DYNAMIC PRICING: Machinery Insurance

Initial State:

Machinery Insurance is generally understood as accident insurance and not lifetime isnuarnce for machines. Therefore machine
Owners (insured) are requested by insurers toscrupilously follow and apply service lines and manufacturers operating recommendations
In order to avoid un-accidental losses
The risk premium (is generally a function of a segment-based loss frequency (machine type, ...), claim amount and surchage to compensate perils and administrative costs

Desired State:

The dynamic premium should be calculated as a function of the tim,e standard fix premium rate, internal factors and external factors. The main idea is based on the fix premium rate and an estimated

- (A) external factors
  1. industry trends (forecast on goods and therefore machine demand)
  2. seasonality (the season can be taken here as a factor)
  3. weather (temperature, humidity, rainfall, --> Okay !!! (some data are collected)
  4. Location (geo-coordinates
  5. Inflation --> Okay !!! (data collected at yearly level)
  6. demographic features (population size in the region, ...)
  7. natural hazard (high waters, earthquacke, ...) --> Okay !!! (data collected at yearly level)
  8. Geo-Political situation (war, lock-down, ...)
  9. General market situation (stock exchange of industrial and good products, ...)
  10. Customer related (nbr of years at the insurance, nbr)
  11. General demand of insurance
  12. Auftragseingang im Allgemeinen (industry forecast demand in germany)
  13. Impact
- (B) internal factors
  1. Iot_health_index (1-100) --> physical condition of a machine
  2. Company Size (small, middle, large,)
  3. Working Staff (size) --> people taking care of the machinery
  4. Spare Part availability ~ age of the machine
  5. Claim distributinb
- (C) "extended" Premium Rate estimation (dynamic pricing)
  1. actual premium rate as baseline
  2. drift/shift/correction = function(t, external param, internal param, noise)
  3. dynamic_price = actual_premium_rate + drift/shift/correction_factor (the correction can be negative or positive) --> time series
  4. Dynamic price to be considered as a ts for forecasting
- (D) Ghbfdgyhfd

Next Steps:

- Gather data (xternal ad internal) to enhance the model using only iot_healt_index
- Apply model to generate suiatble function fo the dynamic price
- Evaluate "number" of data required for a suitable function
- Target ---> build a baseline-model that can be enhanced with real data from the customer at a later stage
- risk dynamic premium should be calculated as a function of the standard fixed premium rate, internal factors and external factors. The main idea is based on the fix premium rate and an estimated

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Dyn_price(t) = fixed_premium(t) + drift(t) = fixed_pre,

Drift_t) = f(t, iot_healt_index, weather, location , seasonality, ...) --> +/-

E - A(risk) >= 0.3 --> E- A -0.3b >0

Simulate dyn(t)n with a contsraaint --> price_max
dyn(t) - fixed_premium*g(t) - alpha1*ito_healh(t) - alpha2*inflation(t) - desired_marge >= 0

Monte Carlo simulation -->

Markov-Chain + integration des autres

Option 1: