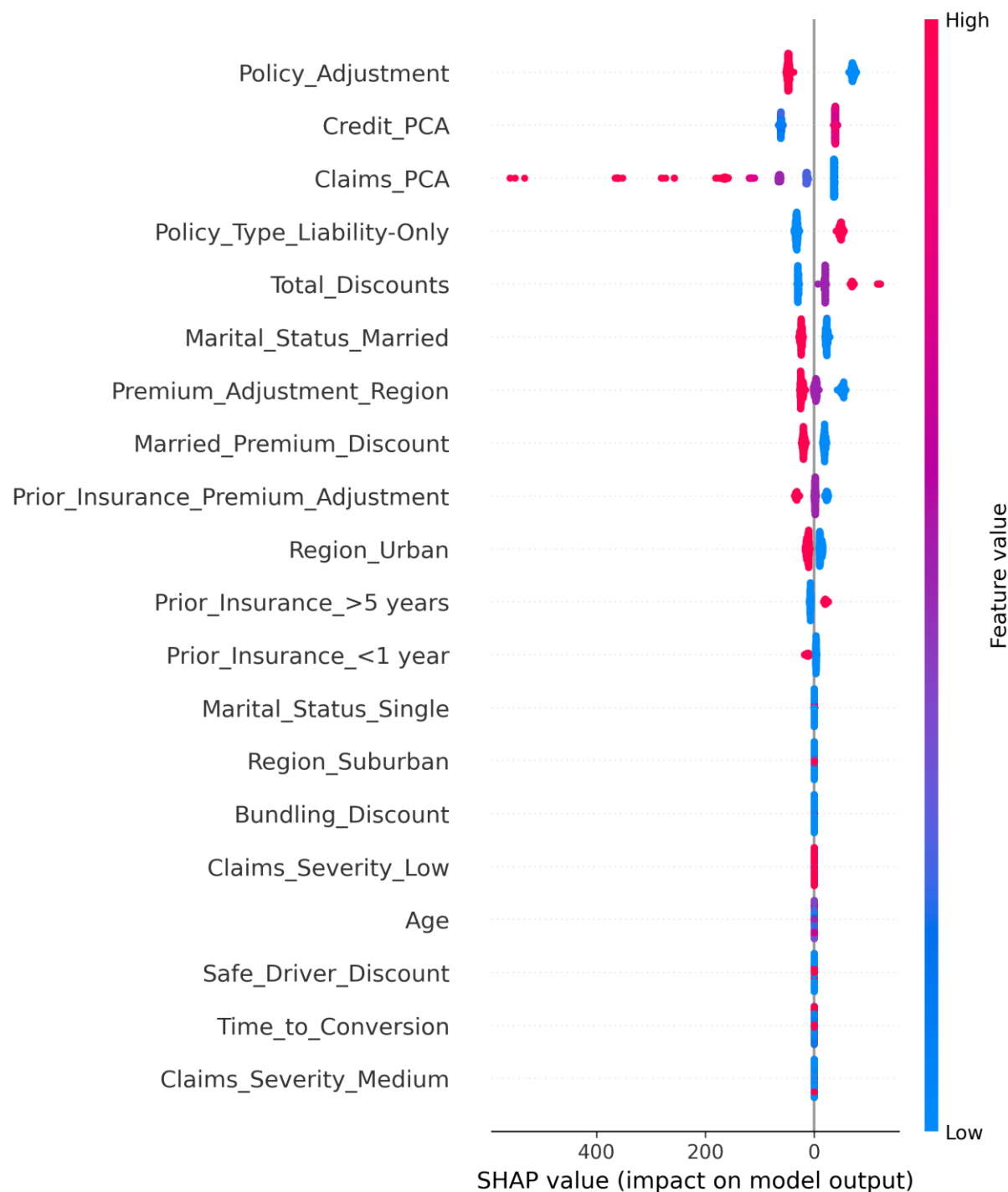


The model identifies `Policy_Adjustment`, `Claims_PCA`, and `Policy_Type_Liability-Only` as the top predictors of insurance premiums, reflecting direct pricing factors, claim behavior, and coverage type. Features like `Credit_PCA` and `Total_Discounts` also play key roles, suggesting the model effectively captures financial risk and incentive structures. Less important features, such as `Multi_Policy_Discount`, contribute minimally and may be candidates for removal or further investigation.



The color gradient (pink for high values, blue for low values) helps us grasp:

- Not only which features are significant,
- But also how their **actual values** influence the prediction – whether they push it up or down.

The SHAP plot reveals which features have the biggest impact on premium predictions and the direction of that impact:

- **Policy_Adjustment: This is the standout feature – higher values (shown in pink) are closely linked to increased premiums, underscoring its key role in adjusting risk-based pricing.**

- **Claims_PCA: Customers who present a higher risk of claims typically see high premium predictions, which aligns well with actuarial principles.**

- **Policy_Type_Liability-Only: Holding a liability-only policy (often linked to less coverage) usually results in lower premiums, as indicated by the negative SHAP impact for high values (in red).**

- **Credit_PCA and Total_Discounts: Good credit behavior and larger discount amounts (on the blue side) generally lead to lower predicted premiums, showing that the model effectively rewards customers who are financially responsible or take advantage of incentives.**

In summary, the SHAP plot validates that the model is picking up on meaningful, interpretable patterns – **penalizing risky profiles and rewarding safer or incentivized ones**, closely reflecting how premiums are structured in real-world insurance scenarios.



Residual Plot

