MEDIZINISCHE UNIVERSITÄT WIEN

Analyse	Projektnr: 22023	Betreuer: J. Brugger	Datum: 06.Mai 22
Dr. Goldbach	e-mail: jonas.brugger@meduniwien.ac.at		

Contents

The following analyses was done using the dataset “Alle studies Clean for SPPS use v2.xlsx”, sent on 21.03.22.

Logistic regression models were computed for every endpoint. Presence of fluid was defined as the dependent variable and the fluid volume determined by the AI as the explanatory variable. ROC curves of the logistic regression models were drawn and the area under the curve (AUC) was calculated. An optimal cutoff point was calculated using the Youden-Index [1]. The fluid volume corresponding to every respective cutoff and the total accuracy, sensitivity and specificity was calulated.

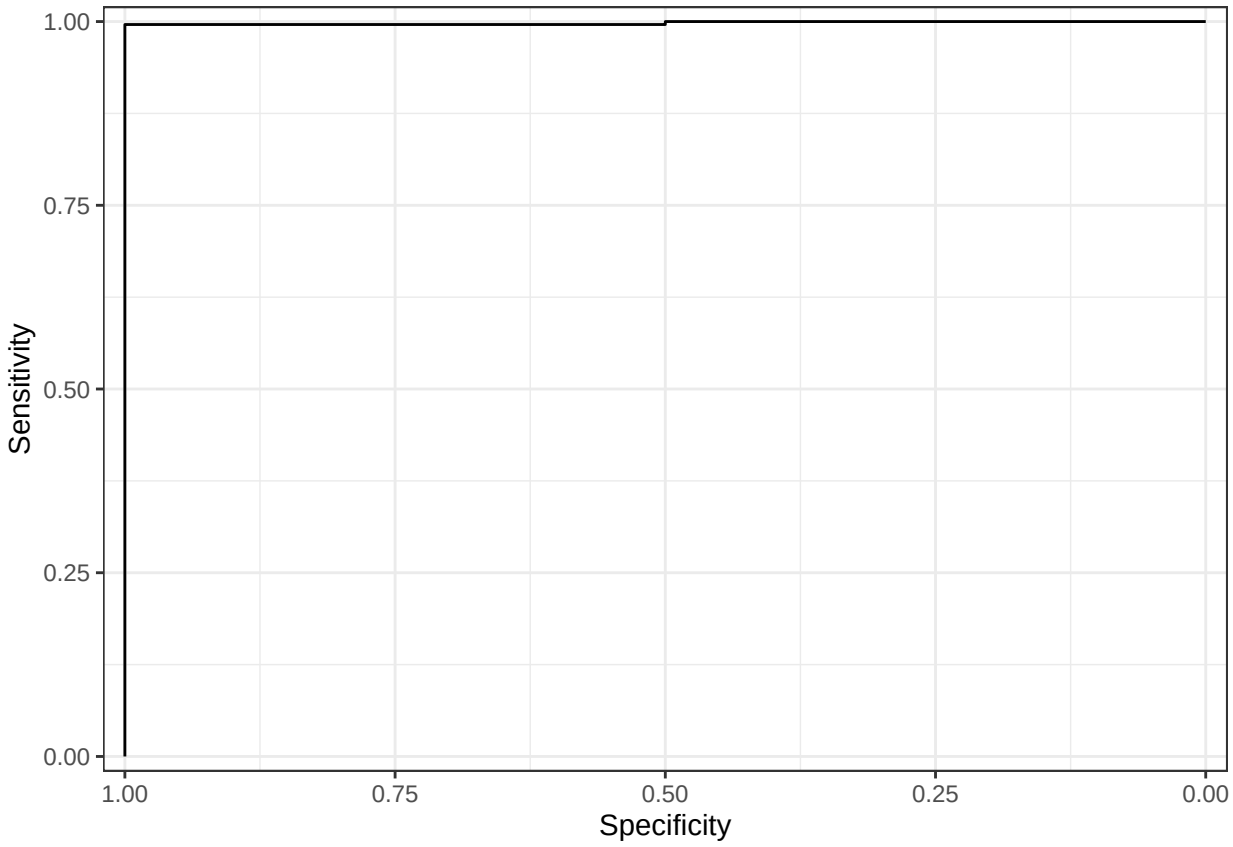
In case of the “Protocol T” and “TREND”-studies the data includes follow-up visits of patients. Logistic regression models were calculated under the assumption that observations are independent. As a sensitivity analysis, the same models were calculated using only the observations of each patient at baseline. Additionally, a 95% confidence interval for the area under the curve (AUC) was calulated by repeatedly sampling one observation of each patients and calculating the AUC of the ROC curve of the resulting model. This was done 1000 times for each instance. The confidence interval of the AUC was then defined as the interval between the 2.5 - and the 97.5 percentile of the obtained AUCs.

Statistical analysis was done using R, version 3.6.1 or higher.

1 Brighter

1.1 IRF_TotalFoV

1.1.1 Both cameras

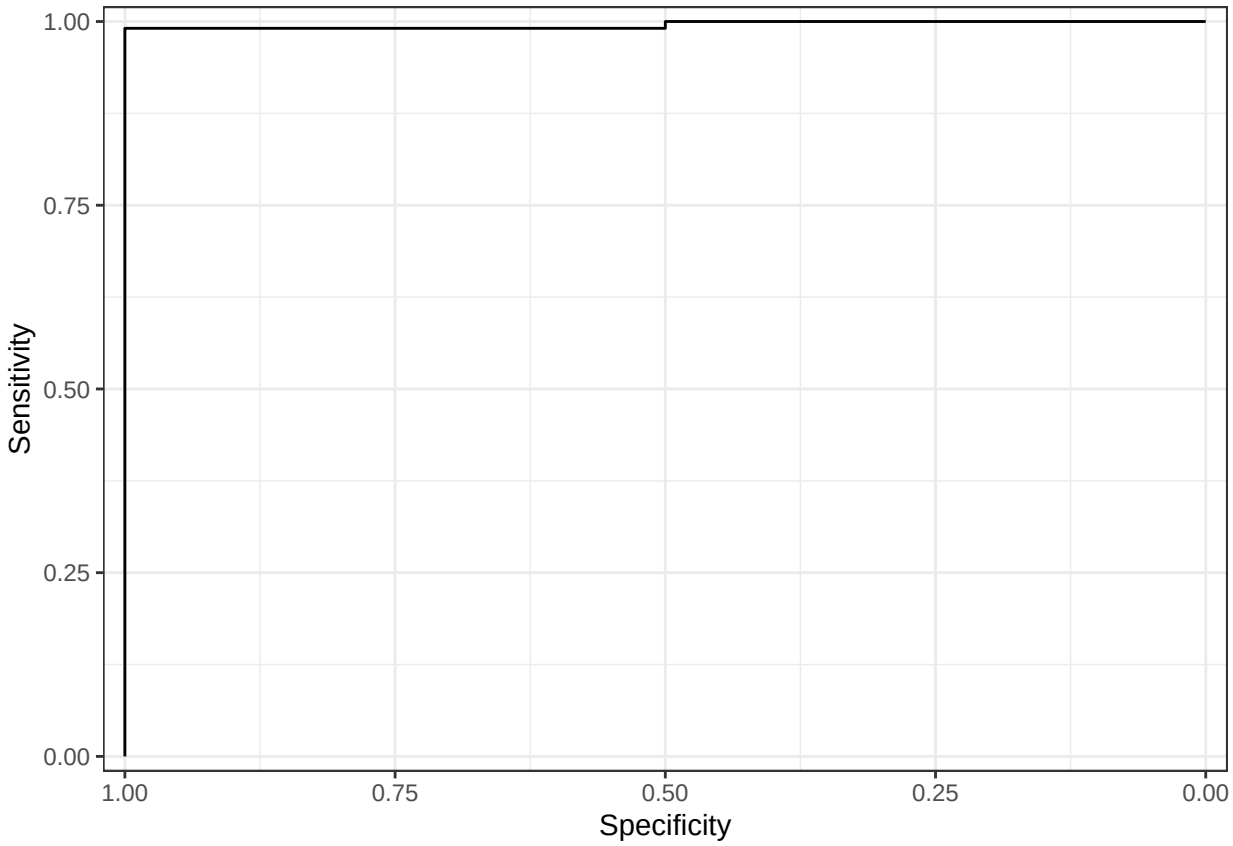


Area under the curve = 0.998

Optimal cutoff for IRF_TotalFoV = 11.4700

accuracy	specificity	sensitivity
0.996	1	0.996

1.1.2 Camera 0



Area under the curve = 0.995

Optimal cutoff for IRF_TotalFoV = 12.6310

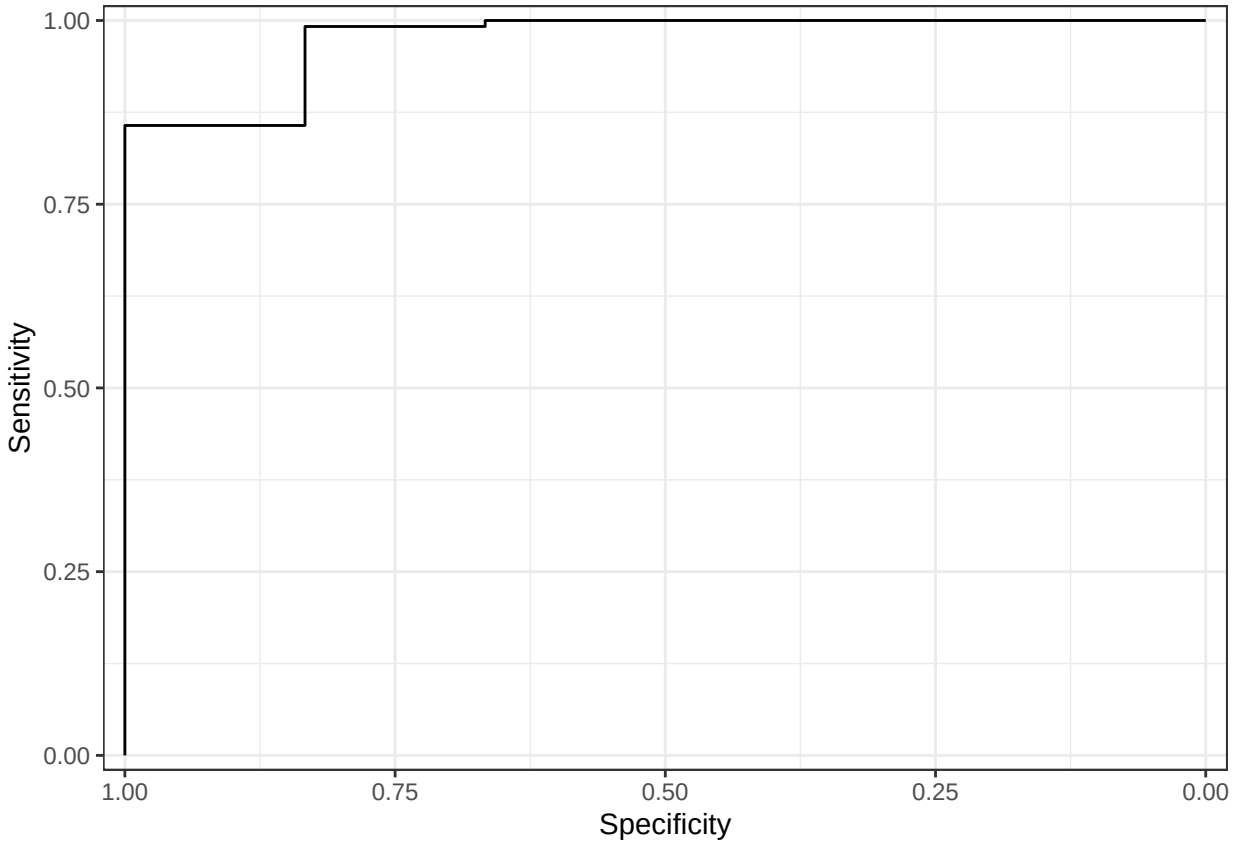
accuracy	specificity	sensitivity
0.991	1	0.991

