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AI - för diagnostisering av prostatacancer

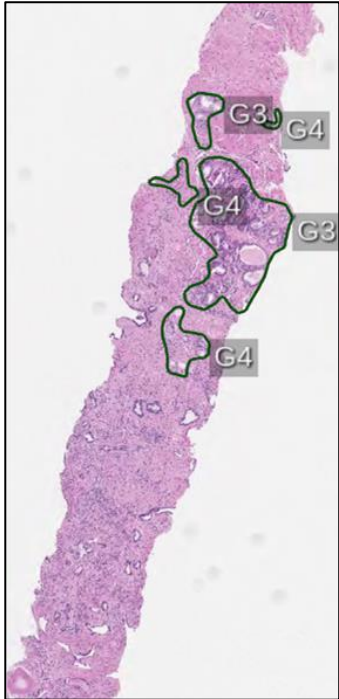
Internetdagarna, 2020-11-24

Ida Arvidsson

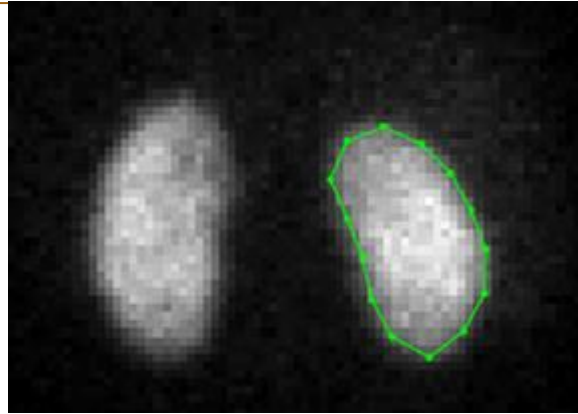
Matematikcentrum, Lunds Universitet



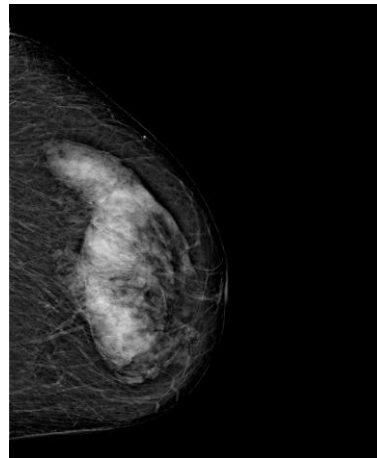
AI inom sjukvård



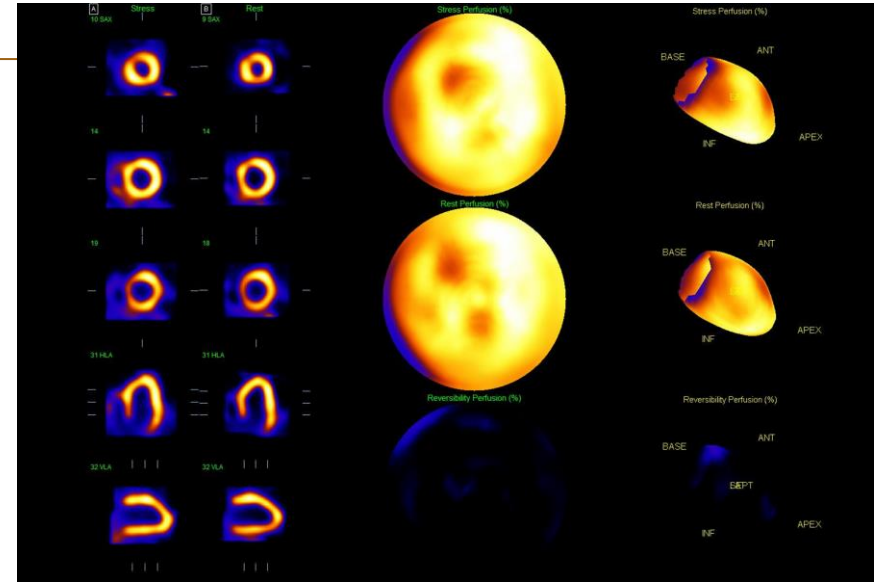
Vävnadsprov för att undersöka prostatacancer



