VALIDATION OF SPECIES OBSERVATIONS

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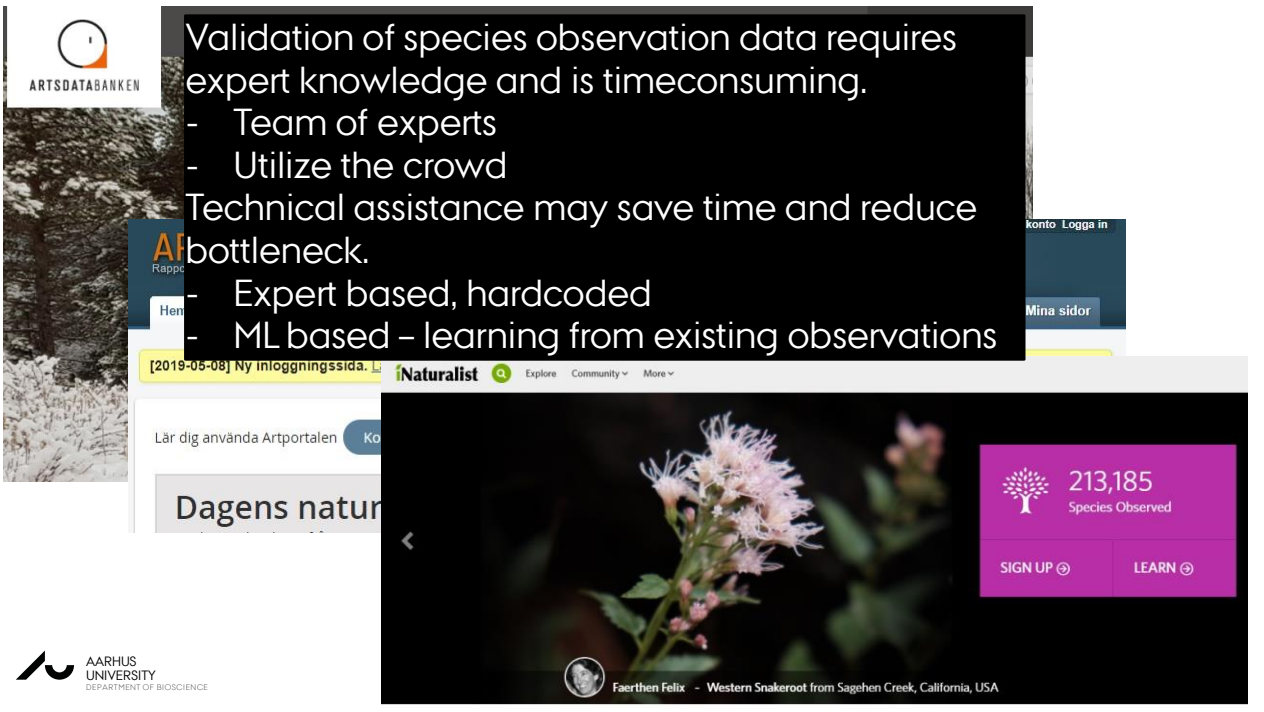
DEPARTMENT OF BIOSCIENCE

