

National Award for E Governance

CATEGORY 2: Application of Emerging Technologies for Providing Citizen Centric Delivery

**USE OF TELERADIOLOGY
AND
ARTIFICIAL INTELLIGENCE
FOR
DIAGNOSING SILICOSIS USING CHEST X- RAY**

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GOOD GOVERNANCE : CITIZEN CENTRIC SYSTEM

DESIRABLE ATTRIBUTES OF PUBLIC SERVICE DELIVERY

- Accessible, available - anytime, anywhere

- Quick Benefit transfer.

- Quality Services, provided with dignity.

Principles of sensitivity, transparency and accountability

Corruption and discretion free

- Assured and accurate.

- User friendly.

- Satisfaction of the beneficiary.

INFORMATION TECHNOLOGY (IT) IS AN ENABLING TOOL FOR ABOVE

CHALLENGE OF SILICOSIS

1. Rajasthan has 33,000+ small and large mines
2. 3+ million workers in mining and related industries
3. 3+ million workers in building and construction industries



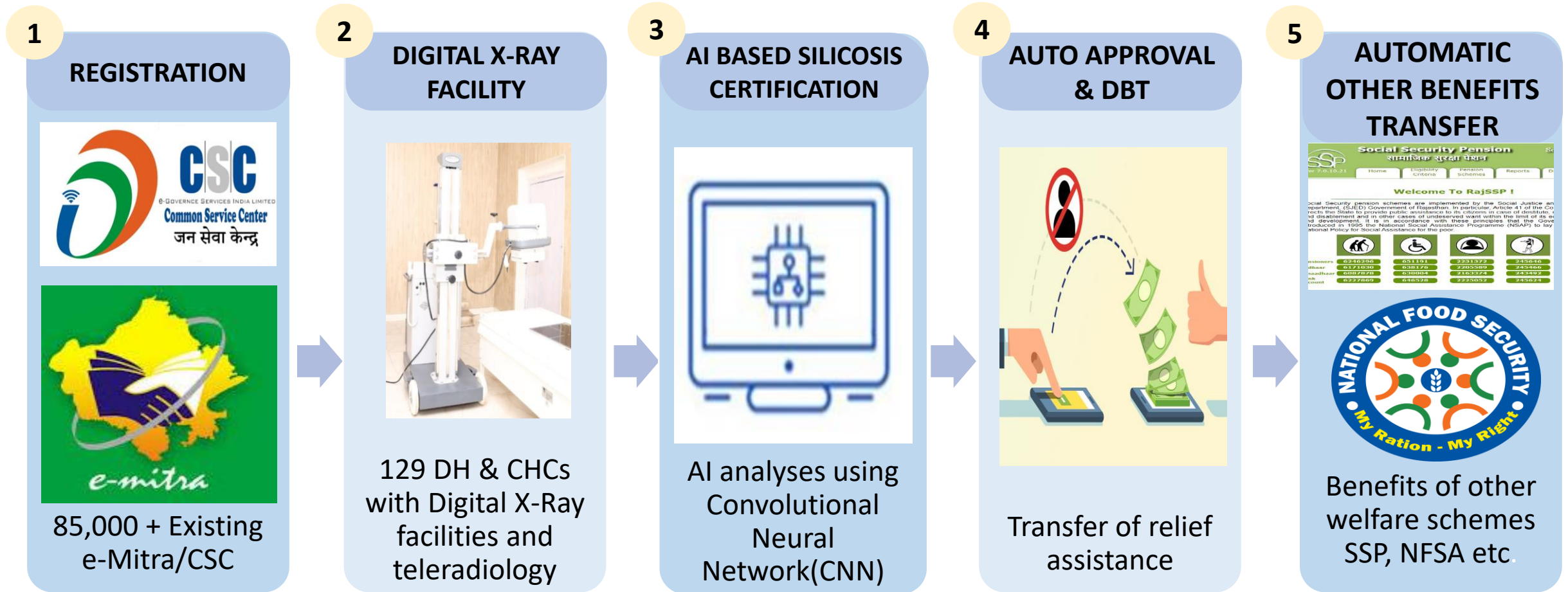
SILICOSIS WORKERS WELFARE POLICY : CHALLENGES IN IMPLEMENTATION

1. Long distances in Rajasthan
2. Shortage of radiologists
3. Delay and consequent corruption in payment
4. Prevention of silicosis by ensuring occupational safety and health



