

Træer, bytræer og den fagre nye verden

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Træer er vigtige

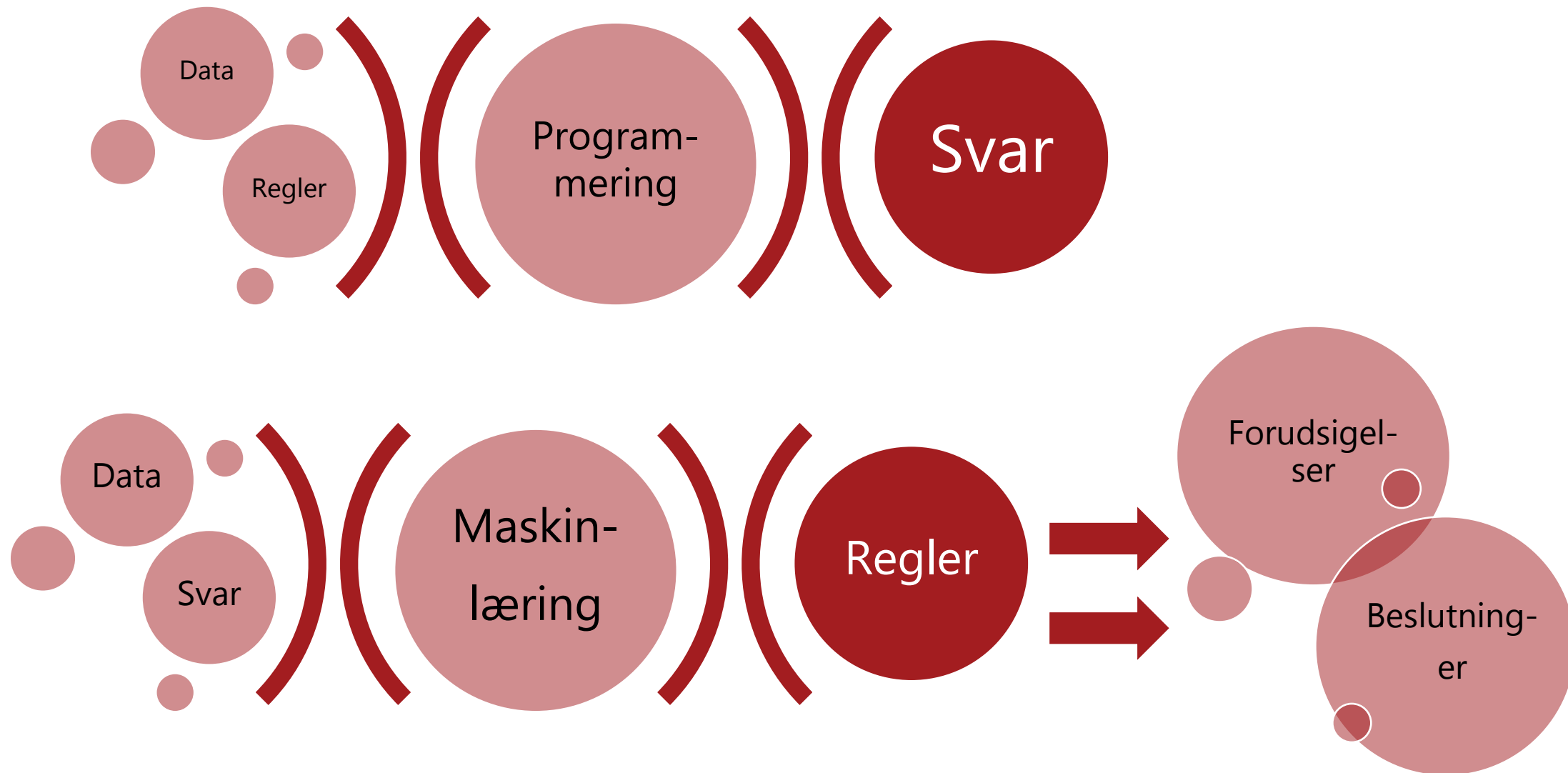
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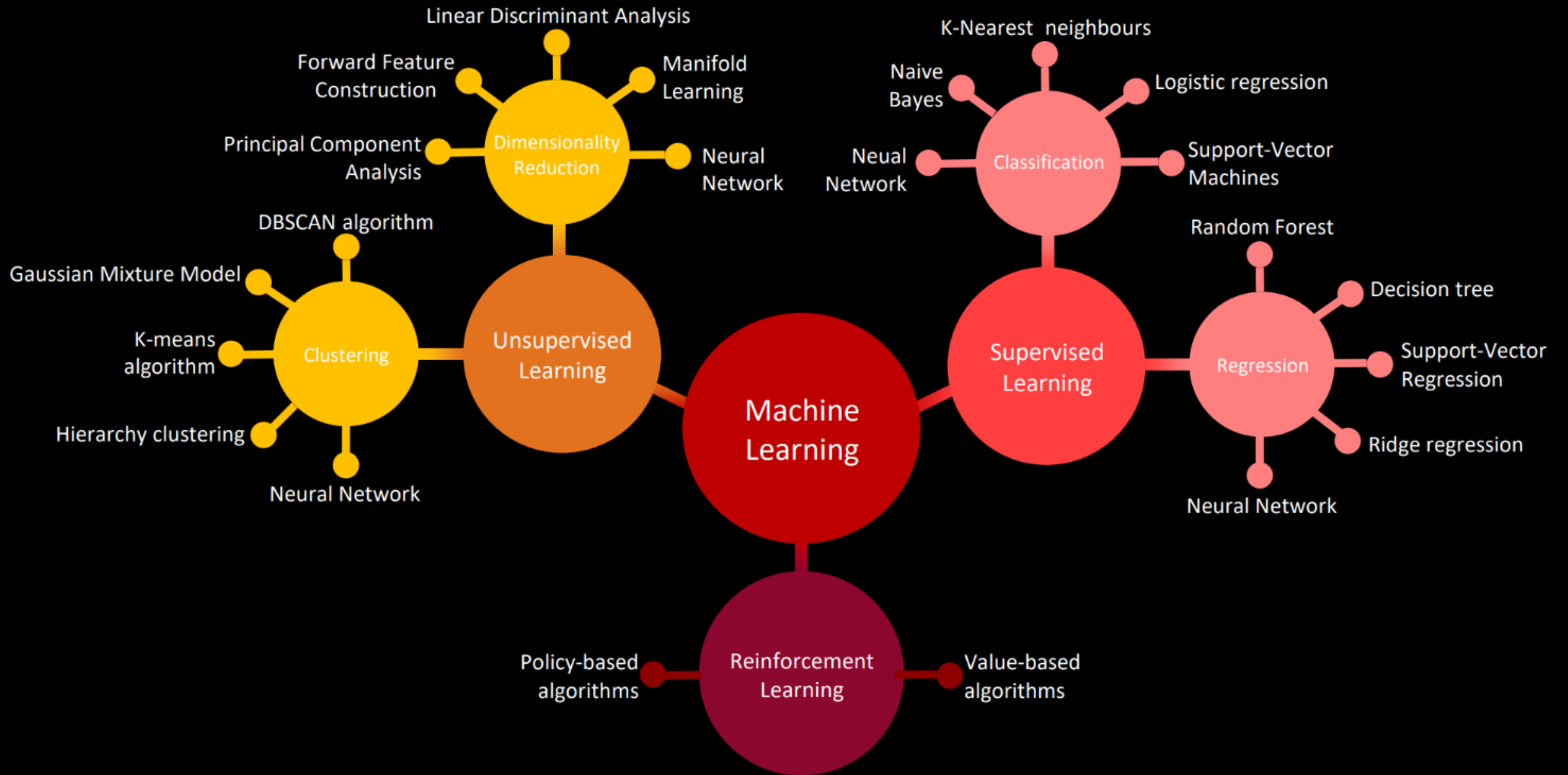
Træpolitik for København