13 MAY 2019 | JESPER BLADT
SENIOR ADVISOR



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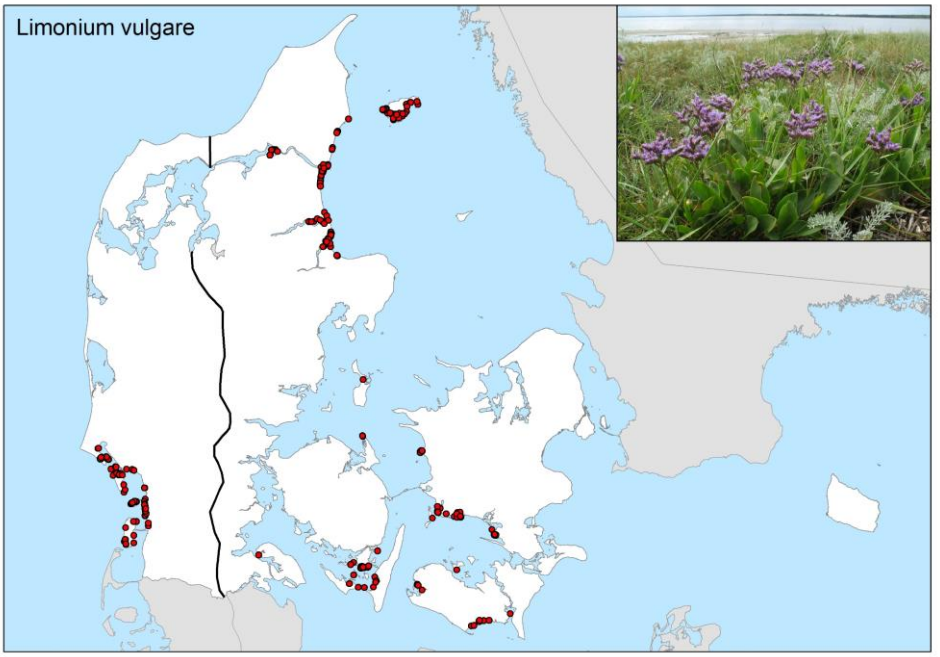
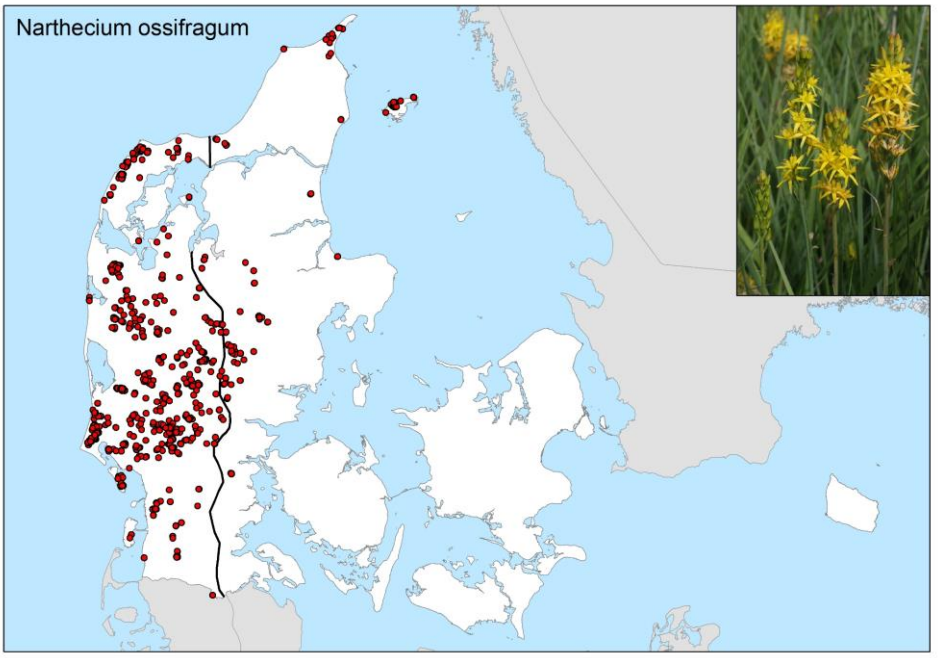
Mainly found on saltmarshes.



Mainly found on in bogs and wet heathland on poor, acidic soil in western parts of Denmark.



