health, Infrastructure, Tourism, Digital.
- The team aims to enhance our clients' value by leveraging the Group's innovations to resolve social and environmental issues plaguing the world's most vulnerable populations, while giving them access to new sources of revenue and finance. Our strong will is to contribute to the Sustainable Development Goals (SDGs) that form the cornerstone of the United Nations 2030 Agenda.
- Through partnerships with international organizations, Japan's aid agencies, ODA and private sector support, QUNIE consultants from the SDGs team actively share their expertise working on impactful projects.

**We enhance our clients overall value with projects in emerging markets through four pillars:**

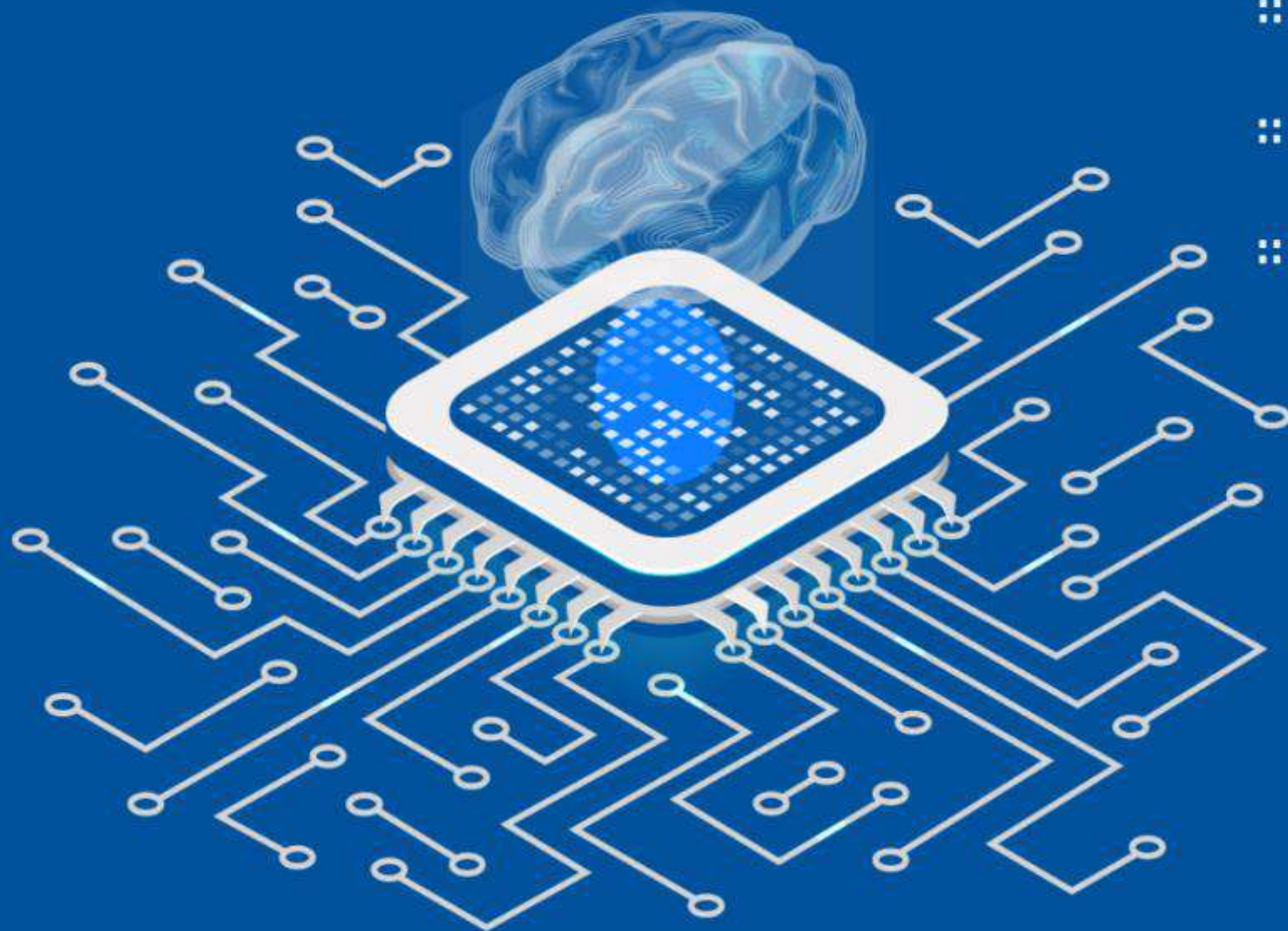




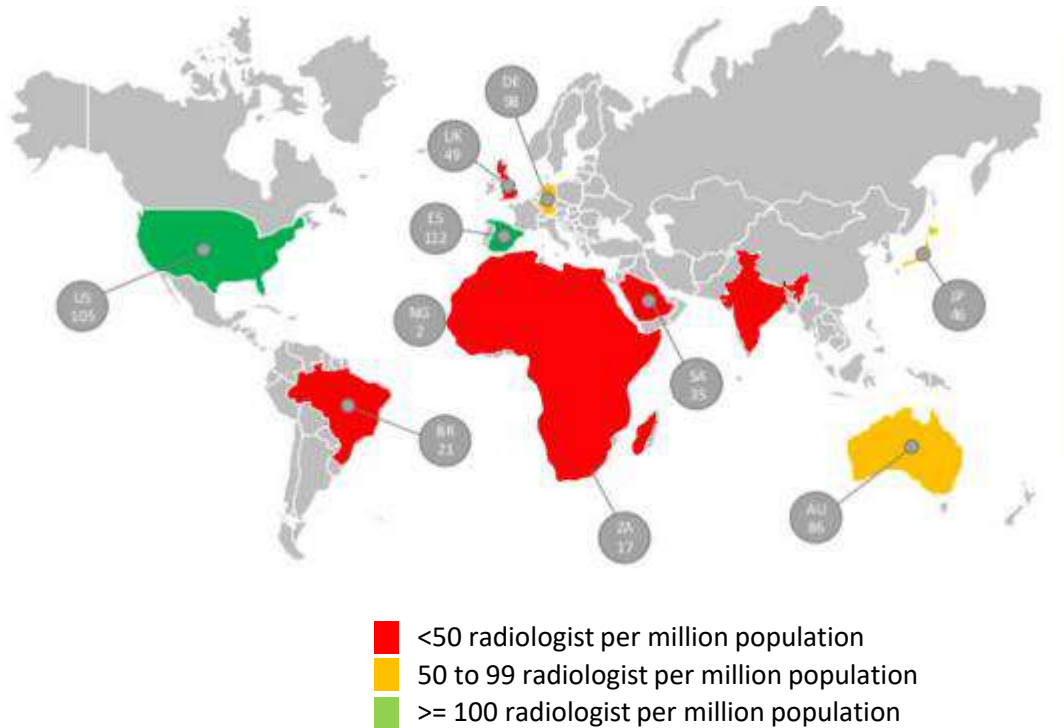


Transforming Radiology  
Leveraging AI

[www.DeepTek.ai](http://www.DeepTek.ai)