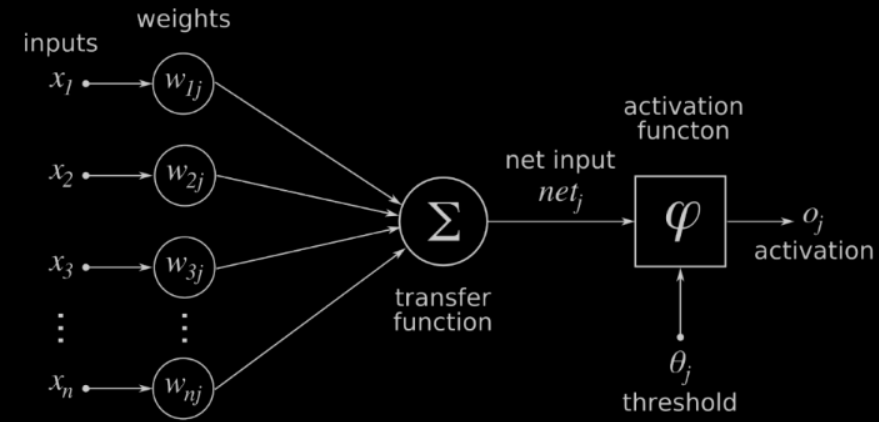
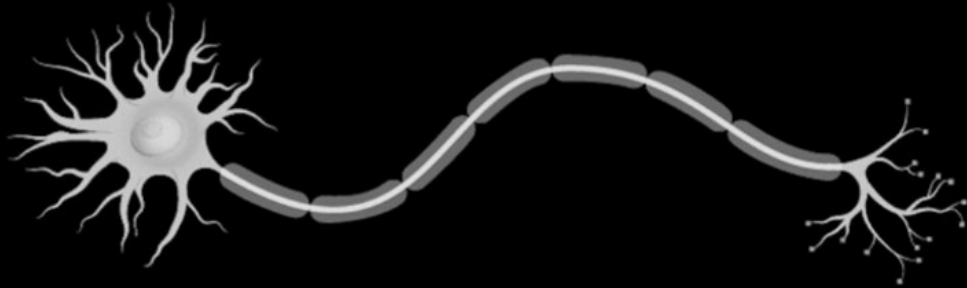
1. Eksisterende træer i København skal som hovedregel bevares
2. Eksisterende træer, der fældes, skal erstattes, medmindre det ikke er fysisk muligt
3. Der skal plantes flere træer i København
4. Der skal sikres gode vækstvilkår for både nye og eksisterende træer i København
5. Der skal sikres et varieret træartsvalg i København

... men hvor er de?

In 1959, Arthur Samuel, a pioneer in the field of machine learning (ML) defined it as the: *“field of study that gives computers the ability to learn without being explicitly programmed”*.



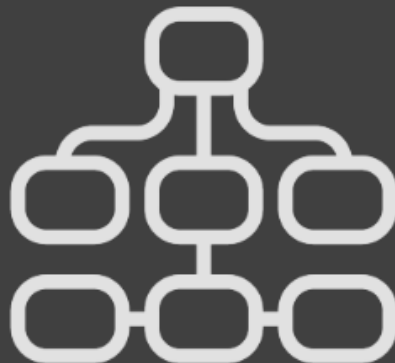




AI is the simulation of human intelligence by machines (computer systems)

MACHINE LEARNING (ML)

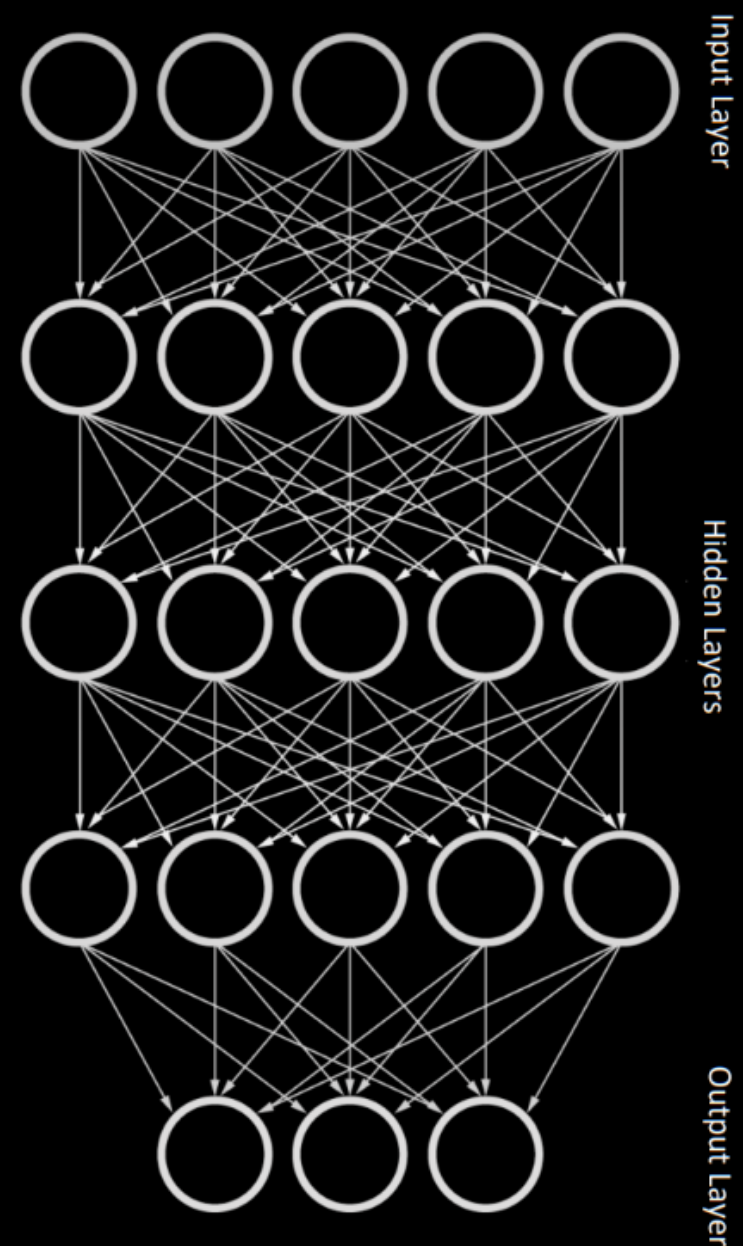
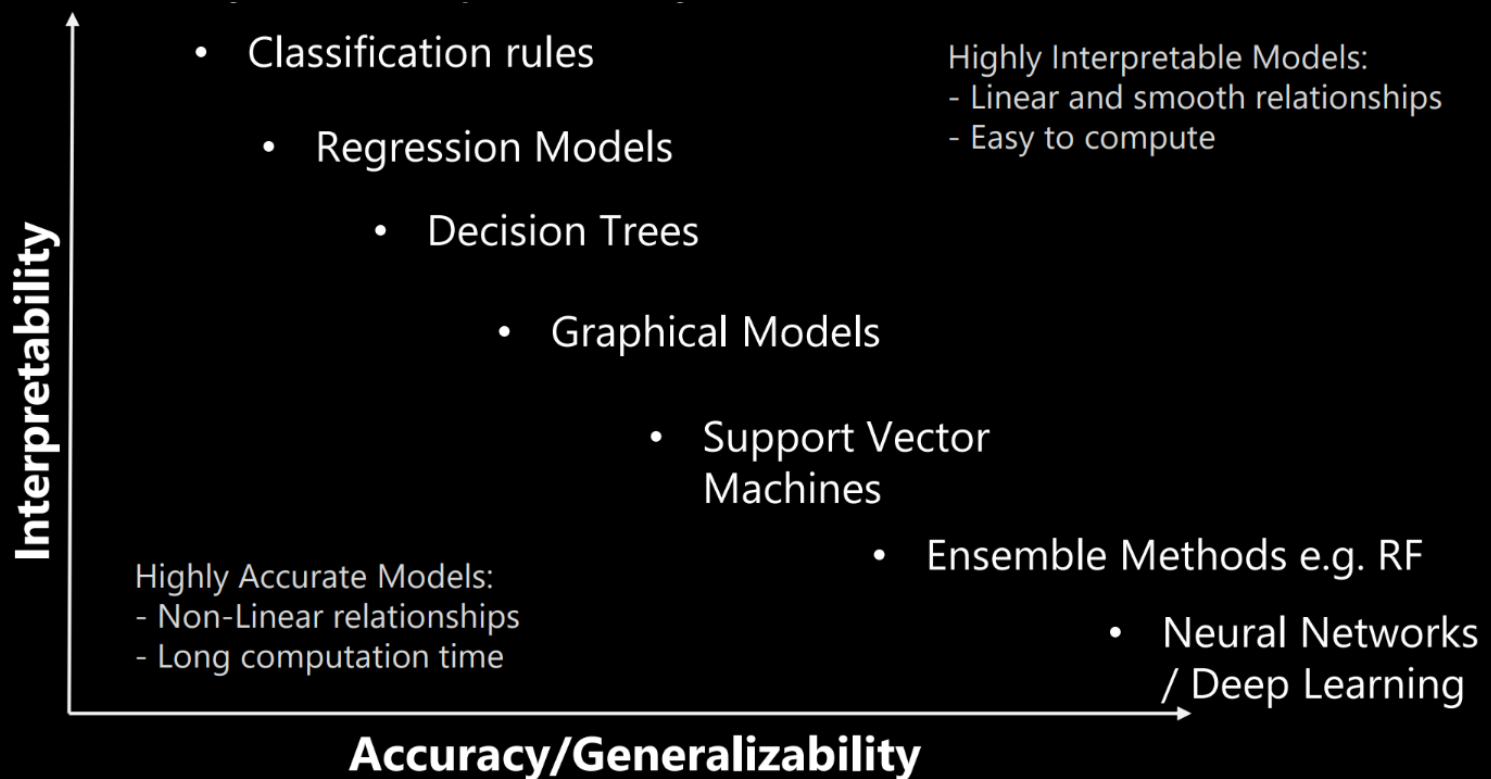
ML enables computers to learn from data and make decisions or predictions without being explicitly programmed

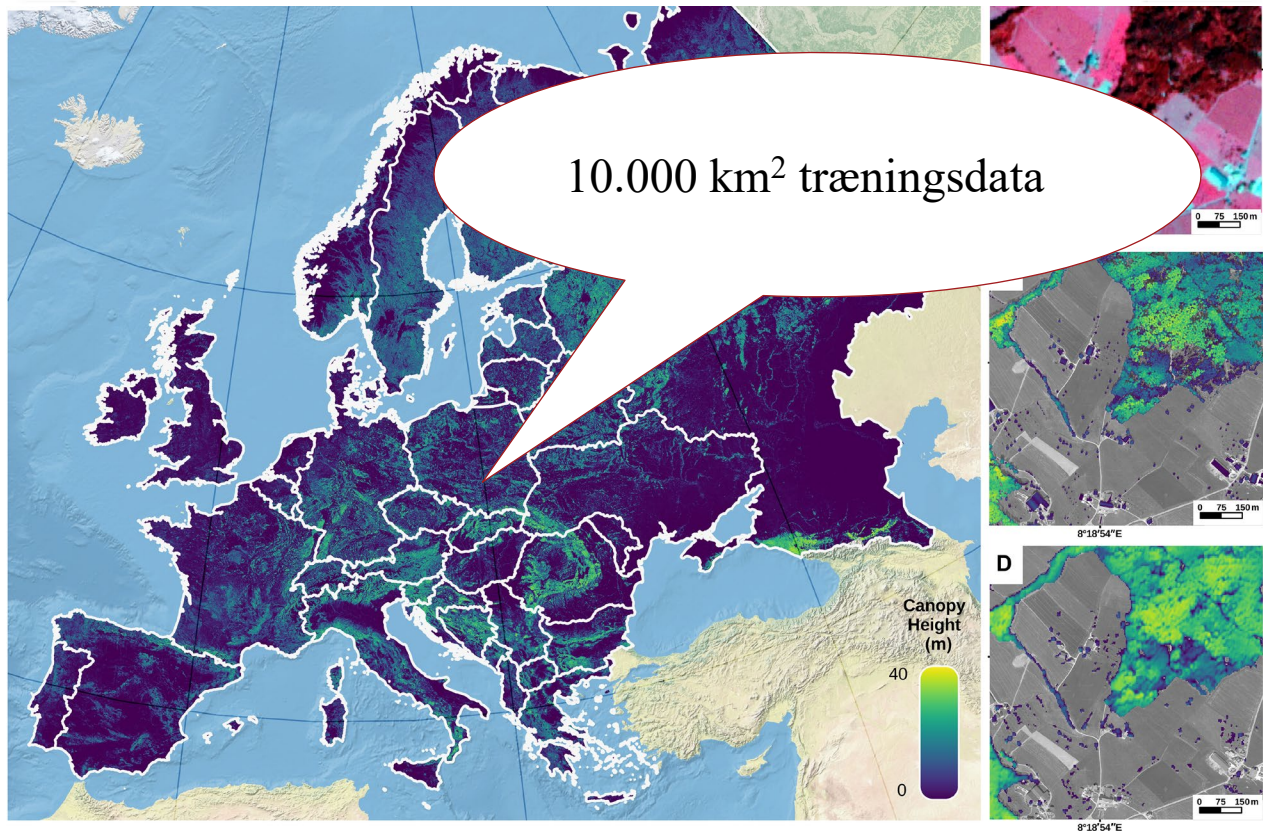
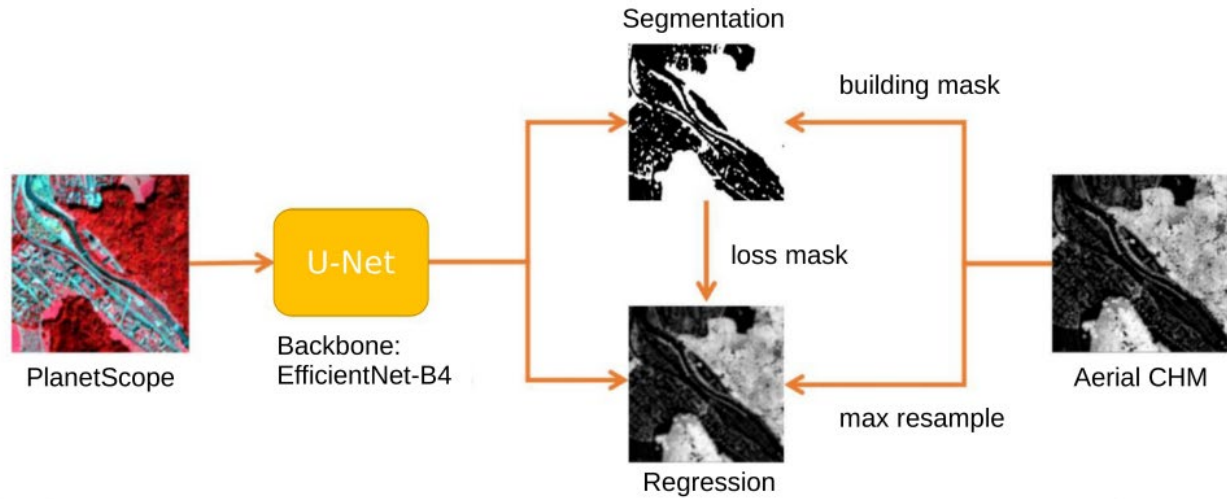