RAJ-SILICOSIS AUTO-APPROVAL PORTAL

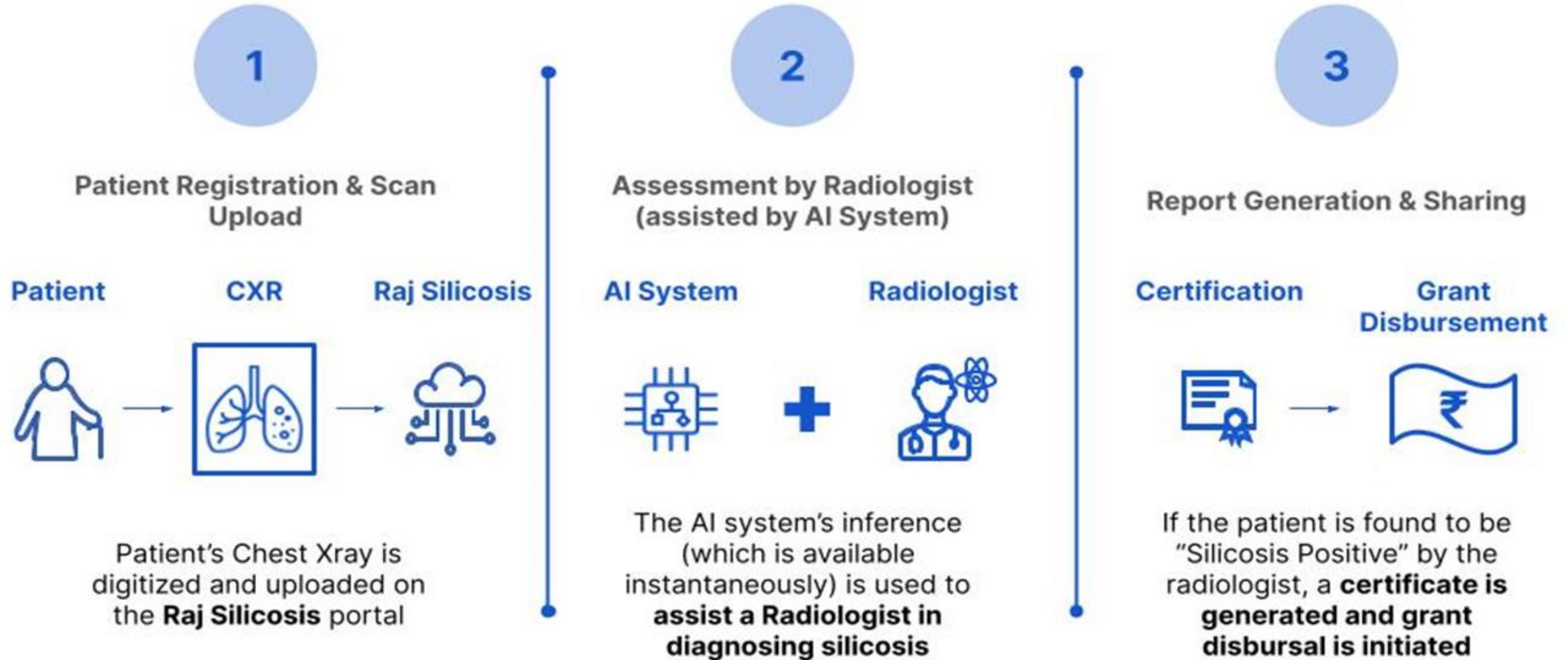
It provides an integrated solution using digital radiography, teleradiology and AI algorithms for silicosis diagnosis and auto-approval



