Paint Material Cost & Repair Cost Regression models for ClaimCorps

Dataset Description

Retained rows with - High confidence, High confidence outlier or Unknown confidence level values only, dropped rows with low confidence level values.

Dropped rows with negative values.

Total number of rows in the dataset1 = 904,822.

Total number of columns in the dataset1= 57.

Mean repair cost = $1199 Median Repair cost = $767

Mean paint material cost= $139 Median paint material cost =$118

Added a new column “Vehicle Category” which contains data about shape of car. (SUV, Hatchback, Sedan etc.)

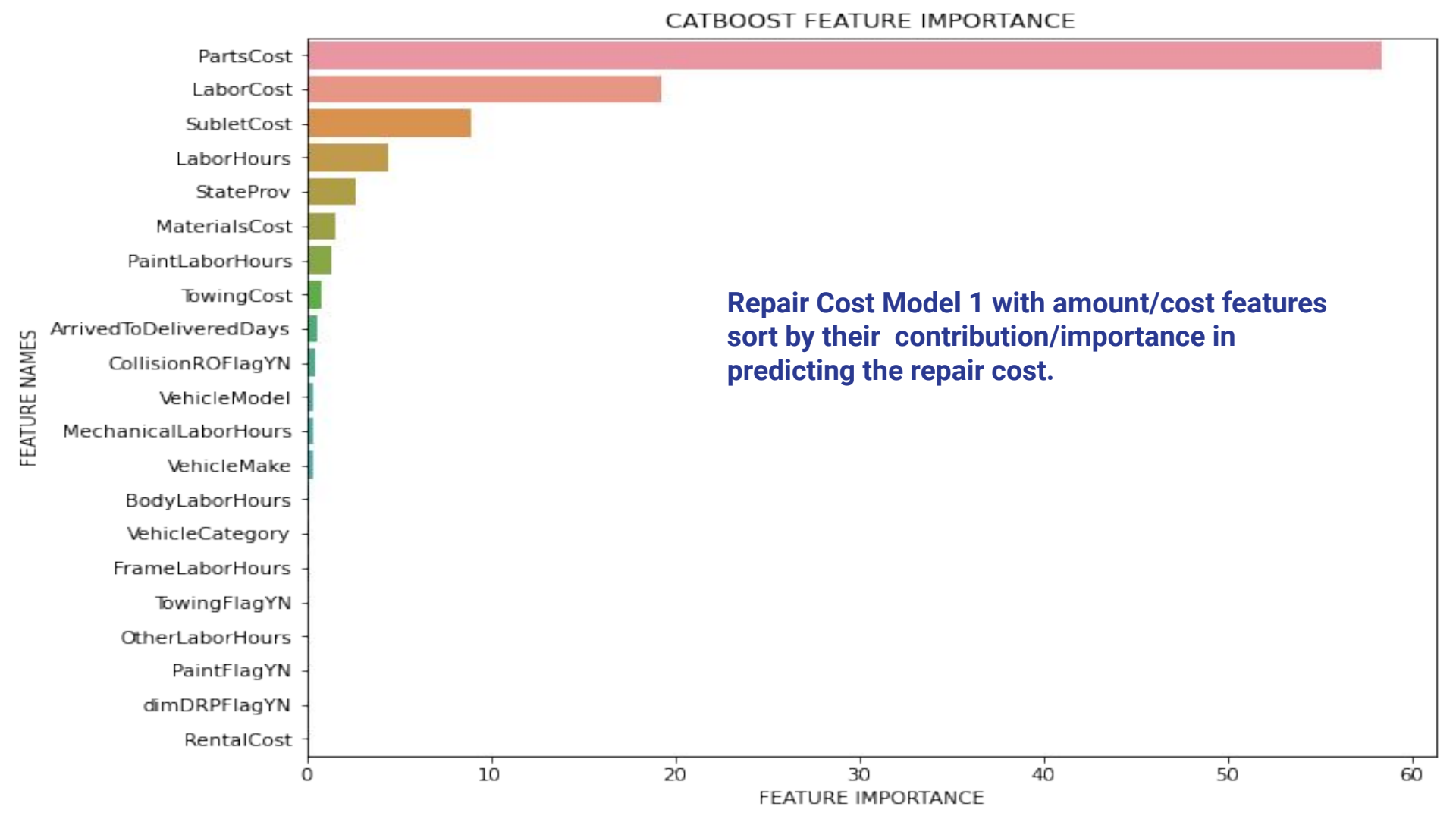
Repair Cost Model 1 **with** amount/cost features