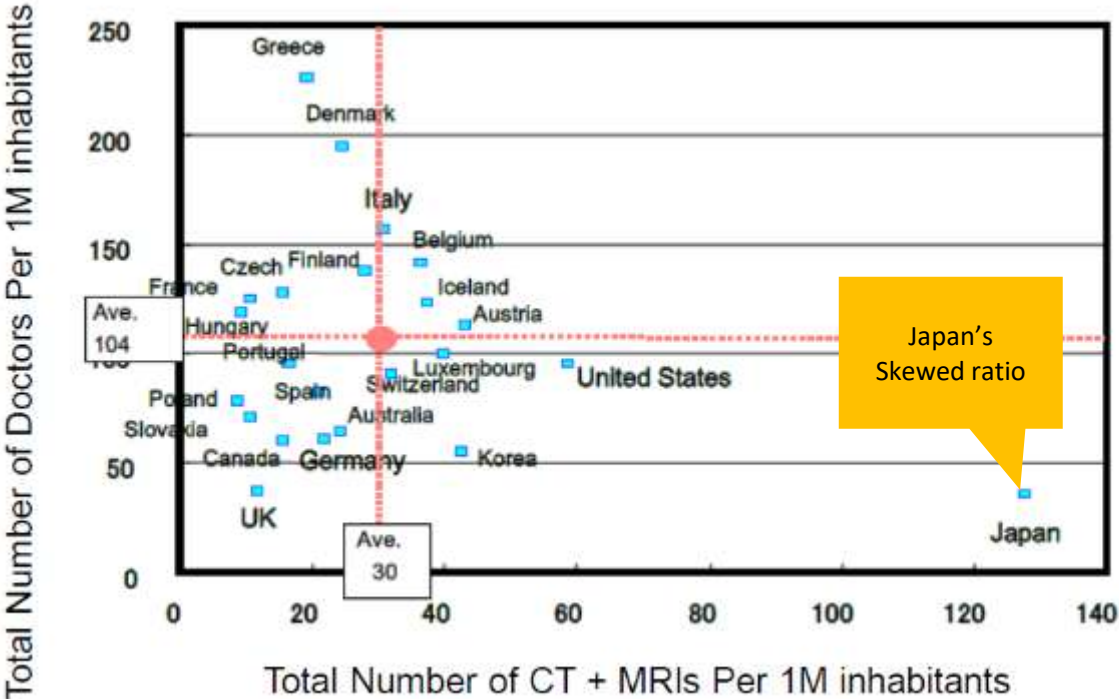
# Large Global Opportunity



Signify Research

In most countries there is a significant short fall of Radiologist required. The situation is getting worse as imaging volumes are increasing at a faster rate than radiologist

<http://www.icr.or.jp/kensyui/syourai/syourai.html>

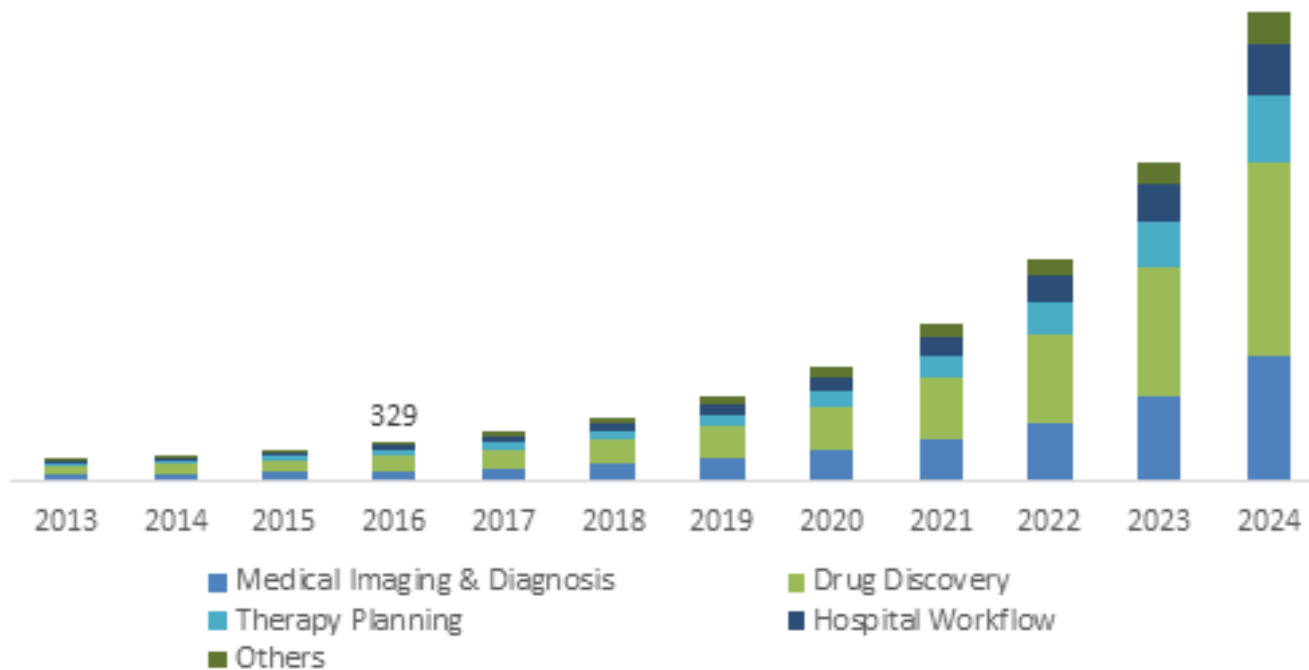


As a part of Society 5.0 goal to prolong healthy life years – Japanese government is supporting development of healthcare AI. Medical Image diagnosis is amongst top priority.

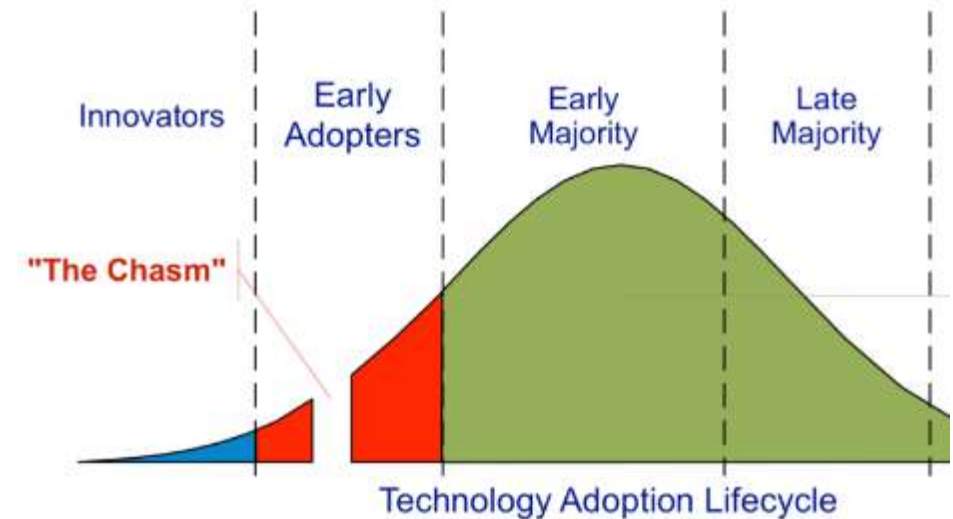
# Market Opportunity / Challenges

Healthcare Artificial Intelligence Market size was over USD 750 million in 2016 and forecast to witness nearly 40% CAGR from 2017 to 2024

Medical Imaging and Diagnosis expected to be amongst the top opportunity area



<https://www.gminsights.com/industry-analysis/healthcare-artificial-intelligence-market>



## Key Challenges

- Lack of regulatory frame work / FDA
- 'Point' solutions don't help productivity improvement
- Critical to have smooth work flow integration
- Perceived threats by Radiologist
- Difficulty to aggregated big and rich data
- Availability / cost of skilled AI resources



## TUNISIA: Innovation in the time of Corona

USING 3D AND AI

### TUNISIA's 3D- Printed Medical Masks



A simplified respirator  
made with 3-D printed parts

### Online Coronavirus Detection Scanning



An artificial intelligence programme  
to evaluate the probability of  
infection based on an X-ray of the  
lungs