KEY FEATURES OF THE RAJ SILICOSIS PORTAL

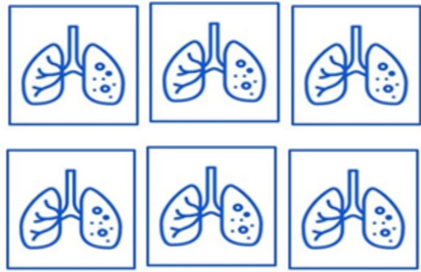
Digital Access to Applicants	Public registration via 84,000 E-Mitra kiosks mapped on the portal for easy access.
Online Registration & Biometric authentication	Aadhaar-based biometric authentication linked with Jan Aadhaar database for secure verification and avoidance of duplicate payments.
Mapping of Health Centers	129 health centers and hospitals with digital X-ray facilities, 662 radiographers, 356 medical officers, and 87 radiologists mapped for medical examinations and certification.
Access for Departmental Users & E-Sign Integration	Portal access for departmental users from health, labor, mines, social welfare sectors, and others. Automated e-signing for quick processing of benefits without human intervention.
Automated Information Sharing	Automatic relief to nominees on death of a beneficiary using online death certificate integration from the Pehchaan Portal.
AI Assistance & Predictive Capability	AI model compares new X-ray images with confirmed cases, assisting radiologists in the accurate identification of potential silicosis cases.
Support to Radiologists	AI acts as a “first-line reader” to prioritize suspected cases, enhancing diagnostic efficiency and aiding healthcare professionals.

AI ASSISTANCE TO RADIOLOGIST FOR CERTIFICATION

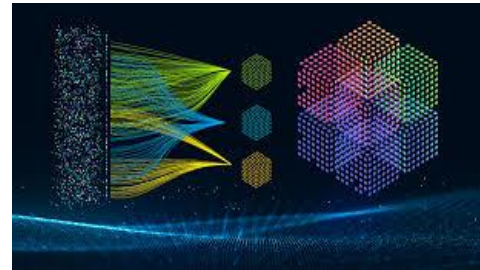


HOW AI SYSTEM FUNCTIONS : TRAINING AND PREDICTION

A: TRAINING



DATASETS OF 29160 LABELLED CHEST X-RAY IMAGES UPLOADED



TRAINING OF AI SOFTWARE USING CNN AND FEATURE EXTRACTION FOR PATTERN RECOGNITION

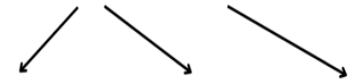


DEEP LEARNING



B: VALIDATION AND TESTING

All Data



Training

Validation

Test

Models learn the task

Which model is the best?

How good is this model truly?