- Features in model 1
  'LaborHours','PartsCost','LaborCost','MaterialsCost','TowingCost','SubletCost','RentalCost','StateProv','BodyLaborHours', 'PaintLaborHours','FrameLaborHours', 'MechanicalLaborHours', 'OtherLaborHours','ArrivedToDeliveredDays','CollisionROFlagYN','dimDRPFlagYN','PaintFlagYN','TowingFlagYN','VehicleMake','VehicleModel','VehicleCategory'
- Target Variable = RepiarCost.
- Algorithm used - CatBoost Regressor.

Repair Cost Model 1 **with** amount/cost features Evaluation

Testing performance
RMSE: 235.02
R2: 0.98 out of 1. Closer the R2 score is to 1 the better the model is. Predicted values are close to the actual value amounts mostly because we are using cost features in our model. Cost features are part of the formula used for calculating the repair cost.

Actual Repair Cost	Repair Cost Predicted by our model.
568	563
191	206
1738	1716
1519	1628
1088	1061
925	945
1255	1212
1346	1337
326	330



Repair Cost Model 1 with amount/cost features sort by their contribution/importance in predicting the repair cost.

Repair Cost Model 2 **without** amount/cost features.

- Features in Model 2 = 'Division','StateProv','LaborHours','ArrivedToDeliveredDays','CollisionROFlagYN','dimDRPFlagYN','PaintFlagYN','TowingFlagYN','VehicleMake','VehicleModel','VehicleCategory'
- Target Variable = RepairCost.
- Algorithm used - Catboost Regressor.

Repair Cost Model 2 **without** amount/cost features Evaluation.

RMSE: 874.28

R2: 0.66 out of 1.