1.1.3 Camera 1

Kann kein Modell rechnen, da nur ein Level an Anwesenheit von Flüssigkeit

1.2 IRF_CMM

1.2.1 Both cameras

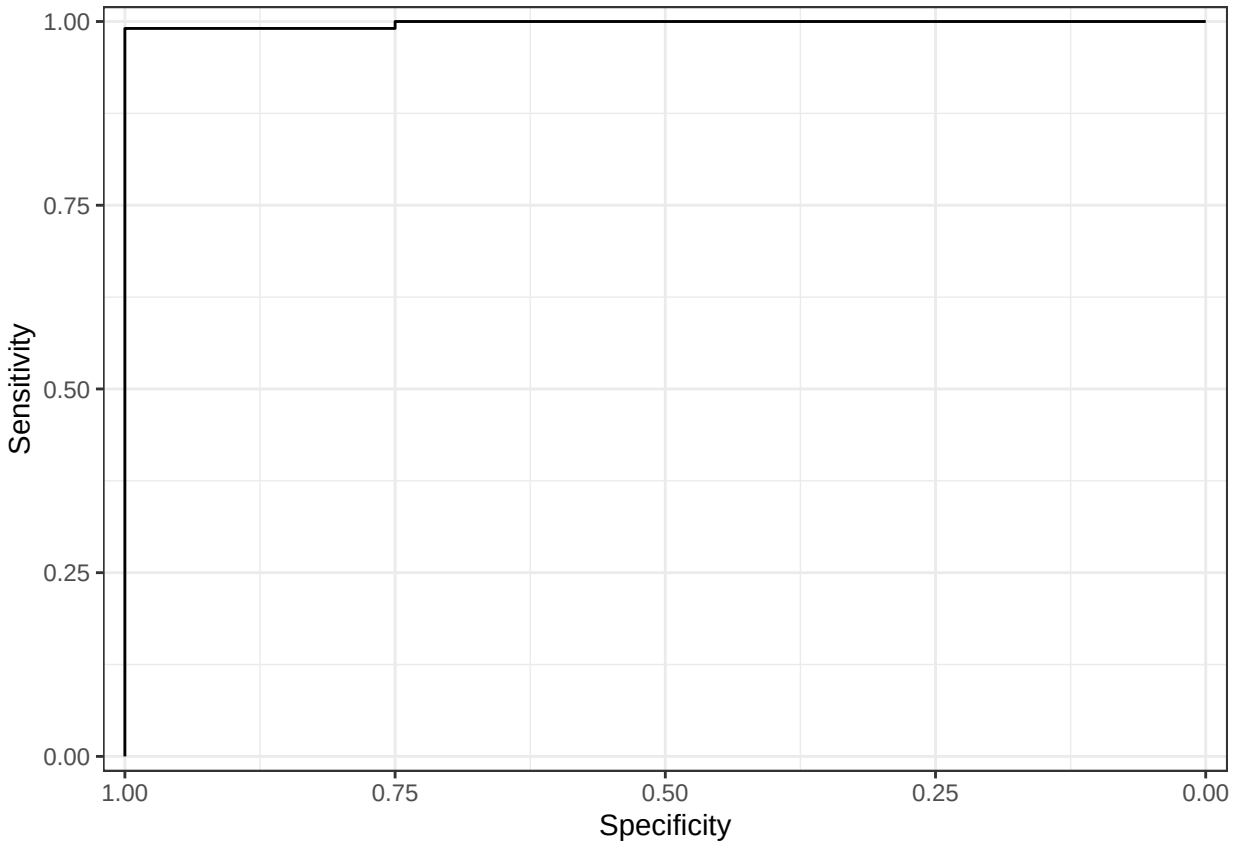


Area under the curve = 0.975

Optimal cutoff for IRF_CMM = 40.9920

accuracy	specificity	sensitivity
0.861	1	0.857

1.2.2 Camera 0

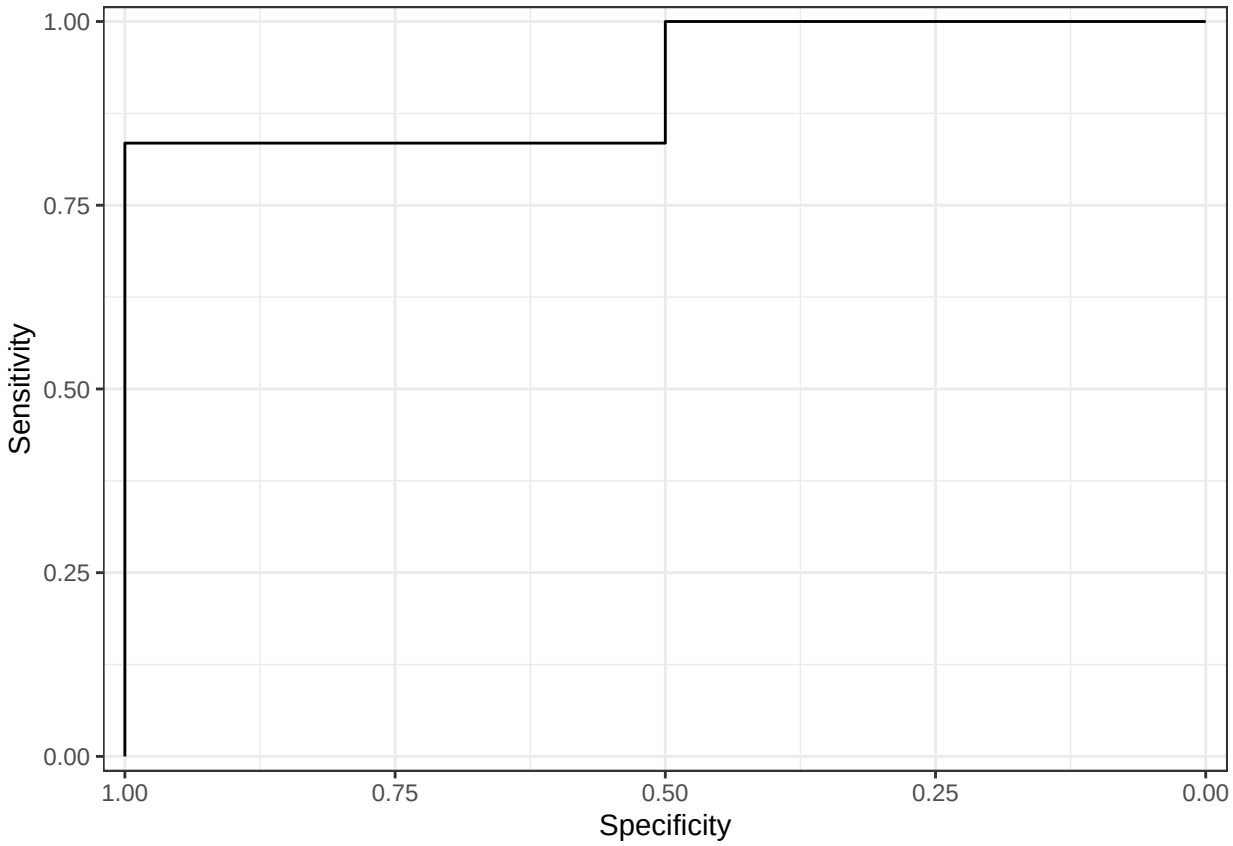


Area under the curve = 0.998

Optimal cutoff for IRF_CMM = 1.7610

accuracy	specificity	sensitivity
0.991	1	0.991

1.2.3 Camera 1



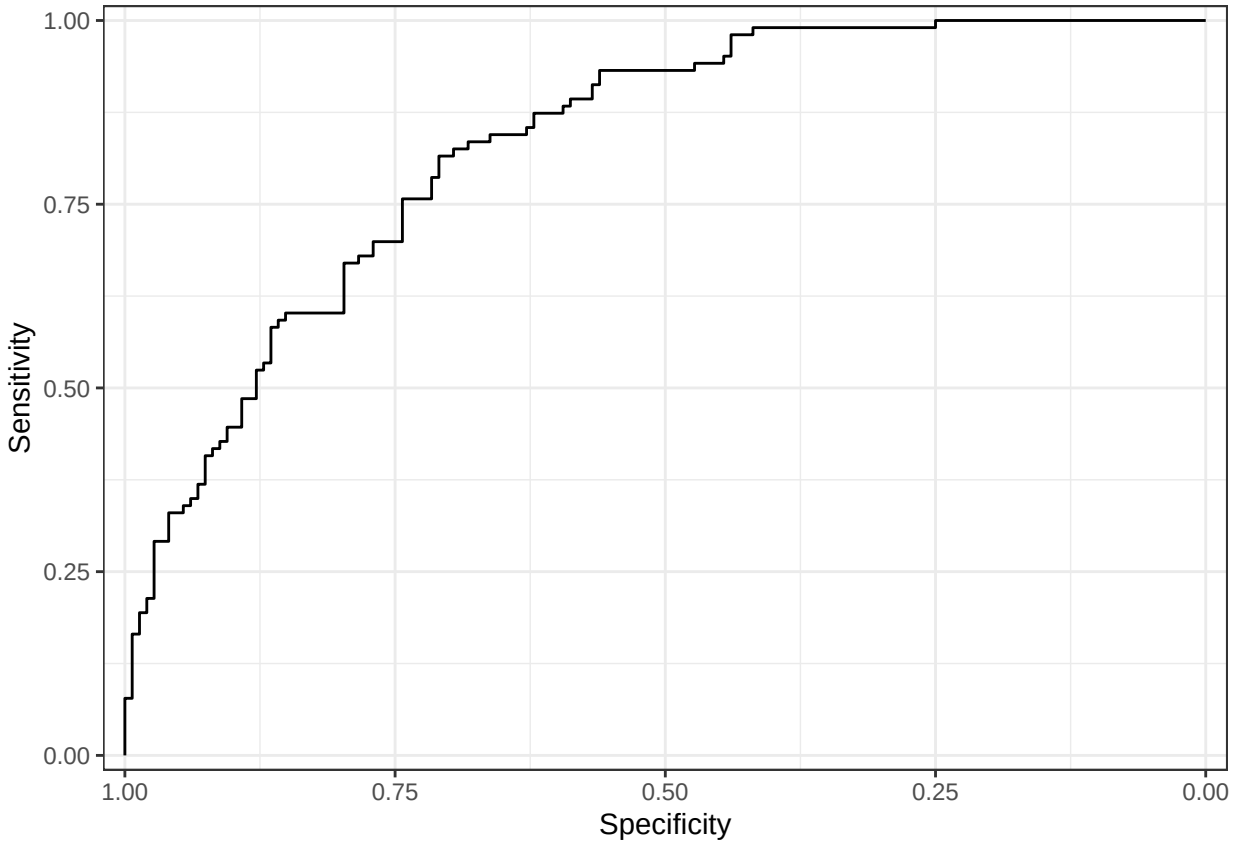
Area under the curve = 0.917

Optimal cutoff for IRF_CMM = 40.9920

accuracy	specificity	sensitivity
0.837	1	0.835

1.3 SRF_TotalFoV

1.3.1 Both cameras

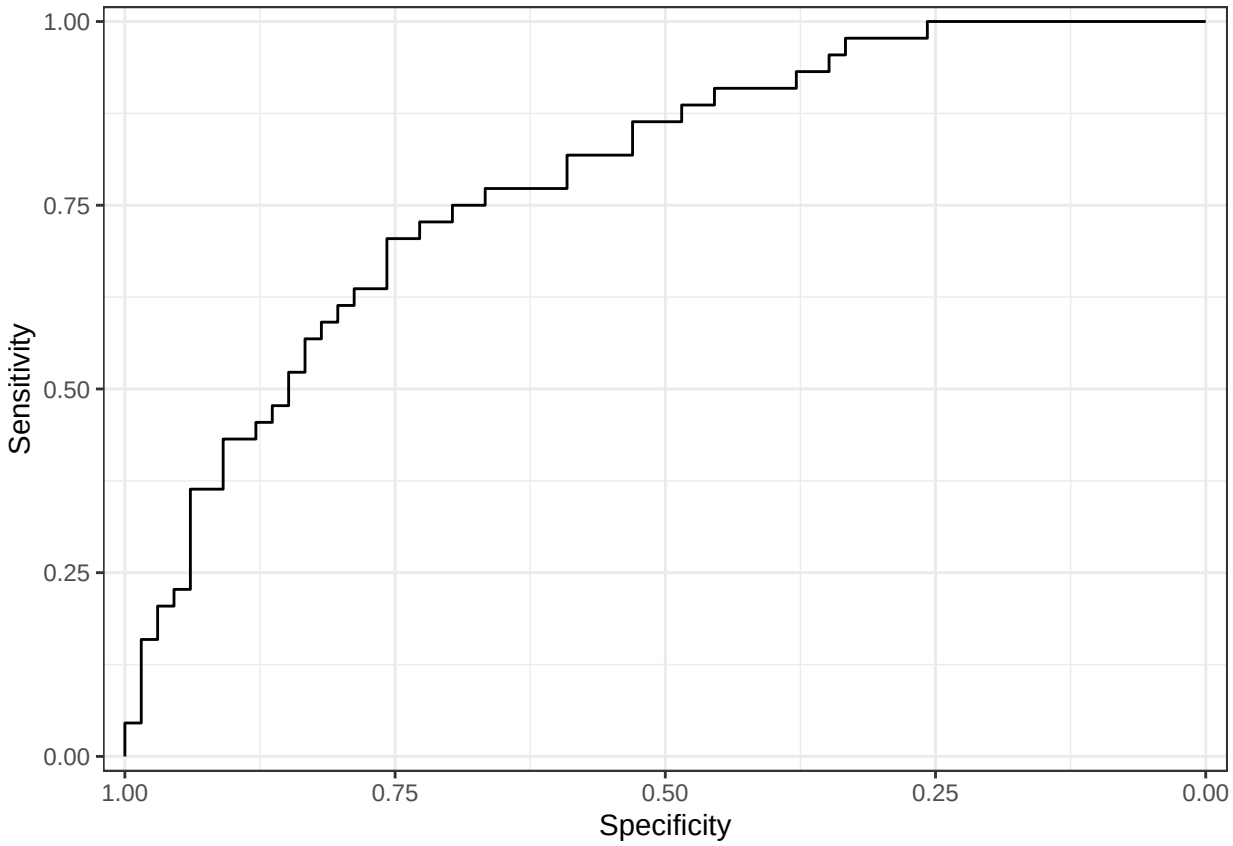


Area under the curve = 0.830

Optimal cutoff for SRF_TotalFoV = 28.5880

accuracy	specificity	sensitivity
0.753	0.709	0.816

1.3.2 Camera 0

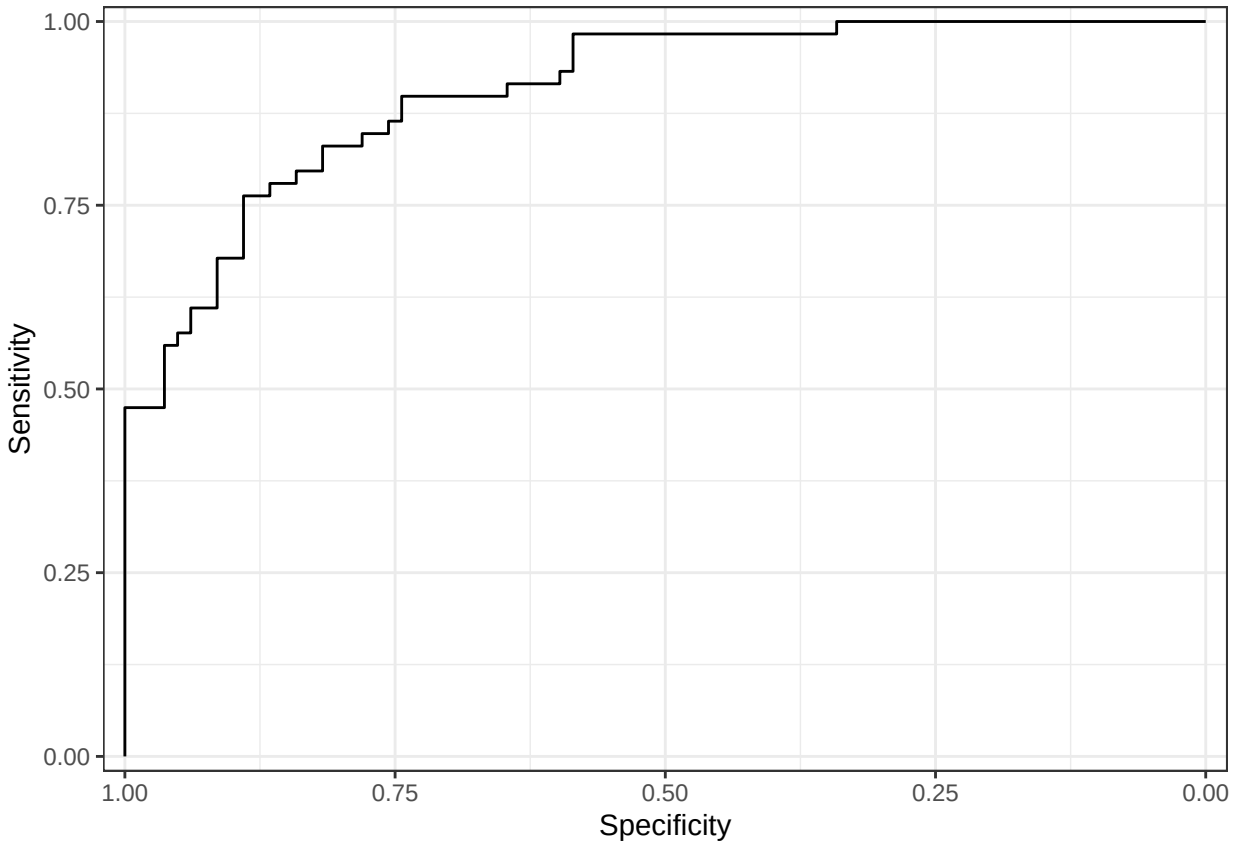


Area under the curve = 0.785

Optimal cutoff for SRF_TotalFoV = 176.3380

accuracy	specificity	sensitivity
0.736	0.758	0.705

1.3.3 Camera 1



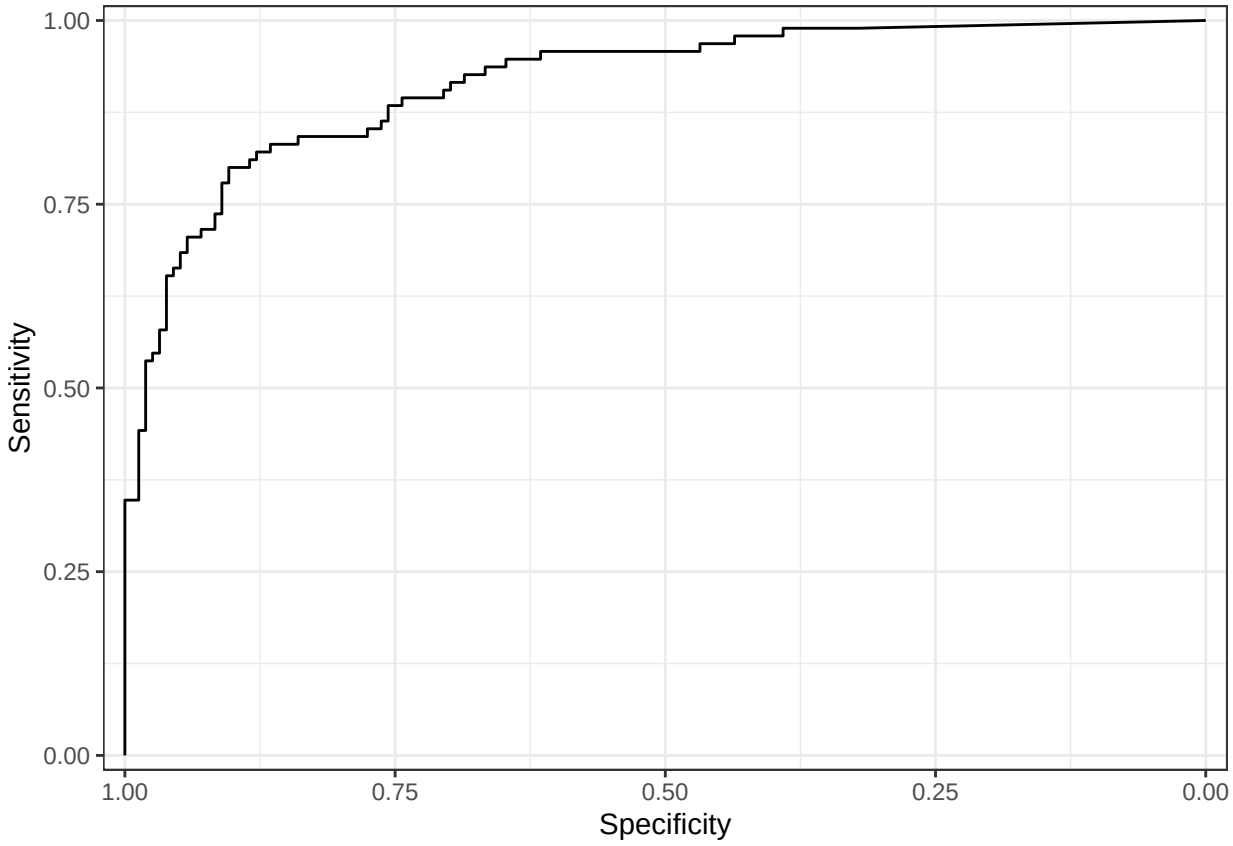
Area under the curve = 0.906

Optimal cutoff for SRF_TotalFoV = 28.5880

accuracy	specificity	sensitivity
0.837	0.89	0.763

1.4 SRF_CMM

1.4.1 Both cameras

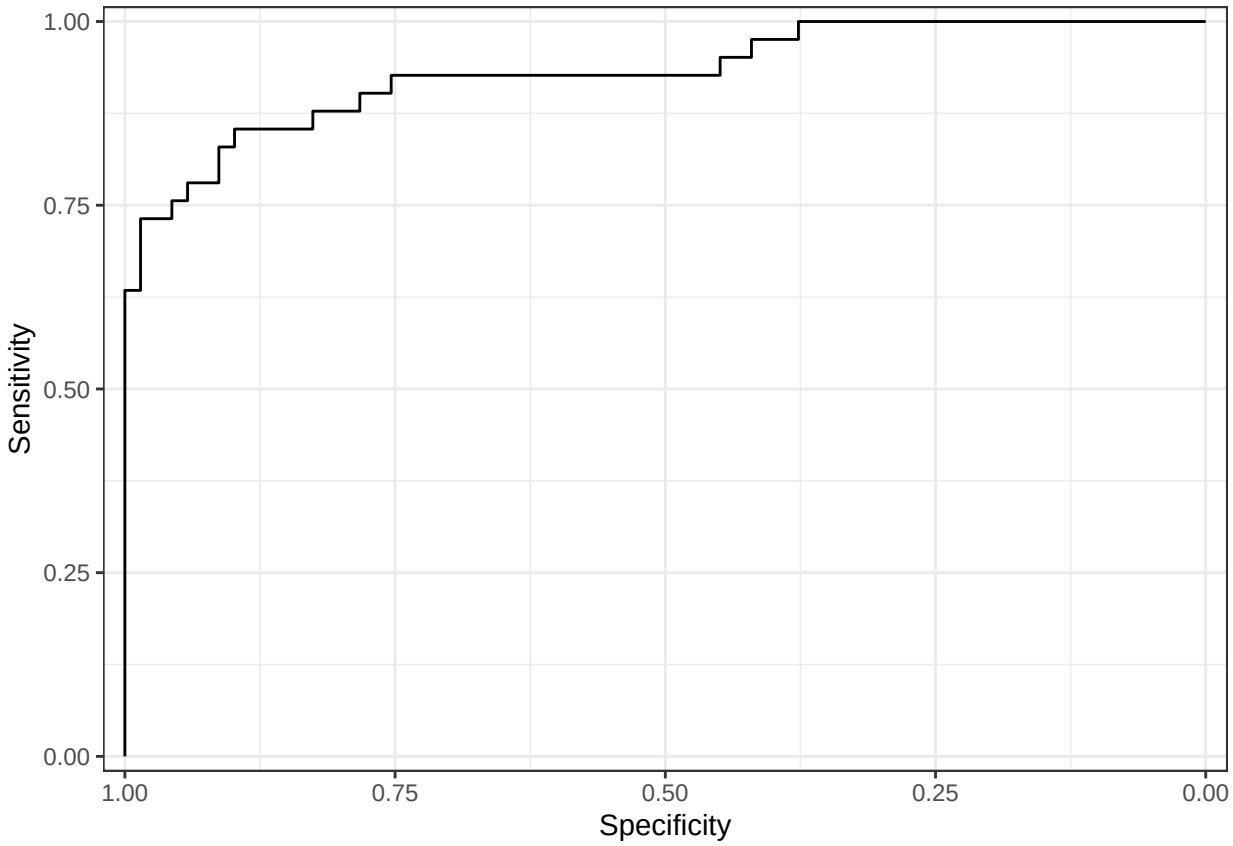


Area under the curve = 0.916

Optimal cutoff for SRF_CMM = 9.4910

accuracy	specificity	sensitivity
0.865	0.904	0.8

1.4.2 Camera 0

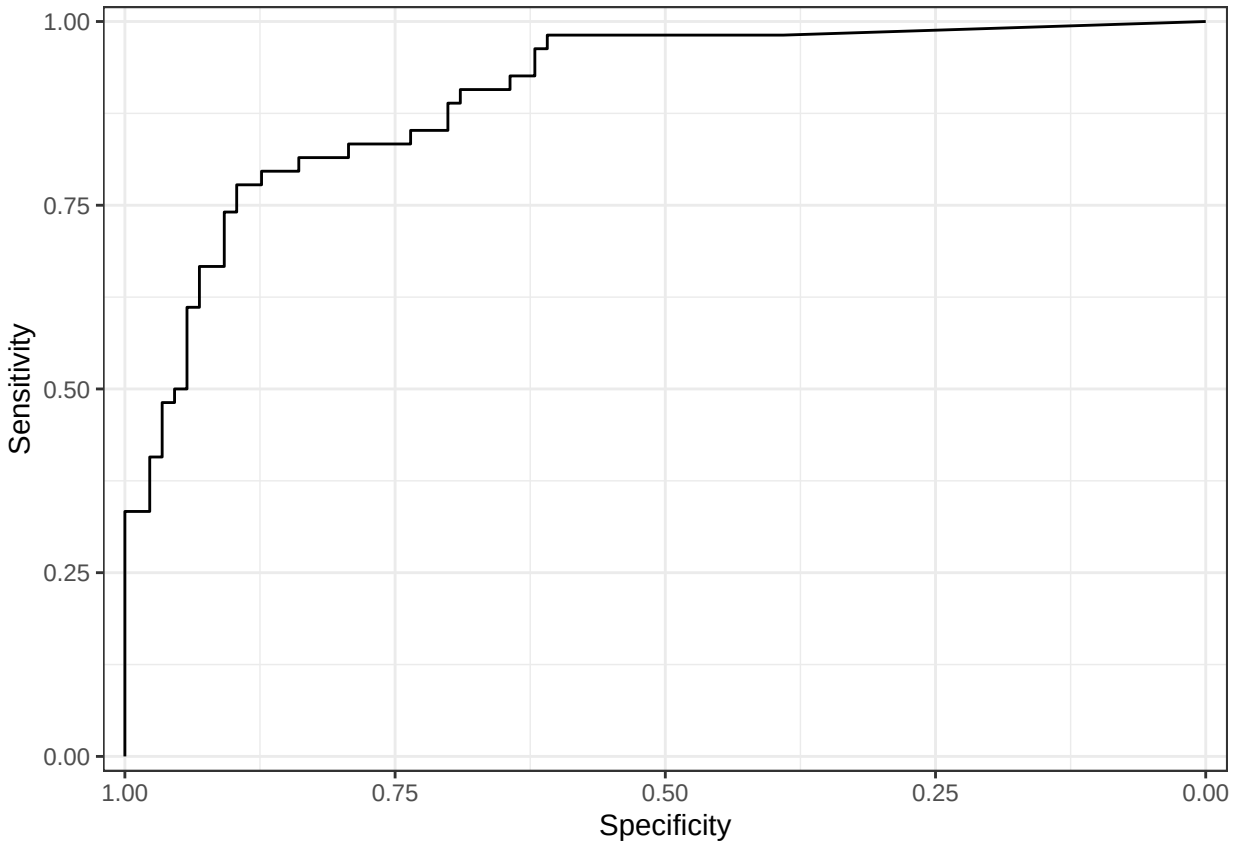


Area under the curve = 0.931

Optimal cutoff for SRF_CMM = 7.6310

accuracy	specificity	sensitivity
0.882	0.899	0.854

1.4.3 Camera 1



Area under the curve = 0.900

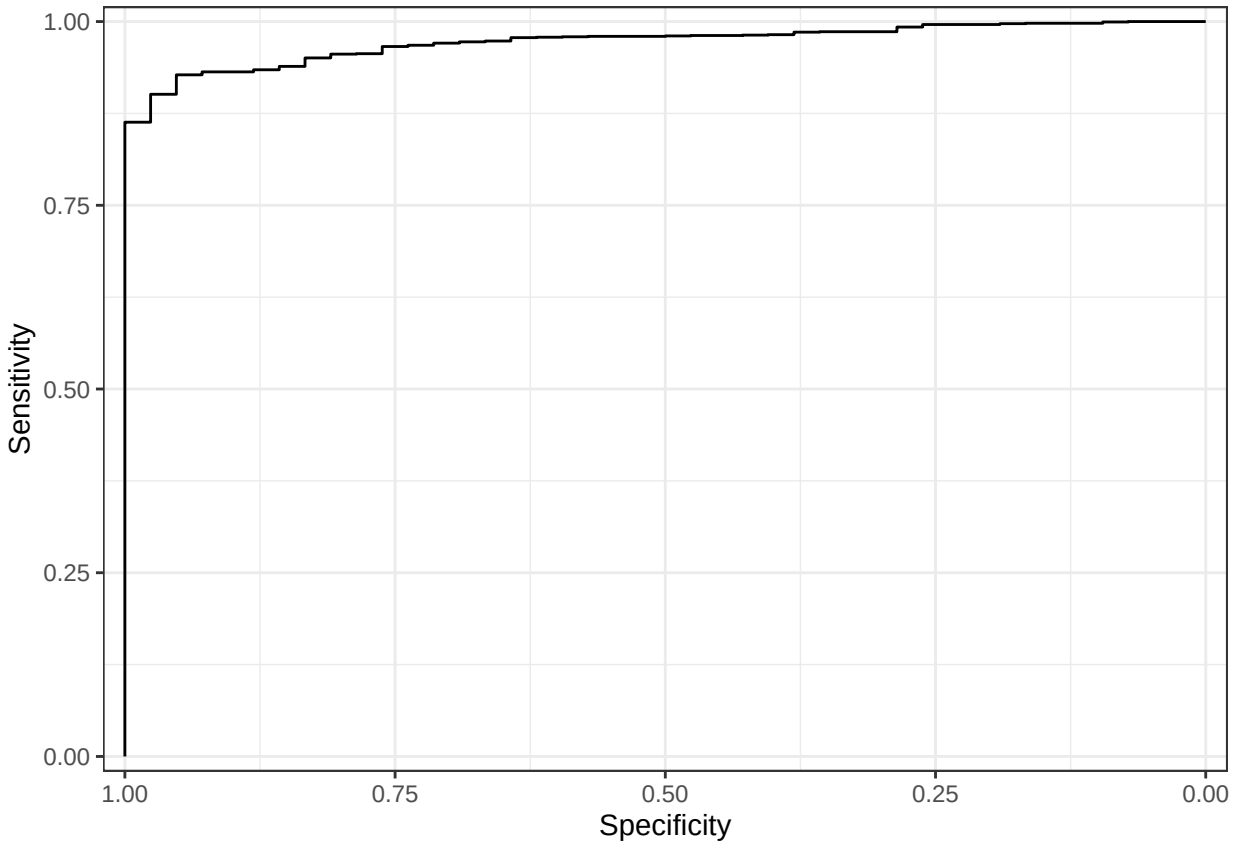
Optimal cutoff for SRF_CMM = 9.4910

accuracy	specificity	sensitivity
0.851	0.897	0.778

2 Protocol T

2.1 IRF_TotalFoV

2.1.1 Both cameras

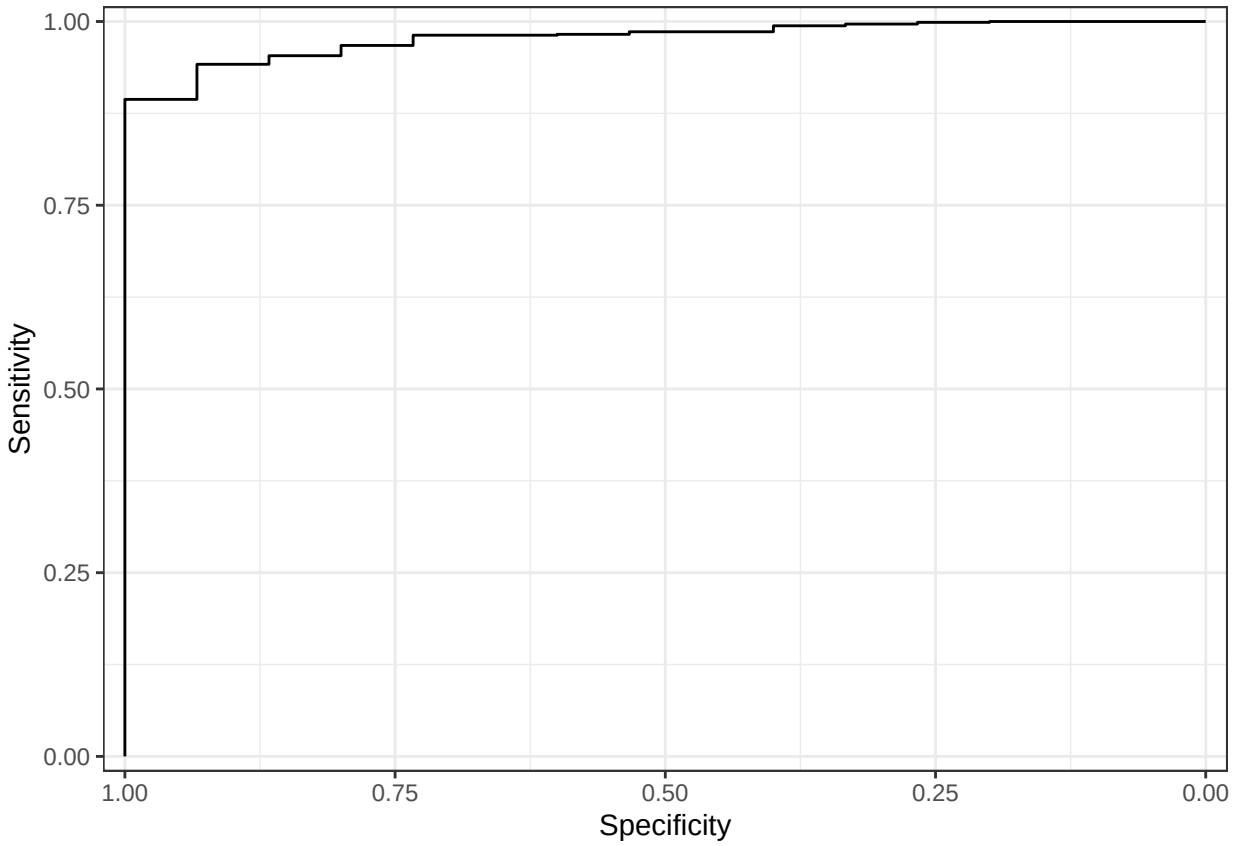


Area under the curve = 0.972 95% CI for AUC: [0.963; 0.984]

Optimal cutoff for IRF_TotalFoV = 10.3240

accuracy	specificity	sensitivity
0.928	0.952	0.928

2.1.2 Camera 0

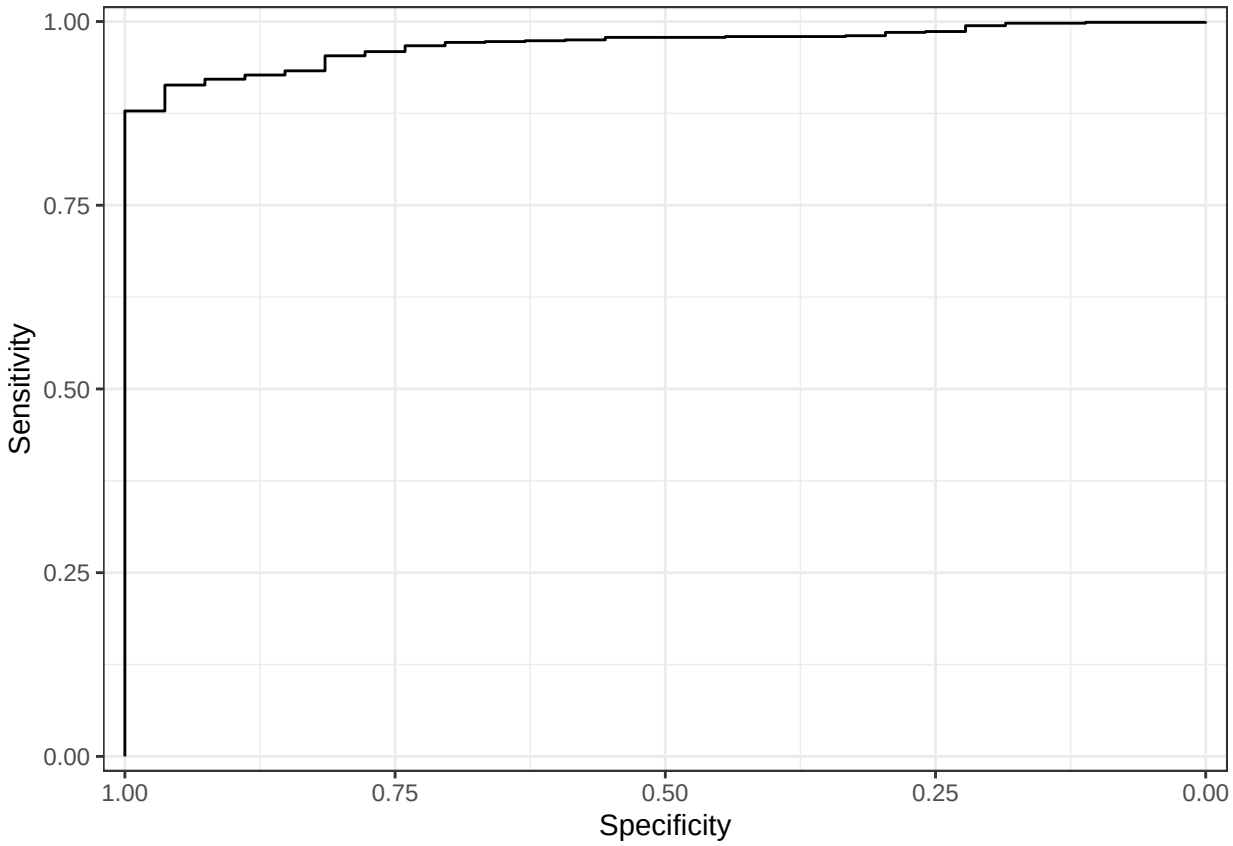


Area under the curve = 0.978 95% CI for AUC: [0.962; 0.995]

Optimal cutoff for IRF_TotalFoV = 21.6910

accuracy	specificity	sensitivity
0.896	1	0.894

2.1.3 Camera 1



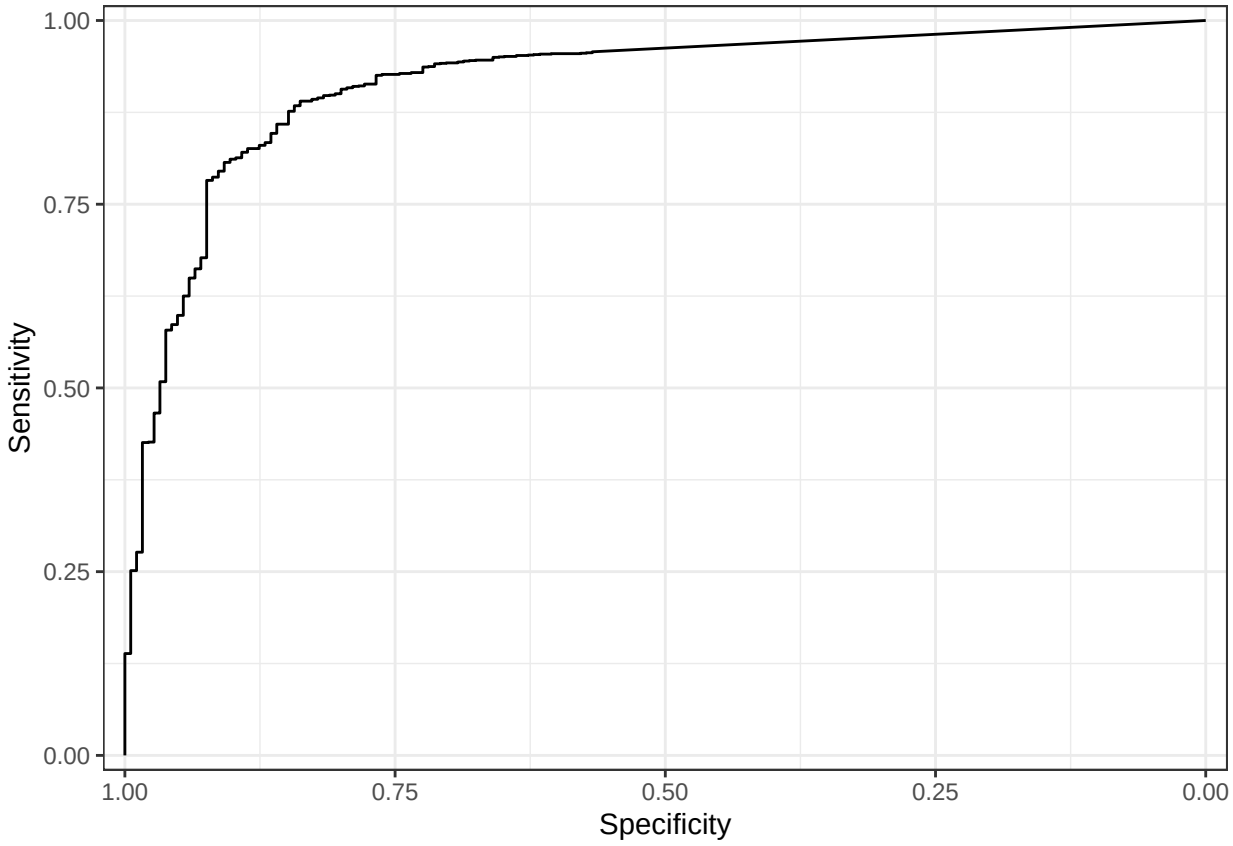
Area under the curve = 0.969 95% CI for AUC: [0.953; 0.980]

Optimal cutoff for IRF_TotalFoV = 14.8370

accuracy	specificity	sensitivity
0.882	1	0.878

2.2 IRF_CMM

2.2.1 Both cameras

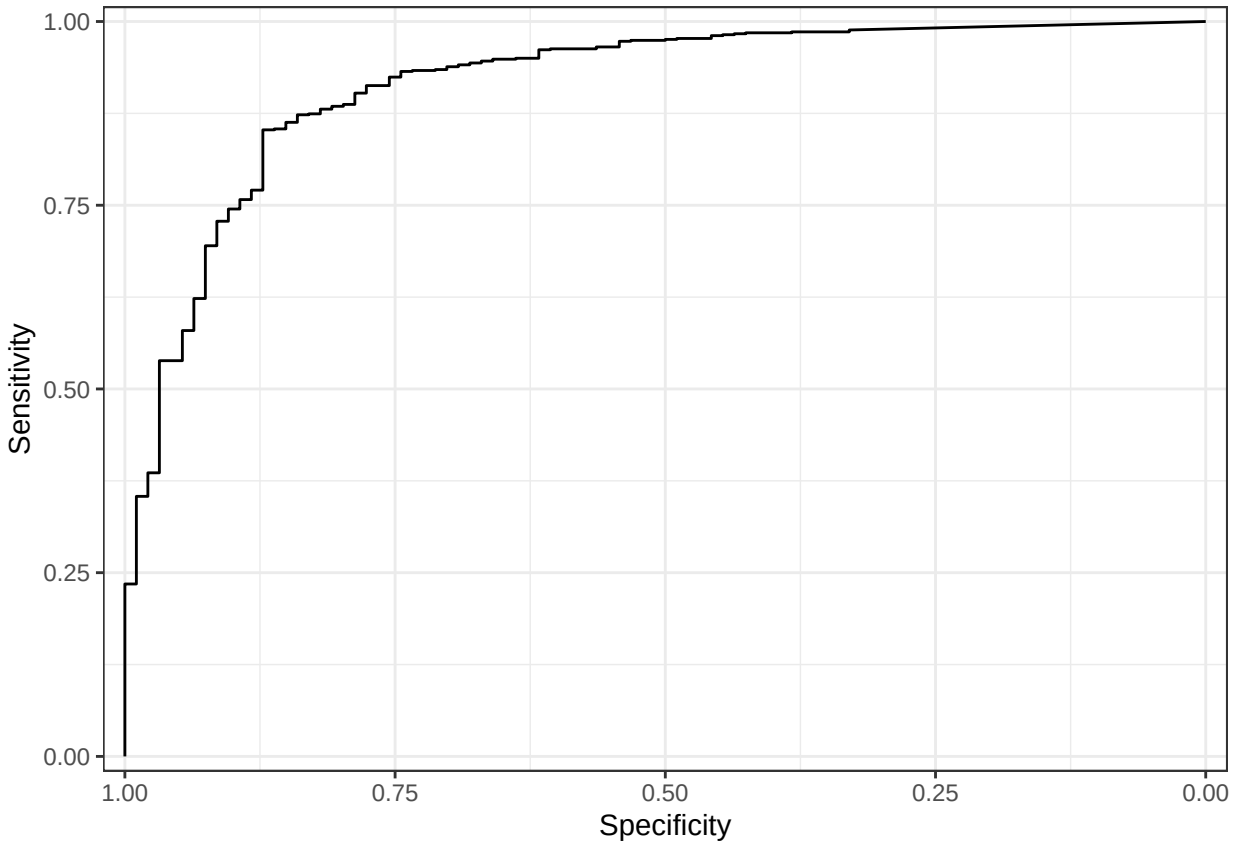


Area under the curve = 0.917 95% CI for AUC: [0.886; 0.934]