DEEP LEARNING (DL)

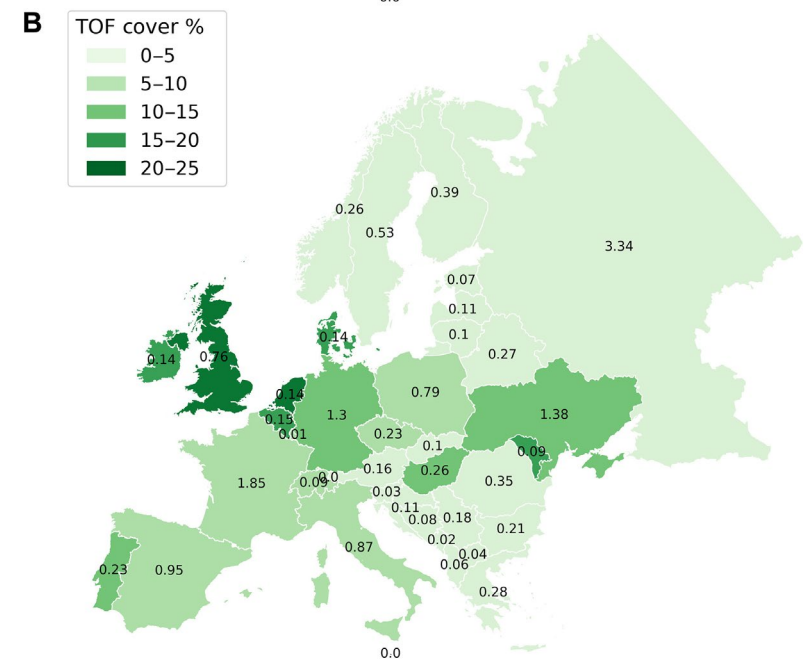
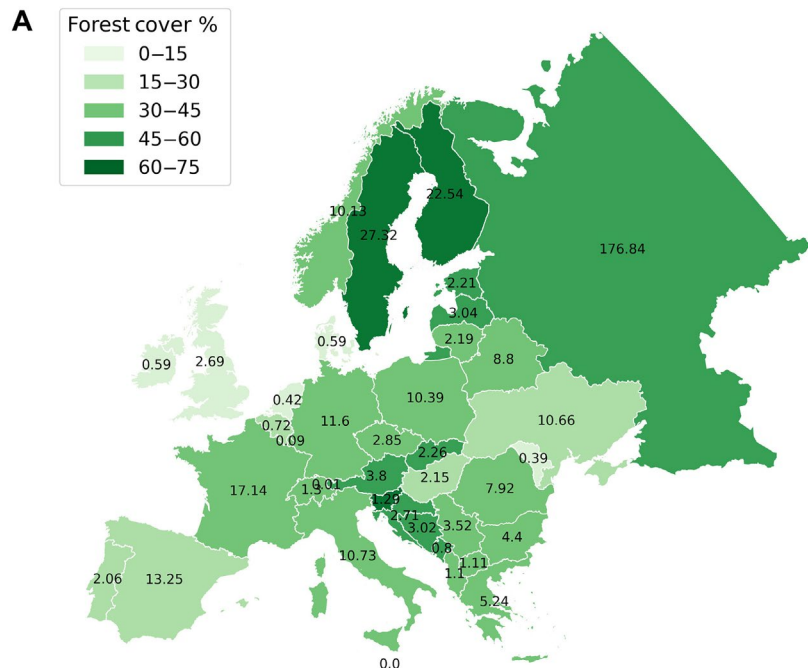
DL is a subset of ML that uses deep artificial neural networks to mimic the learning process of the human brain