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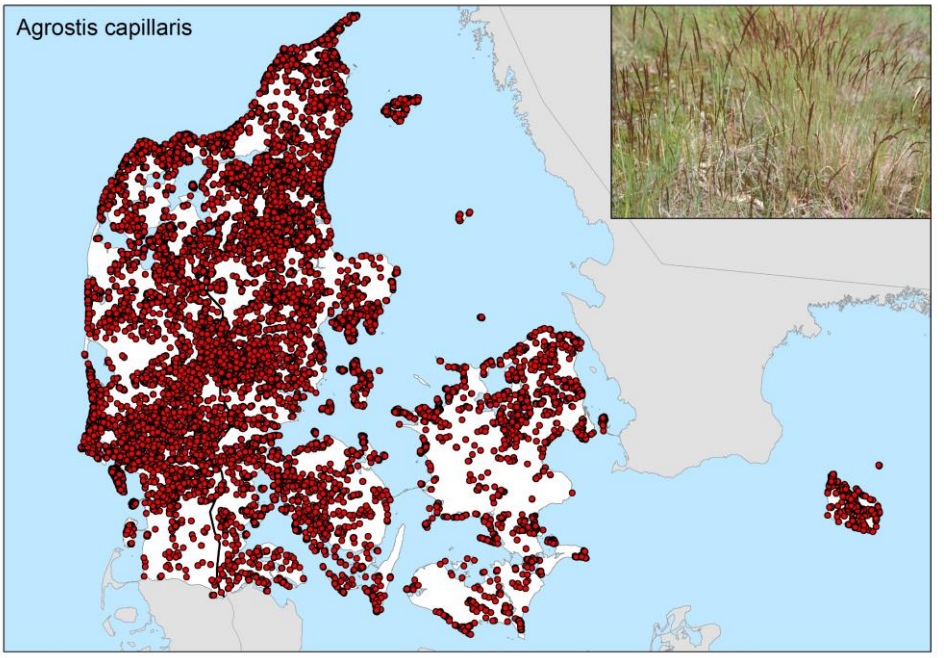
Common grass found in all of Denmark. Mainly dry conditions.



PROBLEM STATEMENT

Given some properties of one specific location, estimate the probability of one specific species existing in this location.

Input:

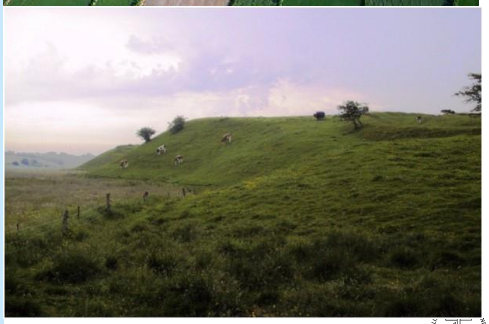
- known species occurrences, presence and sometimes absence.
- properties of locations

Species observations for database of Dansih authorities

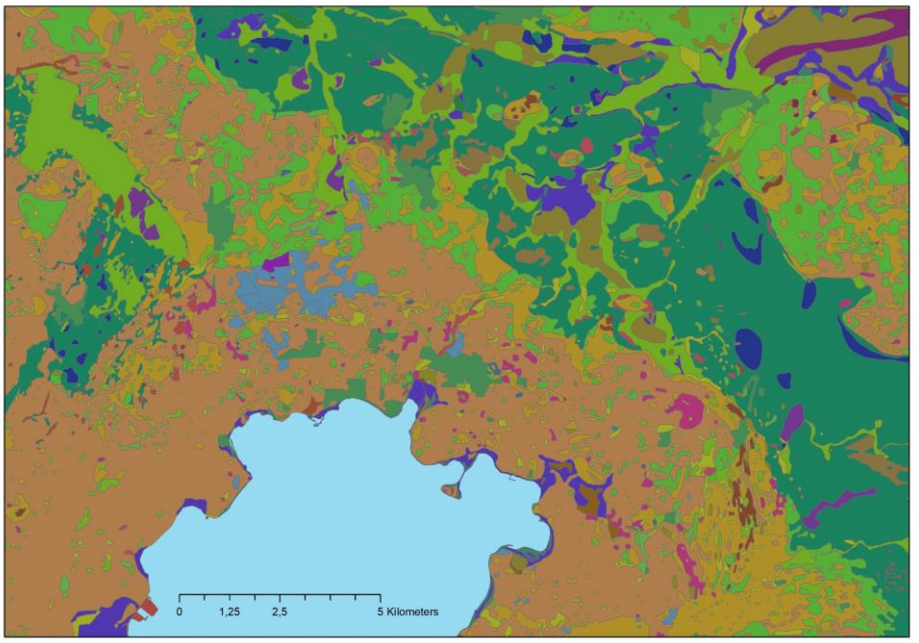
Landuse/landcover propoerties and environmental properties.