INVEST IN TUNISIA







**200+**

Hospitals & Medical Imaging Centers  
as paying customers



**TB / COVID**

Public health screening  
10K+ scans monthly



**Global Customers**

India, Japan, APAC, AFRICA



**55,000+**

Scans processed  
every month



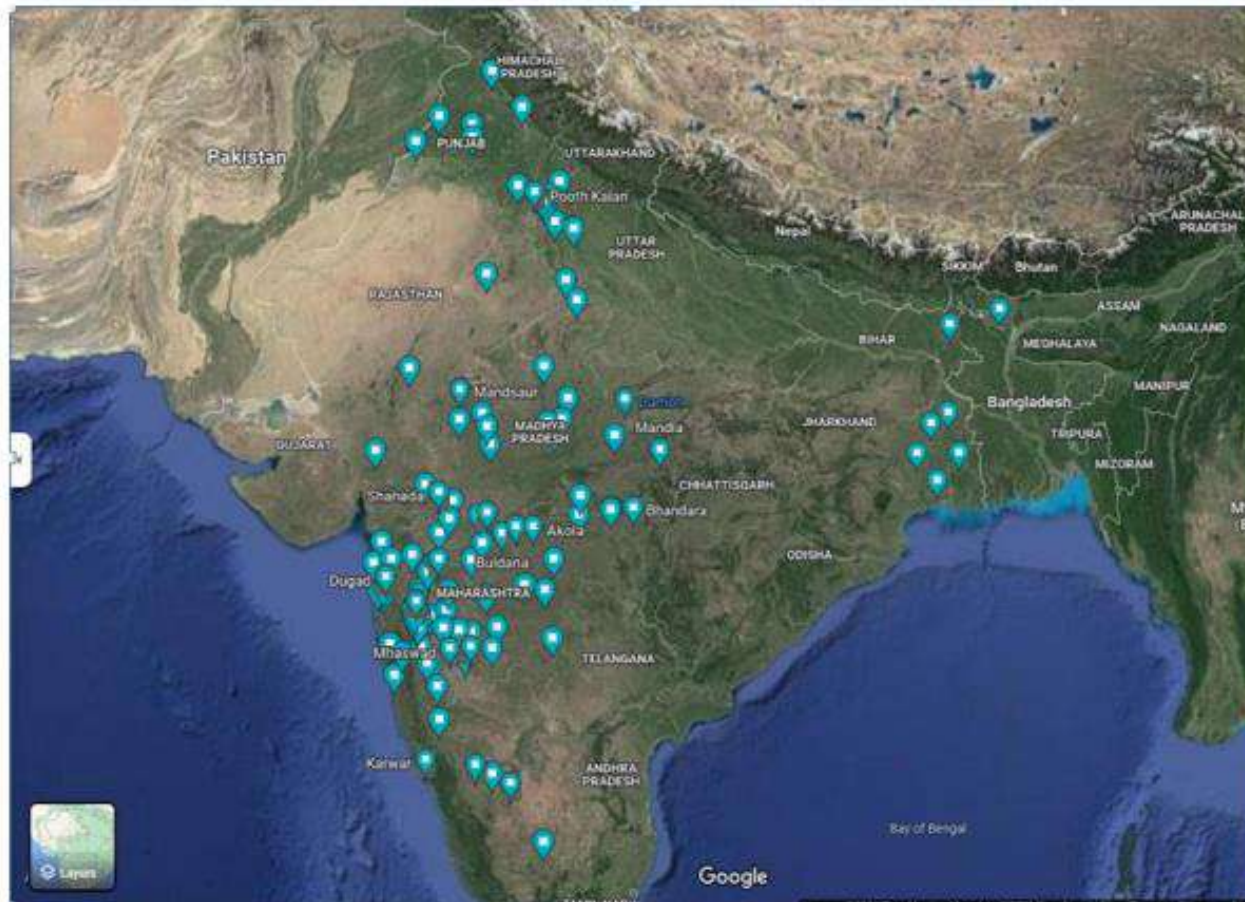
**7 Patents filed &  
21+ Papers**



**110+ members**

35+ Tech  
20+ Radiologist

# Customer locations



**India - 200+ clients**



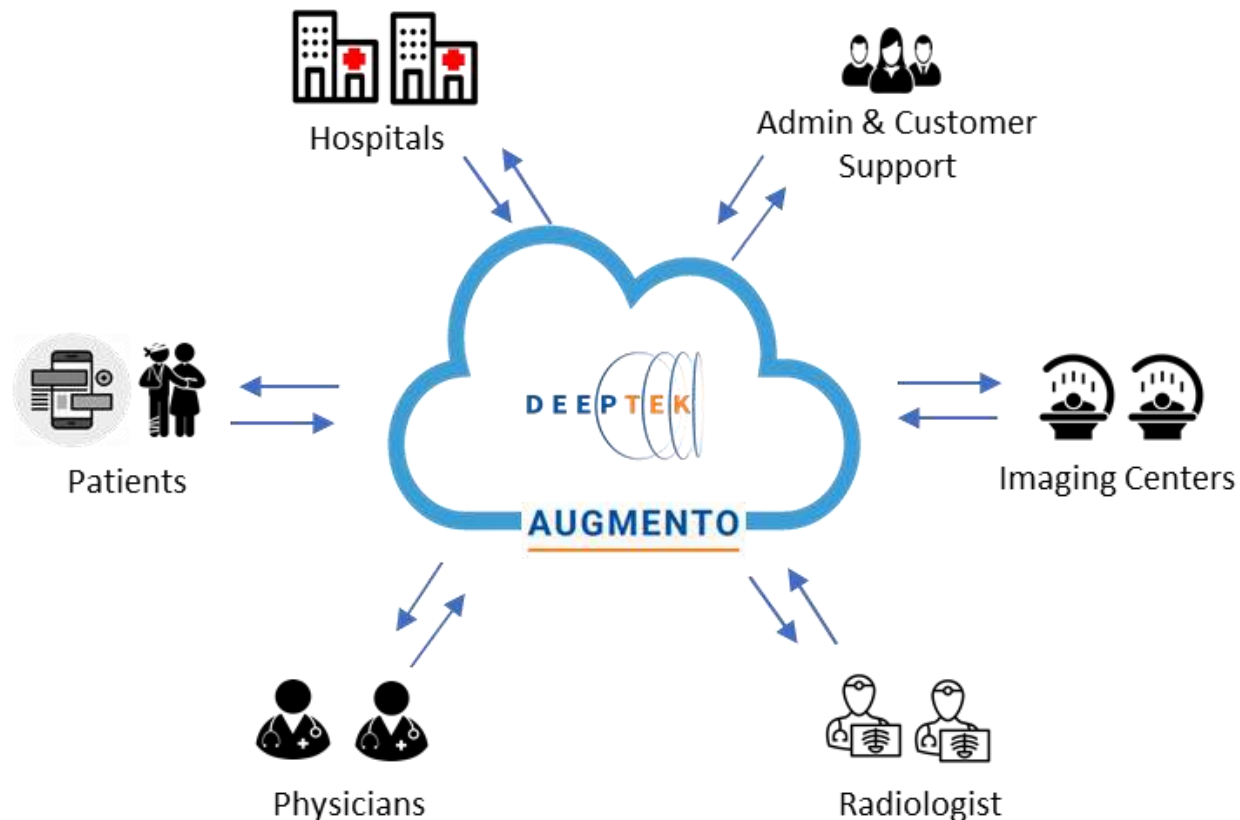
**Africa - 1 Teleradiology client in Uganda**