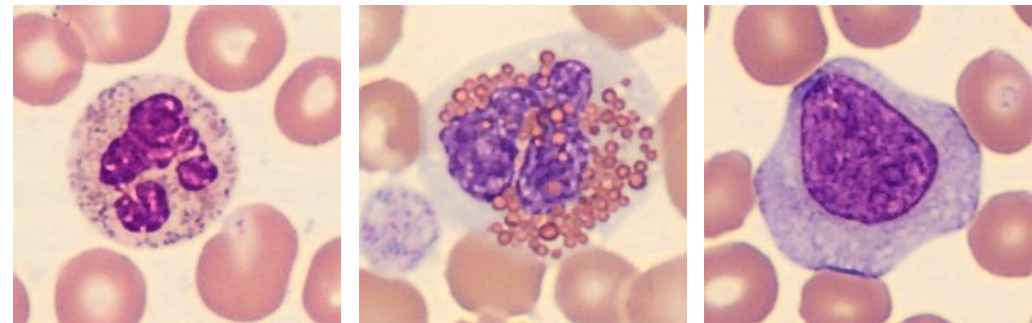
Scintigrafi för att upptäcka ärr på njurarna hos barn



Mammografi för att hitta bröstcancer



Hjärtscintigrafi för diagnostisering av kranskärslsjukdomar



Mikroskopibilder av blodceller

AI för diagnostisering av prostatacancer

Varför:


- Omkring $\frac{1}{6}$ av män blir diagnostiserade med prostatacancer
- Brist på patologer
- Stor variation i diagnostisering mellan patologer

Hur:


- Digital patologi och bildanalys

Samarbete mellan Lunds Universitet,
Skånes Universitetssjukhus samt Sectra AB

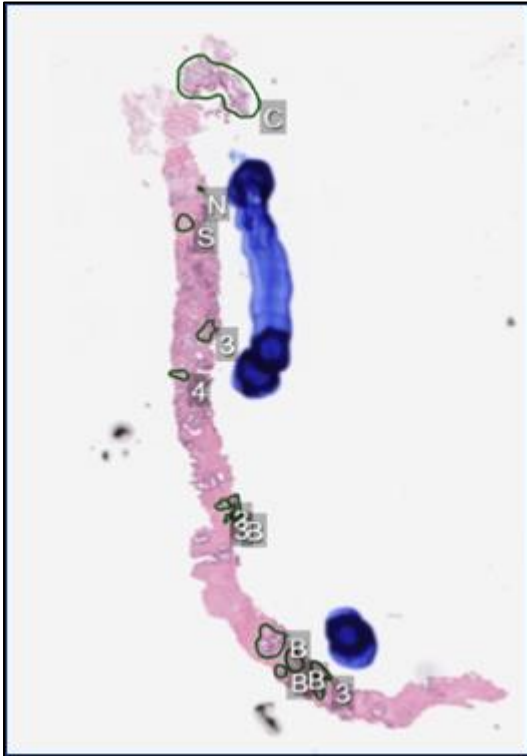
Estimated New Cases

			Males
Prostate	220,800	26%	
Lung & bronchus	115,610	14%	
Colon & rectum	69,090	8%	
Urinary bladder	56,320	7%	
Melanoma of the skin	42,670	5%	
Non-Hodgkin lymphoma	39,850	5%	
Kidney & renal pelvis	38,270	5%	
Oral cavity & pharynx	32,670	4%	
Leukemia	30,900	4%	
Liver & intrahepatic bile duct	25,510	3%	
All Sites	848,200	100%	