Landcovertypes:

field
extensiveField
meadow
bog
saltmarsh
heathland
dryGrass
forest
lake
stream



Soiltypes of Denmark
- Sample and modelbased.



Soiltypes of Denmark
- Sample and modelbased.

Surface Geology Map of Denmark 1:25.000, version 4.

This digital geological map shows the surface geology in 1 meters depth, just beneath the ploughing- and culture layers. The map is a result of the systematic geological mapping of Denmark.This version 4 from 2015 classifies 88 % of Denmark's area.

- Postglacial layers
- FG - Freshwater gravel
- FS - Freshwater sand
- FI - Freshwater silt
- FL - Freshwater clay
- FP - Freshwater gyttja
- FT - Freshwater peat
- FV - Alternating thin freshwater beds
- FK - Tufa, bog- and lake marl
- FJ - Ocher and bog iron
- FHG - Delta gravel
- FHS - Delta sand
- FHL - Delta clay
- HG - Saltwater gravel
- HS - Saltwater sand
- HI - Saltwater silt
- HL - Saltwater clay
- HP - Saltwater gyttja
- HT - Saltwater peat
- HV - Alternating thin saltwater beds, marsh
- HSG - Saltvands skalgrus
- EK - Aeolian dune sand
- ES - Aeolian sand
- Lateglacial layers
- TG - Meltwater gravel
- TS - Meltwater sand
- TI - Meltwater silt
- TL - Meltwater clay
- TV - Alternating thin meltwater beds
- YG - Saltwater gravel
- YS - Saltwater sand
- YL - Saltwater clay
- YP - Saltwater gyttja
- Marginal glaciale lag
- ZG - Glaciolacustrine gravel
- ZS - Glaciolacustrine sand
- ZL - Glaciolacustrine clay
- ZV - Alternating thin glaciolacustrine beds
- Glacial layers
- DG - Meltwater gravel
- DS - Meltwater sand
- DI - Meltwater silt
- DL - Meltwater clay
- DV - Alternating thin meltwater beds
- MG - Gravelly till
- MS - Sandy till
- MI - Silty till
- ML - Clayey till
- MV - Alternating thin till beds
- KMG - Limey till, gravelly
- KMS - Limey till, sandy
- KML - Limey till, clayey
- Interglacial layers
- Interglacial layers
- QG - Saltwater gravel
- QS - Saltwater sand
- QL - Saltwater clay
- Other layers
- BY - Town
- SØ - Freshwater
- HAV - Sea
- TA - Technical and artificial construction
- RÅ - Pit
- LRÅ - Abandoned pit
- LSL - Landslide
- O - Rubbish dump
- X - Bed unkown, no infomation
- IA - No access
- Other layers (alphabetic)
- BK - Danian bryozoan og corallian limestone
- ED - Eocene diatomite
- EE - Eocene vulcanic ash
- G - Gravel / sand and gravel
- GC - Oligocene/miocene/pliocene brown coal
- GL - Oligocene/miocene/pliocene mica clay
- GS - Oligocene/miocene/pliocene mica sand
- GV- Oligocæn/miocæn/pliocæn alternating layers
- K - Chalk and limestone
- KS - Miocene quartz sand
- LL - Eocene clay, plastic clay
- OL - Oligocene clay
- PKV - Pre-Quarternary layers
- PL - Selandian clay, paleocene clay
- PS - Selandian sand, paleocene greensand
- RL - Eocene Røsnæs clay
- S - Sand
- SK - Campanien-maastrichtien skrivekridt
- SL - Eocene Søvind marl
- ZK - Danien chalk / chalk and flint