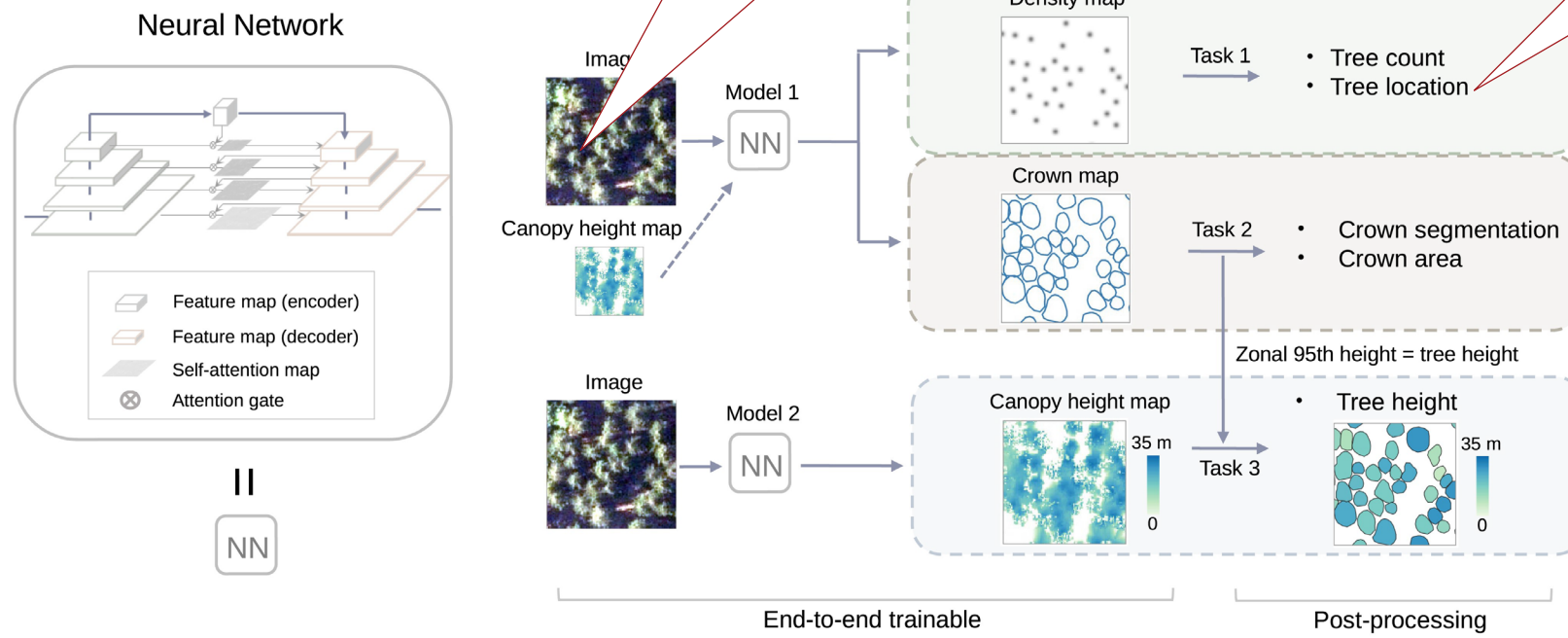


På lidt større afstand



Country	Total tree cover (% of country)	Tree cover outside forests (% of total)	Total biomass in Tg	Tree biomass outside forests in Tg (% of total)
Ireland	10.5%	19.7%	36.65	3.24 (8.8%)
United Kingdom	14.1%	22.1%	264.29	26.29 (9.9%)
The Netherlands	14.8%	24.6%	47.32	5.79 (12.2%)
Denmark	16.9%	19.5%	63.47	4.74 (7.5%)
Ukraine	20.1%	11.4%	1534.2	53.2 (3.5%)
France	34.6%	9.7%	2388.2	77.2 (3.2%)
Germany	36.1%	10.0%	2264.3	65.4 (2.9%)
Italy	38.6%	7.5%	1501.3	37.6 (2.5%)
Estonia	50.3%	3.0%	259.3	2.7 (1.0%)
Finland	67.8%	1.7%	1726.2	9.76 (0.6%)

A

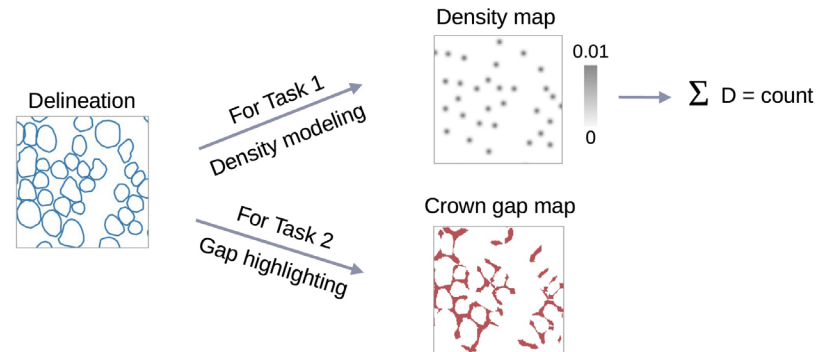


19.771 manuelt afgrænsede træer

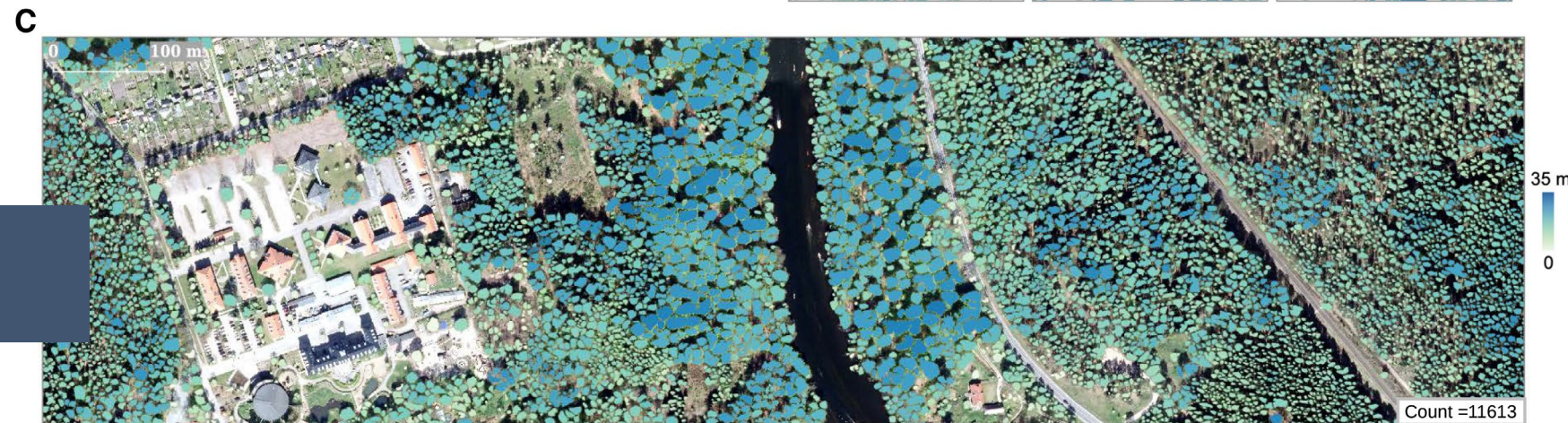
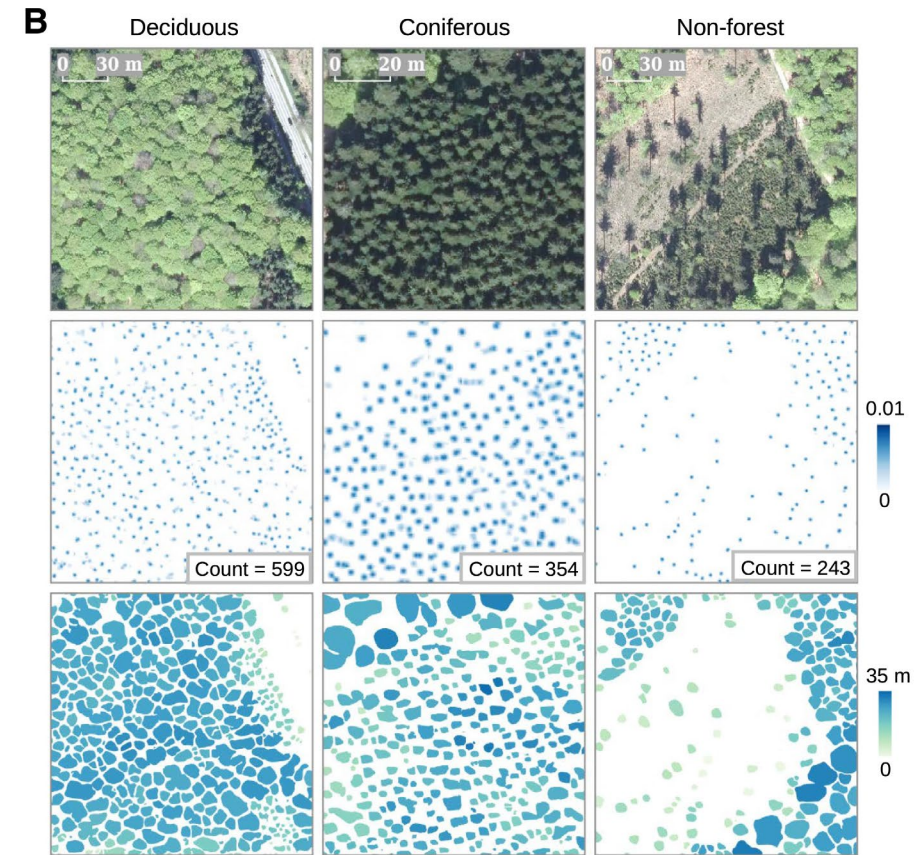
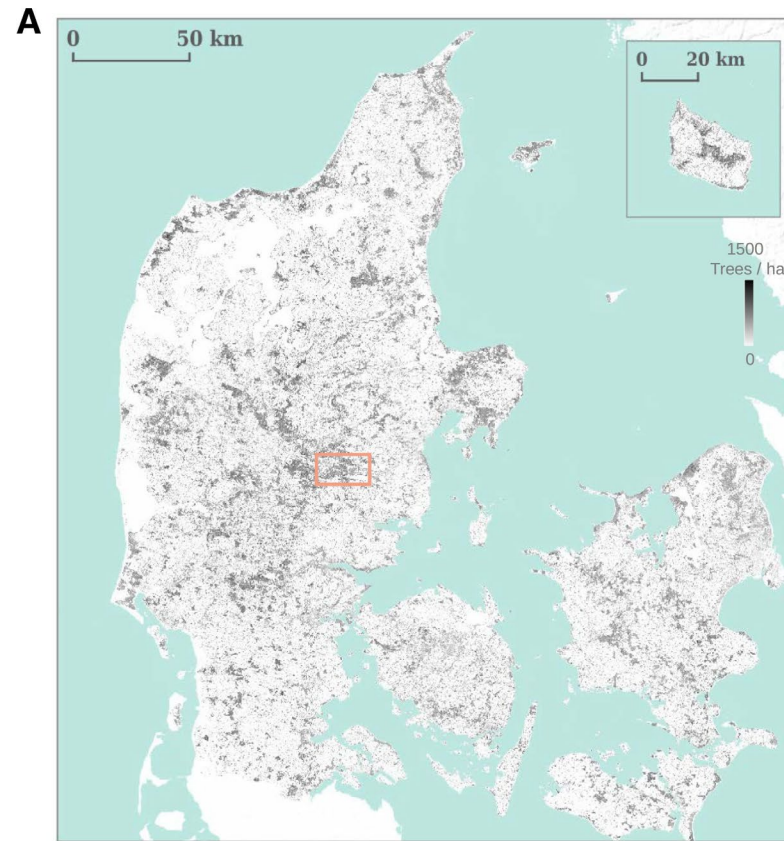
2,679 træer til model-test