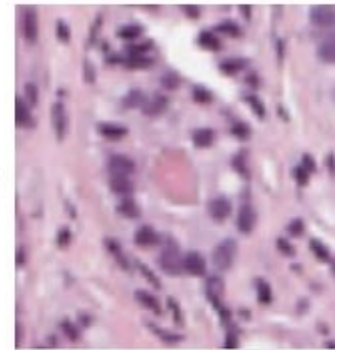
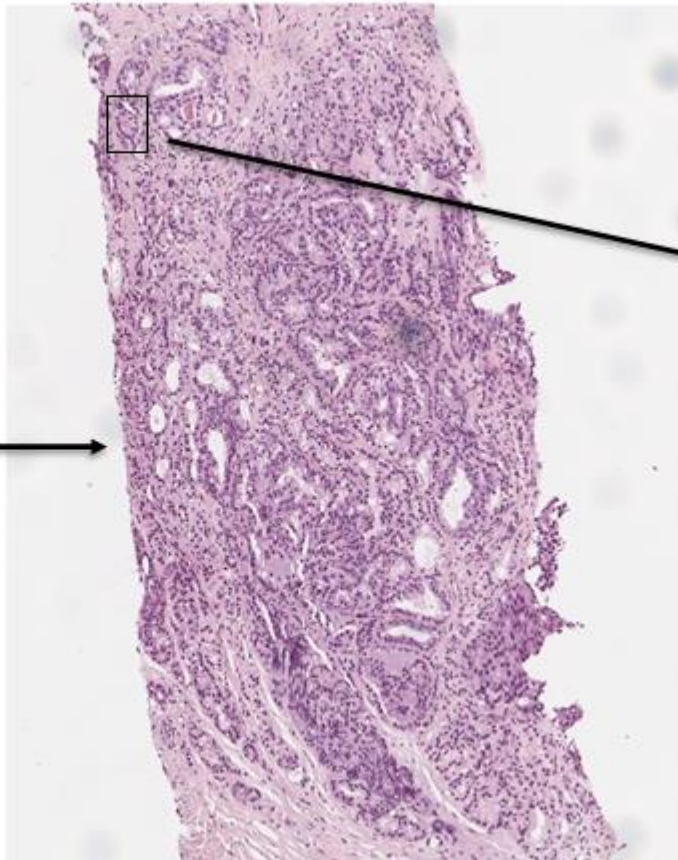
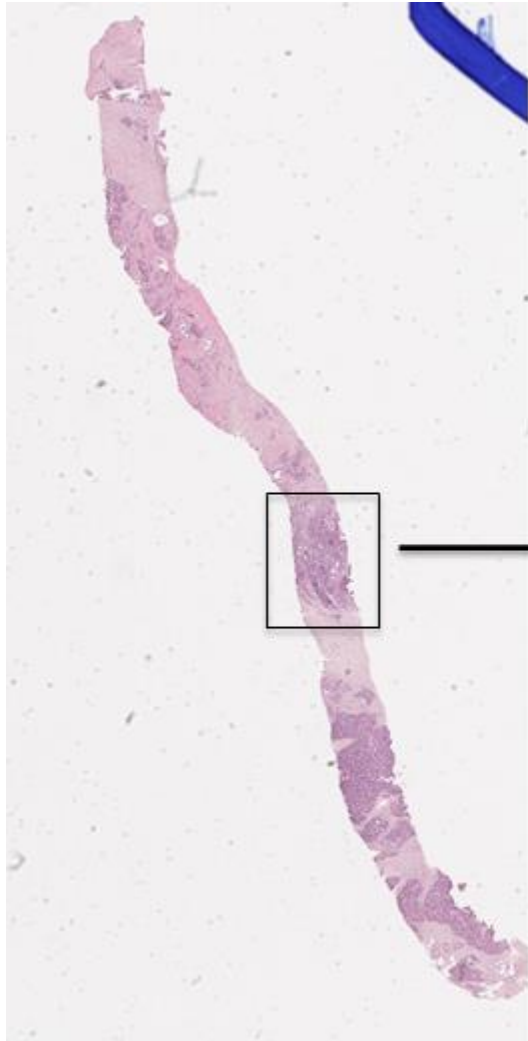
Estimated Deaths

			Males
Lung & bronchus	86,380	28%	
Prostate	27,540	9%	
Colon & rectum	26,100	8%	
Pancreas	20,710	7%	
Liver & intrahepatic bile duct	17,030	5%	
Leukemia	14,210	5%	
Esophagus	12,600	4%	
Urinary bladder	11,510	4%	
Non-Hodgkin lymphoma	11,480	4%	
Kidney & renal pelvis	9,070	3%	
All Sites	312,150	100%	

