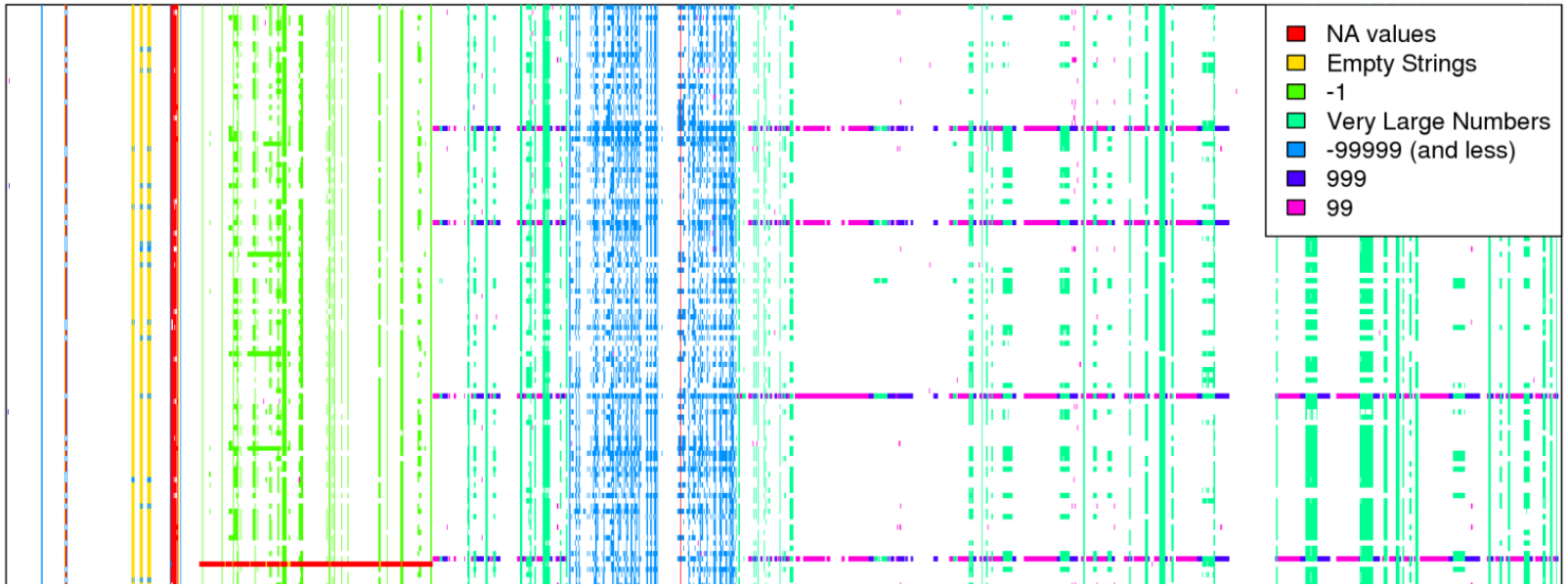
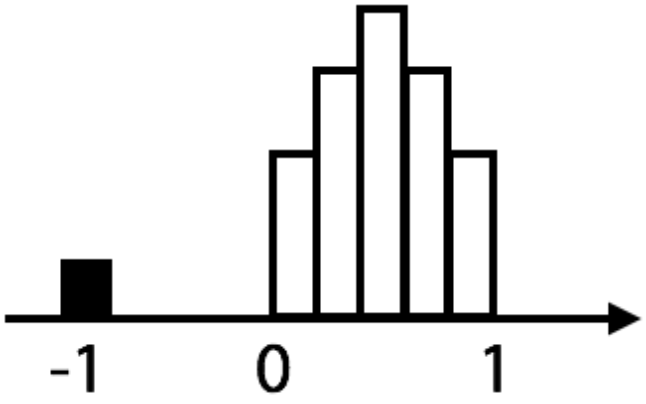
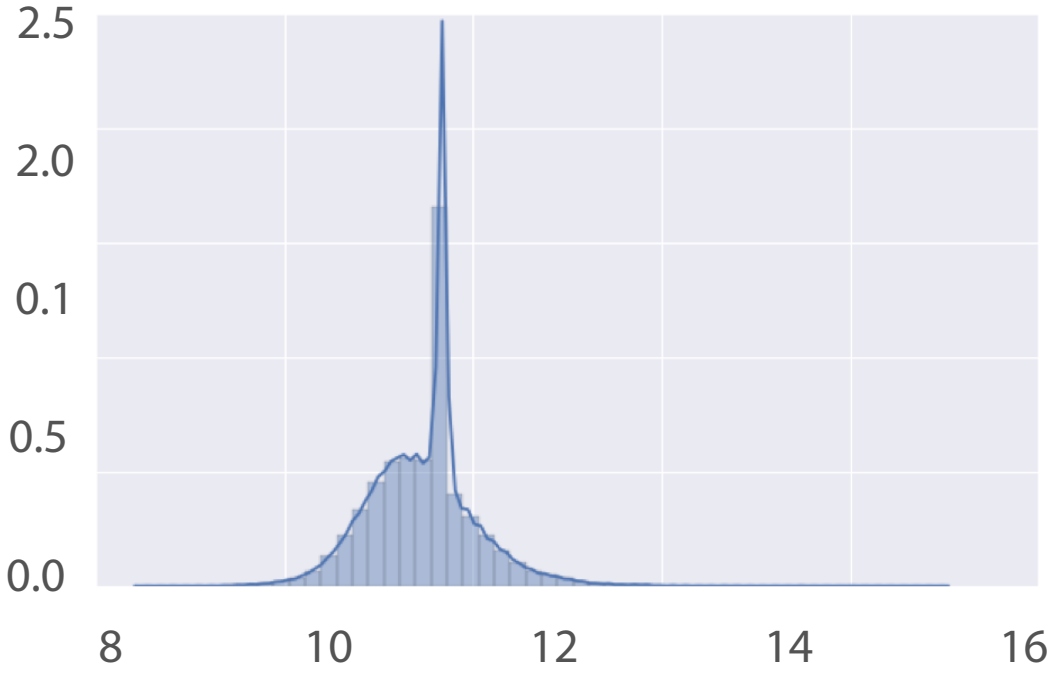
Missing values