Optimal cutoff for IRF_CMM = 1.3960

accuracy	specificity	sensitivity
0.885	0.838	0.89

2.2.2 Camera 0

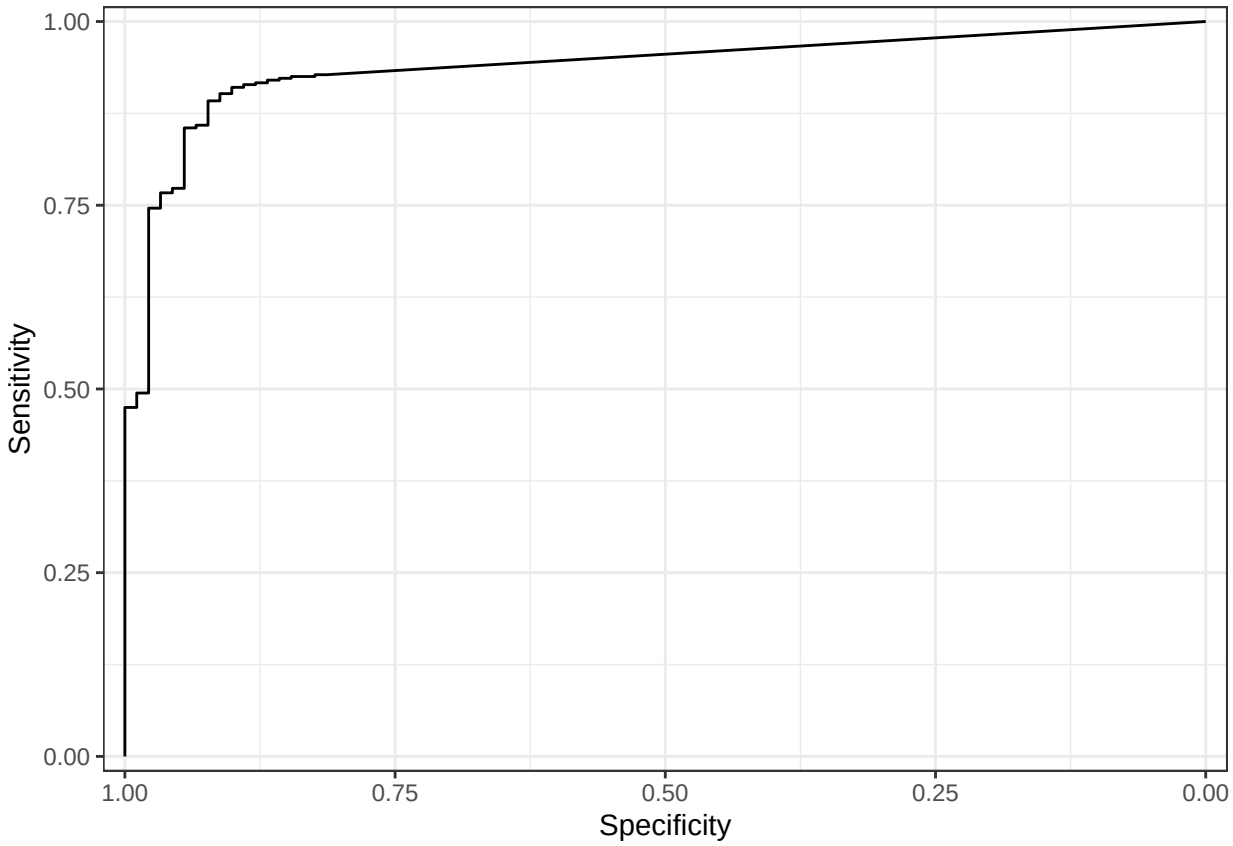


Area under the curve = 0.915 95% CI for AUC: [0.871; 0.942]

Optimal cutoff for IRF_CMM = 7.5230

accuracy	specificity	sensitivity
0.855	0.872	0.853

2.2.3 Camera 1



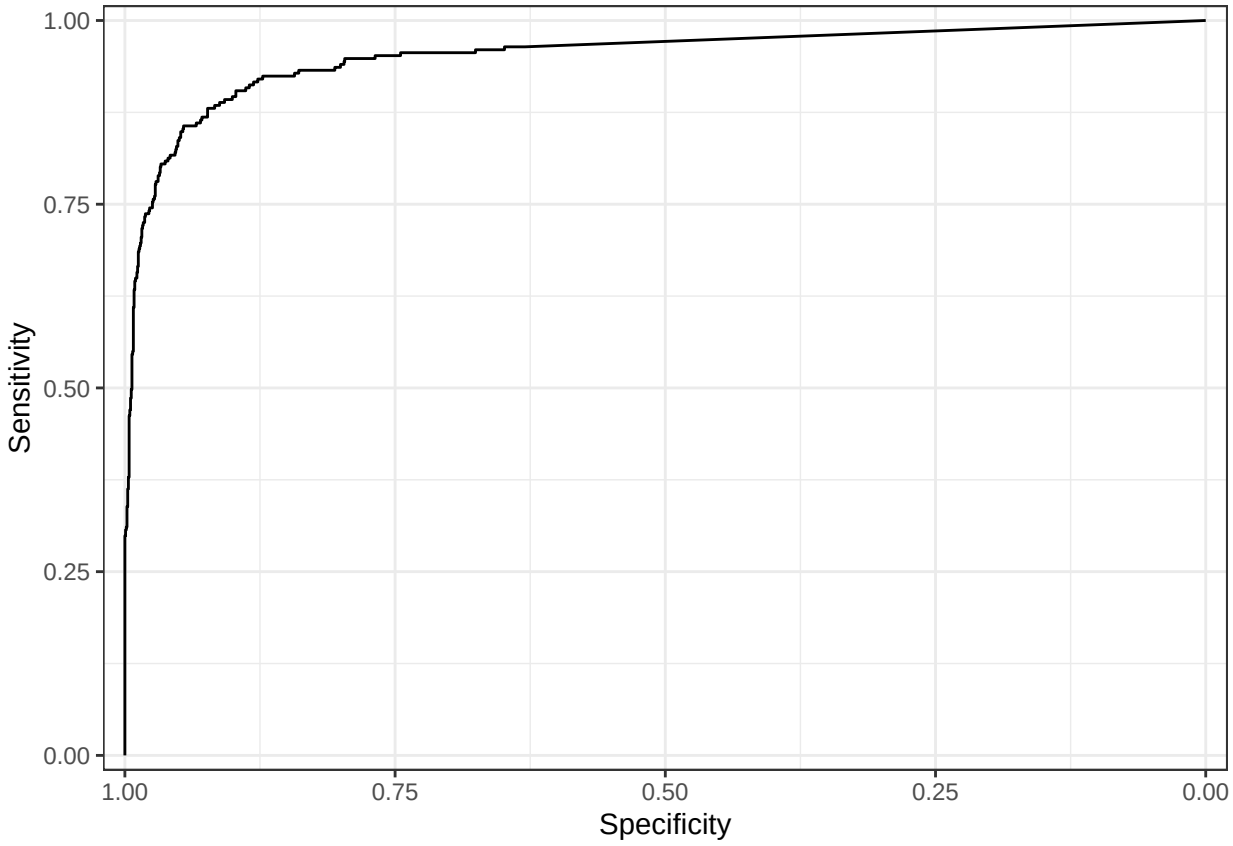
Area under the curve = 0.939 95% CI for AUC: [0.917; 0.963]

Optimal cutoff for IRF_CMM = 0.3890

accuracy	specificity	sensitivity
0.895	0.923	0.892

2.3 SRF_CMM

2.3.1 Both cameras

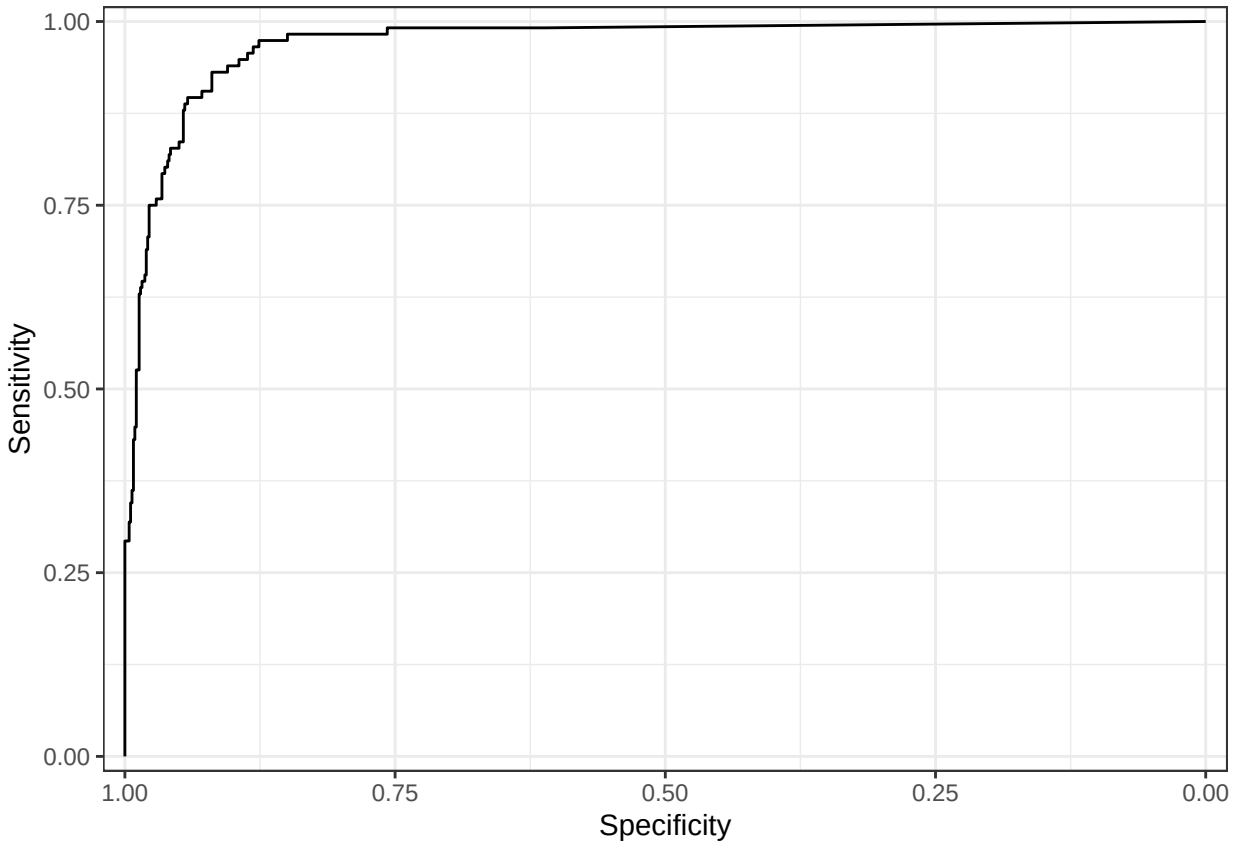


Area under the curve = 0.952 95% CI for AUC: [0.935; 0.972]

Optimal cutoff for SRF_CMM = 1.2980

accuracy	specificity	sensitivity
0.917	0.923	0.88

2.3.2 Camera 0

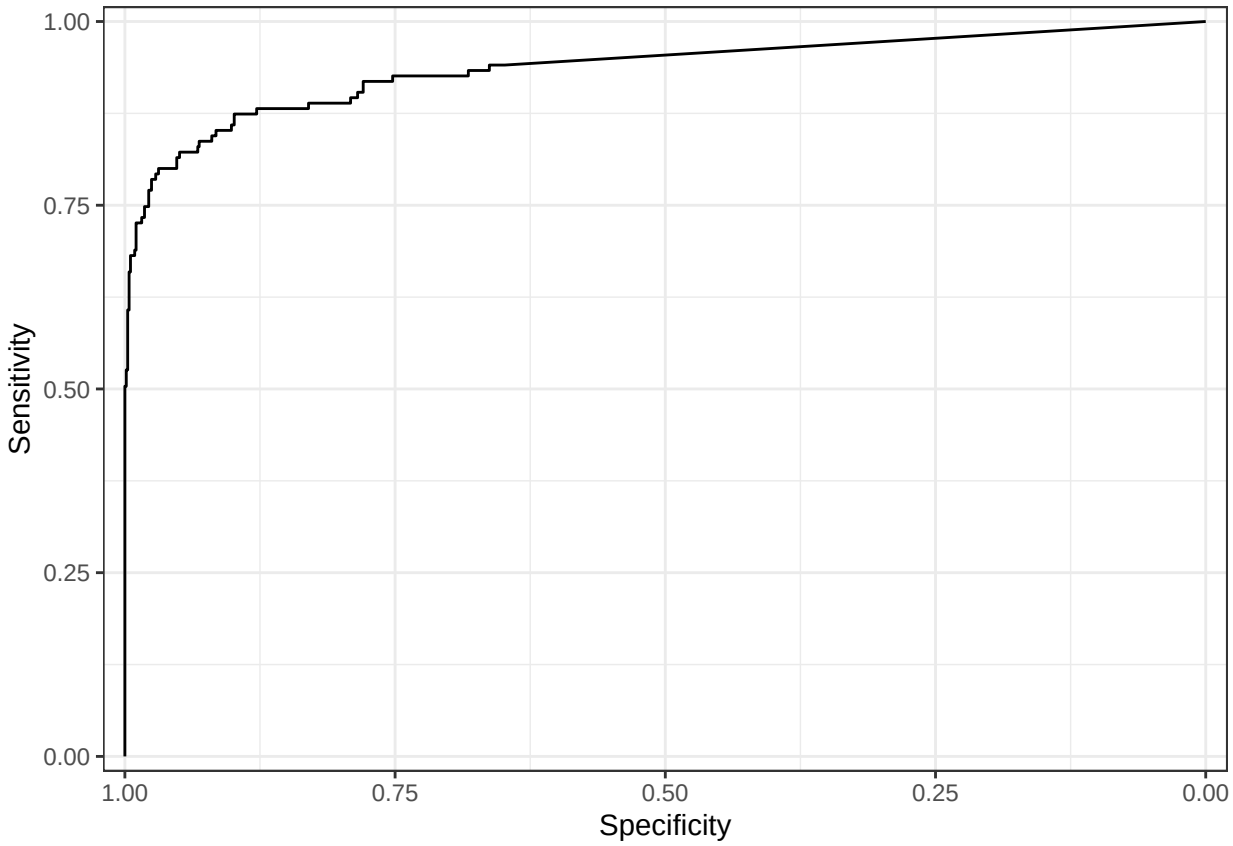


Area under the curve = 0.971 95% CI for AUC: [0.959; 0.988]

Optimal cutoff for SRF_CMM = 1.2810

accuracy	specificity	sensitivity
0.921	0.92	0.931

2.3.3 Camera 1



Area under the curve = 0.936 95% CI for AUC: [0.902; 0.965]

