

# 2nd place solution for Actuarial Loss Prediction

A. Gulyás & N. Fornasin

Team Boosted Goose

# Model overview

Our model can be divided into three mutually independent blocks:



# Preprocessing

The preprocessing consisted of the following major steps (purely technical steps are not listed):

- ▶ **Adjusted unrealistic values** of the predictors, e.g. 200 hours worked per week, reporting date before accident date, etc.
- ▶ **Added features**, such as: weekday of accident, core working hours, reporting delay, etc.
- ▶ **Excluded observations** with implausible set of predictors

# Text analysis

Our analysis of the claim description feature:

- ▶ **Extraction and stemming** of the most common words (in this step laceration and lacerated both become "lacer")
- ▶ **Clustering and weighting** of the words according to median ultimate claim cost
- ▶ **One hot encoding** for every single word identified

SCRAPER SLIPPED AND HIT HEAD HYPERFLEXION INJURY TO NECK AND SHOULDER

18

13

20

22

23

SLIP	HIT	LEG	HEAD	NECK	KNIFE	SHOULDER	Weight
1	1	0	1	1	0	1	96

# Model

The algorithm relied on the following ensemble techniques:

- ▶ **Boosting**: gradient boosting using xgboost
- ▶ **Bagging**: random forest as base learner
- ▶ **Voting**: custom combination based on insight

Further details:

- ▶ Natural logarithm as link function
- ▶ Tweedie distribution of errors
- ▶ Monotonic constraints for selected features, e.g. WeeklyWages