**Task Brief: Dating the undateables**

Your dataset(s) here are all data collected about [rune-stones](https://en.wikipedia.org/wiki/Runestone) (please read this Wikipedia page), the Viking equivalent of headstones, and one of the largest extant (remaining) archaeological artefacts of the Viking Age. Your task here is to try and fill in the blanks in the data through statistical modelling. Rune-stones are not dateable using traditional archaeological techniques - they are stone and thus inorganic, and the most common forms of archaeological dating use isotope decay. A system of dating, about as reliable as one could be, was developed by Anne-Sofie Gräslund, an archaeologist and dog trainer, in the early 1990s. Gräslund’s experience in dog training led her to identify different styles in rune-stone carvings, and she developed a dating system described below as ***stilgruppering*.** Your task is to use the data provided in the .zip file to try and apply one of Gräslund’s dates to rune-stones which *do not* have a date assigned to them in the master spreadsheet.

The data may seem peculiarly incomplete – that’s the nature of archaeology! We deal with objects that were created thousands of years ago (in this situation about one thousand years ago) and have been used and abused through their lives and through their deposition. Archaeological data are often compiled by multiple people, who may or may not have actually had any contact with each other, and are often subject to subjective judgement. Comparatively this dataset is relatively comprehensive, though a lot of these sets are in Swedish, so you’ll need to get familiar with google translate. The data dictionary below is described by file. I only did analysis on the Swedish rune-stones, so other than the master spreadsheet and the inscription data the data files only include these.

# **Master\_spreadsheet**

***Signum:*** ID number of the rune-stone. The first letter refers to the location (for Swedish rune-stones, the bulk of the corpus, the province (state) is used, whereas for others a country code is given).

Swedish rune-stones:

* Bo - [Bohuslän](https://en.wikipedia.org/wiki/Bohusl%C3%A4n" \o "Bohuslän)
* D - [Dalarna](https://en.wikipedia.org/wiki/Dalarna)
* G - [Gotland](https://en.wikipedia.org/wiki/Gotland)
* Gs - [Gästrikland](https://en.wikipedia.org/wiki/G%C3%A4strikland" \o "Gästrikland)
* Hs - [Hälsingland](https://en.wikipedia.org/wiki/H%C3%A4lsingland" \o "Hälsingland)
* J - [Jämtland](https://en.wikipedia.org/wiki/J%C3%A4mtland" \o "Jämtland)
* Lp - [Lappland](https://en.wikipedia.org/wiki/Lapland,_Sweden" \o "Lapland, Sweden)
* M - [Medelpad](https://en.wikipedia.org/wiki/Medelpad" \o "Medelpad)
* Nä - [Närke](https://en.wikipedia.org/wiki/N%C3%A4rke" \o "Närke)
* Sm - [Småland](https://en.wikipedia.org/wiki/Sm%C3%A5land" \o "Småland)
* Sö - [Södermanland](https://en.wikipedia.org/wiki/S%C3%B6dermanland" \o "Södermanland)
* U - [Uppland](https://en.wikipedia.org/wiki/Uppland" \o "Uppland)
* Vg - [Västergötland](https://en.wikipedia.org/wiki/V%C3%A4sterg%C3%B6tland" \o "Västergötland)
* Vr - [Värmland](https://en.wikipedia.org/wiki/V%C3%A4rmland" \o "Värmland)
* Vs - [Västmanland](https://en.wikipedia.org/wiki/V%C3%A4stmanland" \o "Västmanland)
* Ög - [Östergötland](https://en.wikipedia.org/wiki/%C3%96sterg%C3%B6tland" \o "Östergötland)
* Öl - [Öland](https://en.wikipedia.org/wiki/%C3%96land" \o "Öland)

Country codes:

* BR - [British Islands](https://en.wikipedia.org/wiki/British_Islands)
* DR - [Denmark](https://en.wikipedia.org/wiki/Denmark)
* FR - [Faroe Islands](https://en.wikipedia.org/wiki/Faroe_Islands)
* GR - [Greenland](https://en.wikipedia.org/wiki/Greenland)
* IR - [Ireland](https://en.wikipedia.org/wiki/Ireland)
* IS - [Iceland](https://en.wikipedia.org/wiki/Iceland)
* N - [Norway](https://en.wikipedia.org/wiki/Norway)
* X - Other areas

The number refers to the order in which they were found.

There may or may not be additional characters (and these will likely not be useful for your analysis), and they indicate the following:

* # or † means ‘text unreadable’
* $ - newly retranslated
* M - inscription from the Middle Ages, i.e. after the Viking Age.
* U - inscription in Proto-Norse, i.e. before AD 800.
* [inscription from the Viking Age, if M or U are not present]

So, **Öl 31 $** was the 31st rune-stone found in Öland, Sweden, and was re-translated recently.

***Plats:*** Place. Google translate from Swedish is your friend here. To get you started, ‘kyrka’ means ‘church’, and ‘kyrkogård’ means ‘churchyard’.

***Socken***: Parish

***Härad:*** Jurisdictional district

***Kommun***: Municipality/county/town

***Koordinater*:** Coordinates. These are given in the coordinate system ‘WGS1984’.

***Stilgruppering:*** Style grouping in English. A dated typology of the ornamentation on the rune-stones developed in the early 1990s based on the progression of styles. RAK is the earliest and Pr5 is the latest / most recent. These are all approximate but should be seen as mostly reliable.

|  |  |
| --- | --- |
| RAK | 990-1010 AD |
| FP | 1010-1050 AD |
| Pr1 | 1010-1040 AD |
| Pr2 | 1020-1050 AD |
| Pr3 | 1050 – 1070 AD |
| Pr4 | 1060-1100 AD |
| Pr5 | 1100-1130 AD |

***Ristare***: Carver – these are names.

A screenshot of a cell phone

Description automatically generated***Bildlänk*:** Link to a picture of the rune-stone

# **Crosses\_spreadsheet**

***Signum:*** ID number of the rune-stone.

***Cross Y/N***: Whether or not there is a cross on the rune-stone.

0=No, 1=Yes

***#:*** Number of crosses

***Other fields:*** These indicate the presence or absence of a particular typological cross feature, as per ‘Cross Y/N’. These have been classified loosely, and refer to different features of rune-stones. It would be rare but not impossible for a rune-stone to have more than one feature of each ‘type’, i.e. A2 and A3. A through G each refer to different classificatory elements, and the numbers refer to variations within these. See the figure to the right if interested.