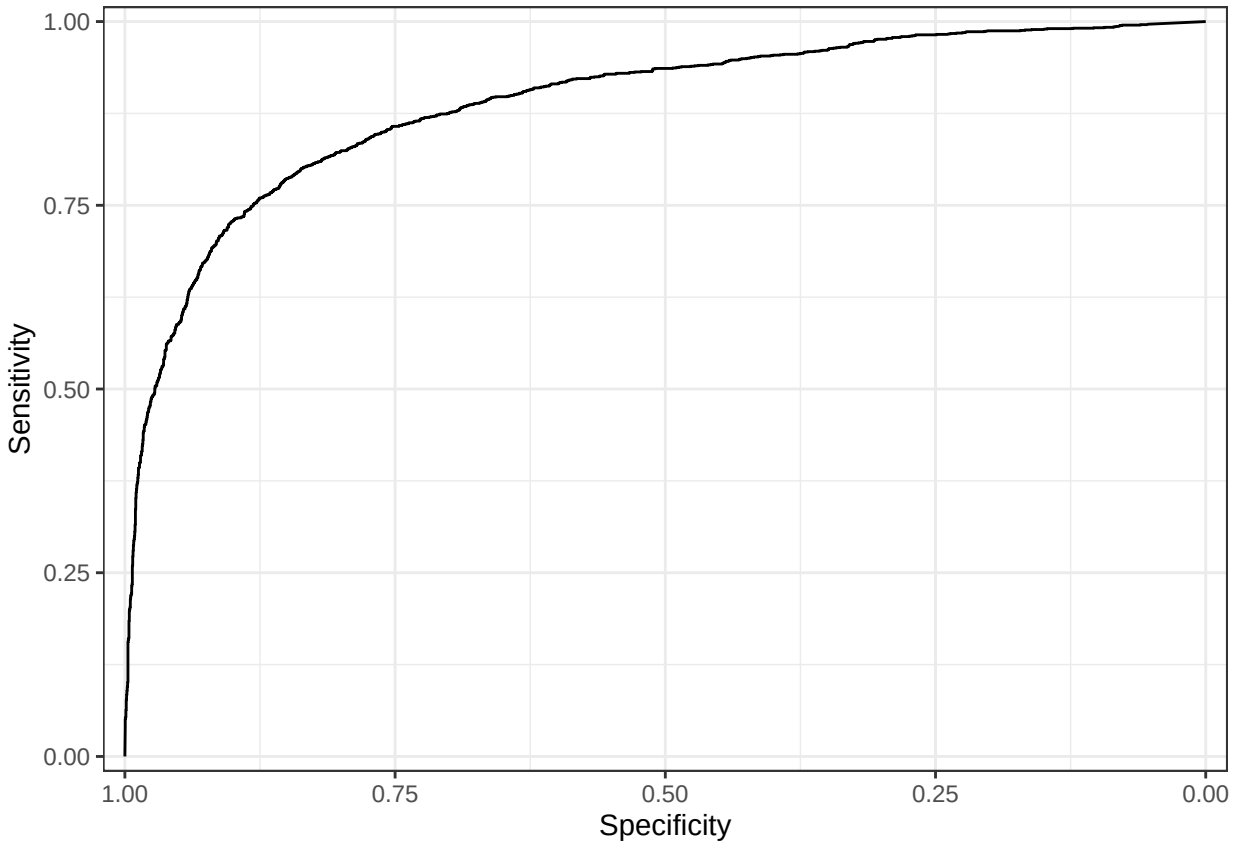
Optimal cutoff for SRF_CMM = 0.9150

accuracy	specificity	sensitivity
0.895	0.899	0.874

3 Trend T

3.1 IRF_TotalFoV

3.1.1 Both cameras

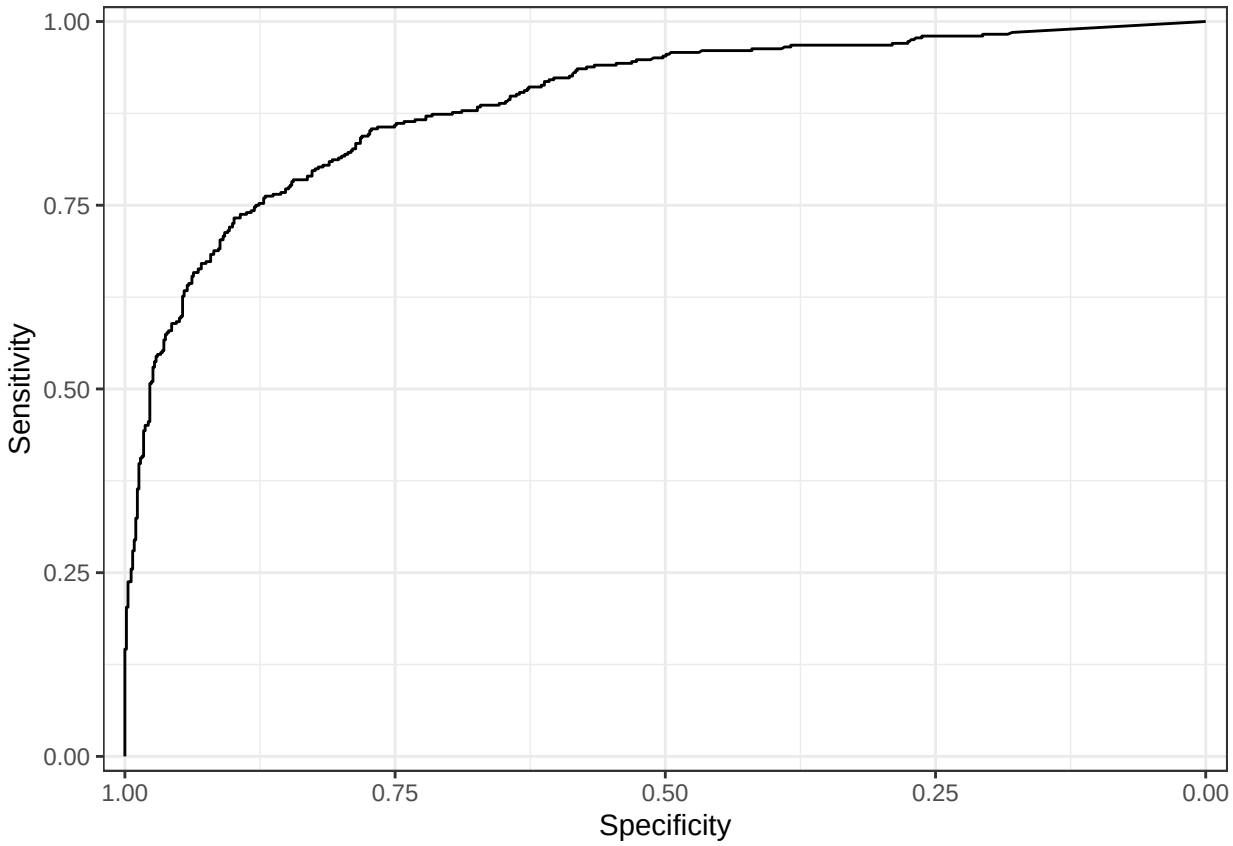


Area under the curve = 0.889 95% CI for AUC: [0.868; 0.914]

Optimal cutoff for IRF_TotalFoV = 3.1450

accuracy	specificity	sensitivity
0.829	0.852	0.785

3.1.2 Camera 0

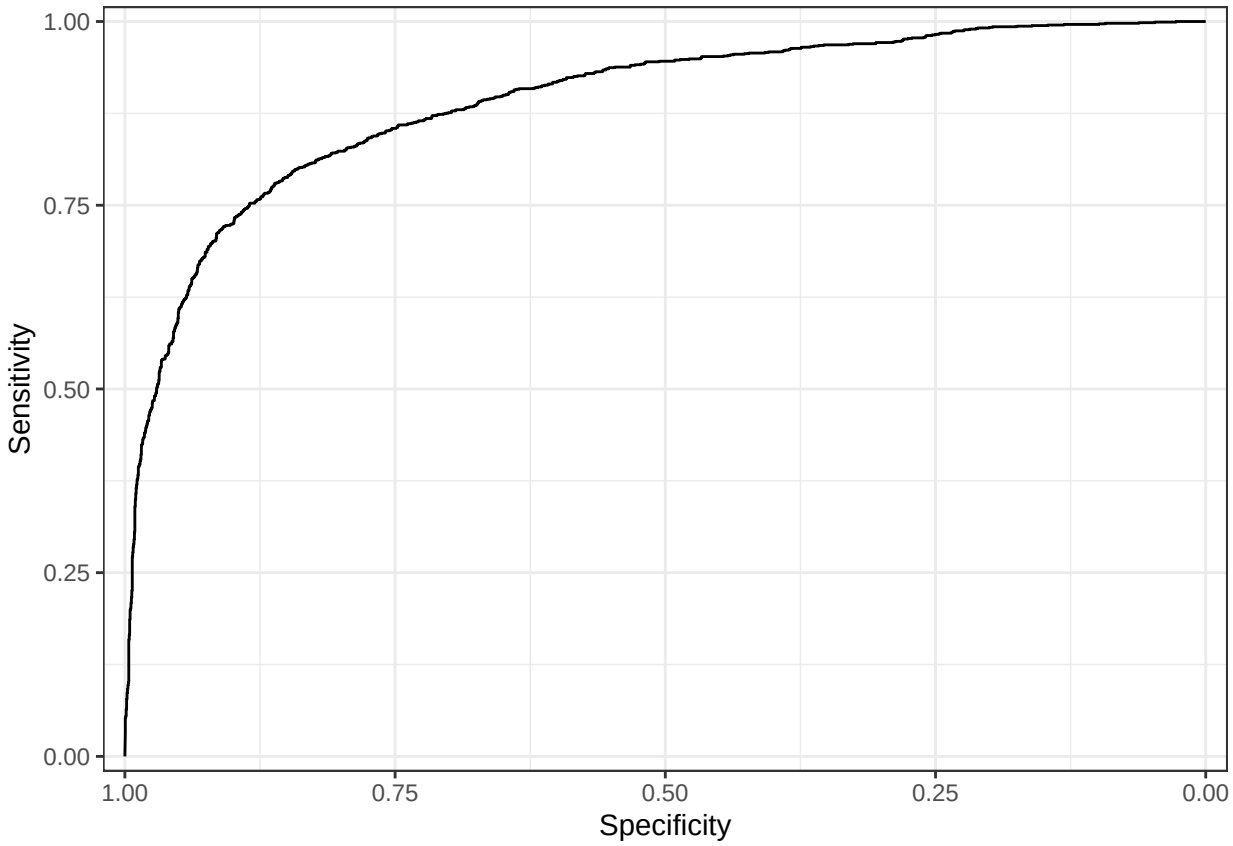


Area under the curve = 0.891 95% CI for AUC: [0.840; 0.931]

Optimal cutoff for IRF_TotalFoV = 4.6150

accuracy	specificity	sensitivity
0.83	0.87	0.762

3.1.3 Camera 1



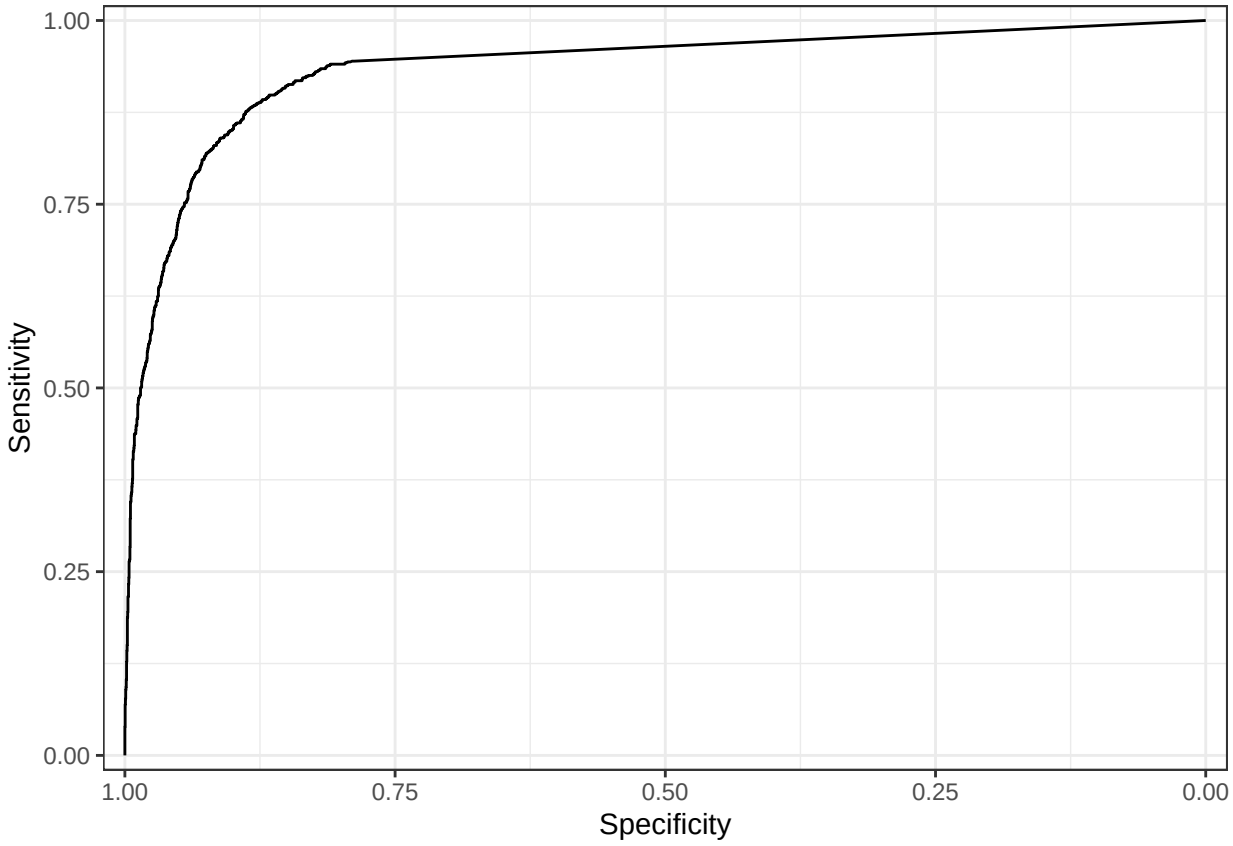
Area under the curve = 0.892 95% CI for AUC: [0.867; 0.921]

Optimal cutoff for IRF_TotalFoV = 3.1450

accuracy	specificity	sensitivity
0.834	0.861	0.78

3.2 IRF_CMM

3.2.1 Both cameras

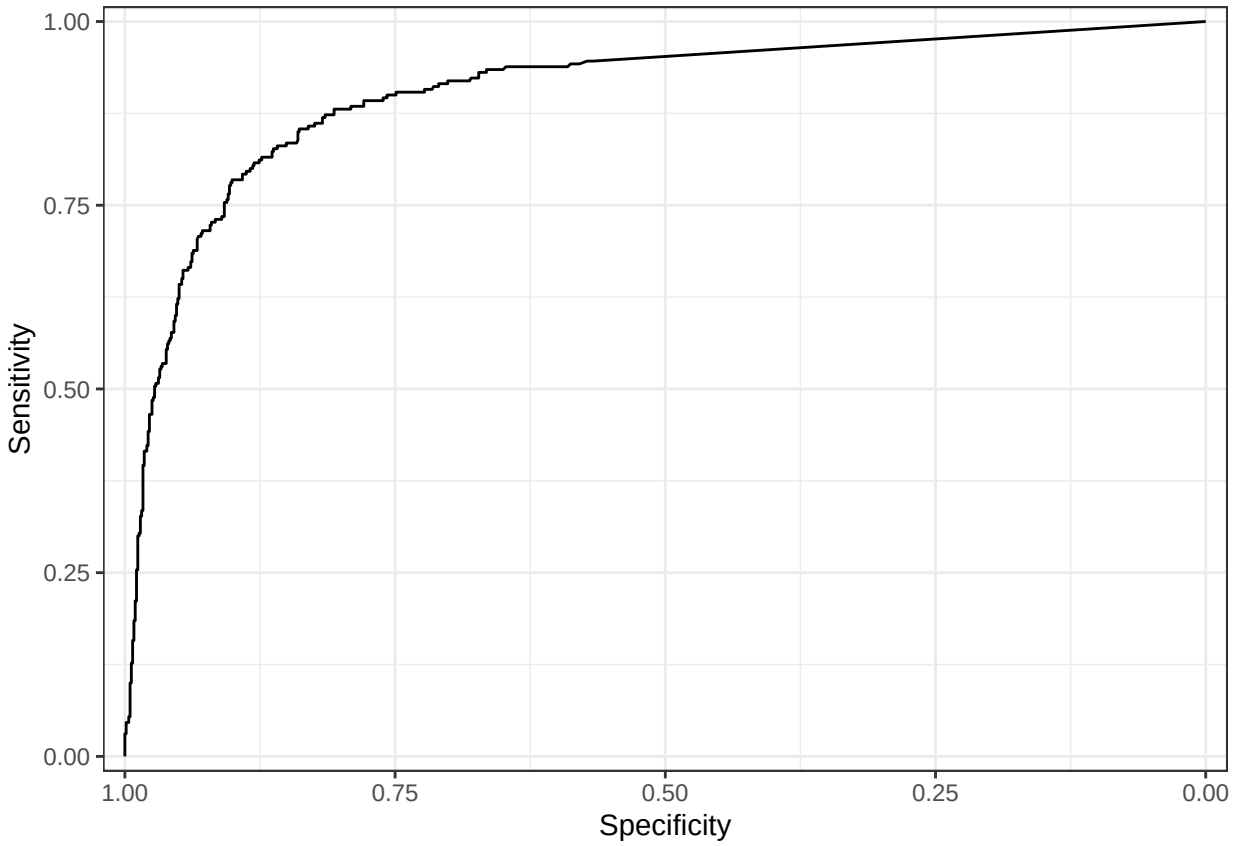


Area under the curve = 0.936 95% CI for AUC: [0.906; 0.954]

Optimal cutoff for IRF_CMM = 0.4230

accuracy	specificity	sensitivity
0.884	0.884	0.881

3.2.2 Camera 0

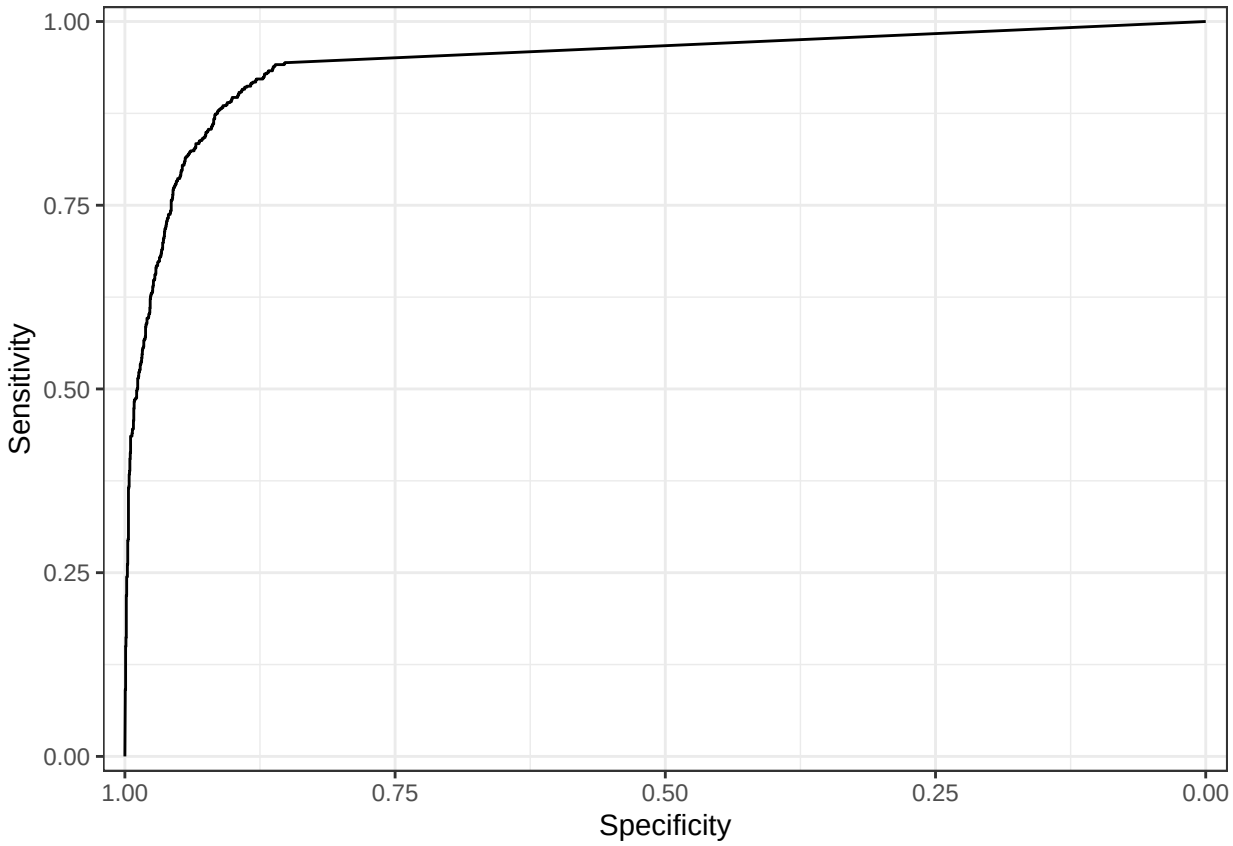


Area under the curve = 0.905 95% CI for AUC: [0.854; 0.955]