+Augmento distributor partner in Kenya and Zambia each

# AUGMENTO: An AI + Smart Report powered cloud PACS



AI powered technology enabling efficient operations, super TAT and seamless stake holder communication



- Fast turn around time
- Access to reports on the mobile
- Smart communication via WhatsApp/SMS/E-Mail



- Access to Radiologist / Cost efficiencies
- Improved Turn Around Time / Services Quality
- Better capacity utilization



- Access to Radiologist / Cost efficiencies
- Improved Turn Around Time / Services Quality
- Better Capacity utilization



- Can service from any location
- Higher productivity and quality
- Hassel free billing and payments



- Easy access to patient reports
- Facilitate better patient outcome
- Location independent



- 24x7 call center support
- Centralized customer support
- Automated Billing, Analytics and MIS





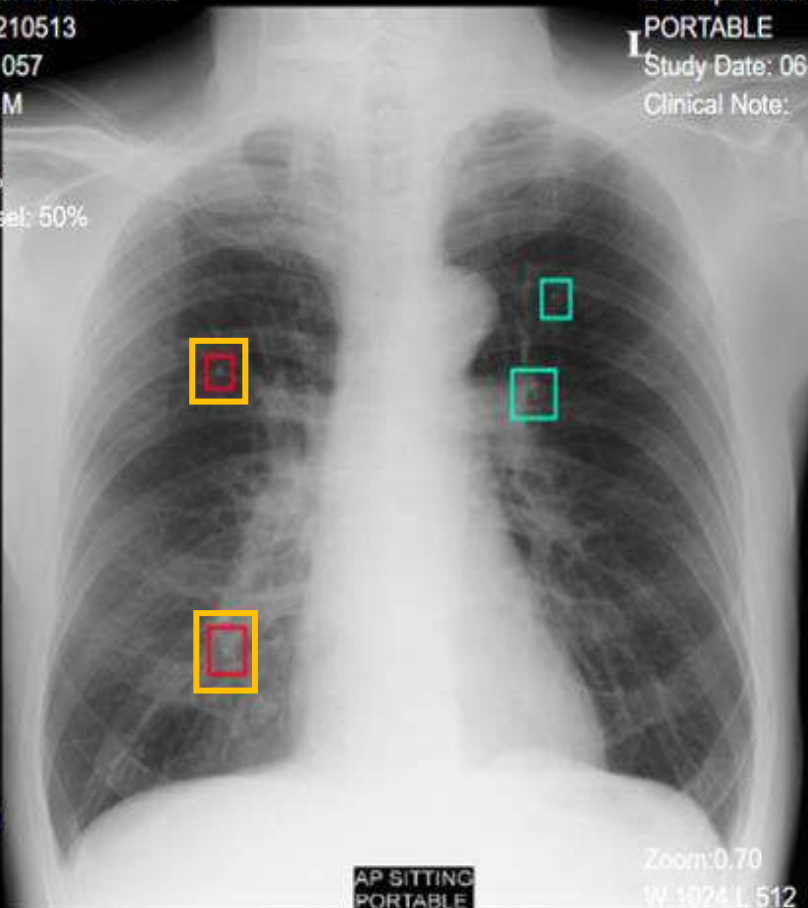
# Pathology Prediction



Patient Name: NAME^NONE  
Patient Id: 1210513  
Patient Age: 057  
Patient Sex: M

Description: CHEST  
PORTABLE  
Study Date: 06-Oct 20:20  
Clinical Note:

Nodule: 50%  
End On Vessel: 50%



Series: 1001  
Image: 1/1  
CR

AP SITTING  
PORTABLE

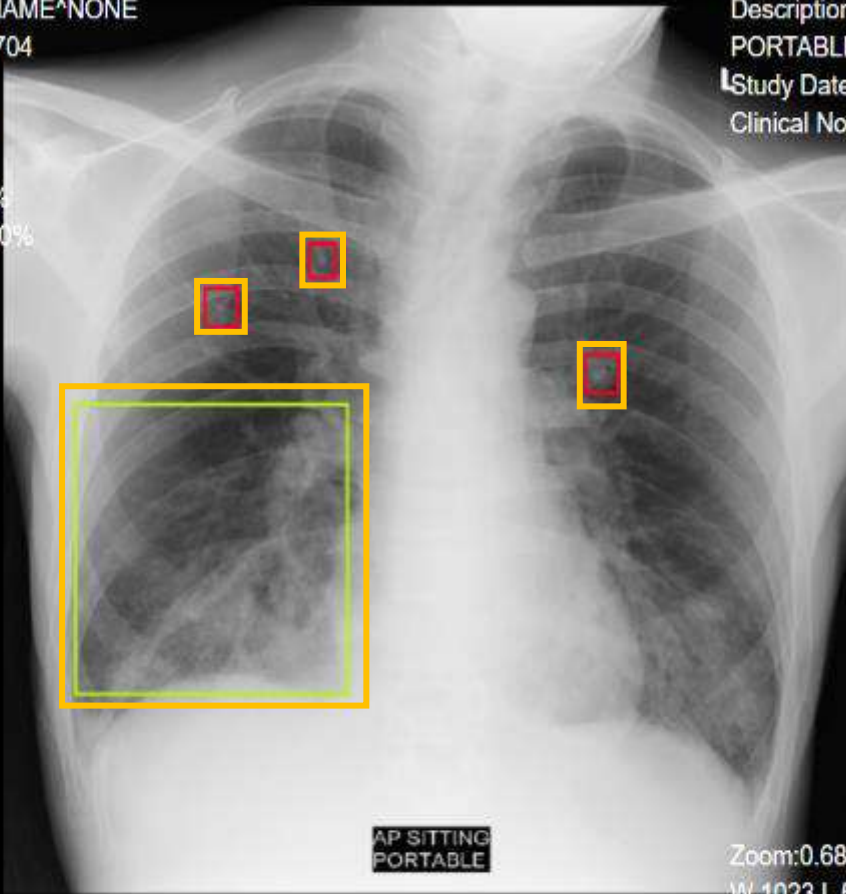
Zoom:0.70  
W 1024 L 512

REGENERATE + [Red Box] [Green Box] Nodule [Green Box] End On Vessel

Patient Name: NAME^NONE  
Patient Id: 1191704  
Patient Age: -  
Patient Sex: M

Description: CHEST  
PORTABLE  
Study Date: 16-Oct 06:07  
Clinical Note:

Pneumonia: 86%  
Consolidation: 80%  
Nodule: 50%



Series: 1001  
Image: 1/1  
CR

AP SITTING  
PORTABLE

Zoom:0.68  
W 1023 L 512

REGENERATE + [Green Box] [Red Box] Consolidation [Red Box] Nodule



# Automated Triaging



**DeepTek**Welcome Ajit Patil![Study List](#)[MIS Report](#)

**Study List**

Triage: Stat AI Prediction - Critical High Medium Low Caution AI Processing Failed

Patient Name

Patient ID

Modality

Hospital Name

Upload Date Range

Study Date From

Study Date To

Pathology

Triage

Search

Clear

[All Studies](#)[Unreported](#)[Saved](#)[Reported](#)

