

# X-ray Machines integration with AI

Utsav Gada

Shah and Anchor Kutchhi Engineering College  
Mumbai, India

Dr. Nilakshi Jain

Shah and Anchor Kutchhi Engineering College  
Mumbai, India

Mr. Srikanth Kodeboyina

Founder & CEO, Blue Eye Soft Corp  
Greer, SC 29650, United States

Mr. Ramesh Menon

Advisor BES & CTO-S&T, IBM  
MD, United States

# CONTENTS

- PROBLEM STATEMENT AND OBJECTIVES
- COMPARITIVE ANALYSIS
- CONCLUSION
- REFERENCES



# Problem Statement and Objectives

## PROBLEM STATEMENT

To do a comparative analysis of existing x-ray machines which work on AI Algorithms.

## OBJECTIVES

- Highlighting Machine Learning and Deep Learning algorithms used in the existing AI based X-ray Machines.
- Awareness about the accuracy and time these machines provide.
- Highlighting the importance of these machines in current pandemic situation.

- **Intel and GE Healthcare's X-ray machine**
- **Siemens Healthineers Ysio X.pree**
- **Stanford University's CheXpert**
- **Nanox's Digital X-ray Device Accompanied by AI-based Software**
- **Google's AI Algorithm**
- **Delft Imaging's CAD4COVID**
- **Blue Eye Soft Corp's BluedocAI™**

# Comparative Analysis



# Comparative Analysis

Parameters	Optima XR240am x	Ysio X.pree	CheXpert	Digital X- ray device by Nanox	Google's AI Algorithm	Cad4Covid	BluedocAI
Organization	GE Healthcare	Siemens Healthineers	Stanford University	Nanox	Google	Delft Imaging	Blue Eye Soft Corp
Cloud Services used	No	Yes	Yes	Yes	Yes	Yes	Yes
Detects COVID	No	No	No	Can't say. Product not launched yet	No	Yes	Yes
Diseases Detected	Orthopedic damage, tumors, pneumonia, foreign objects	Thorax	Pneumonia	Early detection of all medical conditions that are discoverable by X-ray	Pneumothorax, nodules and masses, fractures and airspace opacities in chest X-rays	COVID	COVID

# Comparative Analysis

Unique Feature	The company has embedded all the algorithms on the imaging device itself. It does not use cloud saving the cloud charges and preventing security vulnerabilities	The photos are created using a 3D camera. Viewing the photos based on AI algorithm, it can automatically detect thorax and thus sets the optimal acquisition area for this – the so-called collimation	It uses a mobile device where users can snap a picture or x-ray or upload the picture to get results.	It provides end to end medical service which includes image repository, radiologist matching, online and offline diagnostics review and annotation, connectivity to diagnostic assistive artificial intelligence systems, billing and reporting	It provides expert level accuracy.	It is the first AI software that is proved to perform at the same level as human expert readers to detect COVID-19 related abnormalities on chest X-ray images	It has the accuracy of more than 90%
----------------	--	--	---	---	------------------------------------	--	--------------------------------------

# Conclusion

This paper has presented a detailed working of AI based X-ray Machines using Machine Learning and Deep Learning Algorithms, gave a detailed comparision of various existing machines and explained the need of AI based X-ray Machines in the current pandemic situation.

# References

- F. Shi et al., "Review of Artificial Intelligence Techniques in Imaging Data Acquisition, Segmentation and Diagnosis for COVID-19," in IEEE Reviews in Biomedical Engineering, doi: 10.1109/RBME.2020.2987975.
- S. Rajaraman, J. Siegelman, P. O. Alderson, L. S. Folio, L. R. Folio and S. K. Antani, "Iteratively Pruned Deep Learning Ensembles for COVID-19 Detection in Chest X-Rays," in IEEE Access, vol. 8, pp. 115041-115050, 2020, doi: 10.1109/ACCESS.2020.3003810.
- Hosny A, Parmar C, Quackenbush J, Schwartz LH, Aerts HJWL. Artificial intelligence in radiology. Nat Rev Cancer. 2018;18(8):500-510. doi:10.1038/s41568-018-0016-5
- DENG, LI, et al., "Deep Learning Methods and Applications", Foundations and Trends in Signal Processing, Vol. 7, No. 3-4, (2013), 197-387 \*
- Intel, "Intel and GE Healthcare Partner to Advance AI in Medical Imaging", <<https://www.intel.com/content/www/us/en/customer-spotlight/stories/ge-healthcare-medical-imaging.html>>
- GE Healthcare, "GE Healthcare Discusses Artificial Intelligence in X-ray", Dec, 13, 2019 <[https://www.youtube.com/watch?v=Q\\_0GL-XQuek](https://www.youtube.com/watch?v=Q_0GL-XQuek)>



# References

- HospiMedica International Staff writer , “GE Healthcare Unveils New Imaging Tech and Intelligent Apps at Arab Health 2020”, Jan,28,20,<<https://www.hospimedica.com/arab-health-2020/articles/294780674/ge-healthcare-unveils-new-imaging-tech-and-intelligent-apps-at-arab-health-2020.html>>
- Siemens Healthineers, “Yiso Max” Jun,22,20, <[https://www.siemens-healthineers.com/en-in/radiography/digital-x-ray/ysio-max#FEATURES\\_BENEFITS](https://www.siemens-healthineers.com/en-in/radiography/digital-x-ray/ysio-max#FEATURES_BENEFITS)>
- Stanford Medical, “ Artificial intelligence rivals radiologists in screening X-rays for certain diseases”, Nov,20,18<<https://med.stanford.edu/news/all-news/2018/11/ai-outperformed-radiologists-in-screening-x-rays-for-certain-diseases.html>>
- Imaging Technology News ,“AI Improves Chest X-ray Interpretation”,Dec03,19,<<https://www.itnonline.com/content/ai-improves-chest-x-ray-interpretation>>
- Dave Steiner, MD, Research Scientist and Shravya Shetty, Technical Lead, Google Health, “Developing Deep Learning Models for Chest X-rays with Adjudicated Image Labels”, Dec,3,20,<<https://ai.googleblog.com/2019/12/developing-deep-learning-models-for.html>>
- Delft Imaging, “Cad4covid”, Mar30,20, <<https://delft.care/cad4covid>>

# Thank You!



Utsav Gada

+91 83568 63408

[utsav.gada@sakec.ac.in](mailto:utsav.gada@sakec.ac.in)

Engineering Student

Dr. Nilakshi Jain

+91 99670 39388

[nilakshi.jain@sakec.ac.in](mailto:nilakshi.jain@sakec.ac.in)

Associate Professor

Mr.Srikanth Kodeboyina

+1 (937) 581-7110

[sri@blueyesoft.com](mailto:sri@blueyesoft.com)

Founder & CEO,Blue Eye  
Soft Corp

Mr. Ramesh Menon

+1 (360) 213-6742

[rrmenon@us.ibm.com](mailto:rrmenon@us.ibm.com)

Advisor BES & CTO-S&T,  
IBM