

Automatic Assessment of the Quality of Patient Positioning
in Mammography Using an Artificial Intelligent System

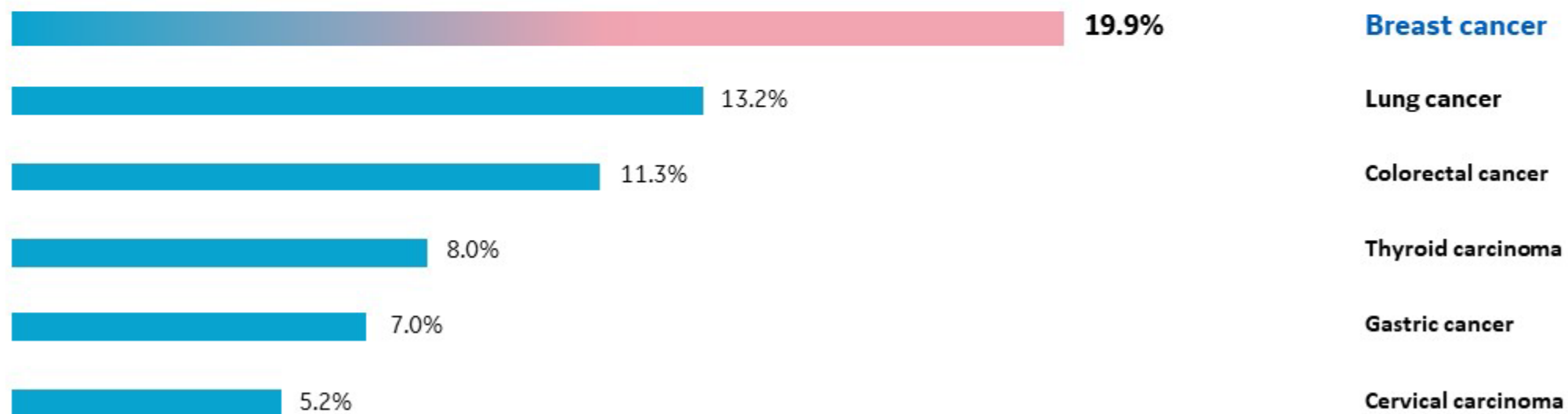


Current status of breast cancer in China

420000 new cases of breast cancer in China during 2020

Ranking first in female cancer incidence rate

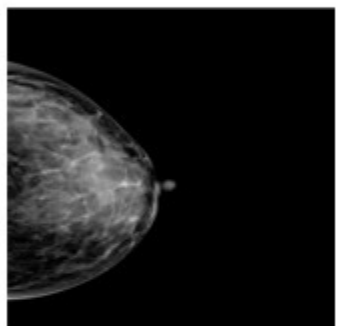
New cases of cancer in China during 2020



Quality control in mammography

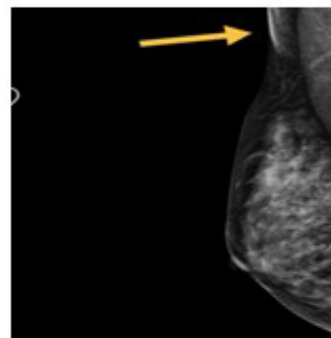
Qualified images are important basis for doctors to make accurate diagnosis.

Unqualified image images will lead to wrong diagnosis.



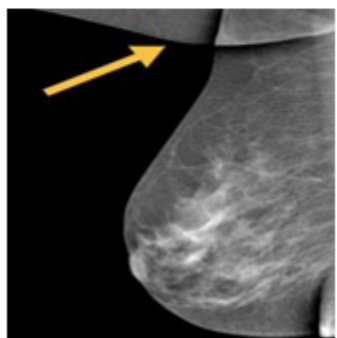
Quality control problem:
incomplete gland

Diagnostic risk:
missed detection



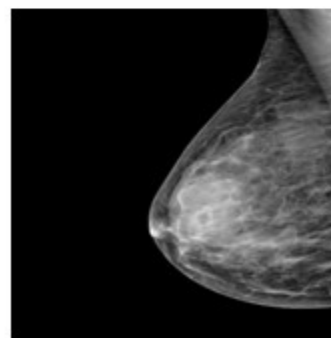
Quality control problem:
skin overlapping