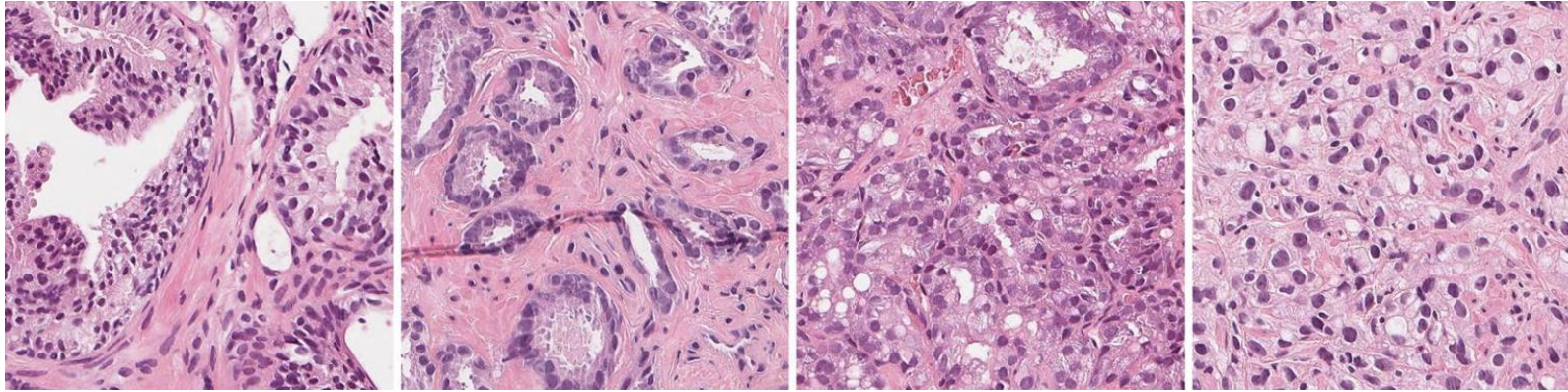
Patologi blir digitalt



Högupplösta bilder



Gleason skalan, gradering av prostatacancer



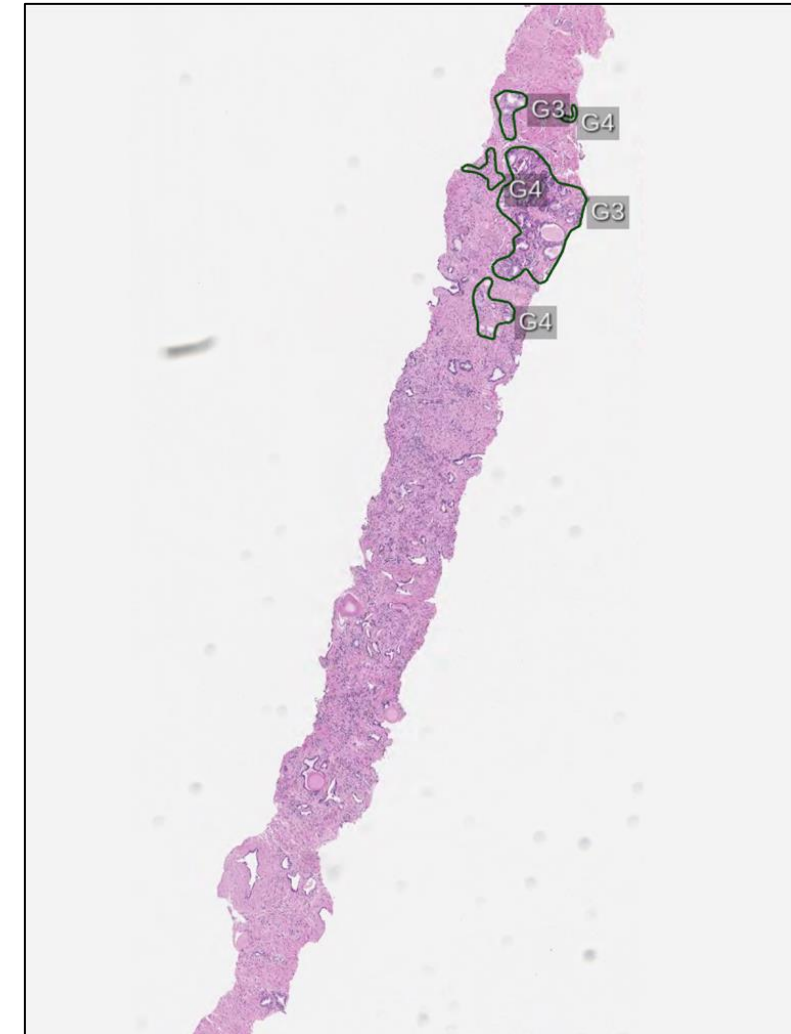