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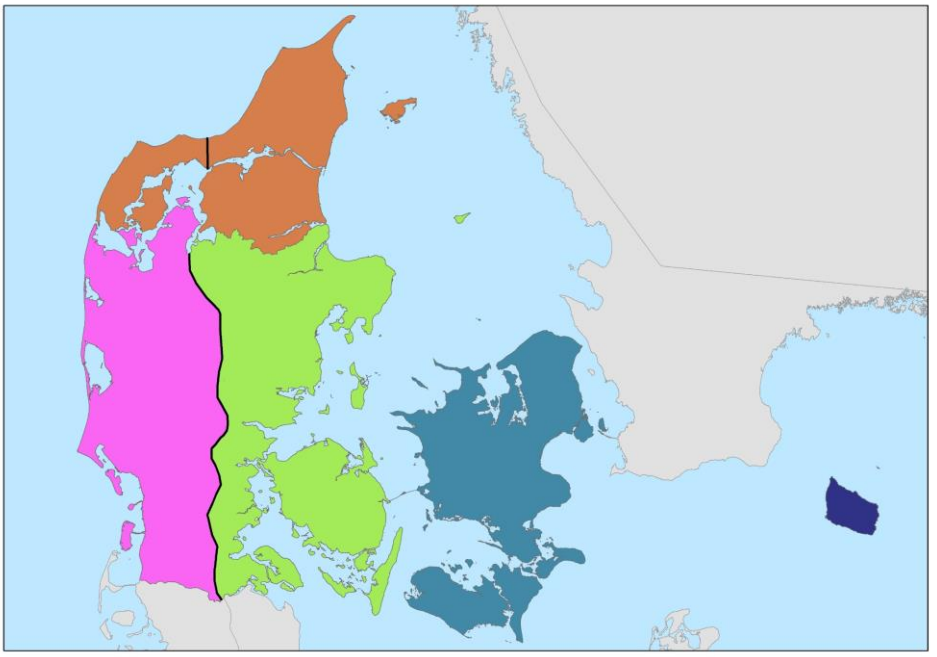
Atlantic and continental biogeographic regions of Denmark.

5 regions often used in policy reporting.



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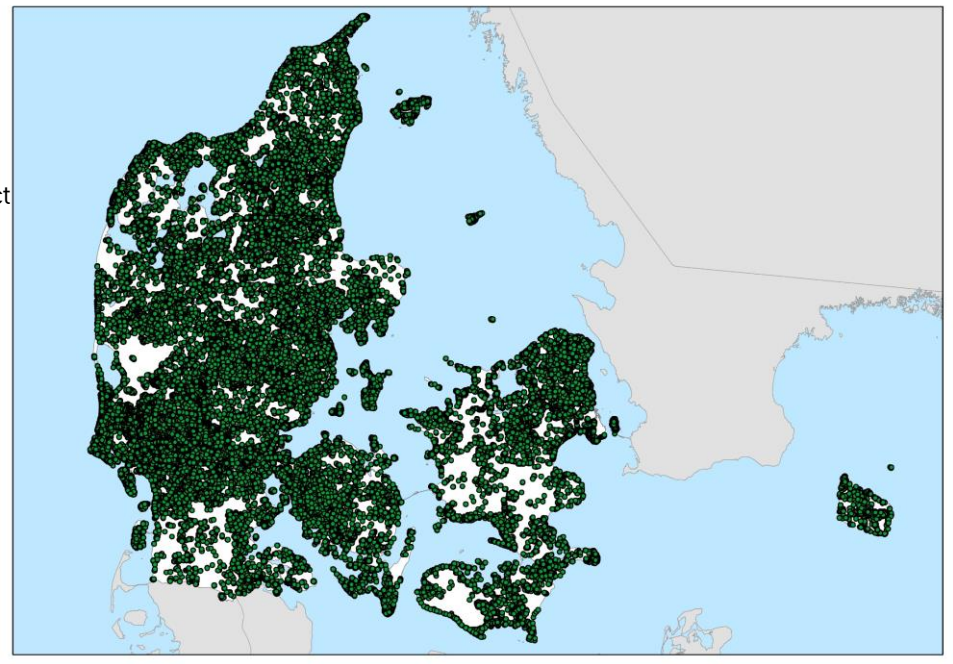
All localities, Used to select 'pseudo-absences'.

133.000 localities



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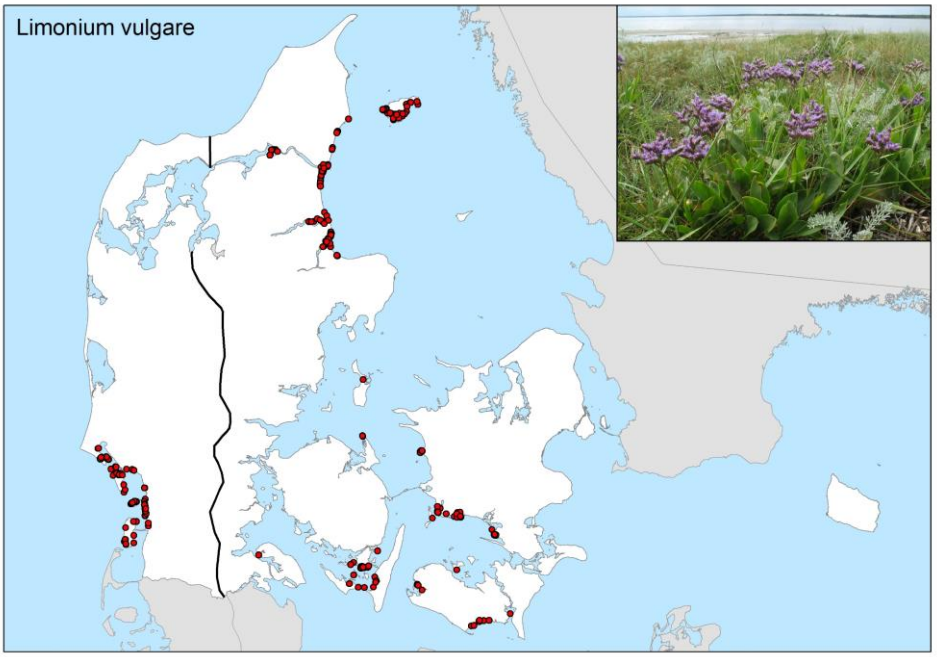
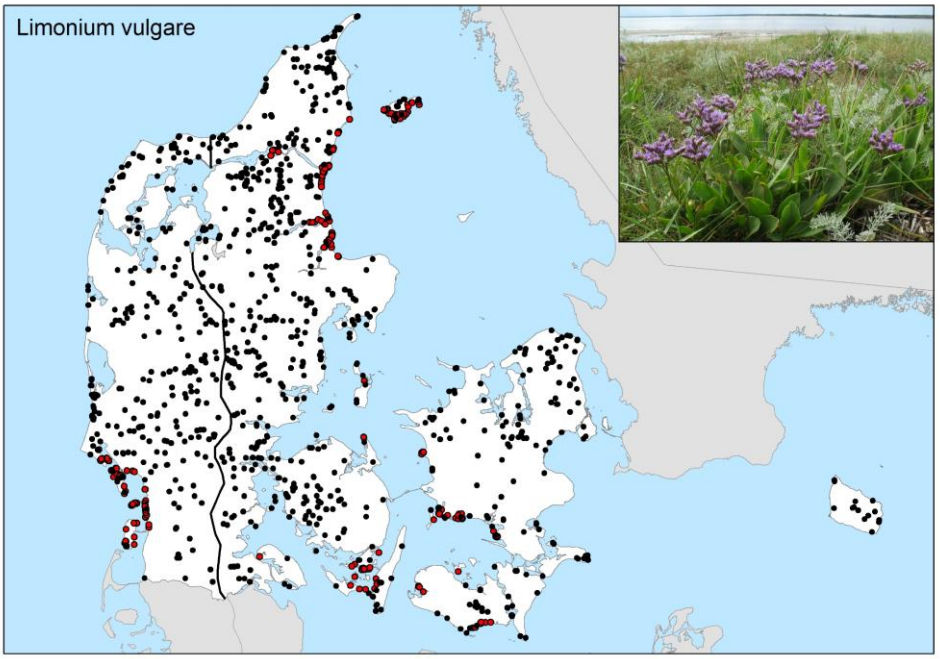
Sample properties for know occurrences.