Choose File

No file chosen

Upload

Refresh

Patient Name	Radiologist	Patient Id	Age / Sex	Study Date	Mod	Hospital	Study Description	#Images	Upload Date		Triage	Report
NAME^NONE		1249292	- / F	18-Oct 02:56	CR	Edison	CHEST,GENERAL	1	05-Oct 09:03			
NAME^NONE		601034	- / F	15-Nov 04:33	CR	Edison	CHEST PORTABLE	1	05-Oct 09:02			
NAME^NONE		1083383	028 / F	05-Oct 06:52	CR	Edison	CHEST,GENERAL	1	05-Oct 09:00			
NAME^NONE		1319177	030 / M	09-Nov 06:43	CR	Edison	CHEST,GENERAL	1	05-Oct 09:00			
NAME^NONE		1258234	031 / M	13-Nov 12:46	CR	Edison	CHEST PORTABLE	1	05-Oct 09:00			
NAME^NONE		107707	- / M	09-Nov 09:27	CR	Edison	CHEST,GENERAL	1	05-Oct 09:00			
NAME^NONE		1103325	- / F	08-Nov 10:45	CR	Edison	CHEST,GENERAL	1	05-Oct 09:00			
NAME^NONE		493960	- / F	15-Nov 07:14	CR	Edison	CHEST PORTABLE	1	05-Oct 08:58			
NAME^NONE		1226991	056 / M	14-Nov 10:50	CR	Edison	CHEST,GENERAL	1	05-Oct 08:58			
NAME^NONE		1050901	060 / M	16-Oct 05:26	CR	Edison	CHEST,GENERAL	1	05-Oct 08:58			



# Smart Reporting



DeepTek

Welcome Ajit Patil

Study List

Series Levels Invert Zoom Pan Stack Scroll Length Angle Pixel Probe Elliptical Rectangle Layout More

☒ Image

Patient Name: NAME\*NONE  
Patient Id: 1191704  
Patient Age: -  
Patient Sex: M  
  
Pneumonia: 86%  
Consolidation: 80%  
Nodule: 50%

AP SITTING  
PORTABLE

Zoom: 0.68  
W 1023 L 512

Description: CHEST  
PORTABLE  
Study Date: 16-Oct 06:07  
Clinical Note:

-- Select --  
Auto Chest Report ✕  
Final Report Addendum

← → Normal ( ) Times N. 12pt **B** *I* U ~~ABC~~ ☒ ☐ ☐ ☐

Zoom 60%

**FINDINGS:**  
Dense opacity without volume loss is seen in right upper zone with few areas of air bronchogram.  
  
Multiple pulmonary nodule in the right upper and left mid lung. The nodule shows evidence of calcification.  
  
Both costophrenic angles appear normal.  
The tracheal lucency is centrally placed.  
The mediastinal and diaphragmatic outlines appear normal.  
The heart shadow is normal.  
The bony thoracic cage and soft tissues are normal.

RSNA / ACR recommended structure

Keywords: NA

REGENERATE

Consolidation

Nodule

Strictly Confidential

Slide: 14





# Cognitive Image Search



DeepTek

Welcome Ajit Patil Study List


Series Levels Invert Zoom Pan Stack Scroll Length Angle Pixel Probe Elliptical Rectangle Layout More


☒ Image SEARCH


SHOW ORIGINAL


Report


**Search Result**


 Sr: 1001 1


 Post operative status.

 Opacity is seen along the right lung apex and along th... obscuring costophrenic angle suggestive of pleural eff...

 Inhomogeneous opacity is seen in right upper zone.