C: PREDICTION



NEW PATIENT X-RAY DIGITIZED & UPLOADED



IMAGE TRANSFER



AI ANALYSES X-RAY USING CNN



Silicosis Unlikely

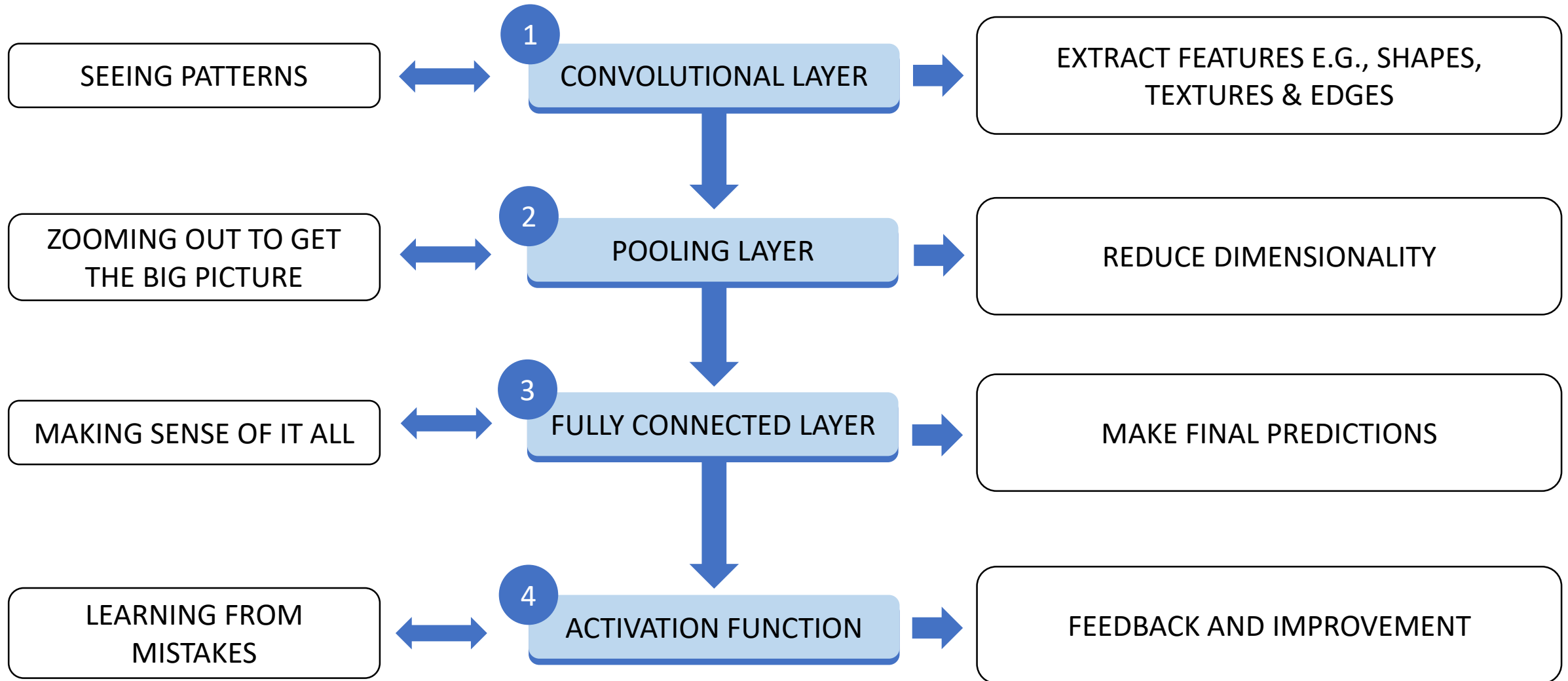


Silicosis Likely

AI PREDICTS X-RAY : SILICOSIS POSITIVE OR NEGATIVE

WHAT IS CONVOLUTIONAL NEURAL NETWORK(CNN)?

CNN IS A TYPE OF DEEP LEARNING ALGORITHM PRIMARILY USED FOR IMAGE RECOGNITION, CLASSIFICATION AND VISUAL DATA PROCESSING.



HOW AI IS CURRENTLY PERFORMING

Accuracy

87.8 %

Sensitivity

82.0%

Specificity

86.9%

In an **unparalleled effort within the public sector**, Rajasthan has set a global precedent by training this **AI solution on an extensive dataset of 38,781 images**.

