

```

• begin
•   using Pkg
•   Pkg.activate(joinpath(Pkg.devdir(), "MLCourse"))
•   using CSV, DataFrames, Distributions, Plots, MLJ, MLJLinearModels, Random,
•       Statistics, OpenML, MLJDecisionTreeInterface, MLJFlux, Flux
• end

```

Non-Linear Methods

We load the precipitation data from a csv file on the harddisk to a DataFrame. Our goal is to predict whether there is some precipitation (rain, snow etc.) on the next day in Pully, getting measurements from different weather stations in Switzerland.

```

• md" # Non-Linear Methods
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  next day in Pully, getting measurements from different weather stations in
  Switzerland."

```

```

• precipitation = CSV.read(joinpath(@__DIR__, "..", "data", "project",
  "trainingdata.csv"), DataFrame);

```

```

• p = dropmissing(precipitation);

```

data_split (generic function with 1 method)

```

• p1 = coerce!(p, :precipitation_nextday => Binary);

```

```

• data1 = data_split(p1);

```

Tree-Based Methods

```

• mach = machine(RandomForestClassifier(n_trees = 500),
•       select(data1.train, Not(:precipitation_nextday)),
•       data1.train.precipitation_nextday) |> fit!;

```

0.8113207547169812

```

• mean(predict_mode(mach, select(data1.test, Not(:precipitation_nextday))) .==
  data1.test.precipitation_nextday)

```

The test accuracy of a random forest with 500 trees is approximately 81%, better than with the linear method (74%).

Neural Networks

```
• mach1 = machine(NeuralNetworkClassifier(builder = MLJFlux.Short(n_hidden = 128,  
• dropout = 0.1,  
• σ = relu),  
• batch_size = 32,  
• epochs = 30),  
• select(data1.train, Not(:precipitation_nextday)),  
• data1.train.precipitation_nextday);
```

```
• fit!(mach1, verbosity = 2);
```

0.7287735849056604

```
• mean(predict_mode(mach1, select(data1.test, Not(:precipitation_nextday))) .==  
• data1.test.precipitation_nextday)
```