Frisk

Gleason grad 3

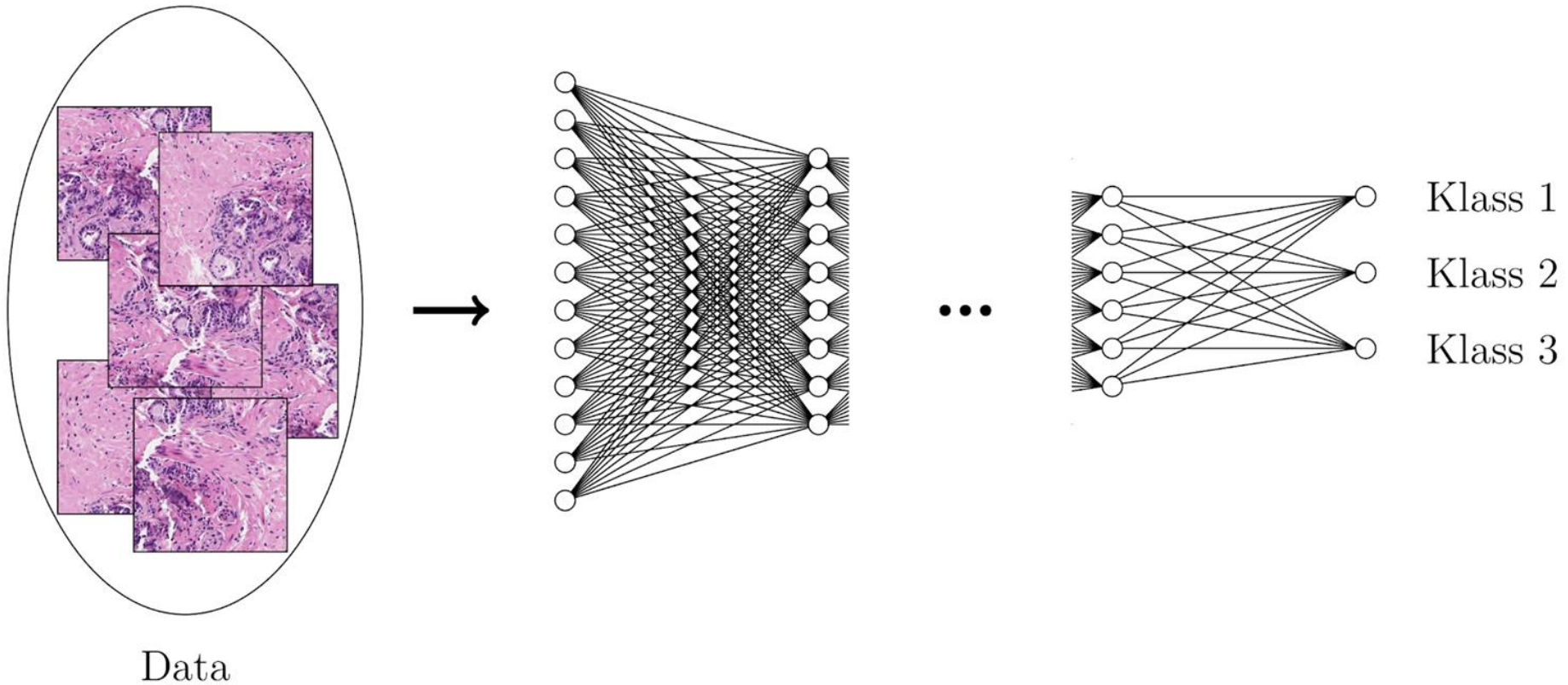
Gleason grad 4

Gleason grad 5

Antal patienter	174
Antal vävnadsprov	698
Antal urklipp	> 200 000