7363



Total number of Chest X-Rays
Uploaded for Prediction

1619



Number of Silicosis Positive
Cases

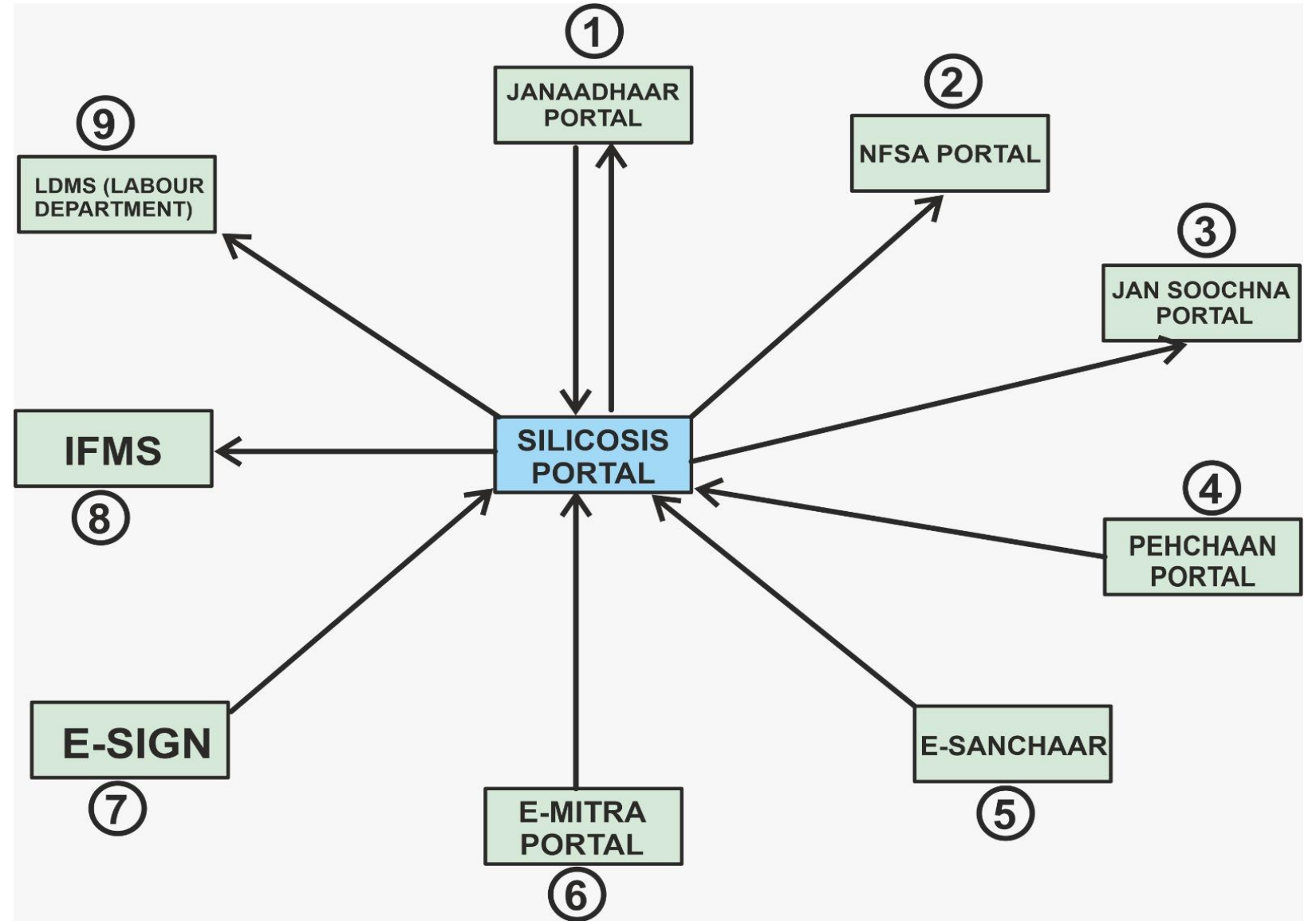
5744



Number of Silicosis Negative
Cases

INTEGRATION WITH OTHER PORTALS

- E-mitra
- Jan Aadhar
- Aadhar
- Jan Suchna
- Pehchaan
- E-Sanchar
- E-Sign
- IFMS portals
- Social Security Pension
- LDMS
- NFSA



SITUATION BEFORE AND AFTER THE DIGITAL SYSTEM: A COMPARISON

BEFORE RAJSILICOSIS

01. Long distance travel by the sick to DHQ for registration
02. Travel to DHQ for medical examination
03. X-ray diagnosis takes time as it is subject to radiologist's availability
04. X-ray diagnosis is subject to radiologist's subjective bias
05. The radiologist's report is physically sent to MO
06. Patient has to apply for relief with certificate to the concerned department, which takes time
07. Diagnosis, certification and benefit disbursement was time consuming and prone to corruption
08. Beneficiary has to apply separately for all other schemes – NFSA, Social security Pension and other BPL schemes

AFTER RAJSILICOSIS

- Registration is online or through e-mitra centres
- Examination at any of the 129 mapped centres of choice
- X-ray diagnosis is instant due to teleradiology, as an empanelled radiologist can diagnose anywhere anytime
- AI tool prediction is objective and unbiased
- Digital Certificate is generated instantly
- Physical presence is no longer required as the process is auto-approval based and through DBT
- Portal ensures quick, hassle-free, transparent and quality digital service delivery to the beneficiaries.
- As the portal is integrated with other portals, beneficiary need not apply separately, thus time, energy and money is saved