Diagnostic risk:
covering the lesion



Quality control problem:
shoulder overlapping

Diagnostic risk:
covering the lesion



Quality control problem:
inadequate pectoralis major muscle

Diagnostic risk:
missed detection of malignant lymph nodes

Challenges from traditional manual quality control



Not real time

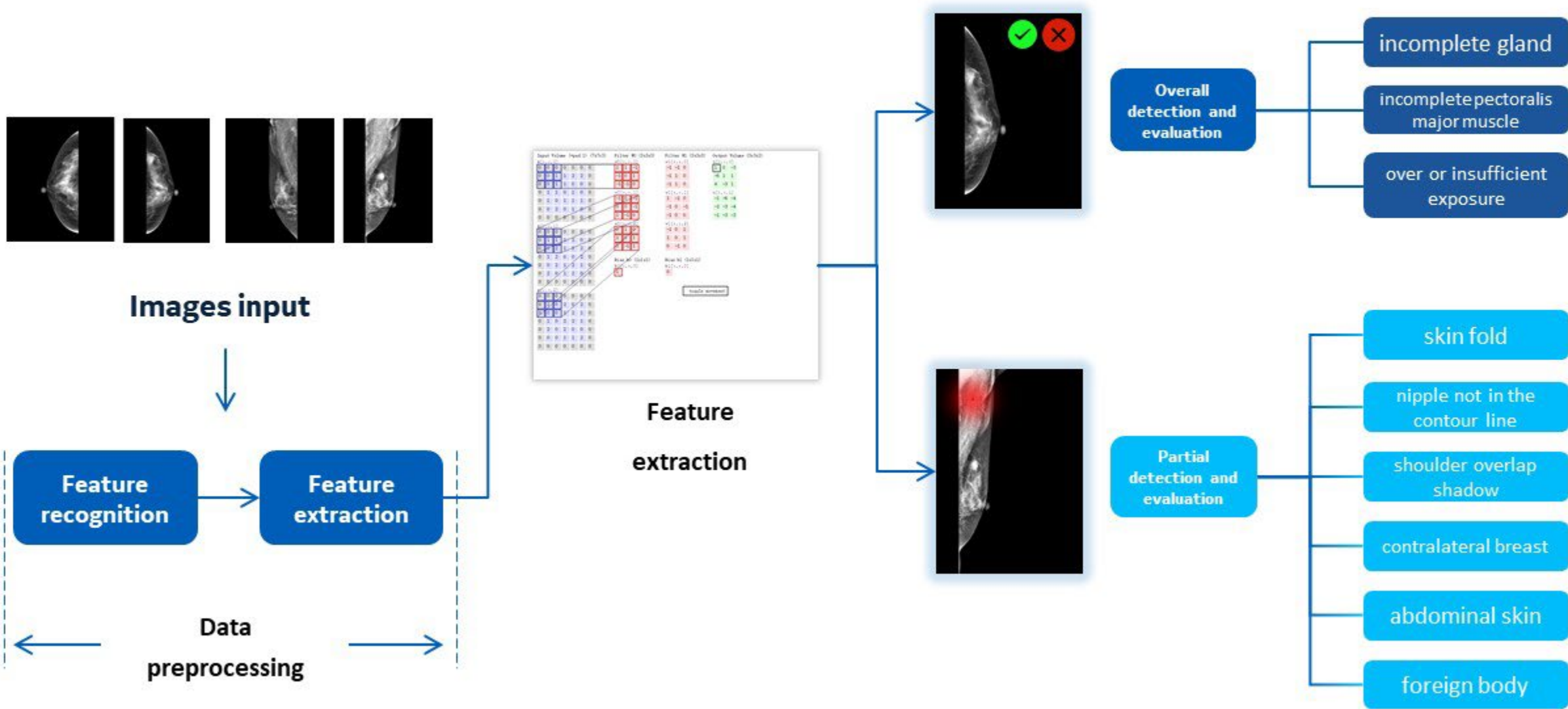


Not instant countable



Not uniformed management

Automatic patient positioning real time evaluation in mammography using an artificial intelligent system