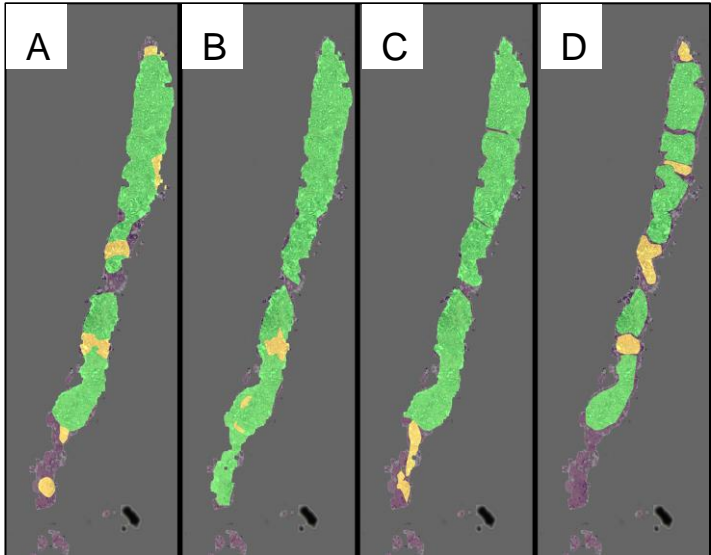
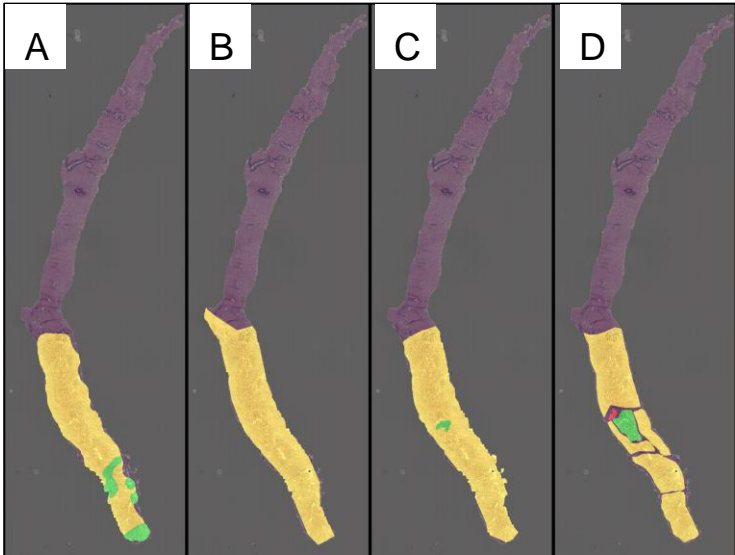
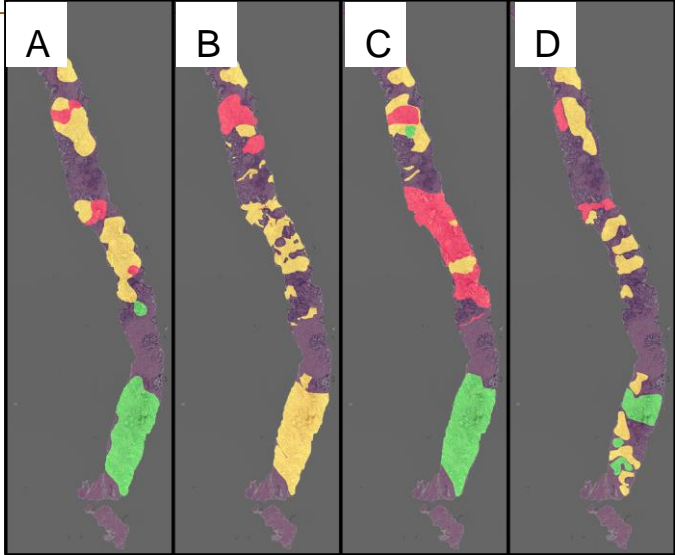
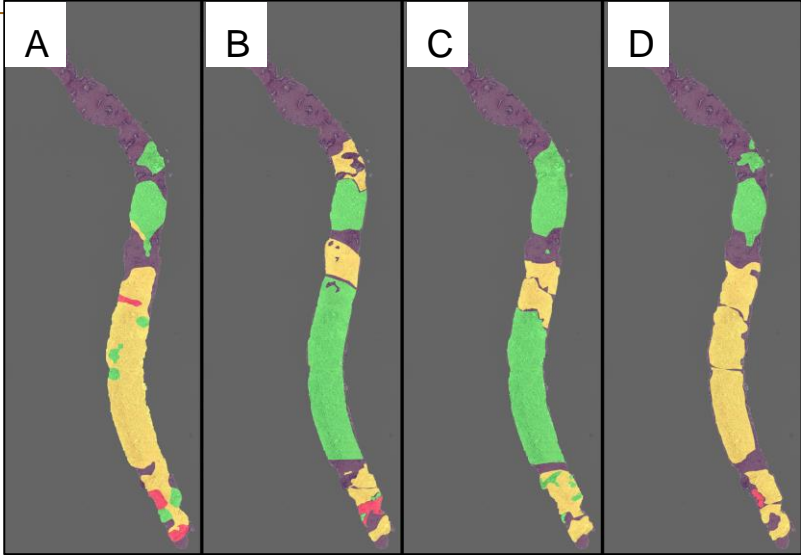