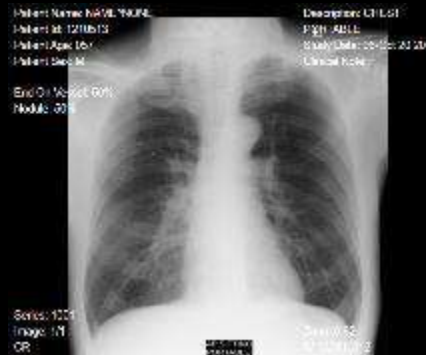




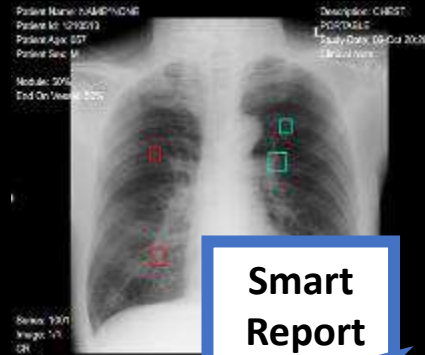
# Self Learning AI Engine



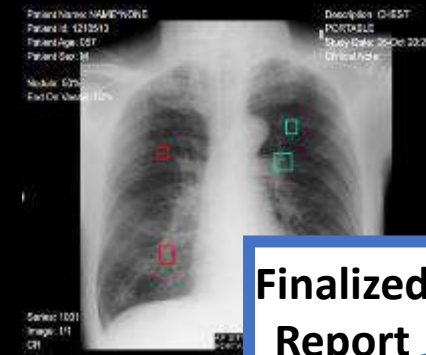
Original Study



AI Results



Radiologist  
Confirmed



Feedback Loop

# AUGMENTO Solution Highlights



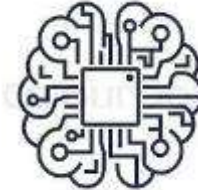
**Server  
Less**



**Zero  
Footprint**



**Any  
OS**



**AI  
Powered**



**Smart  
Work List**



**Highly  
Secure**



**Smart  
Reports**



**Multi  
Modality**



**Multi  
Tenancy**



**Smart  
Storage**



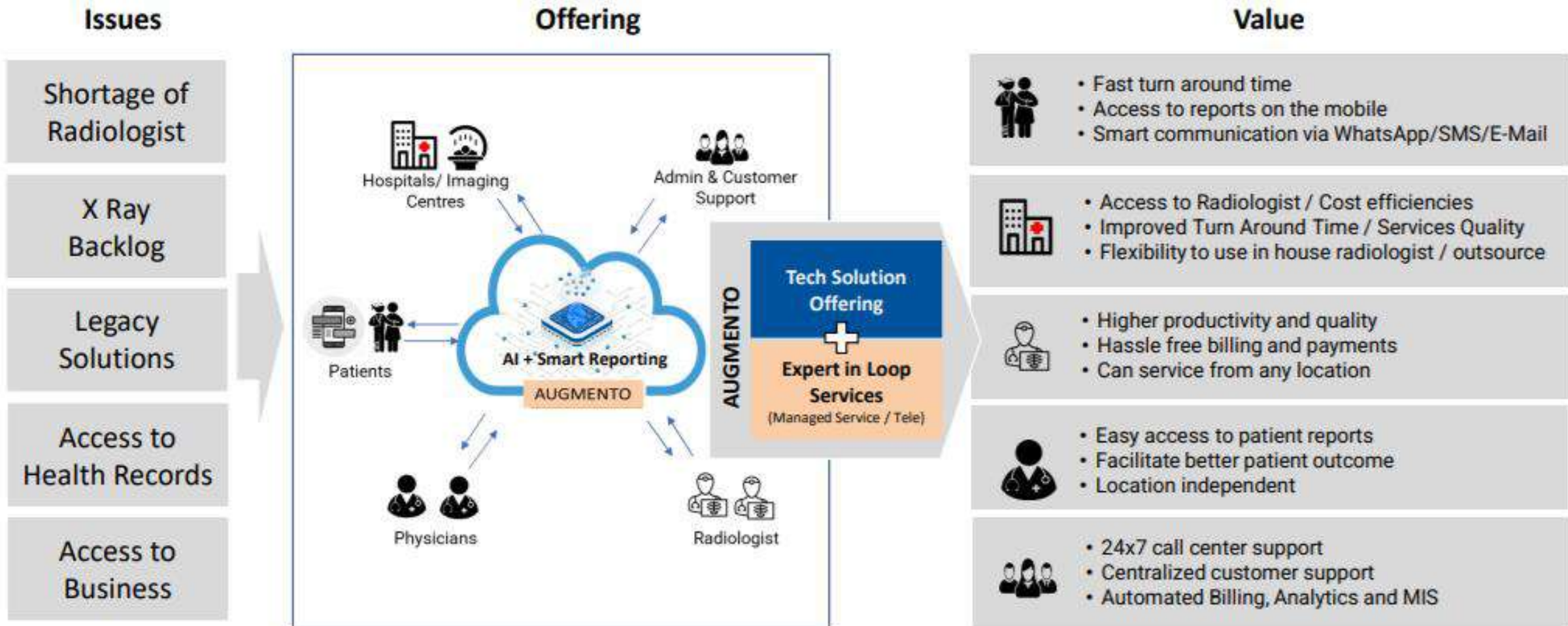
**Smart  
Notifications**

**99%**

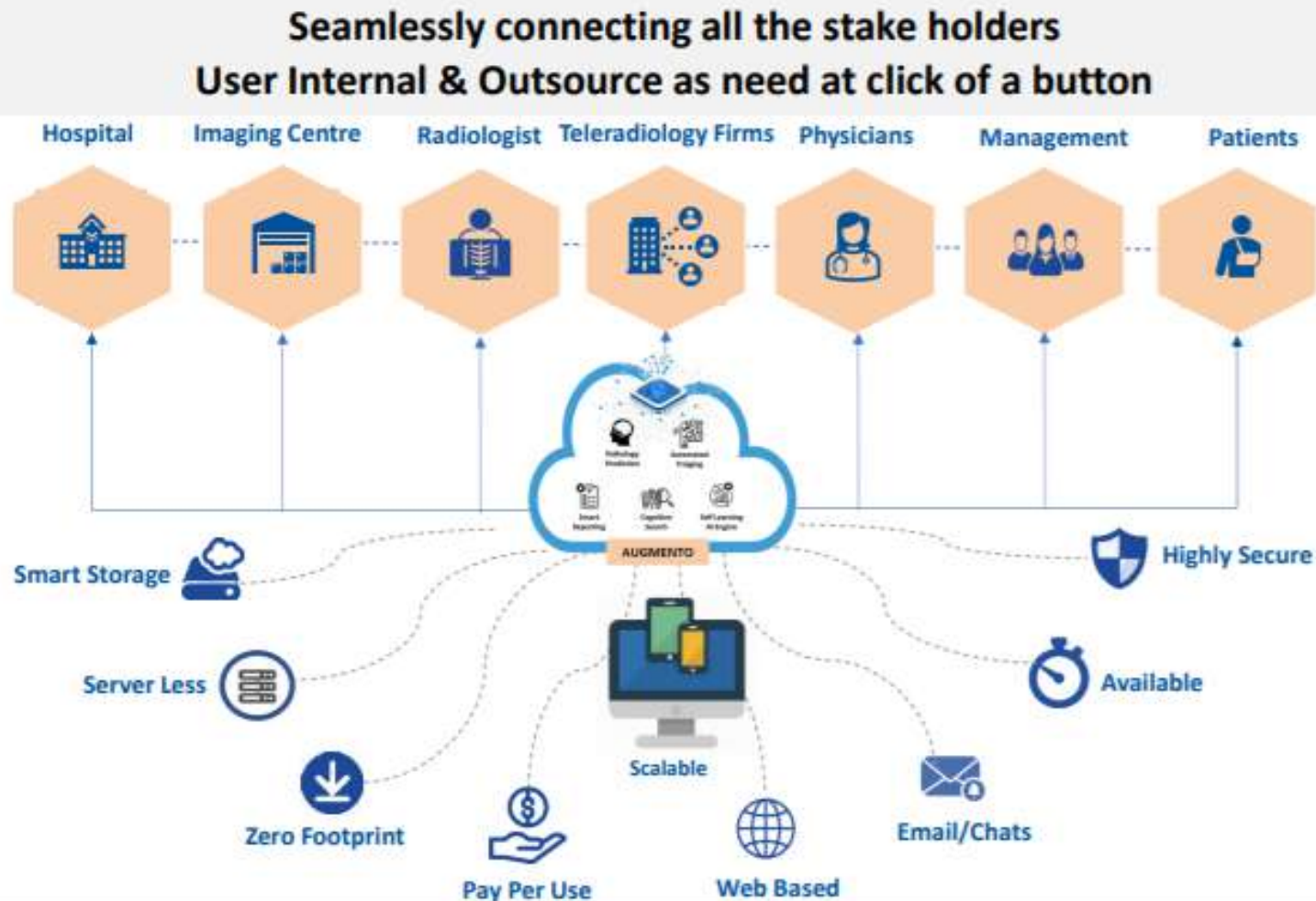
**Highly  
Availability**



# OFFERING : AUGMENTO &/or TELERADIOLOGY



# AUGMENTO : Maximizing the power of CLOUD



## Pricing:

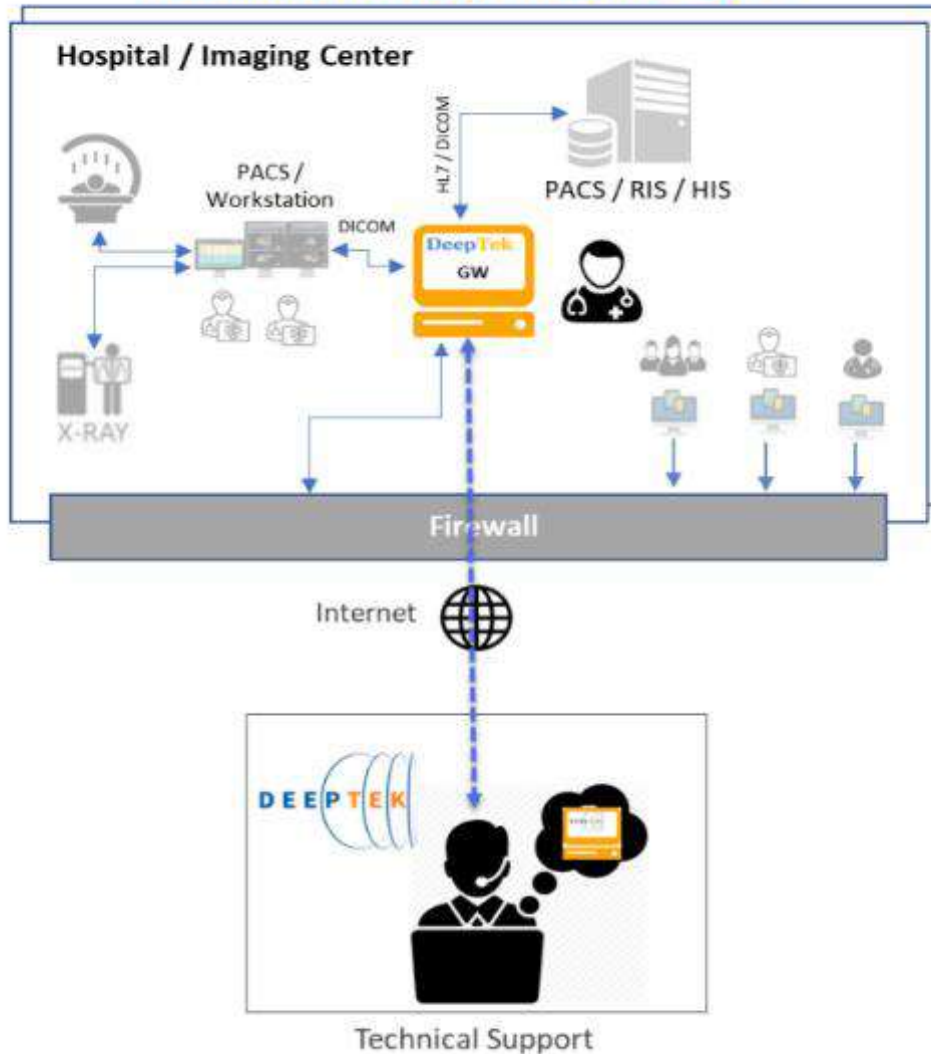
- AUGMENTO platform is free to all teleradiology customers
- For hospitals / imaging centers who want to leverage their team of radiologist – AUGMENTO is charged in a SaaS (pay per scan) mode

