Linear Model

Suman

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##model1

Pr\_P\_Tr<- read.csv("G:/Suman/batch34/project2/Datasheet/Property\_Price\_Train.csv", stringsAsFactors=TRUE)  
model1\_lm<-lm(Sale\_Price~Heating\_Quality+Air\_Conditioning+Electrical\_System+First\_Floor\_Area+Second\_Floor\_Area+Grade\_Living\_Area+Underground\_Half\_Bathroom+Full\_Bathroom\_Above\_Grade+Kitchen\_Above\_Grade+Kitchen\_Quality+Rooms\_Above\_Grade+Functional\_Rate+Fireplaces+Fireplace\_Quality+Pool\_Area+Garage  
 +Garage\_Finish\_Year+Garage\_Quality+Garage\_Built\_Year+Garage\_Condition+Pavedd\_Drive  
 +BsmtFinSF1+BsmtUnfSF+Total\_Basement\_Area+Building\_Class+Zoning\_Class+Lot\_Extent+Lot\_Size+Property\_Shape+Land\_Outline+Lot\_Configuration+Property\_Slope+Neighborhood+House\_Type+Overall\_Material+House\_Condition+Construction\_Year+Remodel\_Year+Roof\_Design+Brick\_Veneer\_Area  
 ,data=Pr\_P\_Tr)  
model1\_lm

##   
## Call:  
## lm(formula = Sale\_Price ~ Heating\_Quality + Air\_Conditioning +   
## Electrical\_System + First\_Floor\_Area + Second\_Floor\_Area +   
## Grade\_Living\_Area + Underground\_Half\_Bathroom + Full\_Bathroom\_Above\_Grade +   
## Kitchen\_Above\_Grade + Kitchen\_Quality + Rooms\_Above\_Grade +   
## Functional\_Rate + Fireplaces + Fireplace\_Quality + Pool\_Area +   
## Garage + Garage\_Finish\_Year + Garage\_Quality + Garage\_Built\_Year +   
## Garage\_Condition + Pavedd\_Drive + BsmtFinSF1 + BsmtUnfSF +   
## Total\_Basement\_Area + Building\_Class + Zoning\_Class + Lot\_Extent +   
## Lot\_Size + Property\_Shape + Land\_Outline + Lot\_Configuration +   
## Property\_Slope + Neighborhood + House\_Type + Overall\_Material +   
## House\_Condition + Construction\_Year + Remodel\_Year + Roof\_Design +   
## Brick\_Veneer\_Area, data = Pr\_P\_Tr)  
##   
## Coefficients:  
## (Intercept) Heating\_QualityFa   
## -1.728e+05 1.035e+04   
## Heating\_QualityGd Heating\_QualityTA   
## -3.788e+03 3.316e+03   
## Air\_ConditioningY Electrical\_SystemFuseF   
## 2.385e+04 -7.003e+02   
## Electrical\_SystemSBrkr First\_Floor\_Area   
## -3.875e+03 8.797e+01   
## Second\_Floor\_Area Grade\_Living\_Area   
## 7.611e+01 -3.359e+01   
## Underground\_Half\_Bathroom Full\_Bathroom\_Above\_Grade   
## 1.405e+04 9.446e+03   
## Kitchen\_Above\_Grade Kitchen\_QualityFa   
## -3.004e+04 -2.562e+04   
## Kitchen\_QualityGd Kitchen\_QualityTA   
## -3.247e+04 -3.325e+04   
## Rooms\_Above\_Grade Functional\_RateMajD2   
## 4.056e+03 -1.253e+04   
## Functional\_RateMD Functional\_RateMD1   
## 1.336e+04 -3.757e+03   
## Functional\_RateMD2 Functional\_RateMS   
## -6.886e+03 4.512e+03   
## Functional\_RateTF Fireplaces   
## 8.505e+03 1.143e+04   
## Fireplace\_QualityFa Fireplace\_QualityGd   
## -2.390e+04 -2.043e+04   
## Fireplace\_QualityPo Fireplace\_QualityTA   
## -1.248e+04 -2.465e+04   
## Pool\_Area GarageAttchd   
## -9.889e+00 4.536e+04   
## GarageBasment GarageBuiltIn   
## 6.342e+04 5.138e+04   
## GarageCarPort GarageDetchd   
## 5.456e+04 4.926e+04   
## Garage\_Finish\_YearRFn Garage\_Finish\_YearUnf   
## -3.366e+03 -7.205e+03   
## Garage\_QualityFa Garage\_QualityGd   
## -1.369e+05 -1.290e+05   
## Garage\_QualityTA Garage\_Built\_Year   
## -1.454e+05 3.799e+01   
## Garage\_ConditionFa Garage\_ConditionGd   