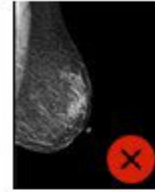


Nine types of abnormalities detection during mammography

Incomplete gland



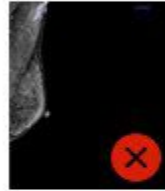
Incomplete pectoralis major muscle



Over or insufficient exposure



Skin fold



LMLO

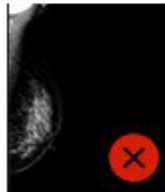


No abnormality

Nipple not in the contour line



Shoulder overlap



Contralateral breast



Abdominal skin



Foreign body



Acquisition alert



Performance of mammography quality control system



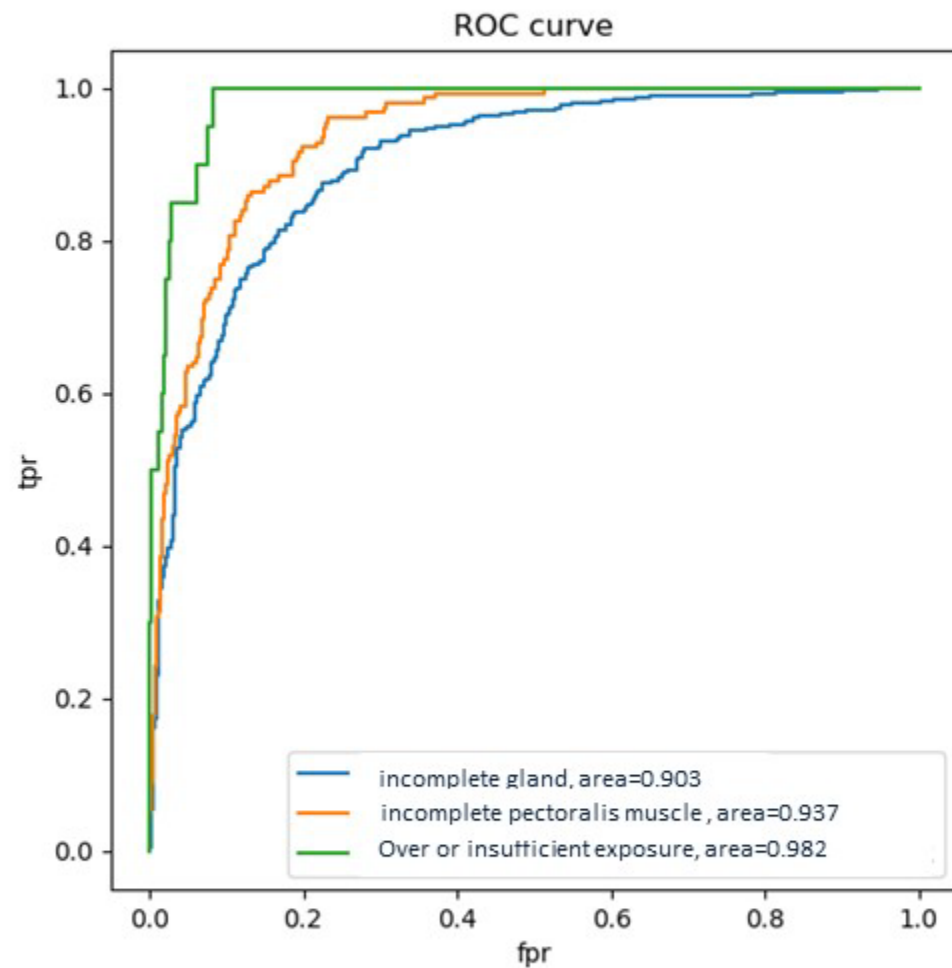
Training data set

30000+ case



Validation accuracy

95.8%



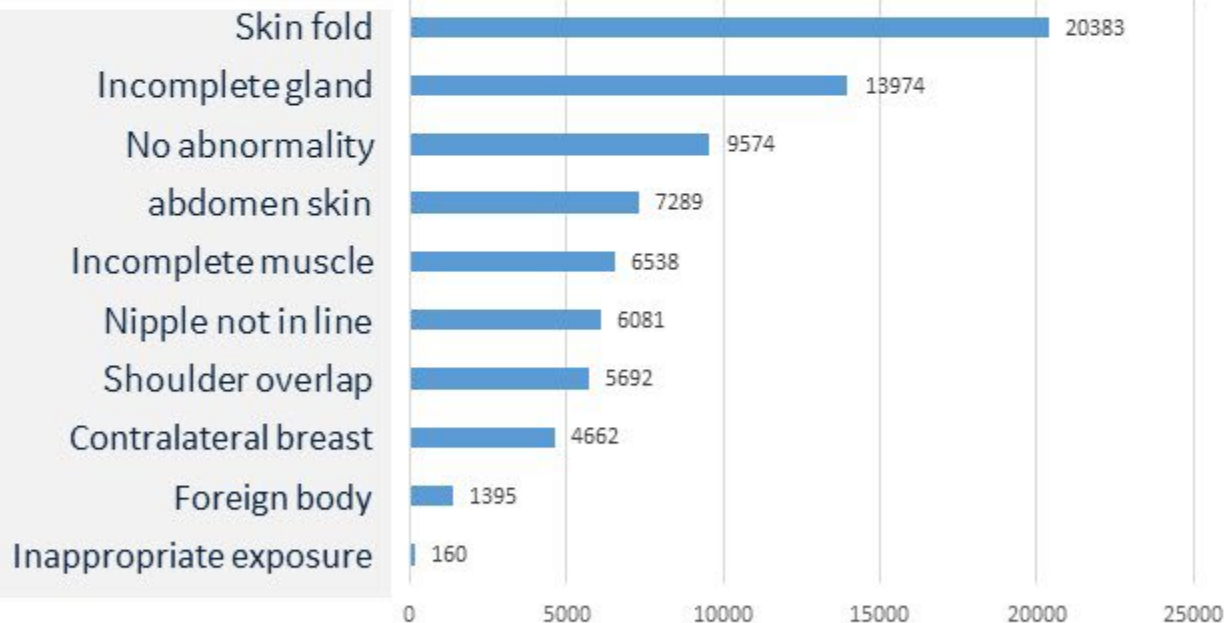
Validation ROC curve

Quality control management and analysis system

B	C	D	H
患者编号	检查时间	位置	可能异常原因
726253	20160926	LCC	无异常
MG18878	20210411	RMLO	无异常
MG18878	20210411	LCC	1:乳头未在轮廓线 2:腺体包含不全
MG18878	20210411	RCC	1:乳头未在轮廓线 2:腺体包含不全
MG18878	20210411	LMLO	1:皮肤皱裂 2:腺体包含不全
0020078811	20181217	RMLO	1:皮肤皱裂 2:拍到腹部皮肤
0020078811	20181217	RMLO	1:皮肤皱裂 2:拍到腹部皮肤
524311	20150804	LMLO	1:皮肤皱裂 2:拍到腹部皮肤 3:腺体包含不全 4:胸大肌摄入不全