**Cutting edge Cloud Technology enabling  
High Reliability, Super Convenience and Cost Efficiency**

# Quick and Easy Onboarding (30min\*)



## Installation through Remote Access



- Onboarding takes just about **30 mins\***
- GW installation and configuration is handled remotely (no onsite visit is not needed)

\* With support for local IT staff to enable remote login and provision of necessary modality configuration paraments

## Minimum Specs for GW machine to be provisioned by customer

Workstation Requirement	
Hardware	PC in same LAN
	Internet connection on that PC.
	Hard disk space 50Gb and above
	Ram 4 GB and above.
Software	Window 7 and above
	.Net framework 4.5 and above
	Java Development Kit (JDK) 8 and Above
Internet Connection	Internet Connection. (3 Mbps & above).
Firewall	Port 11115 open for inbound/outbound Connection.

[www.deeptek.ai](http://www.deeptek.ai) | Strictly confidential



# Teleradiology services : What Sets us Apart



**DeepTek**  
Teleservices

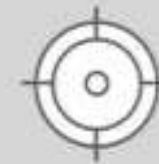


Simplifying tasks  
for radiologists



Low TAT

Error Mitigation  
Algorithms



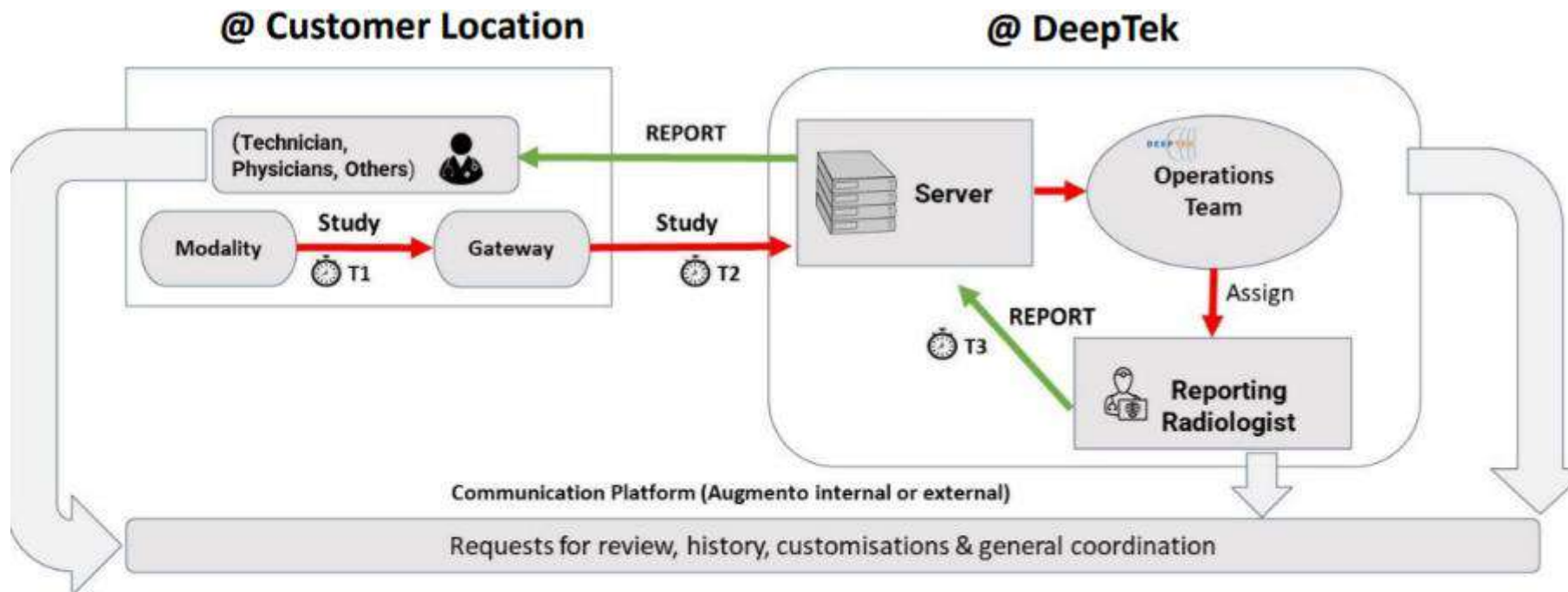
Highly Accurate  
Reports

Smart Reporting



Structured Reporting  
per RSNA/ACR  
guidelines

# Teleradiology : Workflow & Timeline



## Highlights:

- ☐ Structured Reporting
- ☐ Smart Notifications
- ☐ Smart Workflow Optimisation
- ☐ Smart Management App
- ☐ Smart Analytics
- ☐ 24\*7 Call Centre Support
- ☐ 24\*7 Operation
- ☐ Unlimited Modalities
- ☐ Quick Onboarding and Installation
- ☐ Ease of Billing

	T1	T2	T3
X-Ray	5 - 10 mins	1 - 2 mins	15 - 30 mins
CT Scan	5 - 20 mins	4 - 5 mins	30 - 60 mins
MRI	15 - 30 mins	4 - 5 mins	30 - 60 mins

# Teleradiology : Testimonials



Team of  
Expert  
Radiologist

Stringent  
Peer  
Reviews

Automated  
Error  
Checks

Smart  
Structured  
Reporting  
(X Rays)

Continual  
Feedback  
Research &  
Publications

## TESTIMONIALS

*"We are a hospital based in Ratnagiri around 300 km away from the nearest metro city in the Sahyadri mountains range. We have been benefited by DeepTek's advanced platform with AI features and smart reporting which has ensured prompt reports in less than few minutes for our digital X-Rays. Reports are directly received in our inbox making access simple and we are able to upload studies even on low internet bandwidths. It's a boon to have such a technology. DeepTek's platform is also used when we conduct camps for Tuberculosis screening using digital chest X-rays"*

- Dr Ravindra Gode, Ratnagiri, Maharashtra, India

*"We have been using DeepTek services for Structured Reporting Solution and their AI platform for Emergency Radiology, General Radiology, complex Musculoskeletal Imaging, Body Imaging and Neuro Imaging. The reports are always detailed, quantified and the service is always available 365 days a year. DeepTek Team Consultants are easily accessible to communicate results of critical and complex findings with our consultants and also discuss outcomes."*

-Dr.Rahul Bacchav, Dhule, Maharashtra, India



# Teleradiology : Core Competence



## Medical Big Data

- Have collaboration with India based hospital to aggregate medical scan and health record data
- Several million images (MRI, CT, X Ray and others)

- Total data set: 10+ million data scans
- About 50,000 new annotated scans added every month in the data set
- Additionally, over 100,000 scans are manually annotated every month



## Hospital based Validation

- Have collaboration with hospitals to test / validate your technology solutions
- Testing on real live case data with involvement from hospital doctors



## Medical Experts (Doctors)

Have a strong team of radiologist who can support :

- Data annotation / Curation
- Advisory support
- Tele Reporting



## AI Technology Experts

Have a team of AI data scientist and technology experts who can support you on our AI solution development and testing