Missing data, numeric



Hidden NaNs





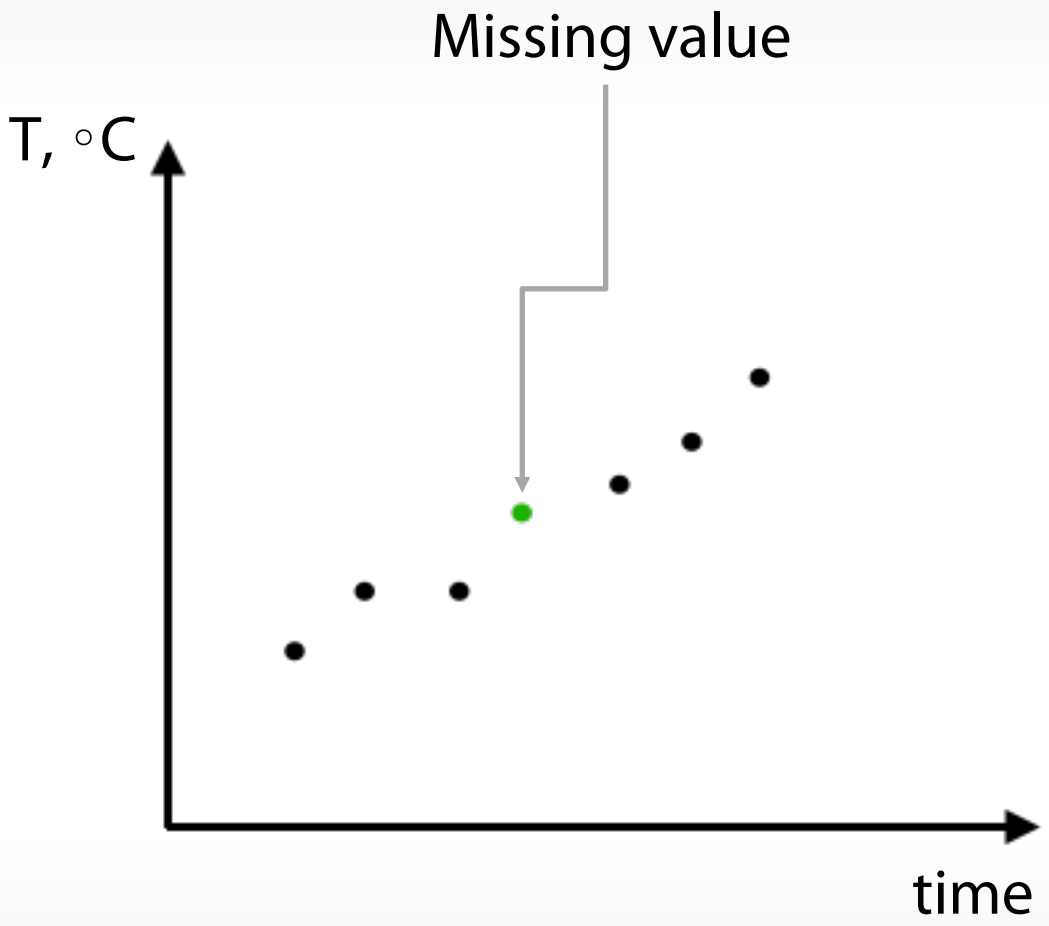
Fillna approaches

1. -999, -1, etc
2. mean, median
3. Reconstruct value

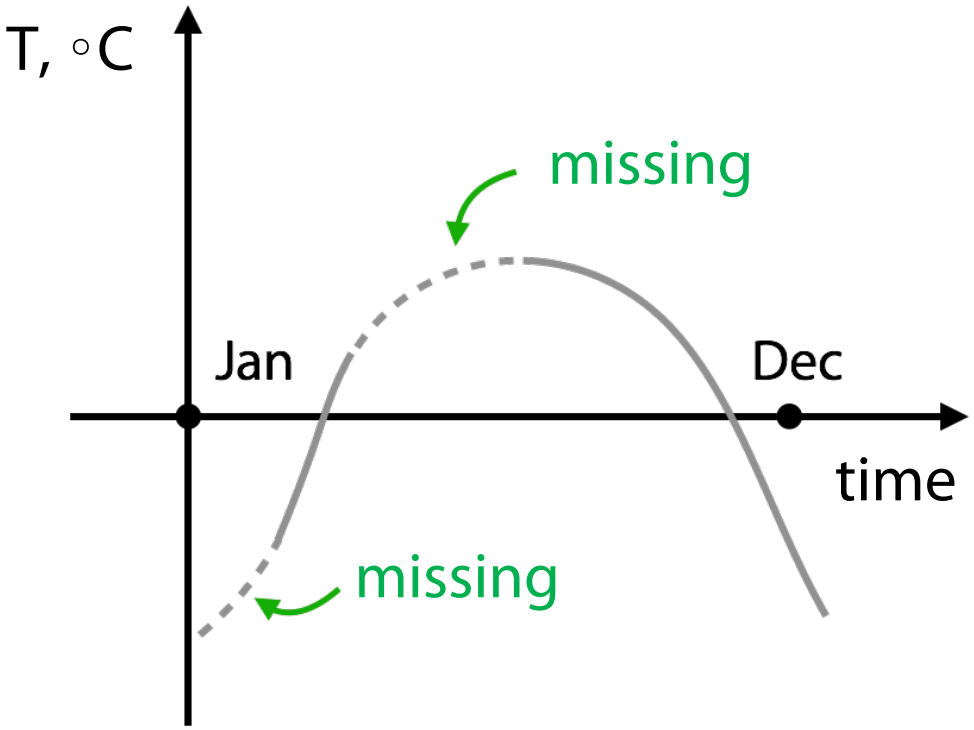
“Isnull” feature

feature	isnull
0.1	False
0.95	False
NaN	True
-3	False
NaN	True

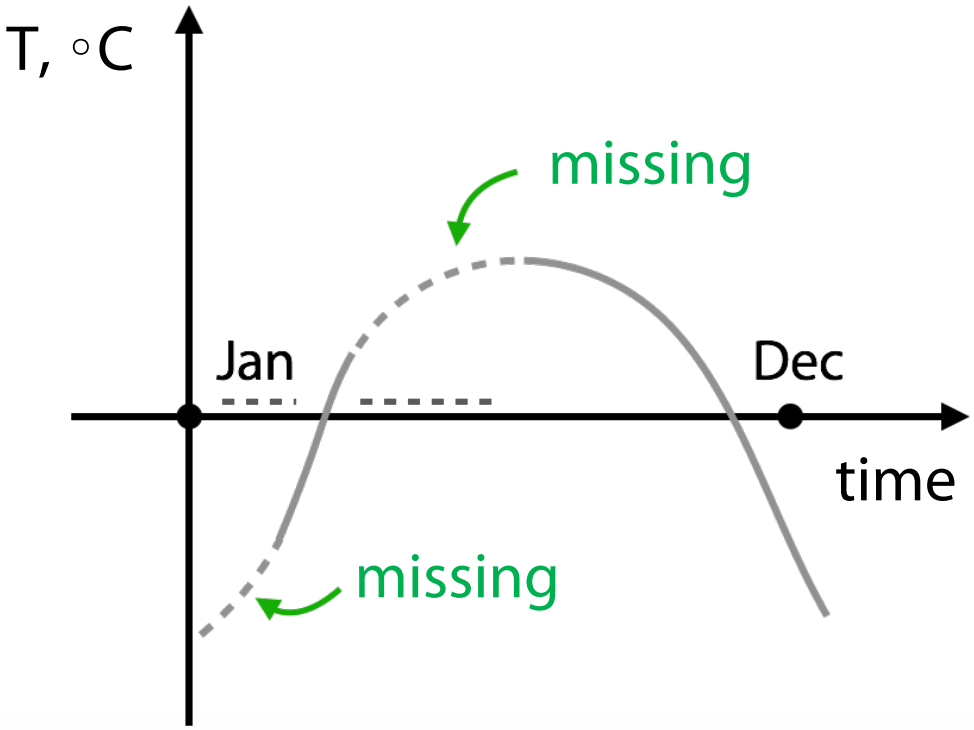
Missing values reconstruction



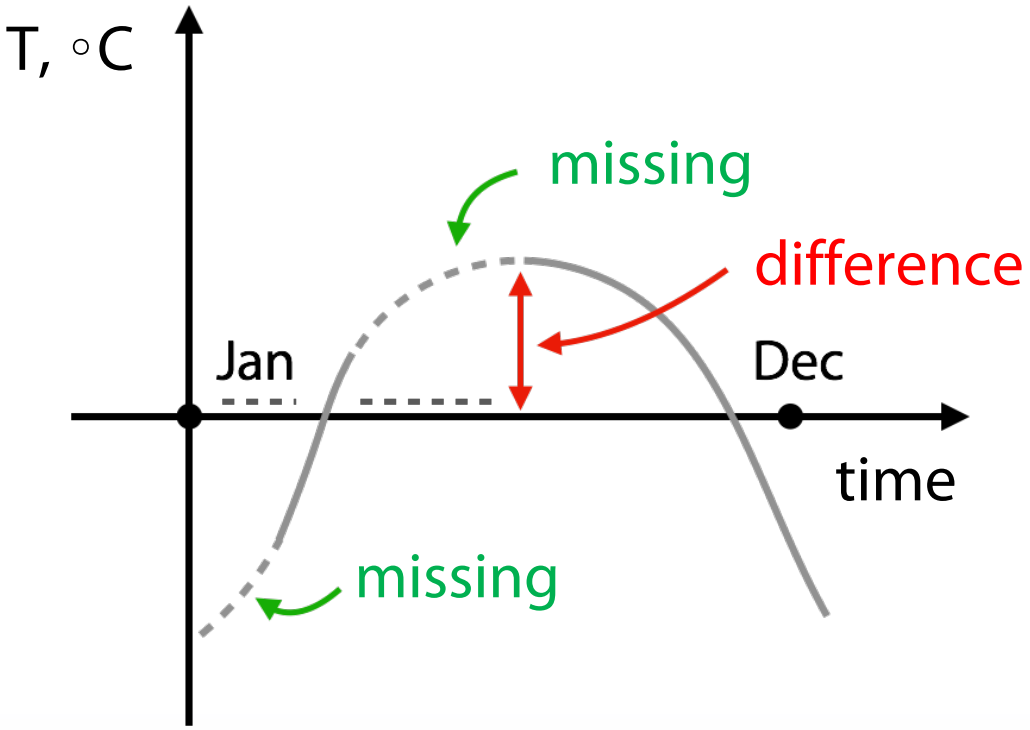
Feature generation with missing values



Feature generation with missing values



Feature generation with missing values



Feature generation with missing values

categorical_ feature	numeric _feature