B



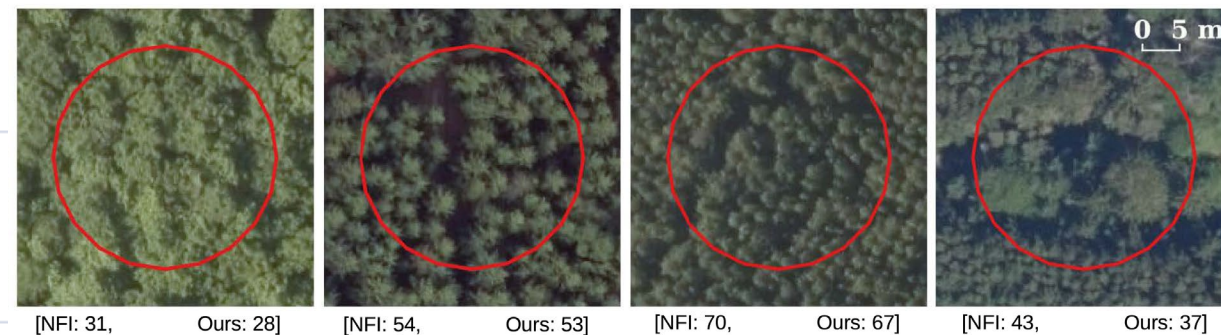
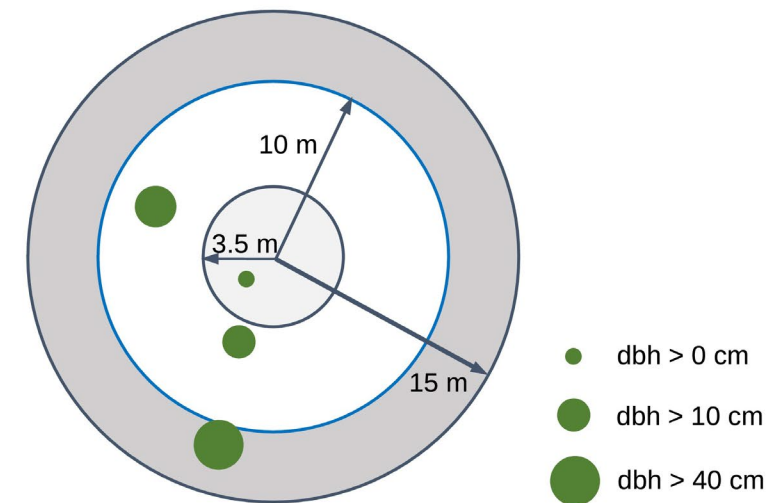
Lidt tættere på



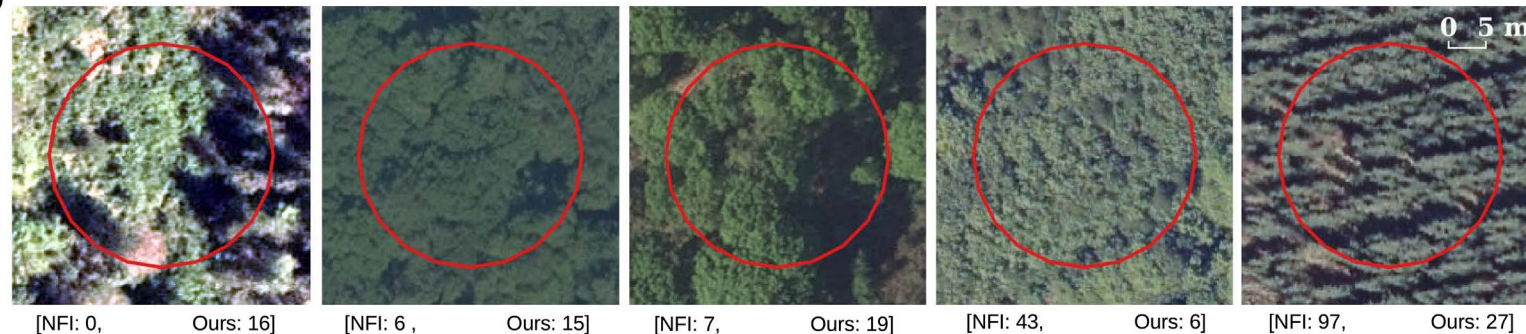
Resultater

Forest/landscape type	Tree count	Tree crown area (ha)
Deciduous forest	136,467,592 (43.7%)	233,720 (50.0%)
Coniferous forest	85,023,211 (29.1%)	92,352 (19.8%)
Nonforest	91,014,130 (27.2%)	141,186 (30.2%)
Total	312,504,933 (100%)	467,257 (100%)

B



D



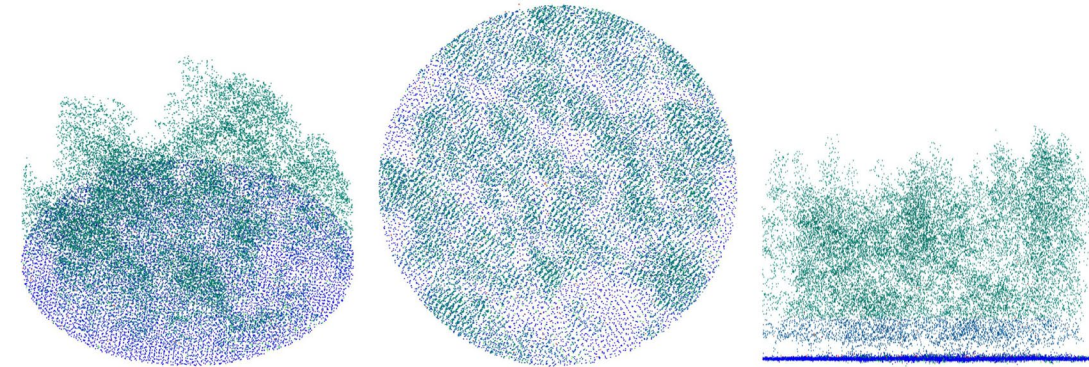
Resultater

An aerial photograph of the Frederiksberg district in Copenhagen, Denmark. The image is overlaid with numerous red circles of varying sizes, representing the locations and relative heights of trees. The circles are densely packed in green spaces and more sparsely distributed in urban areas. The background shows a mix of residential buildings, streets, and greenery.

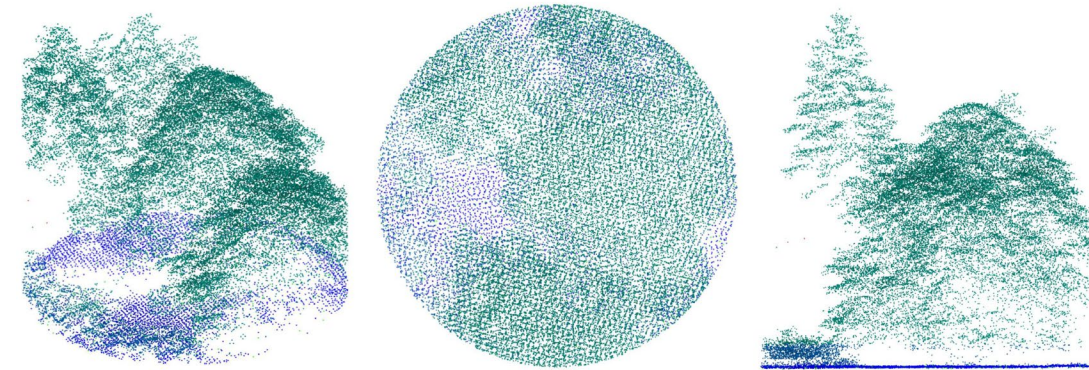
Træs at Frederiksberg:
Antal: 34.627
Areal: 88,9 ha
Højde: 11,7 m i gns.

A zoomed-in aerial view of a park area within Frederiksberg. The park features a large green lawn, a winding path, and a small pond. The trees in the area are marked with red circles of varying sizes, indicating their locations and heights. The surrounding urban environment is visible at the edges of the inset.

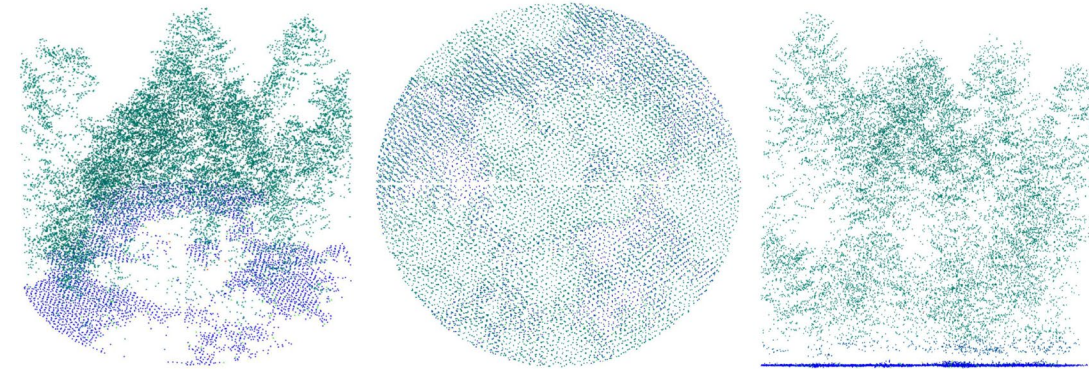
Men hvad med
bytræerne?



(a) Broadleaf only subplot with AGB of 27.93 Mg ha^{-1} .



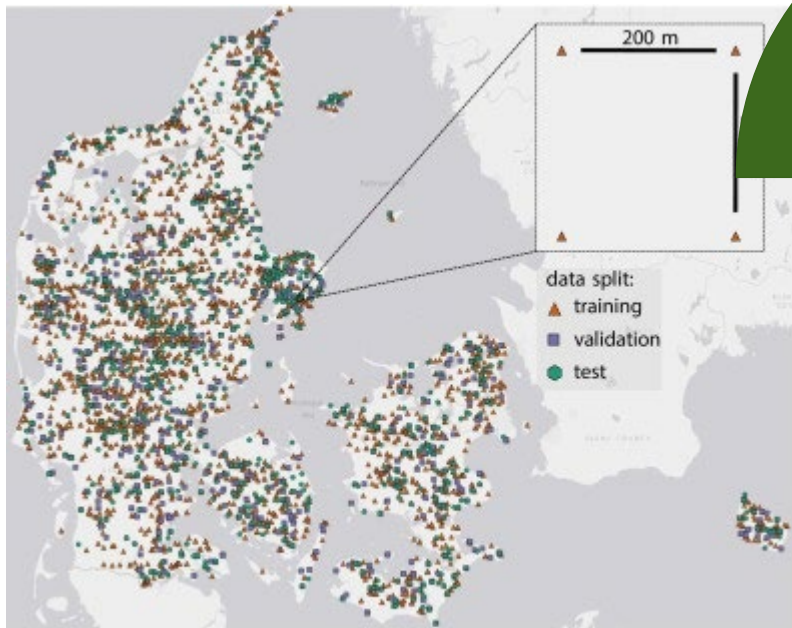
(b) Mixed forest subplot (28% conifer) with AGB of $226.50 \text{ Mg ha}^{-1}$.



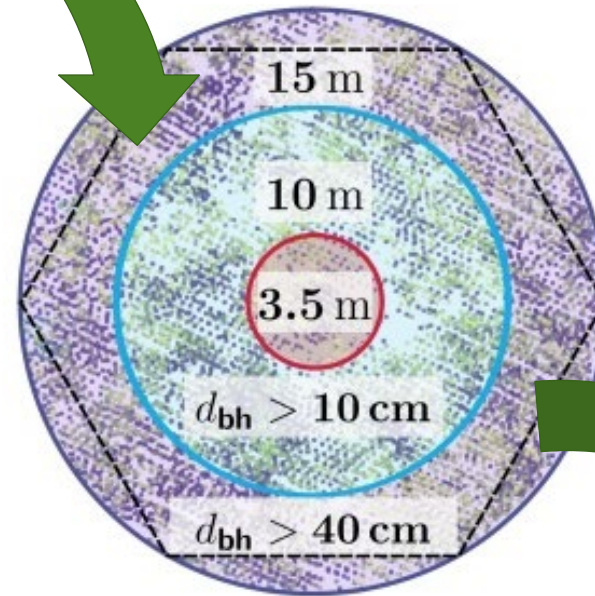
(c) Conifer only subplot with AGB of $150.59 \text{ Mg ha}^{-1}$.



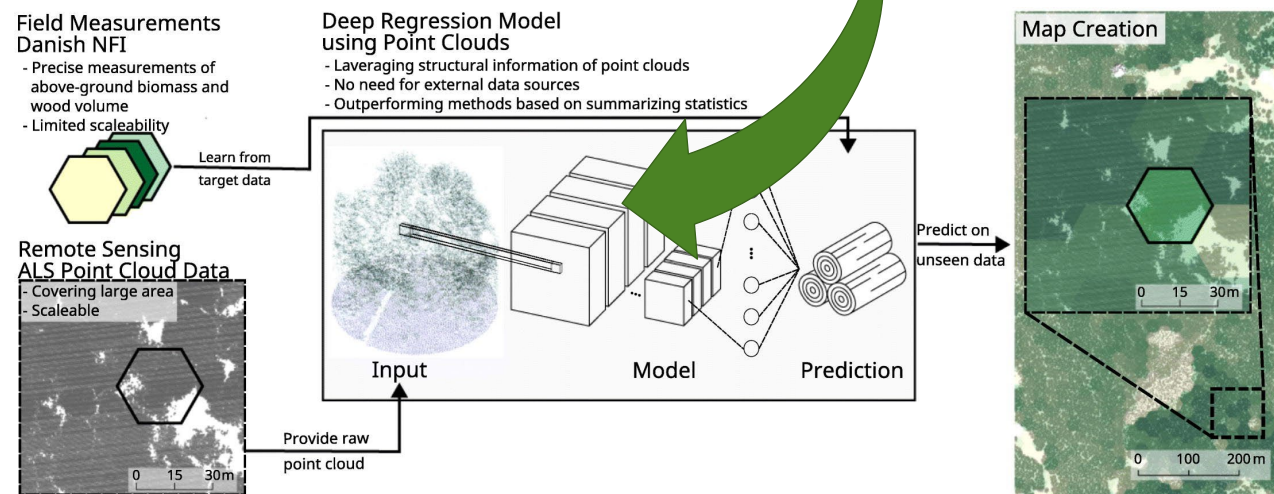
Helt tæt på

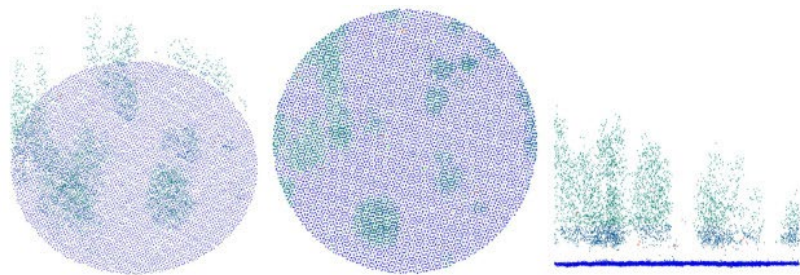


(a) Measurement sites (Danish NFI plots).

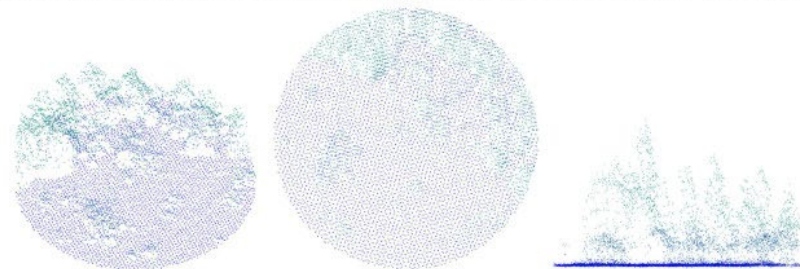


Meget mere viden om træer





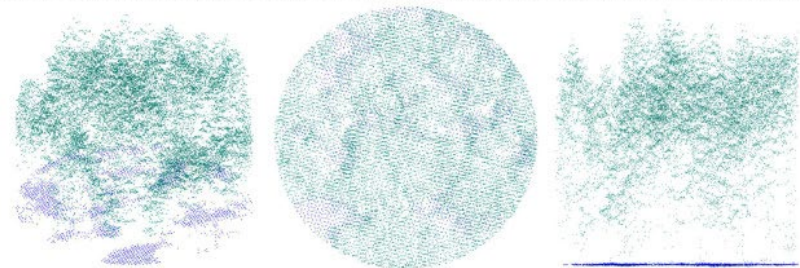
(a) NFI: 1.79, linear: 10.67, RF: 11.73, KPConv: 1.02, PointNet: 8.25, power: 12.04, MSENet14: 2.42, MSENet50: 3.69



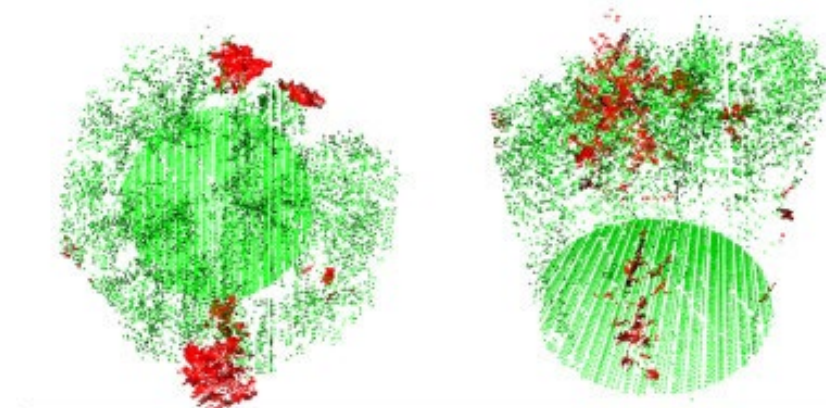
(b) NFI: 0.86, linear: 7.67, RF: 6.01, KPConv: 0.95, PointNet: 6.94, power: 10.67, MSENet14: 0.89, MSENet50: 2.07



(c) NFI: 417.6, linear: 275.4, RF: 266.2, KPConv: 407.5, PointNet: 297.0, power: 271.7, MSENet14: 418.1, MSENet50: 431.3

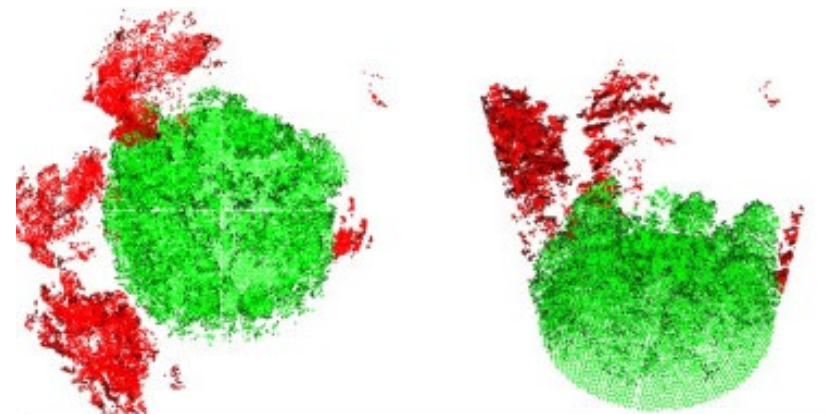


(d) NFI: 245.9, linear: 214.3, RF: 210.4, KPConv: 238.8, PointNet: 232.2, power: 218.6, MSENet14: 229.0, MSENet50: 249.7



	NFI	linear	RF	KPConv	PointNet	power	MSENet14	MSENet50
orig.	334.66	363.90	361.15	338.25	335.87	305.03	323.00	335.96
augm.	-	339.13	336.64	331.86	335.87	282.18	322.87	335.31

(a) adding small trees to large tree plot



	NFI	linear	RF	KPConv	PointNet	power	MSENet14	MSENet50
orig.	44.53	82.87	78.70	66.64	52.93	73.13	58.28	55.22
aug.	-	205.69	179.55	67.19	51.16	164.46	60.45	52.02

(b) adding large trees to small tree plot

Deep learning – i virkeligheden