Optimal cutoff for IRF_CMM = 0.8180

accuracy	specificity	sensitivity
0.842	0.839	0.854

3.2.3 Camera 1



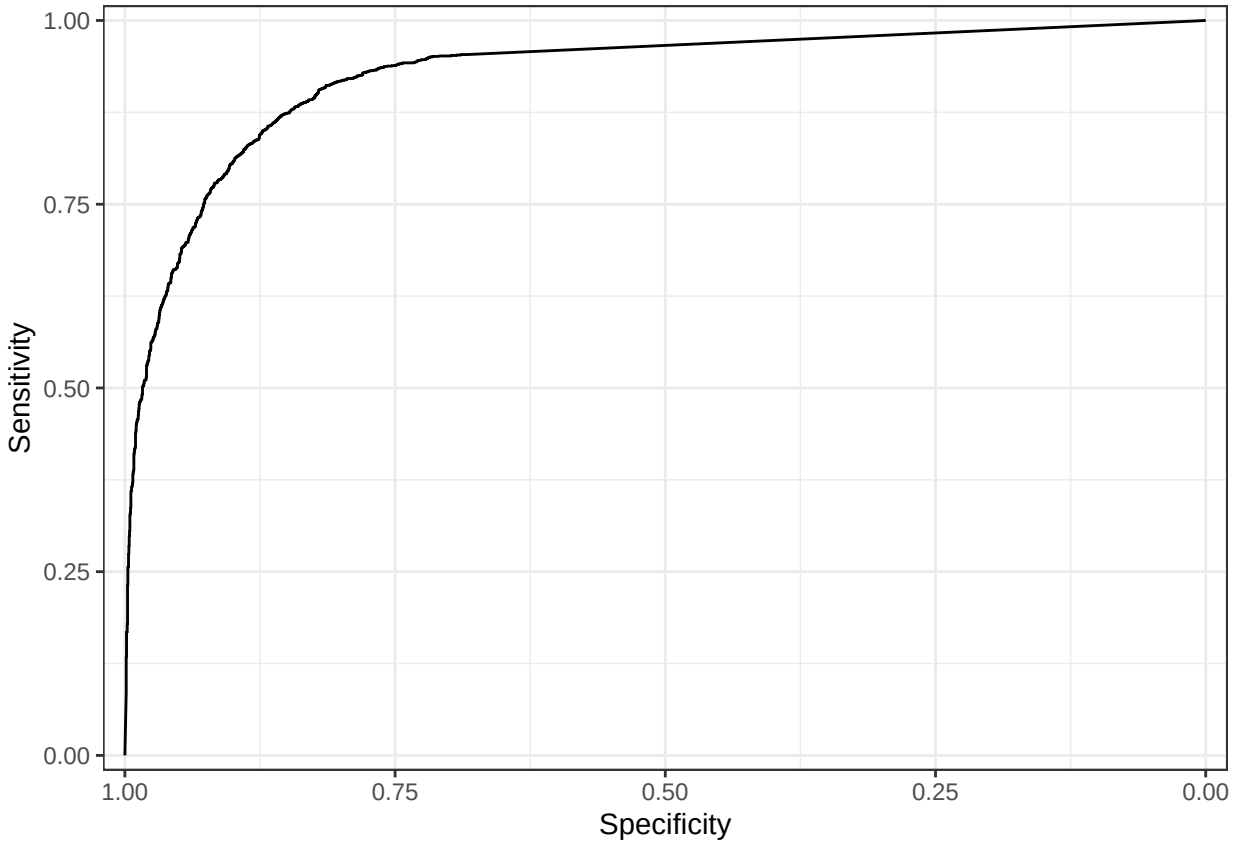
Area under the curve = 0.945 95% CI for AUC: [0.912; 0.965]

Optimal cutoff for IRF_CMM = 0.0280

accuracy	specificity	sensitivity
0.876	0.861	0.941

3.3 IRF_MM3

3.3.1 Both cameras

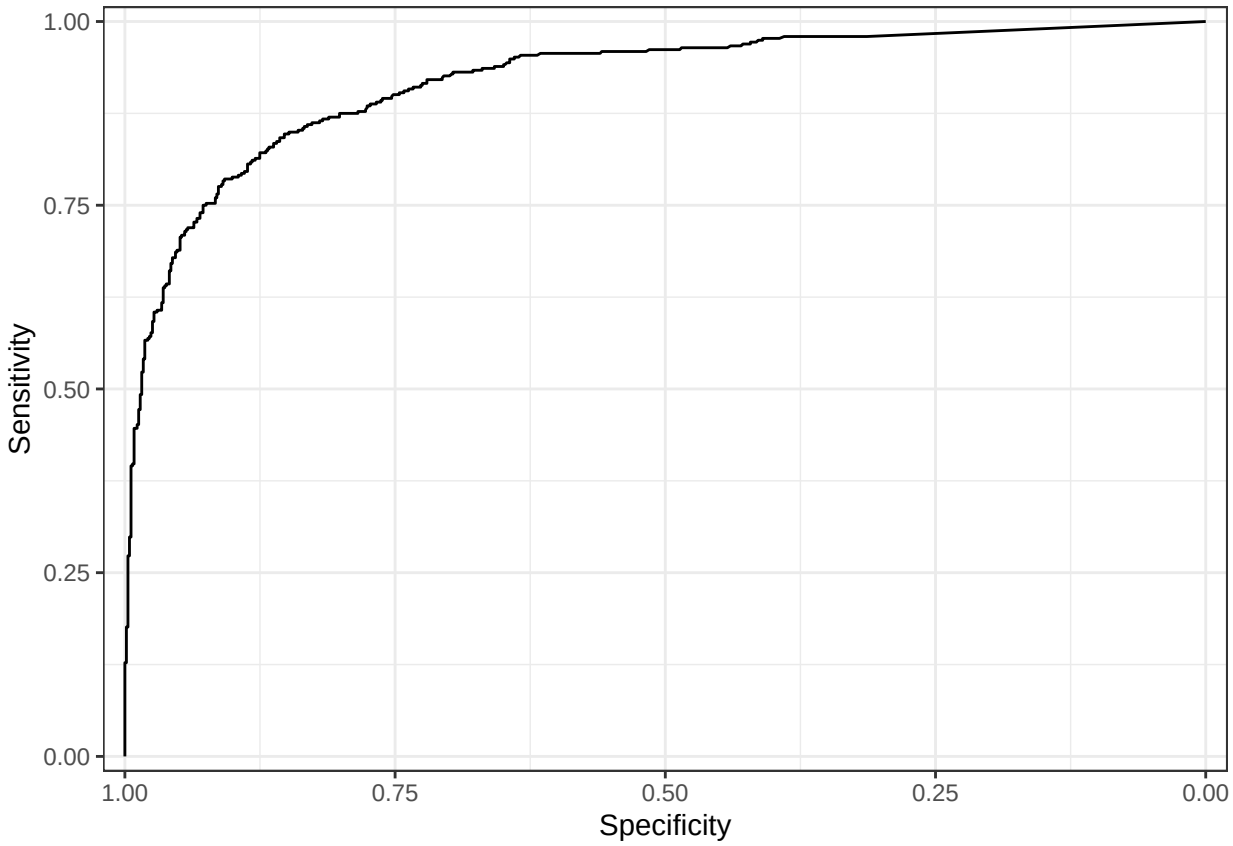


Area under the curve = 0.928 95% CI for AUC: [0.910; 0.946]

Optimal cutoff for IRF_MM3 = 0.6750

accuracy	specificity	sensitivity
0.86	0.855	0.872

3.3.2 Camera 0

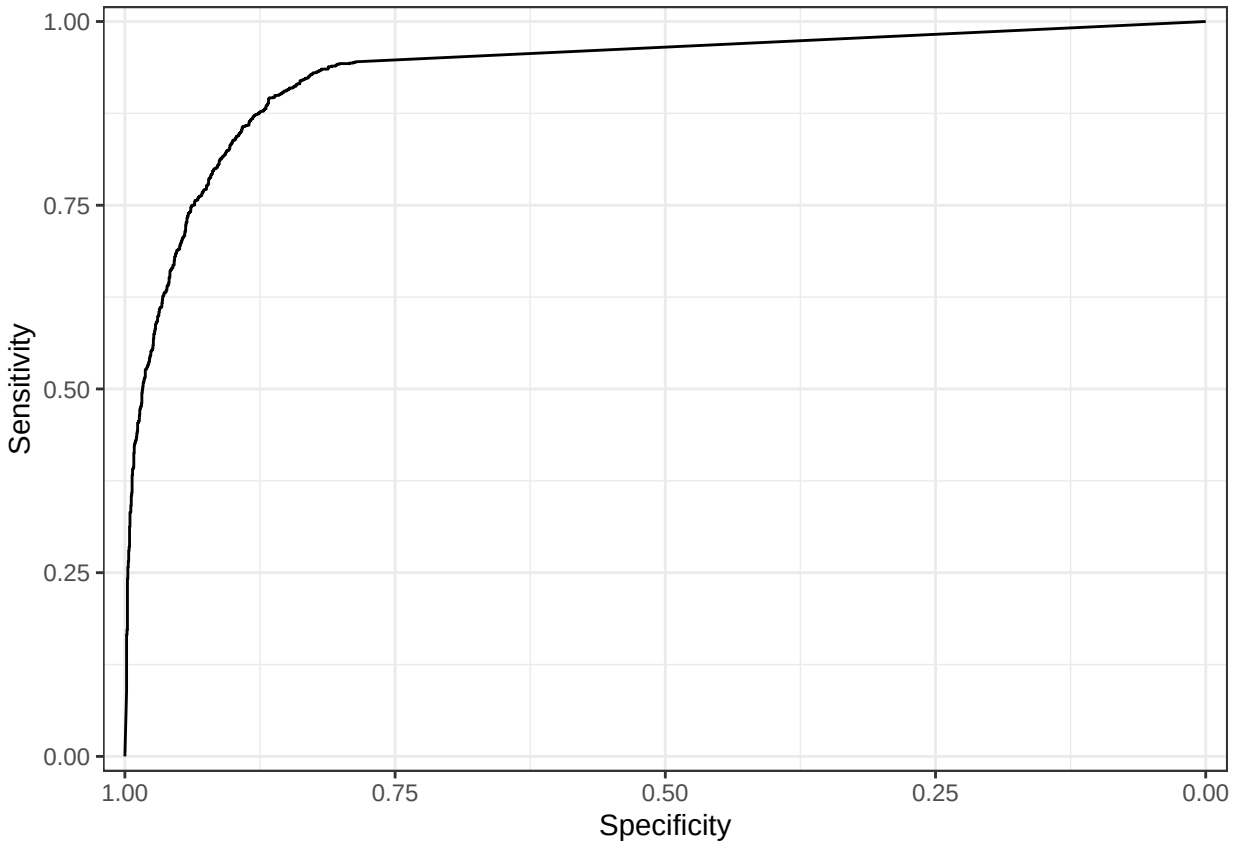


Area under the curve = 0.920 95% CI for AUC: [0.880; 0.957]

Optimal cutoff for IRF_MM3 = 1.8560

accuracy	specificity	sensitivity
0.851	0.852	0.847

3.3.3 Camera 1



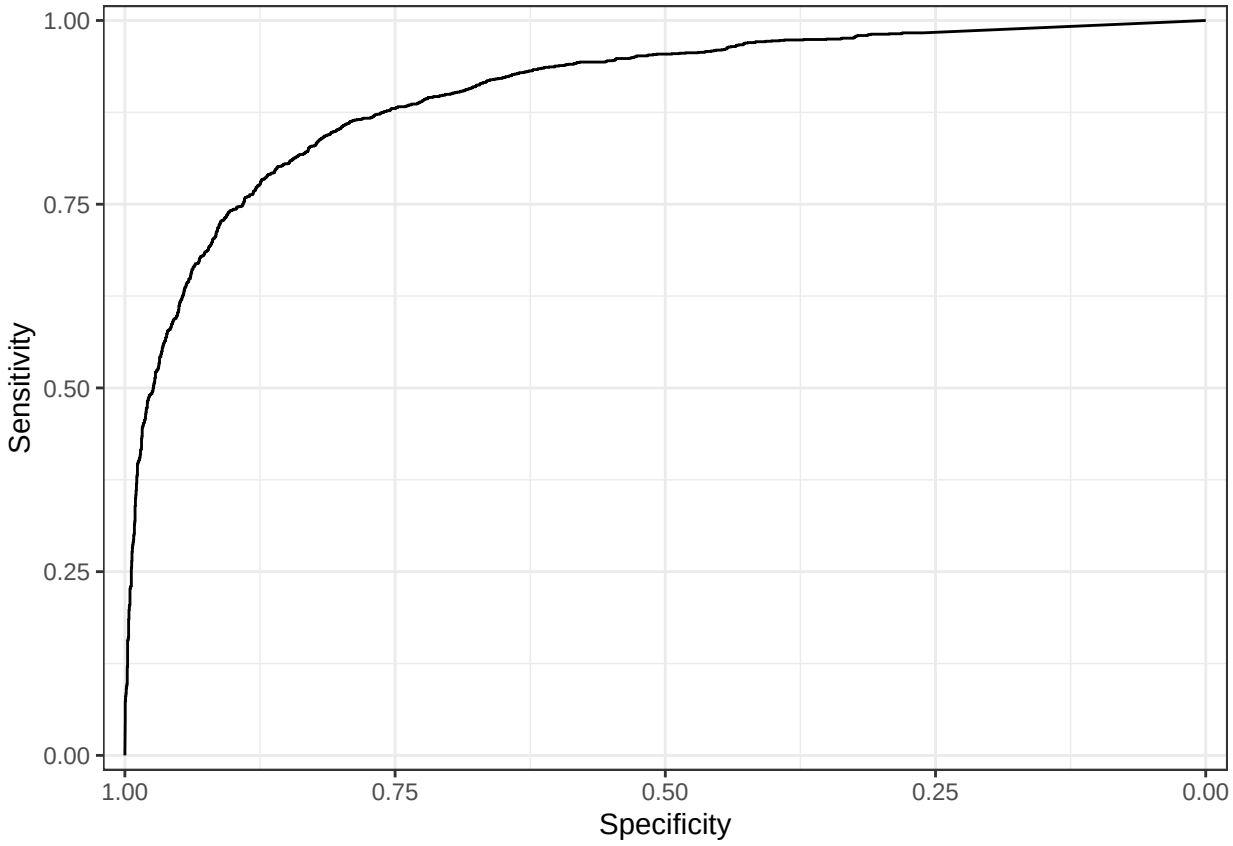
Area under the curve = 0.933 95% CI for AUC: [0.912; 0.954]

Optimal cutoff for IRF_MM3 = 0.3860

accuracy	specificity	sensitivity
0.876	0.866	0.896

3.4 IRF_MM6

3.4.1 Both cameras

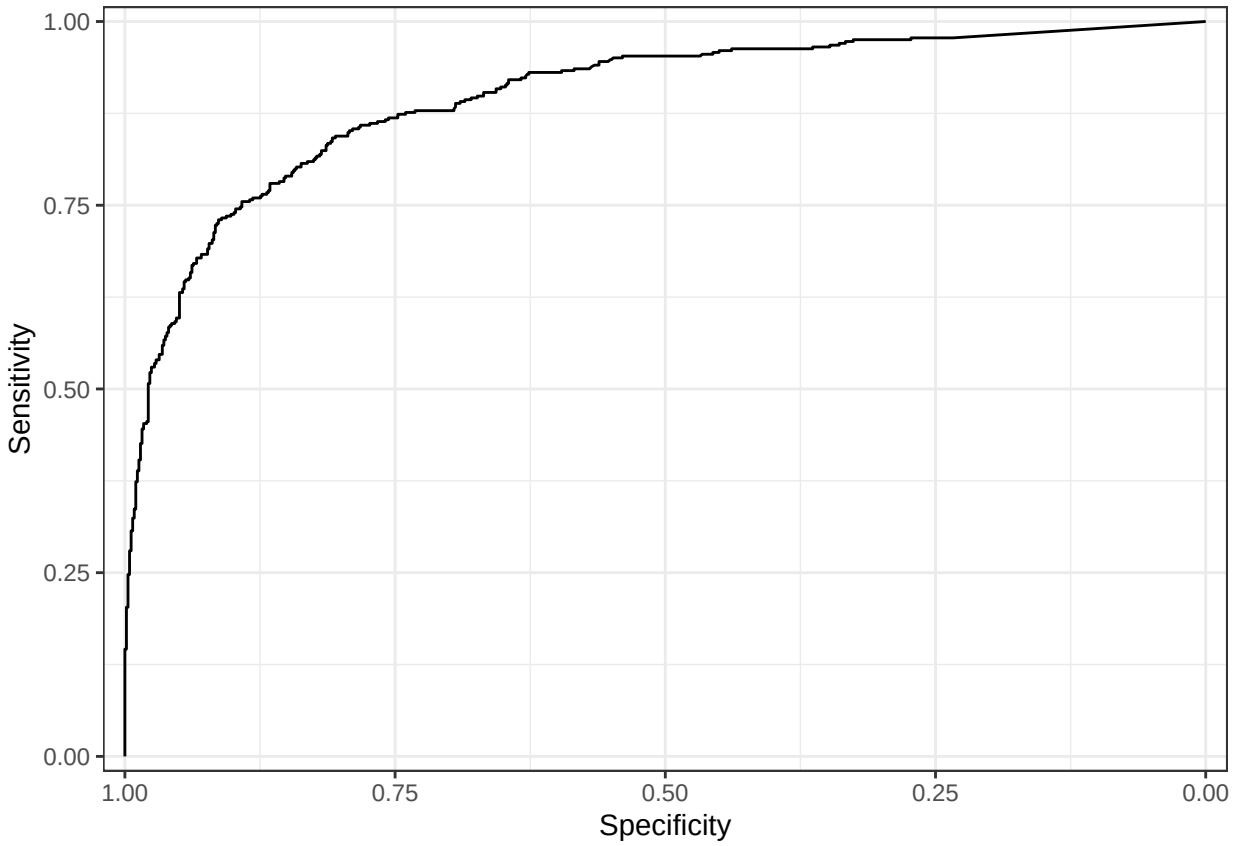


Area under the curve = 0.903 95% CI for AUC: [0.882; 0.925]