English\_inscriptions

This is a .txt file that contains the runic inscription text, where it remains, with the ***signum*** included before the text. An Old Norse (the Viking language) version exists and is also included as old\_norse\_inscriptions but as it contains many special (non-UTF-8) characters it may be difficult to deal with. If you speak Icelandic (just in case!) this file could be fun to play around with. Inscriptions tend to follow similar formulas – the Wikipedia page again has more on this.

rune\_stone=data.frame("type"=c(1,2,3,1,1,2,1,2,1,2,1,1,1,2,4,1,2,3,1,2,3,4,1,2,4,1,2,1,1,2,1,1,1,1,1,1,2,1,2,1,2,3,1,2,1,2,1,1,1,2,1,1,1,1,1,1,1,1,2,1,1,2,1,1,1,2,1,2,3,4,1,1,2,3,1,1,1),"number"=c(429,10,1,76,81,1,225,1,49,1,6,11,17,3,1,19,4,2,573,14,6,2,185,3,1,143,2,10,107,1,146,16,11,36,13,180,3,190,3,152,2,1,230,4,757,20,36,57,61,1,30,7,33,9,37,28,190,39,2,54,59,3,85,19,55,1,36,8,2,1,52,874,18,1,3,1,12),"name"=c("A1","A1","A1","A2","A3","A3","A4","A4","A5","A5","A6","A7","A8","A8","A8","A9","A9","A9","B1","B1","B1","B1","B2","B2","B2","B3","B3","B4","C1","C1","C10","C2","C3","C4","C5","C6","C6","C7","C7","C8","C8","C8","C9","C9","D1","D1","D2","D3","D4","D4","D5","D6","E1","E10","E11","E2","E3","E4","E4","E5","E6","E6","E7","E8","E9","E9","F1","F1","F1","F1","F2","F3","F3","F3","F4","G1","G2"),stringsAsFactors = FALSE)

p=ggplot(rune\_stone,aes(type,number))

p+geom\_point(aes(color=name))

p+geom\_point(aes(color=name))+geom\_smooth(se=FALSE,method='loess')

rune\_stone1=data.frame("type"=c(2,3,1,1,2,1,2,1,2,1,1,1,2,4,1,2,3,2,3,4,1,2,4,1,2,1,1,2,1,1,1,1,1,1,2,1,2,1,2,3,1,2,2,1,1,1,2,1,1,1,1,1,1,1,1,2,1,1,2,1,1,1,2,1,2,3,4,1,2,3,1,1,1),"number"=c(10,1,76,81,1,225,1,49,1,6,11,17,3,1,19,4,2,14,6,2,185,3,1,143,2,10,107,1,146,16,11,36,13,180,3,190,3,152,2,1,230,4,20,36,57,61,1,30,7,33,9,37,28,190,39,2,54,59,3,85,19,55,1,36,8,2,1,52,18,1,3,1,12),"name"=c("A1","A1","A2","A3","A3","A4","A4","A5","A5","A6","A7","A8","A8","A8","A9","A9","A9","B1","B1","B1","B2","B2","B2","B3","B3","B4","C1","C1","C10","C2","C3","C4","C5","C6","C6","C7","C7","C8","C8","C8","C9","C9","D1","D2","D3","D4","D4","D5","D6","E1","E10","E11","E2","E3","E4","E4","E5","E6","E6","E7","E8","E9","E9","F1","F1","F1","F1","F2","F3","F3","F4","G1","G2"),stringsAsFactors = FALSE)

p1=ggplot(rune\_stone1,aes(type,number))

p1+geom\_point(aes(color=name))+geom\_smooth(se=False,method='loess')

rune\_stone2=data.frame("sum"=c(452,76,83,227,51,6,11,27,33,627,195,147,10,109,16,11,36,13,186,196,159,238,146,797,36,57,63,30,7,33,28,190,43,54,65,85,19,57,9,37,62,52,913,3,1,12),"name"=c("A1","A2","A3","A4","A5","A6","A7","A8","A9","B1","B2","B3","B4","C1","C2","C3","C4","C5","C6","C7","C8","C9","C10","D1","D2","D3","D4","D5","D6","E1","E2","E3","E4","E5","E6","E7","E8","E9","E10","E11","F1","F2","F3","F4","G1","G2"),stringsAsFactors = FALSE)

> p\_sum=ggplot(rune\_stone2,aes(name,sum))

> p\_sum+geom\_point(aes(color=name))

p\_select\_1=p\_select %>%

+ filter(Stilgruppering=='RAK' | Stilgruppering=='Pr2' |Stilgruppering=='Pr3' |Stilgruppering=='Pr4'|Stilgruppering=='Pr5'|Stilgruppering=='FP'|Stilgruppering=='Pr1'|Stilgruppering=='Pr1 - Pr2?'|Stilgruppering=='Pr2 - Pr3?'|Stilgruppering=='Pr3 - Pr4?'|Stilgruppering=='Pr4 - Pr5?')

p1111=ggplot(p\_select\_1,aes(Stilgruppering,Koordinater))

> p1111+geom\_point()