

Warranty Data Analysis

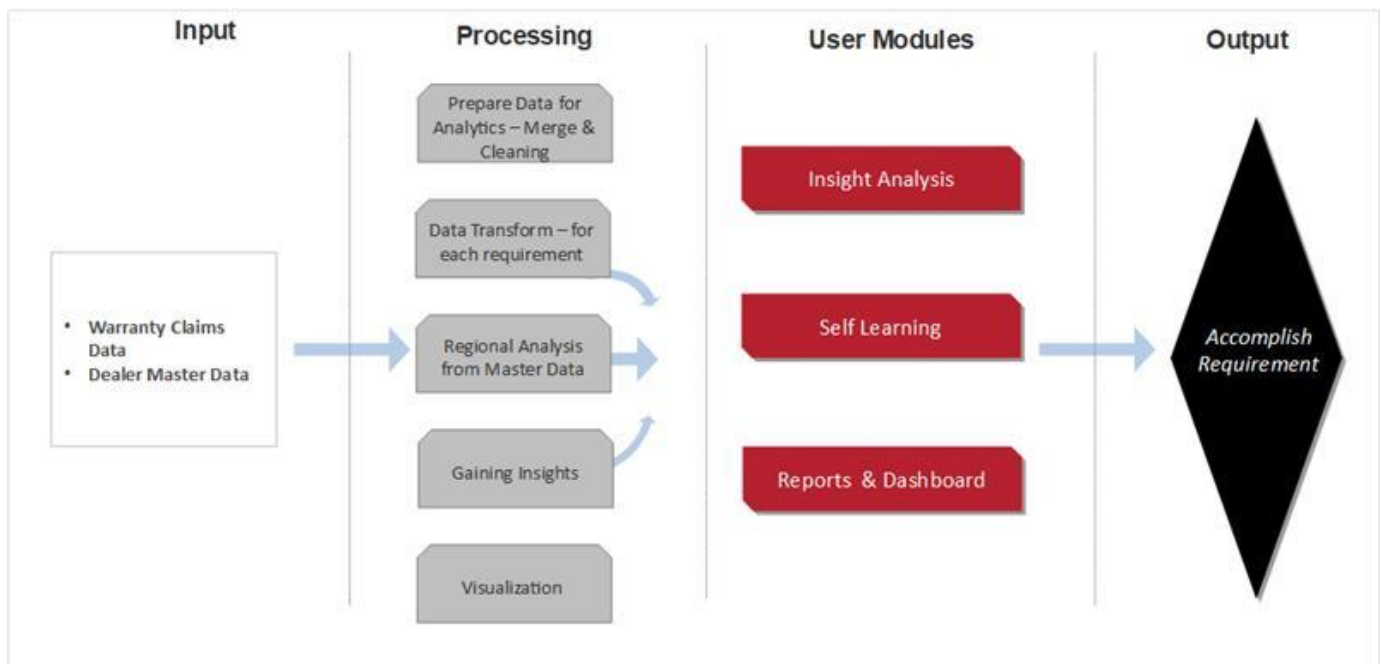
1. Problem Statement

Warranty data provides us with insight into what needs to be improved to reduce failure rates and improve customer satisfaction.

The most obvious use of warranty data is to improve product quality, but how!

How to reduce the warranty costs by predicting which parts are unlikely to fail and minimizing your inventory of those parts.

2. Implementation Process



3. Data Sources

Dealers KPI's Data :

- Dealer Code
- Dealer name
- External Claim number
- Internal Claim number
- Model Series
- Category of the vehicle
- FIN (WMC + remaining bytes of FIN)
- TGA
- Damage code 5 Bytes
- Damage code 2 Bytes
- Damage Code description
- Repair Type
- Repair Type description
- Initial Registration date
- Repair date
- Type of Service
- Service Description
- Duration of repair
- Wage Costs/Labor cost
- Material cost or Part cost
- Dealer Handling cost
- Sublet cost

Dealer Master Data:

- Dealer code – VEGA
- Region

4. Project Milestones

Week1:

- Understand project
- Assign Roles
- KPI's Dataset overview
- Marge and clean the datasets
- Calculating KPI's

Week2:

- Top 5 Models
- Top 5 Dealers
- User Interface

Week3:

- Best Dealers
- Model Contribution
- Testing
- Visualization

5. Key Highlights:

- There are Total **40831 FIN** are Available where April Contain **28.82%**, May Contain **38.01%**, June Contain **29.58%** and July Contain **29.93%**.
- There are **182 Dealers** overall where April has **95.6%**, May has **96.7%**, June has **97.8%** and July has **97.8%**.
- '**Mercedes-Benz (China) Ltd. Northern Star (Tianjin) Automobile Ltd Shanghai Branch**' is Find Out to the Most Popular Dealer as it has been visited Most in compared to other Dealers in **May, June and July** (above 700 times).
- '**Mercedes-Benz (China) Ltd. Northern Star (Tianjin) Automobile Ltd Shanghai Branch**' has been visited Mostly in Overall 4 Months as **4.67%** of overall visits and in the other hand '**Liuzhou Hua Xing Hang Auto Sales and Service co.**' has been visited Very Lessly in Over
- *Damage code **87100** of Damage type '**Head Unit - Total failure**' has the highest material cost **11856202.44/-** and this damage is '**repaired with parts**'. And Damage Code **32301** of Damage type '**Front Shock Absorber - Noise**' Has the Highest Overall duration **2172.6 hours**.
- April has the Highest Value in terms of costs per fin in Compare to Other Months as **28.61%**, where May has **24.59%**, June has **23.14%** and July has **23.64%**.
- As per the weekly Evaluation of Costs Per FIN, from week 1 to week 4, week 6, week 10 has the the cost above 5000/- and the other weeks has cost per fin between 3000/- to 5000/-
- Best Dealer in terms of Costs per Fin:
 - In April is '**Fuzhou Lzhixing Automobile Sales & Service**',