Optimal cutoff for IRF_MM6 = 1.9170

accuracy	specificity	sensitivity
0.839	0.859	0.801

3.4.2 Camera 0

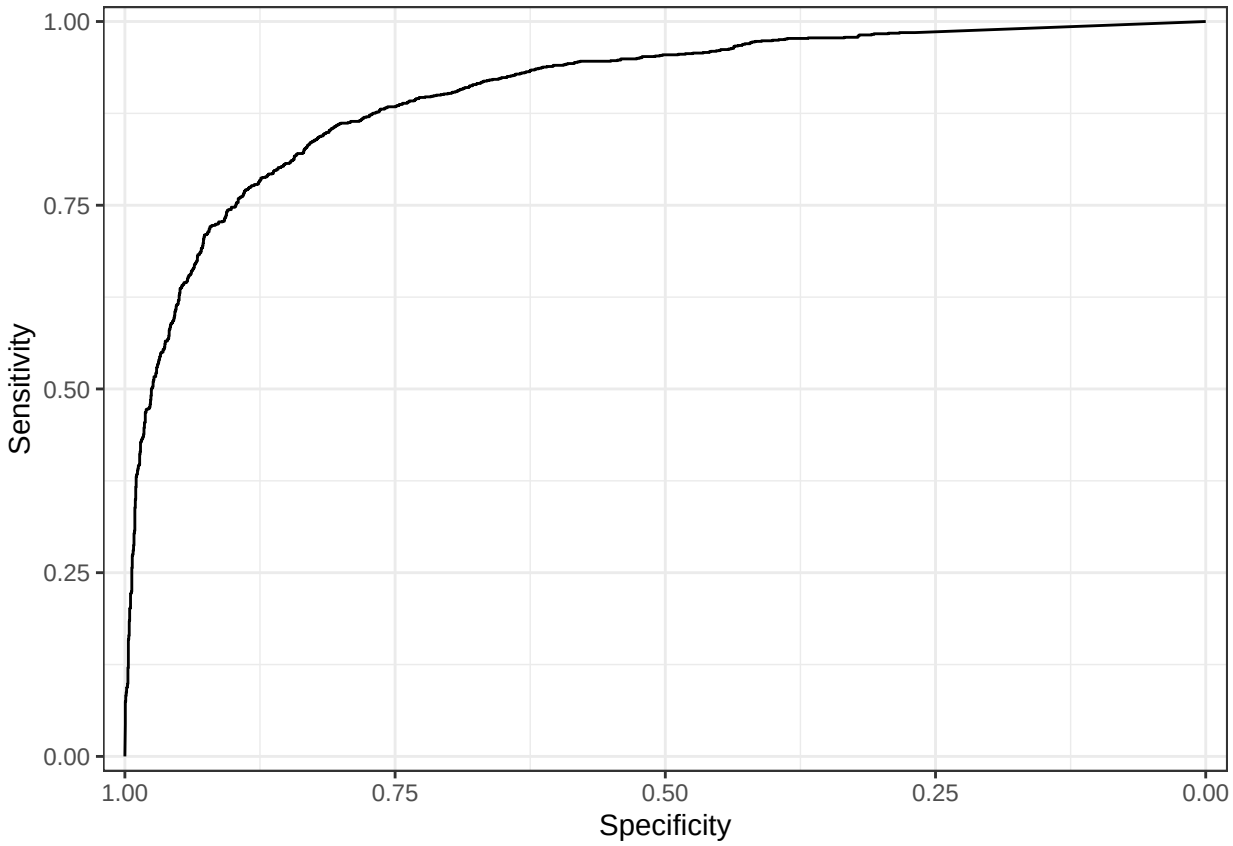


Area under the curve = 0.898 95% CI for AUC: [0.851; 0.939]

Optimal cutoff for IRF_MM6 = 1.9660

accuracy	specificity	sensitivity
0.82	0.808	0.842

3.4.3 Camera 1



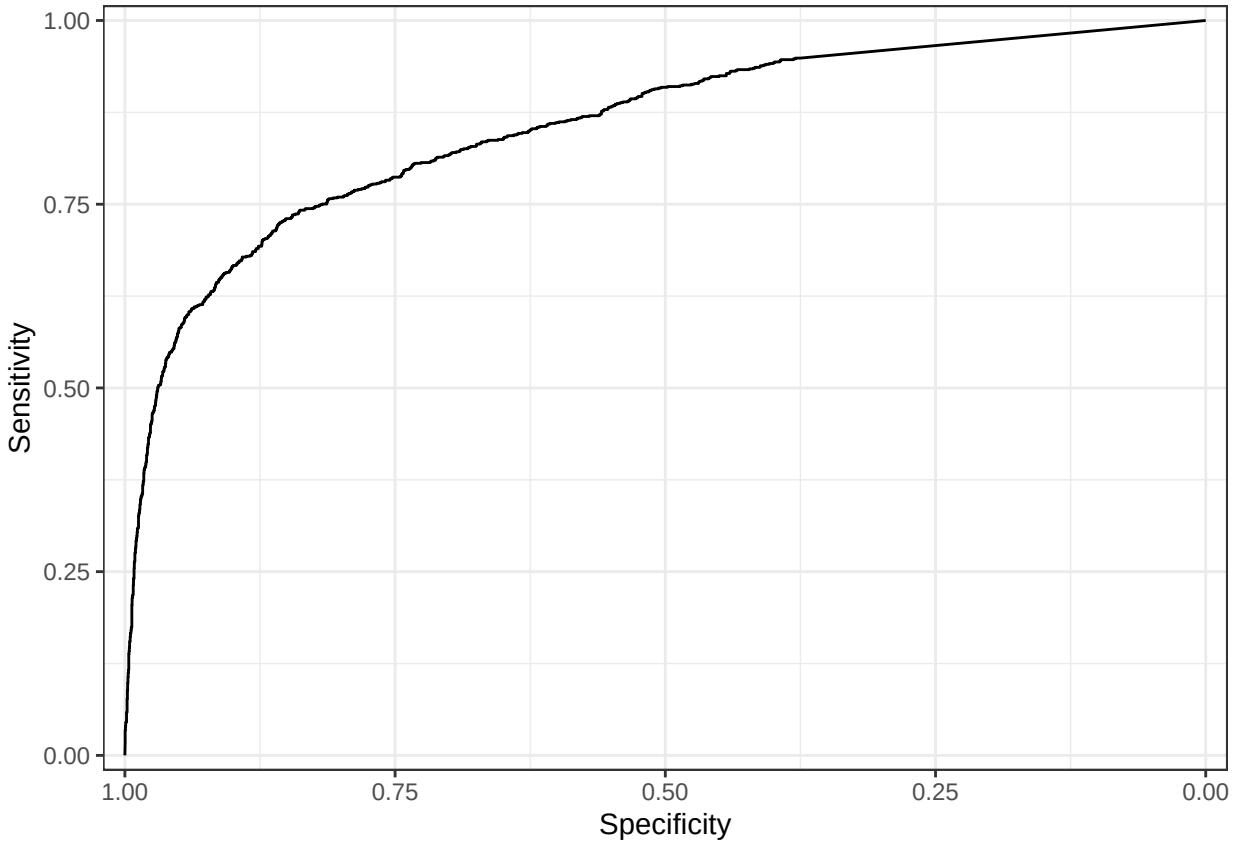
Area under the curve = 0.905 95% CI for AUC: [0.883; 0.931]

Optimal cutoff for IRF_MM6 = 1.4120

accuracy	specificity	sensitivity
0.831	0.828	0.835

3.5 IRF_Perifovea

3.5.1 Both cameras

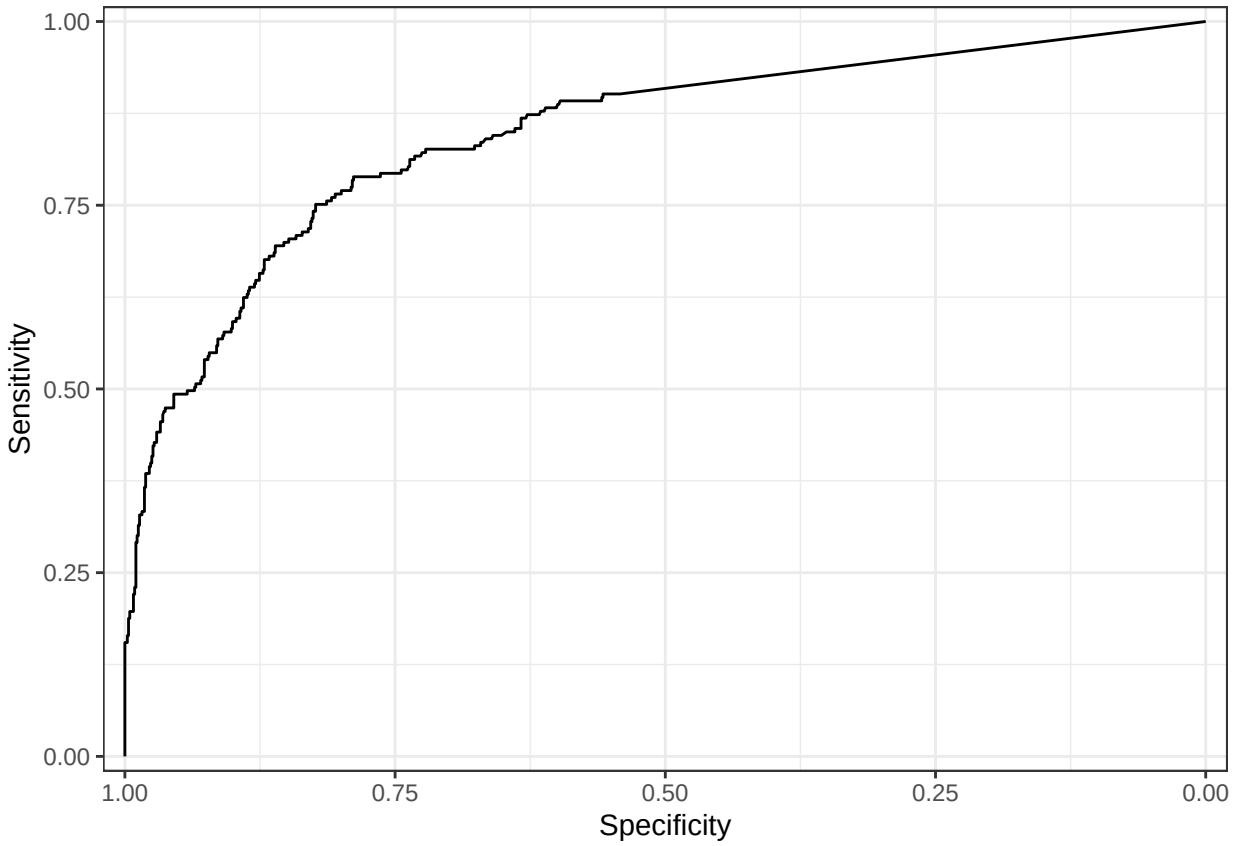


Area under the curve = 0.856 95% CI for AUC: [0.828; 0.894]

Optimal cutoff for IRF_Perifovea = 1.1030

accuracy	specificity	sensitivity
0.831	0.857	0.725

3.5.2 Camera 0

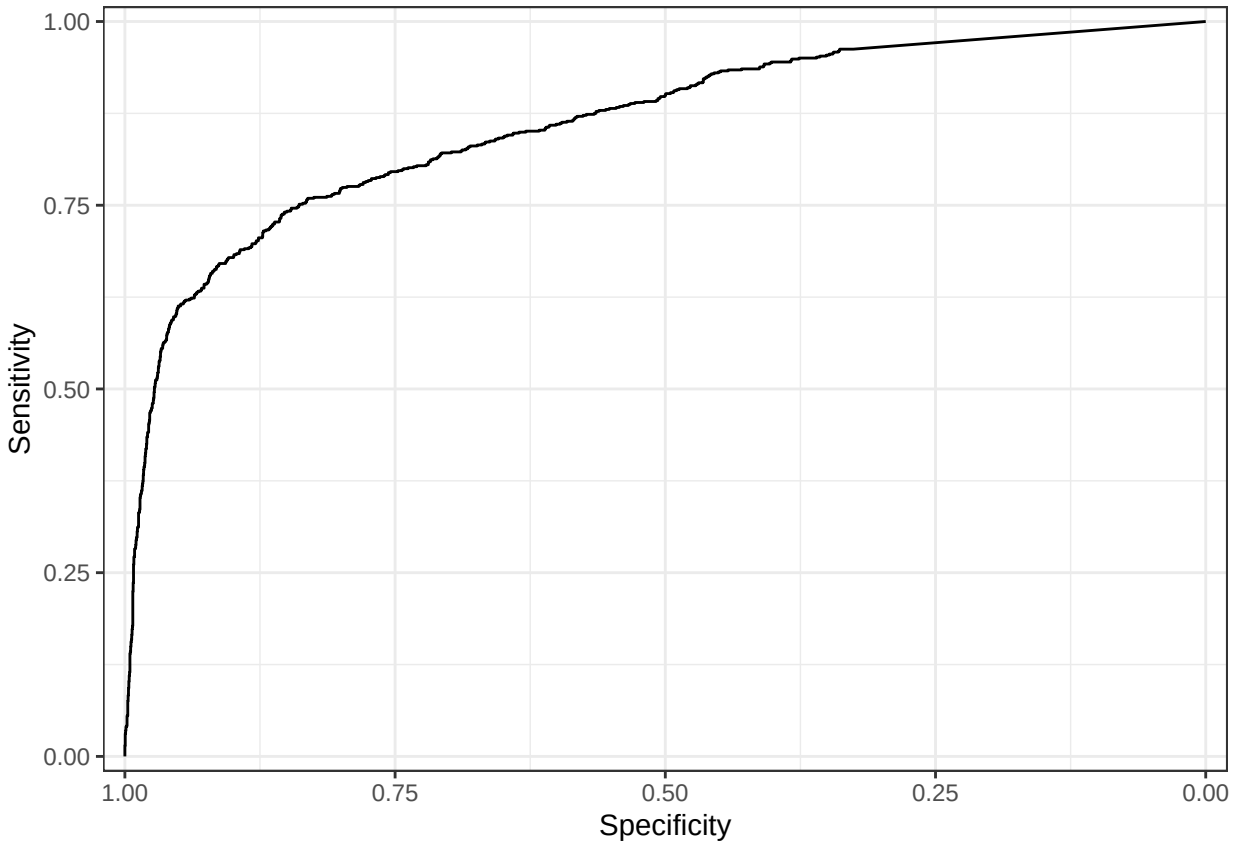


Area under the curve = 0.847 95% CI for AUC: [0.808; 0.922]

Optimal cutoff for IRF_Perifovea = 0.3830

accuracy	specificity	sensitivity
0.789	0.788	0.789

3.5.3 Camera 1



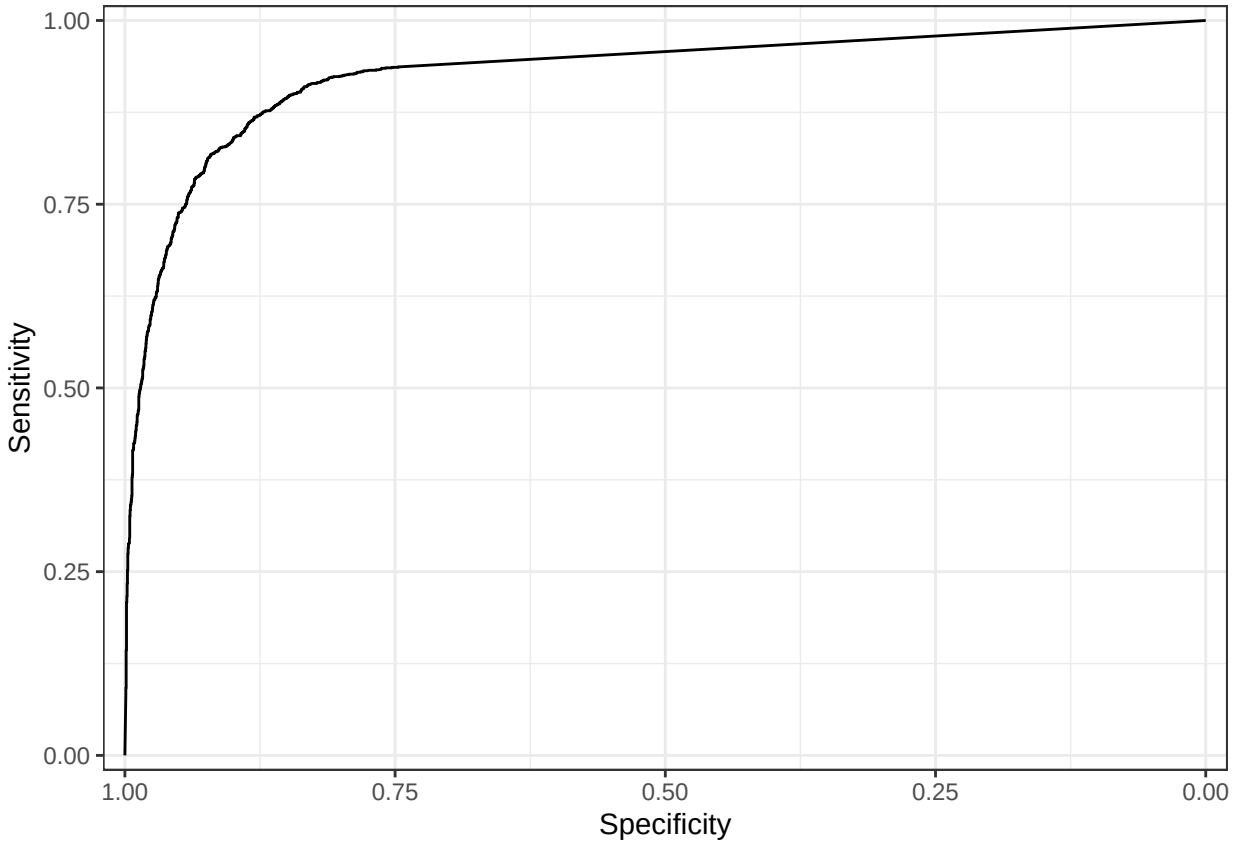
Area under the curve = 0.861 95% CI for AUC: [0.828; 0.899]

Optimal cutoff for IRF_Perifovea = 1.1030

accuracy	specificity	sensitivity
0.83	0.852	0.741

3.6 IRF_Parafovea

3.6.1 Both cameras

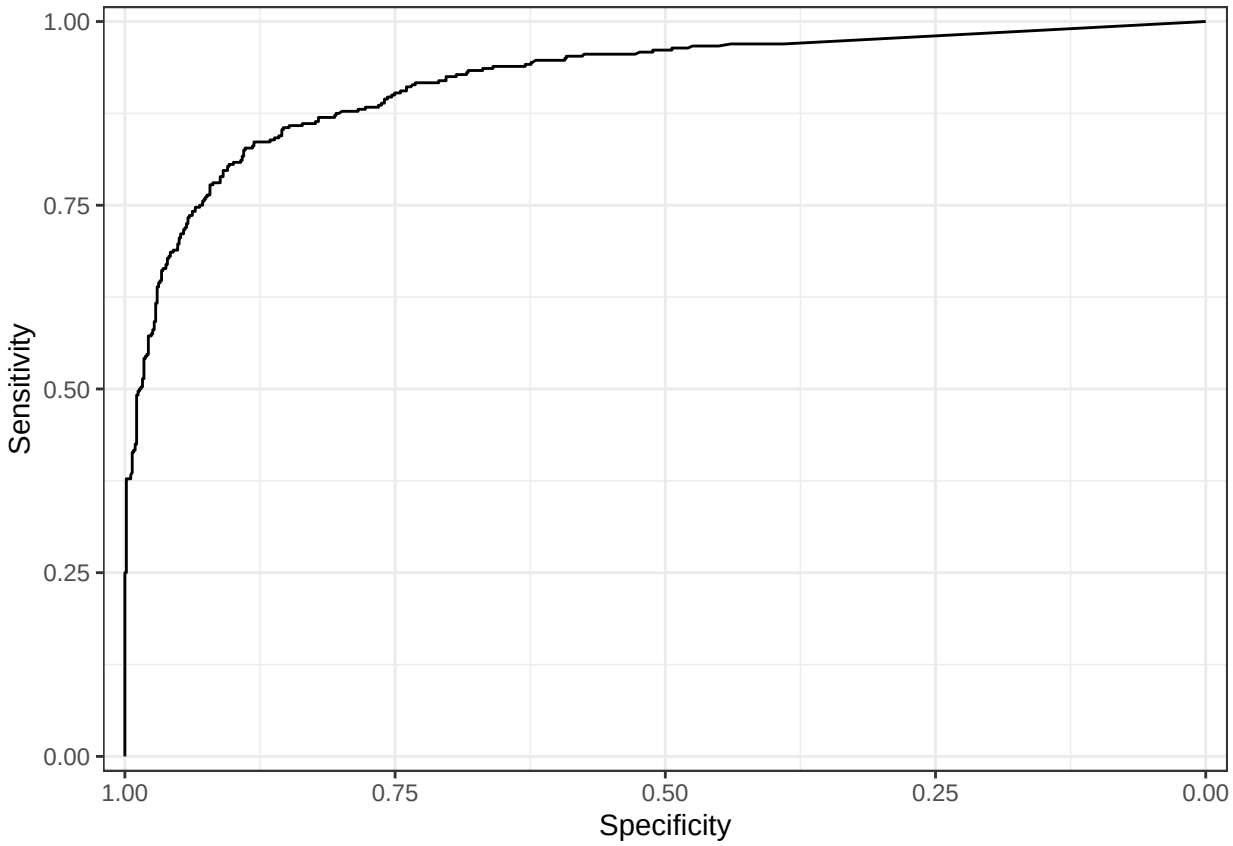


Area under the curve = 0.930 95% CI for AUC: [0.912; 0.949]