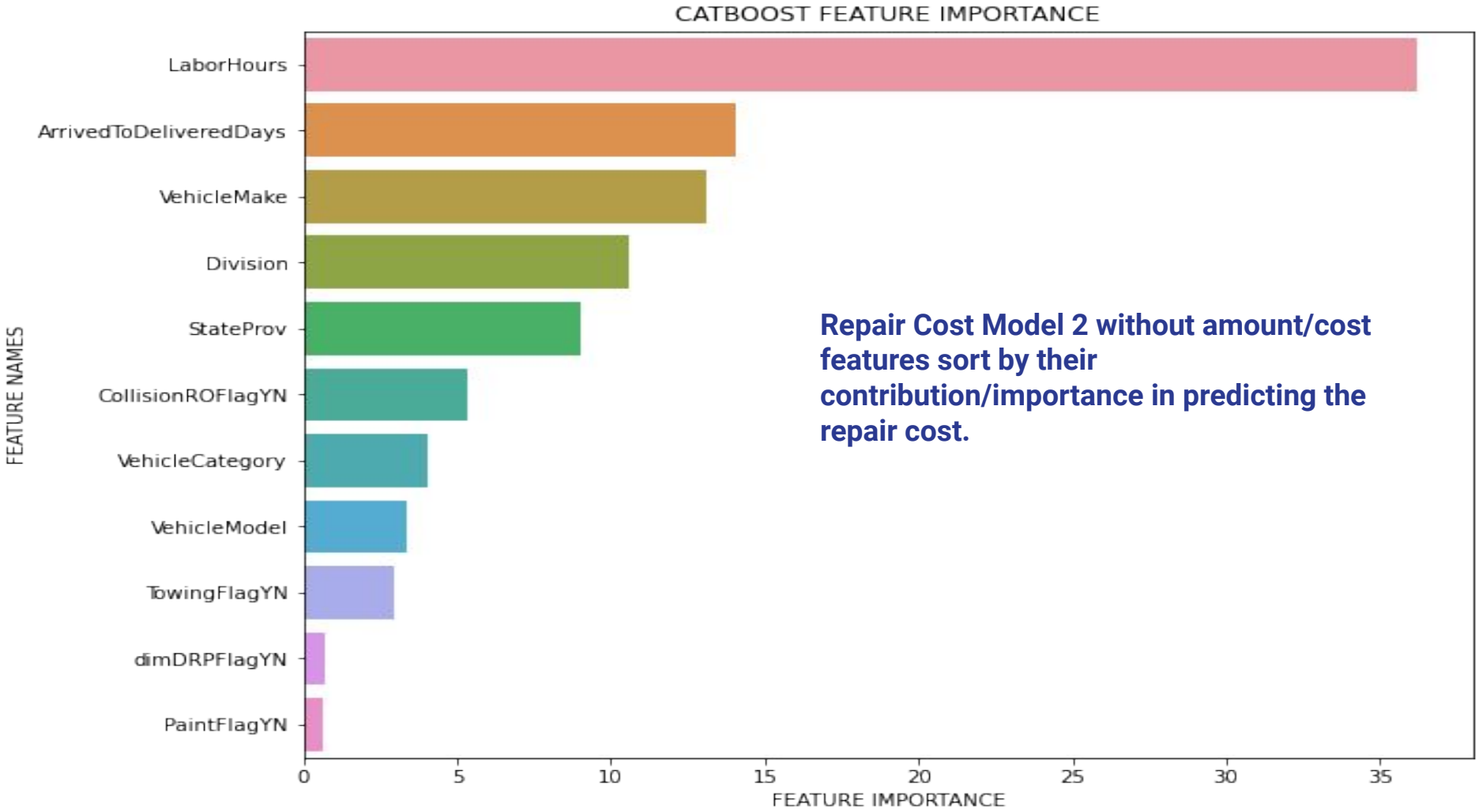
Root Mean Squared Error increases

And R2 decrease significantly, excluding

Cost features from the model significantly

Decrease the model performance.

Actual Repair Cost	Repair Cost Predicted by our model.
568	1195
191	365
1738	1819
1519	686
1088	778
925	411
1255	480
1346	2245
326	1291



Repair Cost Model 2 without amount/cost features sort by their contribution/importance in predicting the repair cost.

Paint Materials Cost Model 1 **with** amount/cost features

- Features in model 1 include 'PartsCost','LaborCost', 'TowingCost','SubletCost','RentalCost','StateProv','LaborHours','ArrivedToDeliveredDays','CollisionROFlagYN','dimDRPFlagYN','PaintFlagYN','TowingFlagYN','VehicleMake','VehicleModel','VehicleCategory'
- Target Variable = PaintMaterialsCost
- Algorithm used - CatBoost Regressor

Paint Materials Cost Model 1 **with** amount/cost features Evaluation

Testing performance
RMSE: 55.66
R2: 0.82 out of 1. Closer the R2 score is to 1 the better the model is

Predicted values are close to the actual value amounts mostly because we are using cost features in our model. Cost features are part of the formula used for calculating the paint materials cost.

Paint Material Cost predicted by our model	Actual Paint Material Cost
138.58480676	153.140
89.97651335	54.600
208.50726345	220.480
95.00853067	67.340
125.79789962	91.260
88.490245	74.880

Paint Materials Cost Model 2 **without** amount/cost features.

- Features in Model 2 = 'StateProv','LaborHours','ArrivedToDeliveredDays','CollisionROFlagYN','dimDRPFlagYN','PaintFlagYN','TowingFlagYN','VehicleMake','VehicleModel','VehicleCategory'
- Target Variable = PaintMaterialsCost.
- Algorithm used - Catboost Regressor.

Paint Materials Cost Model 2 **without** amount/cost features Evaluation.

RMSE: 58.47

R2: 0.80 out of 1.

Root Mean Squared Error increases

And R2 decrease significantly, excluding

Cost features from the model significantly

Decrease the model performance.

Paint Materials Cost predicted by our model	Actual Paint Materials Cost
1.43591895e+02	153.1
9.05251950e+01	54.6
2.07415598e+02	220.5
9.32943505e+01	67.3
1.22960408e+02	91.3
8.52498597e+01	74.9