## 1.634e+05 7.274e+04   
## Garage\_ConditionPo Garage\_ConditionTA   
## 2.095e+05 1.583e+05   
## Pavedd\_DriveP Pavedd\_DriveY   
## -2.659e+04 -1.045e+04   
## BsmtFinSF1 BsmtUnfSF   
## -6.687e+00 -2.474e+01   
## Total\_Basement\_Area Building\_Class   
## 1.387e+01 -3.865e+02   
## Zoning\_ClassFVR Zoning\_ClassRHD   
## 6.124e+04 -7.937e+04   
## Zoning\_ClassRLD Zoning\_ClassRMD   
## 4.335e+04 4.005e+04   
## Lot\_Extent Lot\_Size   
## -1.009e+02 8.482e-01   
## Property\_ShapeIR2 Property\_ShapeIR3   
## -1.030e+04 -5.985e+04   
## Property\_ShapeReg Land\_OutlineHLS   
## 1.148e+03 5.647e+04   
## Land\_OutlineLow Land\_OutlineLvl   
## 4.159e+04 4.054e+04   
## Lot\_ConfigurationCulDSac Lot\_ConfigurationFR2P   
## 2.300e+04 -2.426e+04   
## Lot\_ConfigurationFR3P Lot\_ConfigurationI   
## -3.922e+04 -2.504e+03   
## Property\_SlopeMS Property\_SlopeSS   
## 2.168e+04 -4.948e+04   
## NeighborhoodBlueste NeighborhoodBrDale   
## -8.711e+03 -1.734e+04   
## NeighborhoodBrkSide NeighborhoodClearCr   
## -2.594e+04 -3.065e+04   
## NeighborhoodCollgCr NeighborhoodCrawfor   
## -6.959e+03 -1.888e+04   
## NeighborhoodEdwards NeighborhoodGilbert   
## -7.655e+04 -1.143e+04   
## NeighborhoodIDOTRR NeighborhoodMeadowV   
## -1.222e+04 -2.055e+04   
## NeighborhoodMitchel NeighborhoodNAmes   
## -4.510e+04 -4.423e+04   
## NeighborhoodNoRidge NeighborhoodNPkVill   
## 3.689e+04 -4.334e+03   
## NeighborhoodNridgHt NeighborhoodNWAmes   
## 3.518e+04 -4.557e+04   
## NeighborhoodOldTown NeighborhoodSawyer   
## -4.999e+04 -3.346e+04   
## NeighborhoodSawyerW NeighborhoodSomerst   
## -1.628e+04 -4.974e+02   
## NeighborhoodStoneBr NeighborhoodSWISU   
## 4.603e+04 -5.273e+04   
## NeighborhoodTimber NeighborhoodVeenker   
## -7.762e+03 1.491e+04   
## House\_Type2fmCon House\_TypeDuplex   
## 5.825e+04 8.518e+04   
## House\_TypeTwnhs House\_TypeTwnhsE   
## 1.046e+03 5.385e+03   
## Overall\_Material House\_Condition   
## 1.582e+04 7.051e+03   
## Construction\_Year Remodel\_Year   
## -4.735e+01 3.250e+01   
## Roof\_DesignGable Roof\_DesignGambrel   
## 6.111e+03 7.417e+03   
## Roof\_DesignHip Roof\_DesignMansard   
## 1.195e+04 1.668e+04   
## Brick\_Veneer\_Area   
## 1.596e+01

summary(model1\_lm)

##   
## Call:  
## lm(formula = Sale\_Price ~ Heating\_Quality + Air\_Conditioning +   
## Electrical\_System + First\_Floor\_Area + Second\_Floor\_Area +   
## Grade\_Living\_Area + Underground\_Half\_Bathroom + Full\_Bathroom\_Above\_Grade +   
## Kitchen\_Above\_Grade + Kitchen\_Quality + Rooms\_Above\_Grade +   
## Functional\_Rate + Fireplaces + Fireplace\_Quality + Pool\_Area +   
## Garage + Garage\_Finish\_Year + Garage\_Quality + Garage\_Built\_Year +   
## Garage\_Condition + Pavedd\_Drive + BsmtFinSF1 + BsmtUnfSF +   
## Total\_Basement\_Area + Building\_Class + Zoning\_Class + Lot\_Extent +   
## Lot\_Size + Property\_Shape + Land\_Outline + Lot\_Configuration +   
## Property\_Slope + Neighborhood + House\_Type + Overall\_Material +   
## House\_Condition + Construction\_Year + Remodel\_Year + Roof\_Design +   
## Brick\_Veneer\_Area, data = Pr\_P\_Tr)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -292077 -17062 -1915 14460 232932   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -1.728e+05 5.501e+05 -0.314 0.753548   