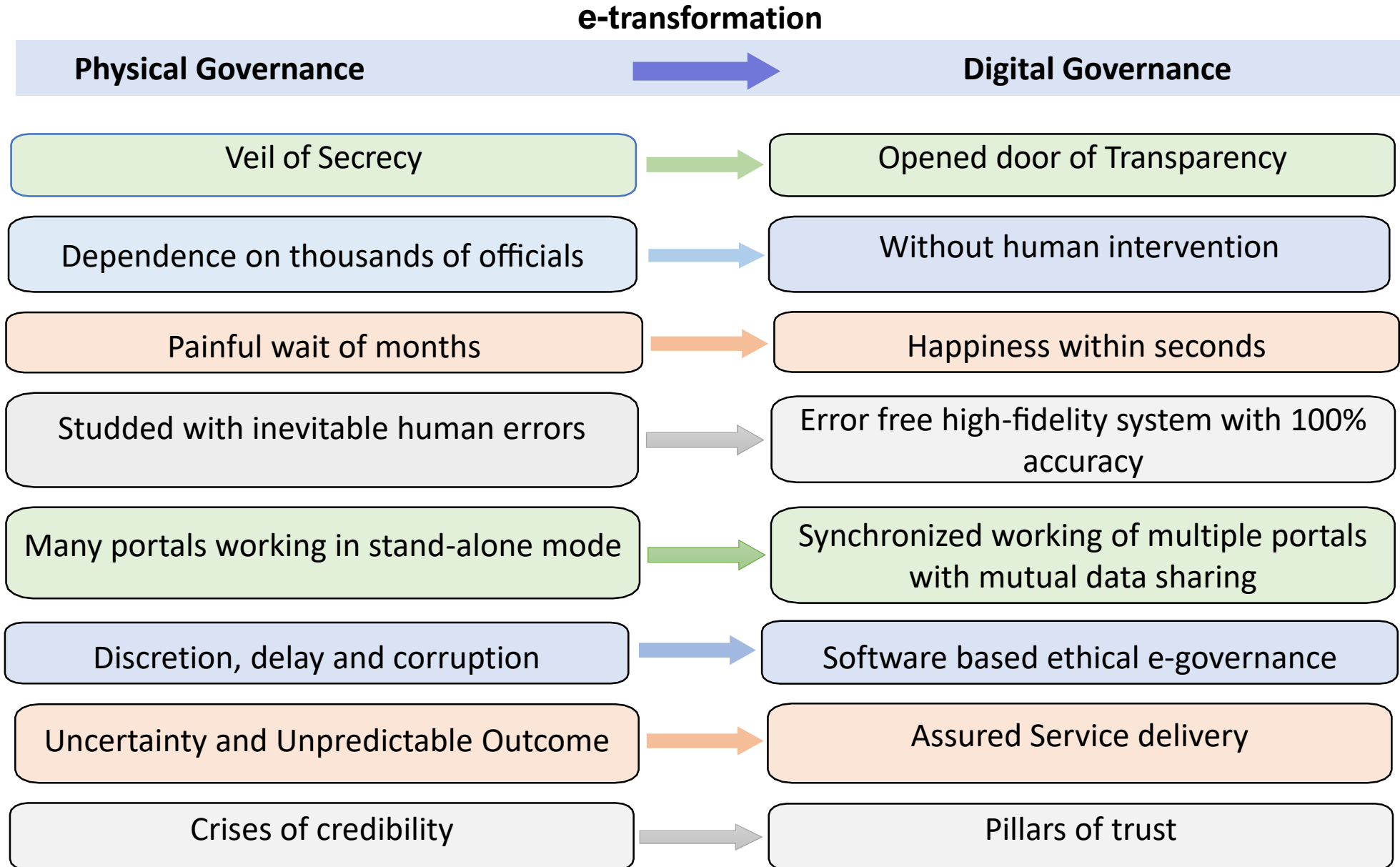
IMPACT

- 1,07, 297 persons have registered for silicosis screening
- 31,504 alive and 9,950 cases of death cases of silicosis certified
- 17,309 persons and families given relief through centralised payment of Rs. 519.721 crores.
- 22,327 children given benefits under silicosis Palanhaar Scheme
- 32,517 beneficiaries have been given pension
- 11,084 cases of silicosis widows have been given
- About 38,000 silicosis affected families benefitted under NFSA



It's RAJASTHAN's Contribution to DIGITAL INDIA PROGRAM

IMPACT OF TRANSFORMATION FROM PHYSICAL TO DIGITAL GOVERNANCE





“Technology is an enabler to create a more equitable, digitally empowered and prosperous India”

THANK YOU!