AI - maskininlärning - neuralt nätverk



AI för Gleason gradering - resultat

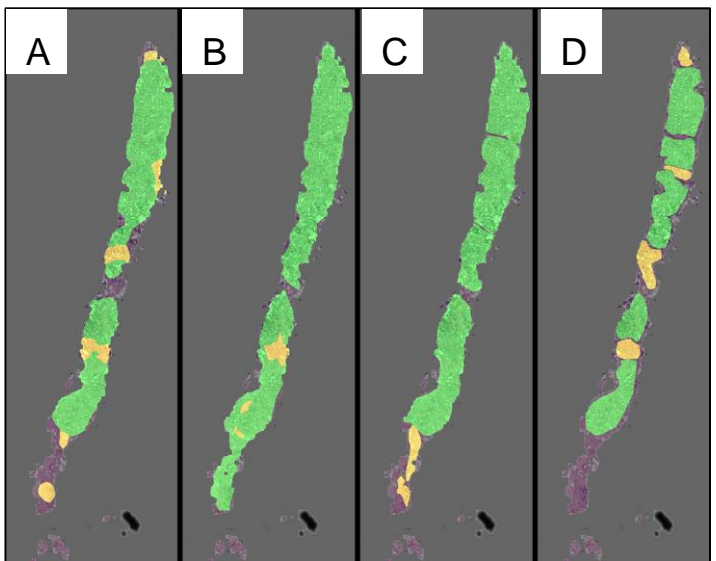
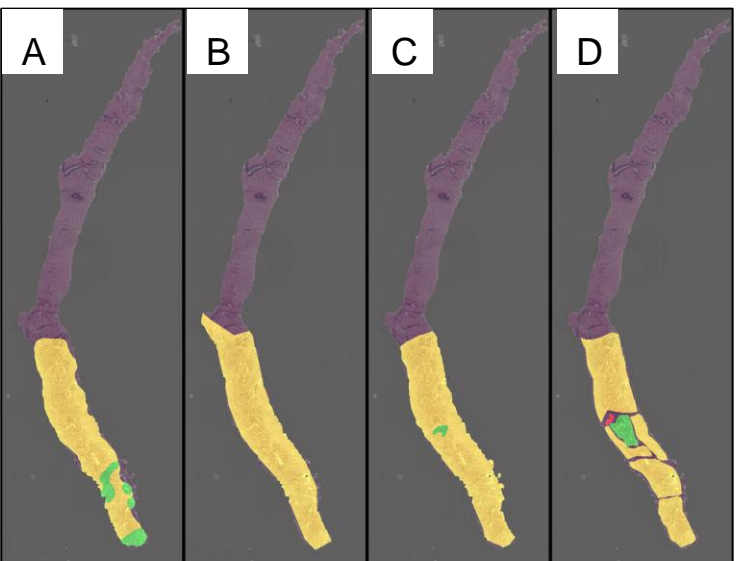
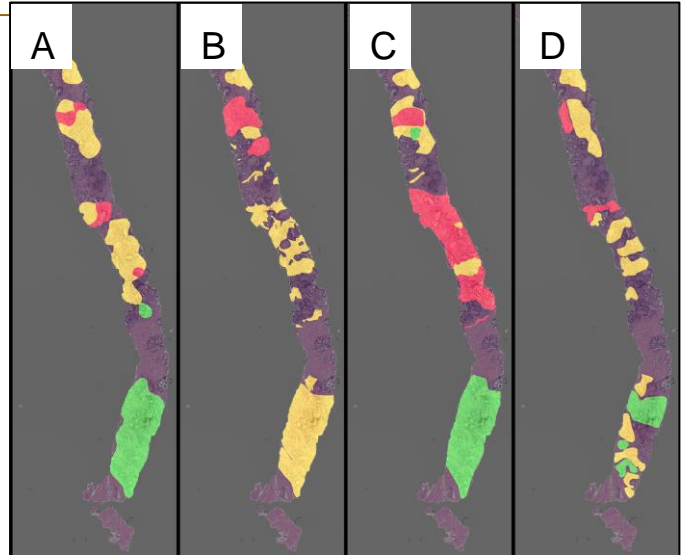
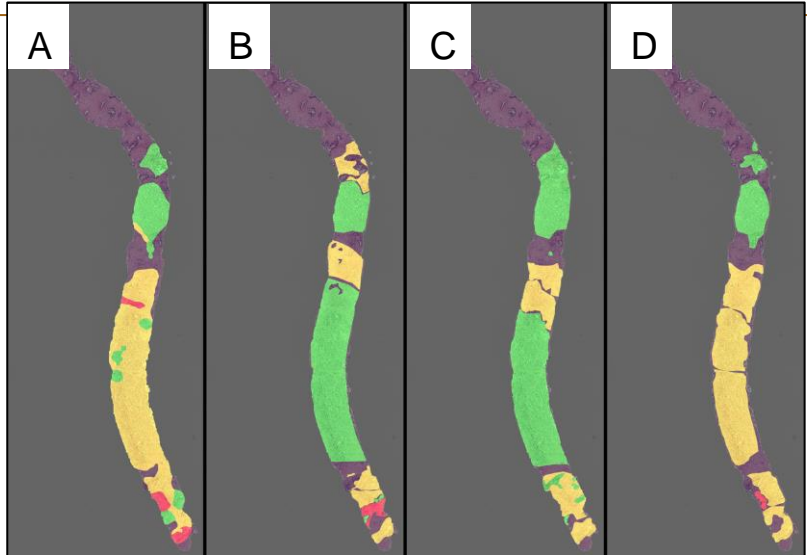
- Gleason 3
- Gleason 4
- Gleason 5