## Heating\_QualityFa 1.035e+04 1.466e+04 0.706 0.480492   
## Heating\_QualityGd -3.788e+03 6.103e+03 -0.621 0.535178   
## Heating\_QualityTA 3.316e+03 6.244e+03 0.531 0.595617   
## Air\_ConditioningY 2.385e+04 1.790e+04 1.333 0.183225   
## Electrical\_SystemFuseF -7.003e+02 2.734e+04 -0.026 0.979576   
## Electrical\_SystemSBrkr -3.875e+03 1.084e+04 -0.357 0.720882   
## First\_Floor\_Area 8.797e+01 5.454e+01 1.613 0.107397   
## Second\_Floor\_Area 7.611e+01 5.365e+01 1.419 0.156635   
## Grade\_Living\_Area -3.359e+01 5.399e+01 -0.622 0.534129   
## Underground\_Half\_Bathroom 1.405e+04 7.613e+03 1.845 0.065581 .   
## Full\_Bathroom\_Above\_Grade 9.446e+03 5.483e+03 1.723 0.085570 .   
## Kitchen\_Above\_Grade -3.004e+04 3.293e+04 -0.912 0.362095   
## Kitchen\_QualityFa -2.562e+04 1.937e+04 -1.322 0.186637   
## Kitchen\_QualityGd -3.247e+04 7.045e+03 -4.609 5.19e-06 \*\*\*  
## Kitchen\_QualityTA -3.325e+04 9.391e+03 -3.540 0.000438 \*\*\*  
## Rooms\_Above\_Grade 4.056e+03 2.371e+03 1.710 0.087824 .   
## Functional\_RateMajD2 -1.253e+04 4.782e+04 -0.262 0.793446   
## Functional\_RateMD 1.336e+04 2.889e+04 0.463 0.643863   
## Functional\_RateMD1 -3.757e+03 2.436e+04 -0.154 0.877518   
## Functional\_RateMD2 -6.886e+03 2.416e+04 -0.285 0.775731   
## Functional\_RateMS 4.512e+03 5.216e+04 0.086 0.931106   
## Functional\_RateTF 8.505e+03 2.064e+04 0.412 0.680488   
## Fireplaces 1.143e+04 5.818e+03 1.964 0.050118 .   
## Fireplace\_QualityFa -2.390e+04 1.393e+04 -1.717 0.086699 .   
## Fireplace\_QualityGd -2.043e+04 1.025e+04 -1.994 0.046741 \*   
## Fireplace\_QualityPo -1.248e+04 1.741e+04 -0.717 0.473946   
## Fireplace\_QualityTA -2.465e+04 1.085e+04 -2.271 0.023557 \*   
## Pool\_Area -9.889e+00 3.655e+01 -0.271 0.786818   
## GarageAttchd 4.536e+04 4.608e+04 0.984 0.325406   
## GarageBasment 6.342e+04 4.834e+04 1.312 0.190220   
## GarageBuiltIn 5.138e+04 4.718e+04 1.089 0.276690   
## GarageCarPort 5.456e+04 6.374e+04 0.856 0.392383   
## GarageDetchd 4.926e+04 4.652e+04 1.059 0.290102   
## Garage\_Finish\_YearRFn -3.366e+03 4.983e+03 -0.676 0.499644   
## Garage\_Finish\_YearUnf -7.205e+03 6.958e+03 -1.036 0.300940   
## Garage\_QualityFa -1.369e+05 5.744e+04 -2.383 0.017556 \*   
## Garage\_QualityGd -1.290e+05 5.705e+04 -2.262 0.024164 \*   
## Garage\_QualityTA -1.454e+05 5.562e+04 -2.614 0.009234 \*\*   
## Garage\_Built\_Year 3.799e+01 1.836e+02 0.207 0.836142   
## Garage\_ConditionFa 1.634e+05 7.410e+04 2.205 0.027909 \*   
## Garage\_ConditionGd 7.274e+04 8.571e+04 0.849 0.396526   
## Garage\_ConditionPo 2.095e+05 8.654e+04 2.420 0.015872 \*   
## Garage\_ConditionTA 1.583e+05 7.267e+04 2.178 0.029910 \*   
## Pavedd\_DriveP -2.659e+04 1.939e+04 -1.371 0.171038   
## Pavedd\_DriveY -1.045e+04 1.584e+04 -0.660 0.509666   
## BsmtFinSF1 -6.687e+00 1.200e+01 -0.557 0.577478   
## BsmtUnfSF -2.474e+01 1.206e+01 -2.052 0.040750 \*   
## Total\_Basement\_Area 1.387e+01 1.384e+01 1.002 0.316747   
## Building\_Class -3.865e+02 1.615e+02 -2.394 0.017061 \*   
## Zoning\_ClassFVR 6.124e+04 5.458e+04 1.122 0.262437   
## Zoning\_ClassRHD -7.937e+04 8.183e+04 -0.970 0.332608   
## Zoning\_ClassRLD 4.335e+04 5.294e+04 0.819 0.413203   
## Zoning\_ClassRMD 4.005e+04 5.182e+04 0.773 0.440019   
## Lot\_Extent -1.009e+02 1.031e+02 -0.978 0.328447   
## Lot\_Size 8.482e-01 2.829e-01 2.998 0.002861 \*\*   
## Property\_ShapeIR2 -1.030e+04 1.281e+04 -0.804 0.421821   
## Property\_ShapeIR3 -5.985e+04 2.171e+04 -2.757 0.006053 \*\*   
## Property\_ShapeReg 1.148e+03 4.422e+03 0.260 0.795289   
## Land\_OutlineHLS 5.647e+04 1.421e+04 3.974 8.15e-05 \*\*\*  
## Land\_OutlineLow 4.159e+04 2.335e+04 1.781 0.075544 .   
## Land\_OutlineLvl 4.054e+04 1.126e+04 3.600 0.000351 \*\*\*  
## Lot\_ConfigurationCulDSac 2.300e+04 1.001e+04 2.298 0.021978 \*   
## Lot\_ConfigurationFR2P -2.426e+04 1.359e+04 -1.785 0.074830 .   
## Lot\_ConfigurationFR3P -3.922e+04 3.099e+04 -1.266 0.206273   
## Lot\_ConfigurationI -2.504e+03 5.252e+03 -0.477 0.633753   
## Property\_SlopeMS 2.168e+04 1.148e+04 1.889 0.059534 .   
## Property\_SlopeSS -4.948e+04 3.366e+04 -1.470 0.142275   
## NeighborhoodBlueste -8.711e+03 3.799e+04 -0.229 0.818742   
## NeighborhoodBrDale -1.734e+04 5.224e+04 -0.332 0.740099   
## NeighborhoodBrkSide -2.594e+04 2.668e+04 -0.972 0.331346   
## NeighborhoodClearCr -3.065e+04 2.402e+04 -1.276 0.202647   
## NeighborhoodCollgCr -6.959e+03 1.603e+04 -0.434 0.664459   
## NeighborhoodCrawfor -1.888e+04 2.082e+04 -0.907 0.364789   
## NeighborhoodEdwards -7.655e+04 1.943e+04 -3.940 9.32e-05 \*\*\*  
## NeighborhoodGilbert -1.143e+04 1.692e+04 -0.675 0.499688   
## NeighborhoodIDOTRR -1.222e+04 3.544e+04 -0.345 0.730324   
## NeighborhoodMeadowV -2.055e+04 3.113e+04 -0.660 0.509452   
## NeighborhoodMitchel -4.510e+04 2.150e+04 -2.098 0.036453 \*   
## NeighborhoodNAmes -4.423e+04 1.869e+04 -2.367 0.018334 \*   
## NeighborhoodNoRidge 3.689e+04 1.767e+04 2.087 0.037410 \*   
## NeighborhoodNPkVill -4.334e+03 2.452e+04 -0.177 0.859774   
## NeighborhoodNridgHt 3.518e+04 1.533e+04 2.295 0.022143 \*   
## NeighborhoodNWAmes -4.557e+04 1.798e+04 -2.534 0.011574 \*   
## NeighborhoodOldTown -4.999e+04 2.965e+04 -1.686 0.092386 .   
## NeighborhoodSawyer -3.346e+04 2.000e+04 -1.673 0.094939 .   
## NeighborhoodSawyerW -1.628e+04 1.695e+04 -0.960 0.337374   
## NeighborhoodSomerst -4.974e+02 1.827e+04 -0.027 0.978297   
## NeighborhoodStoneBr 4.603e+04 1.736e+04 2.652 0.008274 \*\*   
## NeighborhoodSWISU -5.273e+04 2.454e+04 -2.149 0.032166 \*   
## NeighborhoodTimber -7.762e+03 1.768e+04 -0.439 0.660863   
## NeighborhoodVeenker 1.491e+04 2.187e+04 0.682 0.495685   
## House\_Type2fmCon 5.825e+04 3.655e+04 1.594 0.111698   
## House\_TypeDuplex 8.518e+04 5.811e+04 1.466 0.143308   
## House\_TypeTwnhs 1.046e+03 2.466e+04 0.042 0.966168   
## House\_TypeTwnhsE 5.385e+03 1.837e+04 0.293 0.769608   
## Overall\_Material 1.582e+04 2.908e+03 5.441 8.40e-08 \*\*\*  
## House\_Condition 7.051e+03 2.696e+03 2.615 0.009202 \*\*   
## Construction\_Year -4.735e+01 2.496e+02 -0.190 0.849633   
## Remodel\_Year 3.250e+01 1.883e+02 0.173 0.863029   
## Roof\_DesignGable 6.111e+03 2.555e+04 0.239 0.811070   
## Roof\_DesignGambrel 7.417e+03 3.350e+04 0.221 0.824860   
## Roof\_DesignHip 1.195e+04 2.543e+04 0.470 0.638667   
## Roof\_DesignMansard 1.668e+04 3.358e+04 0.497 0.619631   
## Brick\_Veneer\_Area 1.596e+01 1.025e+01 1.557 0.120147   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 41020 on 486 degrees of freedom  
## (868 observations deleted due to missingness)  
## Multiple R-squared: 0.8371, Adjusted R-squared: 0.8022   
## F-statistic: 24.01 on 104 and 486 DF, p-value: < 2.2e-16