- In May and July '**Mercedes-Benz (China) Ltd. Northern Star (Tianjin) Automobile Ltd Shanghai Branch** ',
 - In June '**CangZhou Jizhi Automobile sales**'.
 - And Vehicle Model '**S-class 221**' Contributes the Most.
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- April month have highest average visits per FIN i.e., **1.25 visits/FIN** out of total 9413 unique FINs visited. And The Trend of visits/FIN from April to July is **slightly decreasing from 1.25 visits/FIN to 1.15 visits/FIN**.
 - FIN '**2462431J100790**' with dealer - '**Tianjin Star Automobile Repair & Service Co.**' have highest number of **9** damages. And FIN '**2211761A421497**' with dealer - '**Ky-Xing Automobile Sales & Service Co., Ltd.**' have highest total repair cost **603333.66/-** from JUNE month.
 - Vehicle Model series '**S-Class 221**' is responsible for the highest cost of **77371597.72/-**, 37% of total cost and '**S-Class 140**' is only **0.00034%** of total cost. And Vehicle Model series '**S-Class 221**' have highest visits almost **19.6%** of total in the duration of 4 months.
 - Best Dealer in terms of Damages per hour:
 - In April '**Maybach Shanghai Center - Shanghai Star Trading Co., Ltd.**' with an average of 0.33(h).
 - In May '**Maybach Guangzhou Center - Guangzhou Dragon Star**' with an Average of 0.26(h).
 - In June '**Maybach Beijing Center - New Beijing Star Automobile Service Co., Ltd.**' with an Average of 0.3(h).
 - In July '**Fuzhou Lizhixing Automobile Sales & Service**' with an Average of 0.15(h).

Regional Analysis:

East:

- East Region Contain 37% Dealer.
- **Sichuan Huaxing Jinye Automobile Sales & Service Co. Ltd.** Providing services to 12.62% of the total customers in the East Region.
- Damage Code **87100** of Damage type '**Head Unit - Total failure**' comes up with **Highest Material cost** i.e., 1431295/- approx. Which leads to **Highest Total cost**, and Damage Code **03304** of Damage Type '**Piston pin - Too much play**' has Maximum Average Duration of Operation in Hours i.e., 420 (h) approx. in The East Region.
- Model **S-Class 221** causes highest cost of **8848496.14/- (35.58%)** and Model **C-Class 203** causes lowest cost of **2582.81(0.01039%)** and Most visited Model was **E-Class 212**, that was visited in **total 1069** times or **22.33%** and lowest was Model **SLK 171** with **total visits 1(0.02%)**.

West:

- West Region Contain 11% Dealer.
- **Fuzhou Eastern Star Automobile Service Co., Ltd.** Providing services to 16.9% of the total customers in the West Region.
- Damage Code **53306** of Damage type '**HDD hard disk - Hardware fault**' comes up with **Highest Material cost** i.e., 5851218/- approx. Which leads to **Highest Total cost**, and Damage Code **32301** of Damage Type '**Front shock absorber - Noise**' has Maximum Average Duration of Operation in Hours i.e., 488 (h) approx. in The West Region.
- Model **S-Class 221** causes highest cost of **31923592.1/- (41.78%)** and Model **C-Class 203** causes lowest cost of **881.96/- (0.00115%)** and Most visited Model was **S-Class 221**, that was visited in **total 3507** times or **21.55%** and lowest was Model **M-Class 163** with **total visits 1(0.01%)**.

North:

- North Region Contain 32% Dealer.
- **Jinan Star Automobile Service Co., Ltd.** Providing services to 15.4% of the total customers in the North Region.
- Damage Code **32311** of Damage type '**Shock absorber, rear - Leaks**' comes up with **Highest Material cost** i.e., 2644872/- approx. Which leads to **Highest Total cost**, and Damage Code **32311** of Damage type '**Shock absorber, rear - Leaks**' has **Maximum Average Duration of Operation in Hours** i.e., 811 (h) approx. in The North Region.
- Model **S-Class 221** causes highest cost of **19593560.25/- (32.23%)** and Model **Maybach 240** causes lowest cost of **9061.43/- (0.01491%)** and Most visited Model was **E-Class 212**, that was visited in **total 2710** times or **21.5%** and lowest was Model **C-Class 203** with **total visits 1(0.01%)**.
- The North Region have Most warranty related visitors - 95% of them.

South:

- South Region Contain 20% Dealer.
- **Shenzhen South Rising Star Automobile Sales & Service Co. Ltd.** Providing services to 18.34% of the total customers in the South Region.
- Damage Code **5441B** of Damage type '**Condenser, high voltage intermediate circuit - Electrical fault**' comes up with **Highest Material cost** i.e., 2250437/- approx. Which leads to **Highest Total cost**, and Damage Code **68C01** of Damage type '**Carpet, footwell, left - Odor**' has **Maximum Average Duration of Operation in Hours** i.e., 617 (h) approx. in The South Region.
- Model **S-Class 221** causes highest cost of **15726798.26/- (35.74%)** and Model **S-Class 140** causes lowest cost of **725.92/- (0.00165%)** and Most visited Model was **C-Class 204**, that was visited in **total 2289** times or **19.26%** and lowest was Model **S-Class 140** with **total visits 1(0.01%)**.

- The South region has the least numbers of warranty-related visitors - 72% of them (other related to goodwill etc.)