524311	20150804	RMLO	1:拍到腹部皮肤 2:腺体包含不全 3:胸大肌摄入不全
MG5	20200608	LCC	无异常
MG5	20200608	RCC	1:腺体包含不全
MG5	20200608	RMLO	1:皮肤皱裂 2:乳头未在轮廓线 3:肩膀重叠影 4:胸大肌摄入不全
MG5	20200608	LMLO	1:皮肤皱裂 2:乳头未在轮廓线 3:胸大肌摄入不全
MG4	20200608	RCC	1:腺体包含不全
MG4	20200608	LMLO	1:皮肤皱裂
MG4	20200608	LCC	无异常
MG4	20200608	RMLO	1:皮肤皱裂 2:肩膀重叠影
726253	20160926	RCC	无异常
726253	20160926	RMLO	1:皮肤皱裂 2:拍到腹部皮肤
726253	20160926	LMLO	1:皮肤皱裂 2:拍到腹部皮肤 3:胸大肌摄入不全
726253	20160926	LCC	无异常
0020078811	20181217	RMLO	1:皮肤皱裂 2:拍到腹部皮肤
0021598728	20201009	RCC	无异常
MG18878	20210411	RMLO	无异常
MG18878	20210411	LCC	1:乳头未在轮廓线 2:腺体包含不全
MG18878	20210411	RCC	1:乳头未在轮廓线 2:腺体包含不全
MG18878	20210411	LMLO	1:皮肤皱裂 2:腺体包含不全
MG18991	20210428	RCC	无异常
MG18991	20210428	RMLO	无异常
MG18991	20210428	LMLO	1:皮肤皱裂
MG18991	20210428	LCC	1:腺体包含不全
0000349339	20210908	LCC	1:异物
0000349339	20210908	LMLO	无异常
0000349339	20210908	RMLO	1:皮肤皱裂
0000349339	20210908	RCC	无异常
0000349339	20210908	RMLO	1:皮肤皱裂 2:肩膀重叠影
0000659422	20210917	RMLO	1:皮肤皱裂 2:腺体包含不全
0000659422	20210917	LMLO	1:皮肤皱裂 2:腺体包含不全



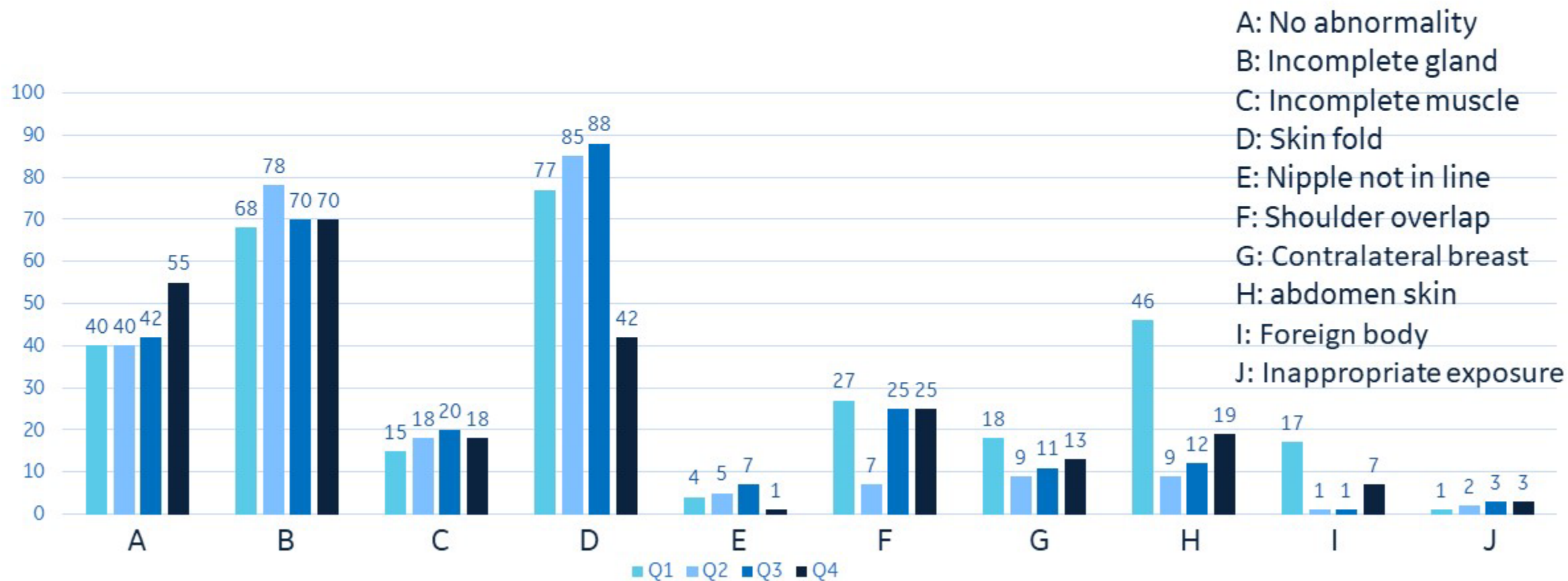
Data output in file



Respectively analysis

Statistical analysis of image quality for improvement

With the help of systematic review and evaluation of the changes in the quality of photography during four quarters, image quality of mammography can be improved by using this management system.



Artificial Intelligent based real time quality control and manage system



**Provide real-time quality control results
for technicians**

- **Ensure the effectiveness of photography**
- **Reduce waste**



**Provide qualified images
for doctors**

- **Reduce the risk of misdiagnosis**
- **Reduce recall rate**



**Provide efficient management tools
for managers**

- **Standardized management of
images and data**