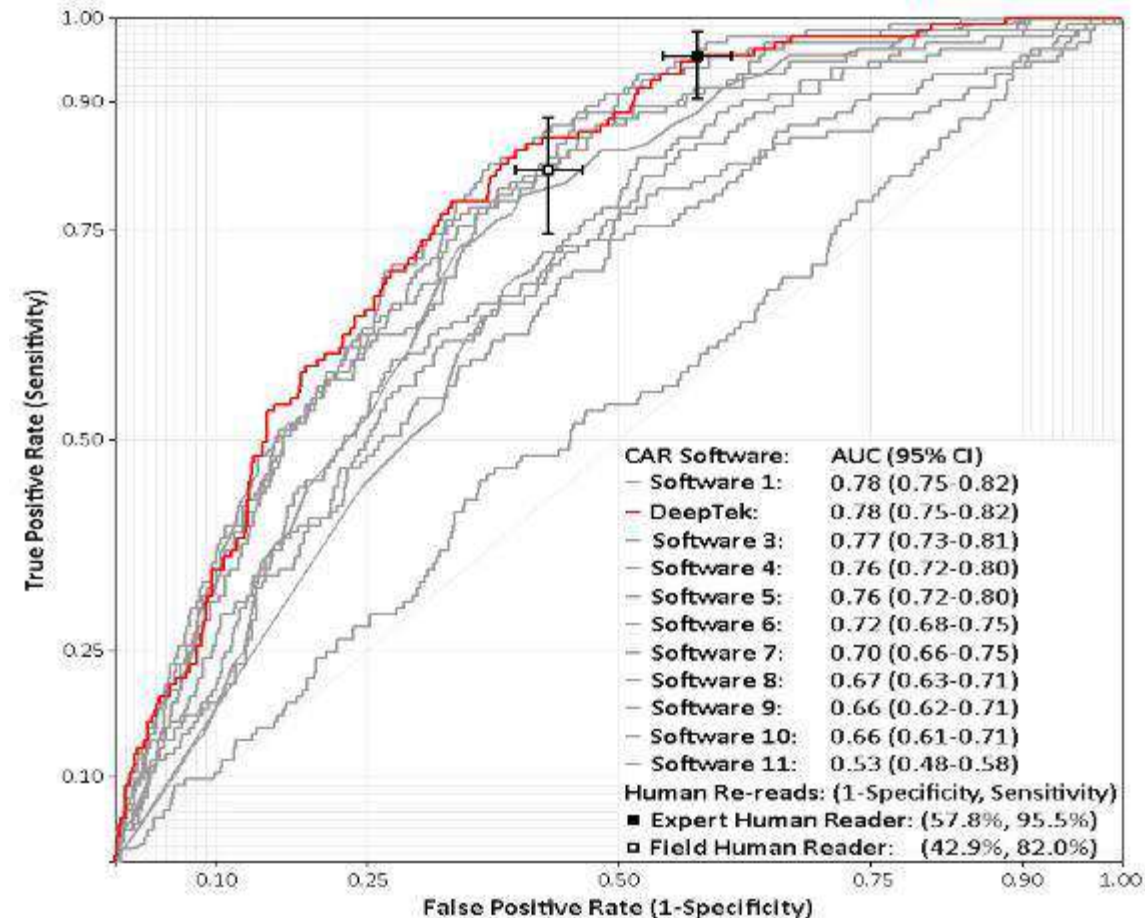
# Third Party Accuracy Evaluation Results



DeepTek's software was evaluated by Friends for International TB Relief (FIT), Vietnam in August 2020

Out of 11 competitors, DeepTek's models was in the top few. It exceeded the fields radiologist and matched expert radiologists' performance

Satisfies Turing test for algorithm



	Sensitivity	Specificity	Accuracy
Expert Radiologist	95.5% (90.4%-98.3%)	42.2% (38.9%-45.5%)	49.0% (45.9%-52.1%)
DeepTek	94.7% (89.5%-97.9%)	41.9% (38.7%-45.2%)	48.7% (45.7%-51.8%)

# Third Party Validation Studies: StopTB Results



Criteria	Predictor	Sensitivity [95% CI]	Specificity [95% CI]
Threshold adjusted as per R1's Sensitivity	Field Reader	93.2% (89.4-95.9%)	11.9% (10.9-12.9%)
	DxTB	92.8% (89.0-95.6%)	42.9% (41.7-44.2%)
Threshold adjusted as per R3's Sensitivity	External Reader	89.8% (85.5-93.2%)	35.7% (34.3-37.2%)
	DxTB	89.8% (85.5-93.2%)	54.6% (53.4-55.9%)
Threshold adjusted as per R2's Sensitivity	Qualified Radiologist	97.7% (95.1-99.2%)	36.5% (35.0-38.0%)
	DxTB	97.3% (94.6-98.9%)	28.0% (26.9-29.2%)

## Summary:

- Total Images : 6,195
- R1 and R3 classified all images into TB, other abnormality or normal
- R2 reading was done for all images deemed suggestive of TB or any abnormality by R1 and 20% of normal images

## Results:

- Our TB model outperformed R1 by a specificity of 31% and R3 by 18.9% when their sensitivities were matched
- When compared with R2 our model had 8.5% less specificity, but the negative class just had 20% of the images from the original set, making the difference less significant



## Patents

- **Filed:** Total 6 Patents for platform filed in the USA
- **Copyrights:** Two copyrights for the platform have been filed.



## Presentations / Posters:

- **ECR 2020:** March 2020 Vienna:
  - Cascading Model Architecture of Convolutional Neural Networks to Improve Performance of Pathology Detection in Digital Chest X-rays
  - Radiology report generation using pointer networks, a step towards radiology report standardization
- **ARRS 2021**
  - Total 5 papers accepted.
- **IRIA 2020.**
  - Brain tumor segmentation on a curated dataset using deep learning tools- potential implications
  - Liver tumor segmentation on a curated dataset using deep learning tools- potential implications



## Publications:

- a. Automatic Grading of Knee Osteoarthritis on the Kellgren-Lawrence Scale from Radiographs Using Convolutional Neural Networks. arXiv:2004.08572
- b. Survey of Personalization Techniques for Federated Learning. arXiv:2003.08673



## Services

### Teleradiology (AI + Crowd Powered)

- Leverages AUGMENTO to delivery end of end teleradiology services
- Deliverable is a radiologist signed report (Services is currently limited to India & Africa only)
- All modalities (X Ray, CT, MRI) are covered
- Team of about 50 radiologist | 24x7 services | Customized TAT starting from 1 hours
- Delivery better quality reporting, faster turn around time, improve radiologist productivity

## Technology

### **AUGMENTO** Radiology Workflow Optimization Platform

- AI powered PACS solution which offers features like automated triaging, pathology prediction, smart reporting etc.
- Helps improve productivity of radiologists, improve quality of clinical reports being prepared and the turn around time
- Can be provisioned on cloud / on premise / private cloud infrastructure

### **GENKI** Public Health Screening

- Used for public health screening using X rays (and CT Scans)
- Enables fast and accurate triaging of patients
- Can be used in hospitals / at hotspots (vans with portable X rays)
- Is being used for TB screening and COVID Suspect screening
- Can identify up to 17 different pathologies on the Chest X ray scan



ICS › 11 › 11.040 › 11.040.01

## IEC 62304:2006

Medical device software

Software life cycle processes

- VULNERABILITY ASSESSMENT AND PENETRATION TESTING CERTIFICAITONS
- CUSTOMER CAN CONDUCT INDEPENDENT INFORMATION SECURITY AUDITS
- FDA CERTIFICAION FOR THE PLATFORM IN PROCESS



For any questions or inquiries regarding this solution, please contact :

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## QUNIE CORPORATION

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