A	1
A	4
A	2
A	-1
B	9
B	NaN

Feature generation with missing values

categorical_ feature	numeric _feature	numeric_ feature_filled
A	1	1
A	4	4
A	2	2
A	-1	-1
B	9	9
B	NaN	-999

Feature generation with missing values

categorical_ feature	numeric _feature	numeric_ feature_filled	categorical _encoded
A	1	1	1.5
A	4	4	1.5
A	2	2	1.5
A	-1	-1	1.5
B	9	9	-495
B	NaN	-999	-495

Treating values which do not present in train data

Train:

categorical _feature	target
A	0
A	1
A	1
A	1
B	0
B	0
D	1

Test:

categorical _feature	target
A	?
A	?
B	?
C	?

Treating values which do not present in train data

Train:

categorical _feature	categorical _encoded	target
A	6	0
A	6	1
A	6	1
A	6	1
B	3	0
B	3	0
D	1	1

Test:

categorical _feature	categorical _encoded	target
A	6	?
A	6	?
B	3	?
C	1	?

Treating values which do not present in train data

1. The choice of method to fill NaN depends on the situation
2. Usual way to deal with missing values is to replace them with -999, mean or median
3. Missing values already can be replaced with something by organizers
4. Binary feature “isnull” can be beneficial
5. In general, avoid filling nans before feature generation
6. Xgboost can handle NaN