Optimal cutoff for IRF_Parafovea = 0.3620

accuracy	specificity	sensitivity
0.877	0.88	0.869

3.6.2 Camera 0

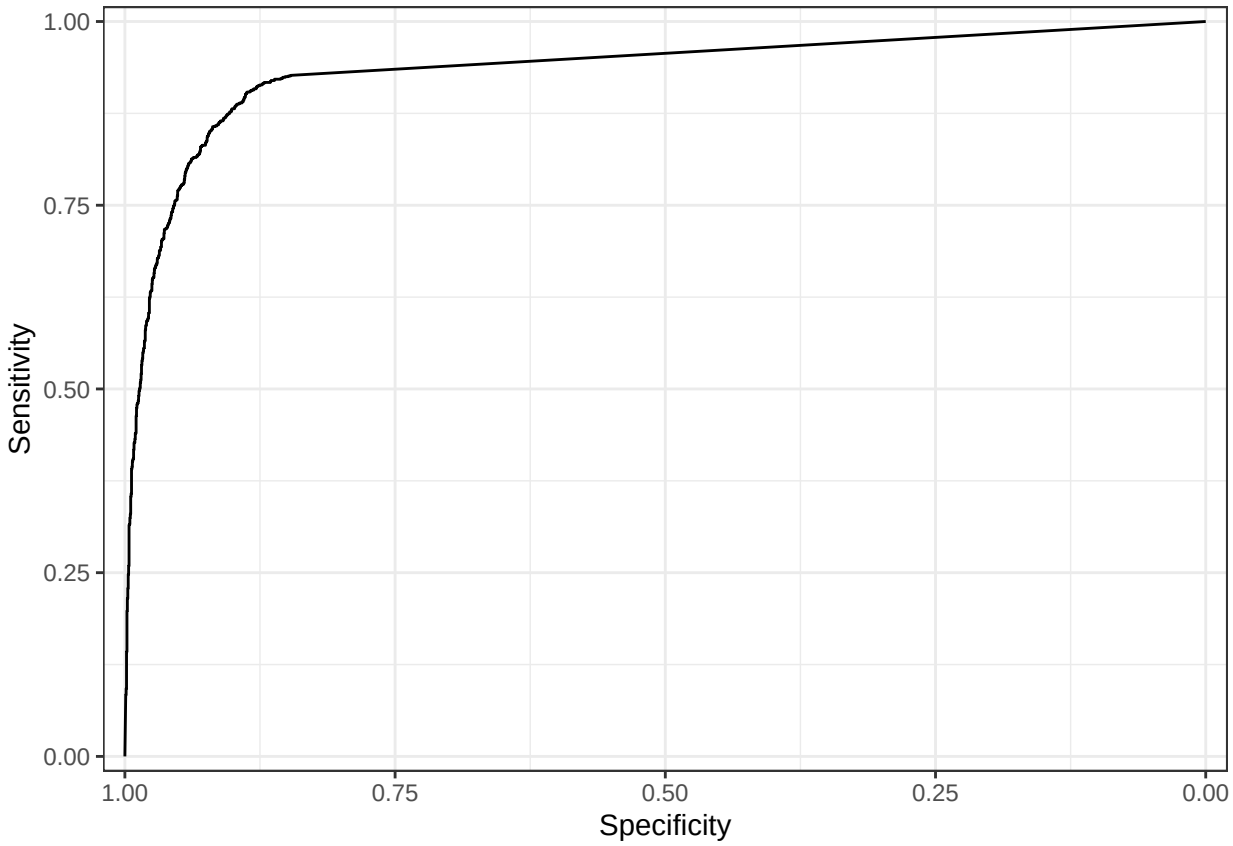


Area under the curve = 0.921 95% CI for AUC: [0.886; 0.963]

Optimal cutoff for IRF_Parafovea = 1.1180

accuracy	specificity	sensitivity
0.866	0.881	0.836

3.6.3 Camera 1



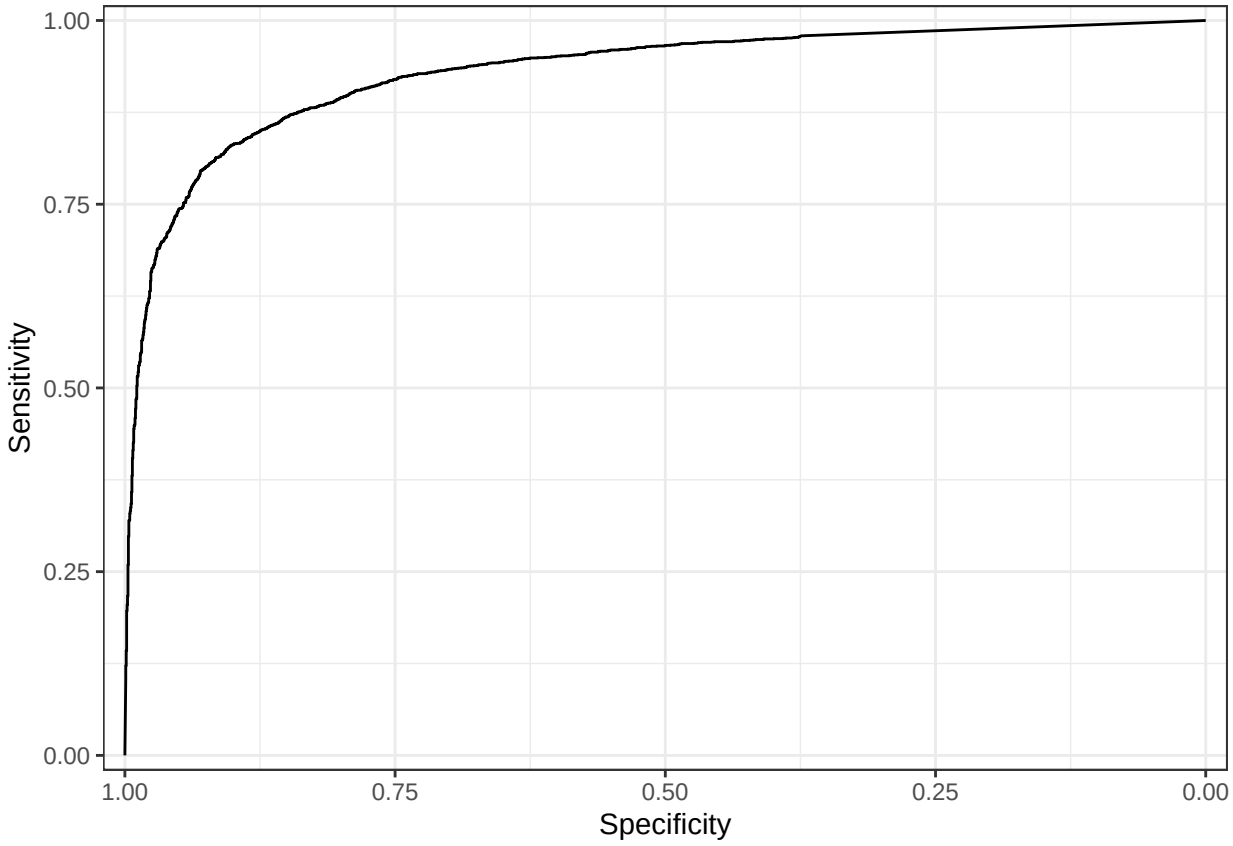
Area under the curve = 0.935 95% CI for AUC: [0.916; 0.958]

Optimal cutoff for IRF_Parafovea = 0.1330

accuracy	specificity	sensitivity
0.892	0.887	0.904

3.7 SRF_TotalFoV

3.7.1 Both cameras

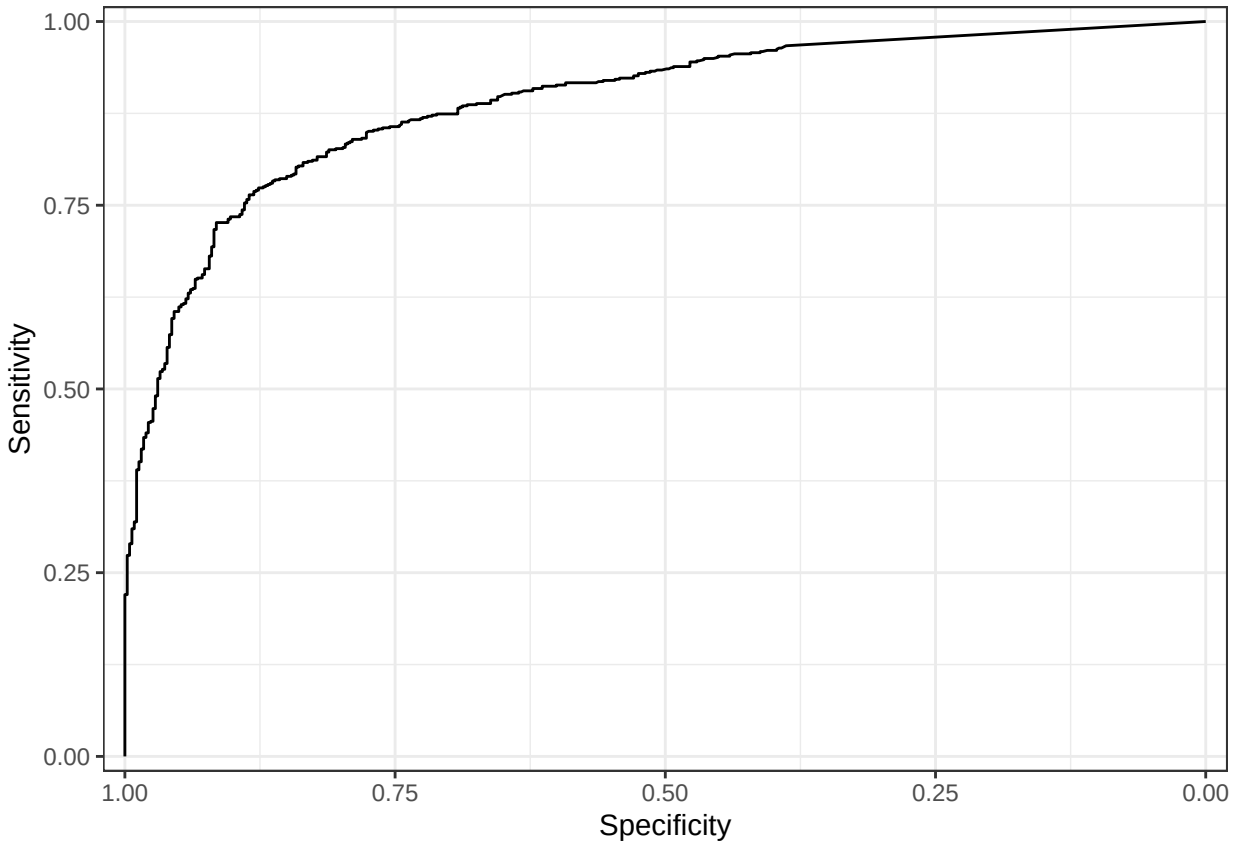


Area under the curve = 0.930 95% CI for AUC: [0.915; 0.948]

Optimal cutoff for SRF_TotalFoV = 4.8390

accuracy	specificity	sensitivity
0.867	0.902	0.83

3.7.2 Camera 0

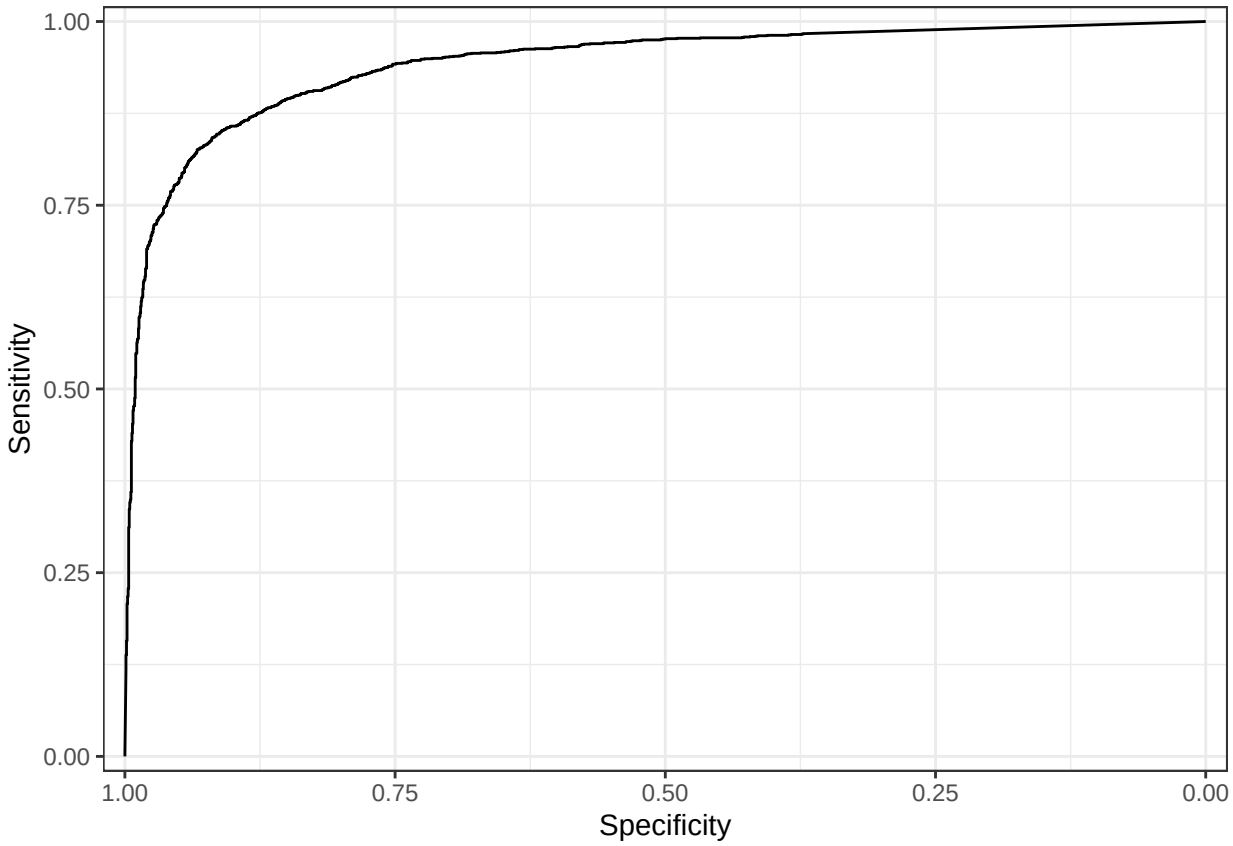


Area under the curve = 0.891 95% CI for AUC: [0.856; 0.934]

Optimal cutoff for SRF_TotalFoV = 3.8380

accuracy	specificity	sensitivity
0.817	0.876	0.774

3.7.3 Camera 1



Area under the curve = 0.943 95% CI for AUC: [0.926; 0.961]

Optimal cutoff for SRF_TotalFoV = 5.0950

accuracy	specificity	sensitivity
0.883	0.91	0.852

4 Descriptive statistics

Study	Fluid Type	Localisation	Fluid yes (n(%))	Fluid no (n(%))	Mean volume AI if fluid present (median(IQR))	Mean volume AI if no fluid present (median(IQR))
BRIGHTER	IRF	CMM	245 (97.61)	6 (2.39)	106.08 (62.21-161.93)	0.06 (0.01-1.31)
BRIGHTER	IRF	TotalFoV	249 (99.20)	2 (0.80)	410.62 (208.38-689.50)	4.29 (2.25-6.34)
BRIGHTER	SRF	CMM	95 (37.85)	156 (62.15)	36.04 (11.10-68.51)	0.34 (0.00-3.90)
BRIGHTER	SRF	TotalFoV	103 (41.04)	148 (58.96)	162.06 (42.93-516.86)	6.92 (0.73-50.05)
Protocol T	IRF	CMM	1595 (89.61)	185 (10.39)	39.66 (9.98-98.34)	0.00 (0.00-0.38)
Protocol T	IRF	TotalFoV	1738 (97.64)	42 (2.36)	177.54 (51.38-485.68)	3.46 (1.62-5.04)
Protocol T	SRF	CMM	251 (14.10)	1529 (85.90)	13.14 (4.15-46.39)	0.00 (0.00-0.13)
TREND	IRF	CMM	977 (20.16)	3869 (79.84)	8.59 (1.80-34.60)	0.00 (0.00-0.00)
TREND	IRF	MM3	1597 (32.96)	3249 (67.04)	11.62 (2.24-63.27)	0.00 (0.00-0.11)
TREND	IRF	MM6	1663 (34.32)	3183 (65.68)	14.62 (2.73-76.07)	0.27 (0.00-0.98)
TREND	IRF	Parafovea	1507 (31.10)	3339 (68.90)	9.49 (1.43-46.18)	0.00 (0.00-0.00)
TREND	IRF	Perifovea	957 (19.76)	3887 (80.24)	5.21 (0.89-29.54)	0.10 (0.00-0.62)
TREND	IRF	TotalFoV	1663 (34.32)	3183 (65.68)	15.42 (3.75-78.41)	1.04 (0.41-2.07)
TREND	SRF	TotalFoV	2394 (49.38)	2454 (50.62)	68.21 (10.75-272.29)	0.07 (0.00-0.87)

5 References

[1] YOUDEN, William J. Index for rating diagnostic tests. Cancer, 1950, 3. Jg., Nr. 1, S. 32-35.