AI för Gleason gradering - resultat

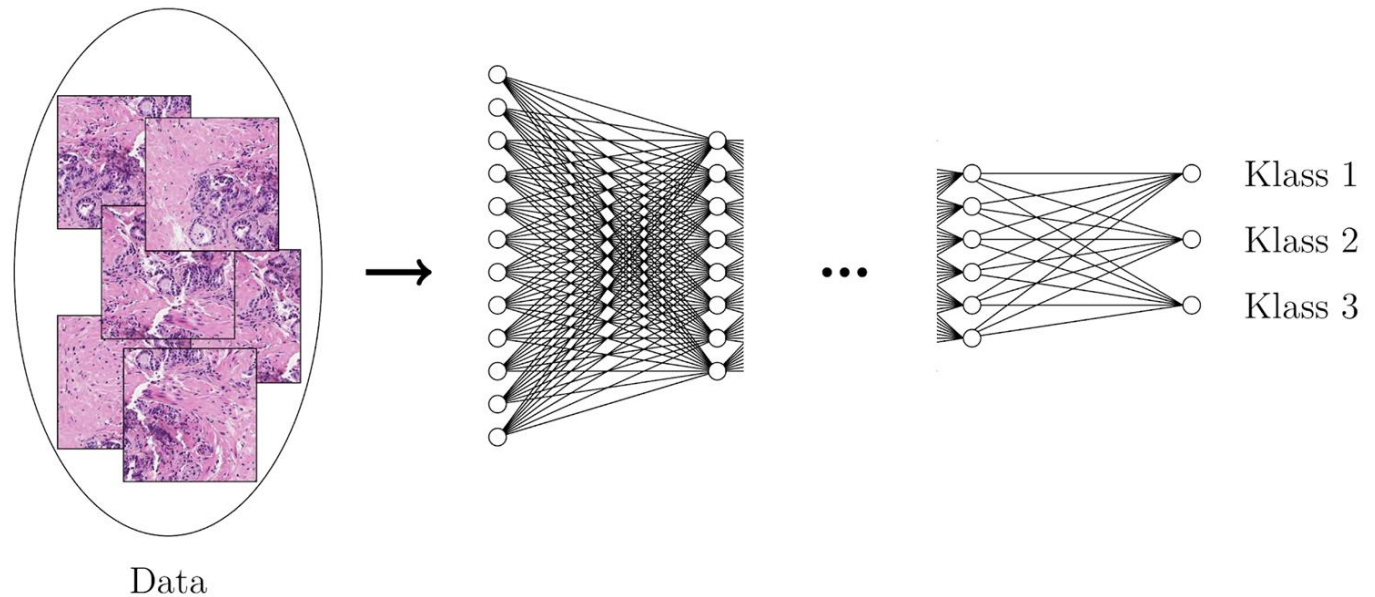
- Gleason 3
- Gleason 4
- Gleason 5

A: Algoritm
B: Patolog 1, år 1
C: Patolog 1, år 2
D: Patolog 2



Sammanfattning

- AI kan användas inom många områden, och många har ännu inte utforskats!
- Varje tillämpning innebär olika utmaningar.
- Det behövs (mycket) data.





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