Sample properties for know occurrences

AND for pseudo-absences.



PROPERTIES OF THE GIVEN LOCATION

- polyTypeId: ‘0’, ‘1’, ‘2’, ‘3’, ‘4’, ‘5’, ‘6’, ‘7’, ‘8’, ‘9’, ‘’
  - *meadow, heathland, bog, dryGrass, forest, lake, saltmarsh, stream, extensiveField, field*
- regionId: ‘1’, ‘2’, ‘3’, ‘4’, ‘5’
  - *NordJyl, VestJyl, OestJylFyn, SjLolFal, Bornholm*
- Bioreg: ‘CON’, ‘ALT’
- soilType:
  'DL','DSG','ED','EQ','ES','F','FYLD','GC','GL','GNG','GS','HAG','HG','HSL','HV','JV','KQ','KS','LL','ML','MSG','PAM','PL','ROG','SK','SO','SVG','T','VAG','Y','ZK',''
- distCoast: min = 0, max = 48991
- x_int: min = 441994, max = 892641
- y_int: min = 6050562, max = 6402150

PROPERTIES OF THE GIVEN LOCATION

OBJECTID;polyType;polyTypeId;regionName;regionId;bioreg;soilType;distCoast;x_int;y_int
1;saltmarsh;6;OestJylFyn;3;CON;HSL;200.0000000;583100;6278030
2;saltmarsh;6;NordJyl;1;CON;HSL;0.0000000;578370;6314280
3;saltmarsh;6;OestJylFyn;3;CON;HSL;0.0000000;601320;6090460
4;saltmarsh;6;OestJylFyn;3;CON;HSL;100.0000000;600240;6090210
5;saltmarsh;6;VestJyl;2;ATL;HSL;282.8427124;470900;6126590
6;saltmarsh;6;VestJyl;2;ATL;HSL;707.1068115;453440;6151850
7;saltmarsh;6;VestJyl;2;ATL;HSL;282.8427124;453750;6152190
8;saltmarsh;6;SjLolFal;4;CON;HSL;100.0000000;643090;6121720
9;saltmarsh;6;NordJyl;1;CON;HSL;100.0000000;577970;6313560
10;saltmarsh;6;OestJylFyn;3;CON;HSL;316.2277527;600660;6090960

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PROBLEM STATEMENT

Given some properties of one specific location, estimate the probability of one specific species existing in this location.

Input:

- known species occurrences, presence and 'absence'.
- properties of locations
  - First example:
  - Limonium Vulgare
  - 559 positive data points (first 459 for training and the rest 100 for testing)
    - Limonium_vulgare.txt
  - 559 negative data points (first 459 for training and the rest 100 for testing)
    - Limonium_vulgare_neg.txt

HINTS FOR THE EXERCISE

1. Treat he problem as a binary classification task

2. Procedures:
   - Read the two txt files, convert the 7 different properties in each line into a feature vector with 7 elements. The value of each element should range from 0 to 1.
   - Define the neural network.
   - Train the network using 459 positive feature vectors and 459 negative feature vectors.
   - Test the network using 100 positive and 100 negative feature vectors.


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