

June 14, 2021

Poverty, Death Rate & Covid-19

By Team Oranges

Funded by Craig Tungsten



Problem Statement

- Covid has adversely affected many communities
- Attempt to determine which counties may be hardest hit in future pandemics
- Use covid-related statistics and census data to predict covid death rates
- Determine if Covid rates differ by poverty, which can then in turn help look for issues within counties and states to increase health care and accessibility.

Datasets



Covid19 death rates per US county



Census bureau acs per county

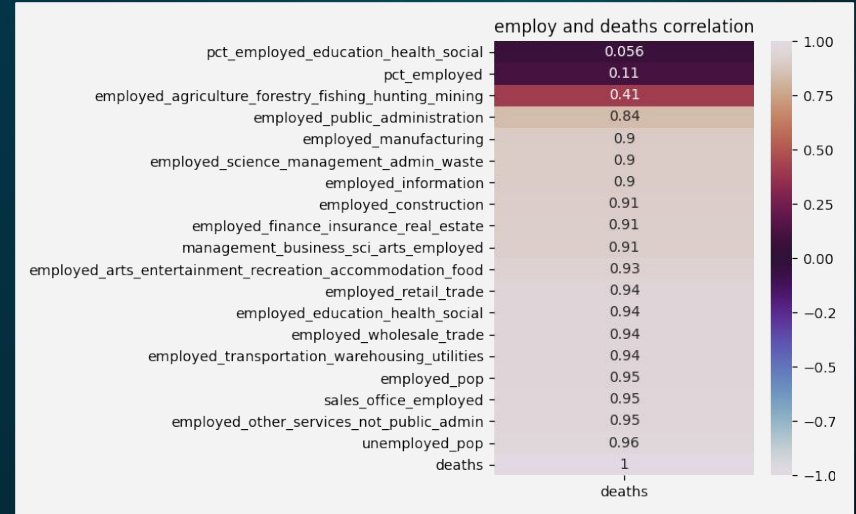
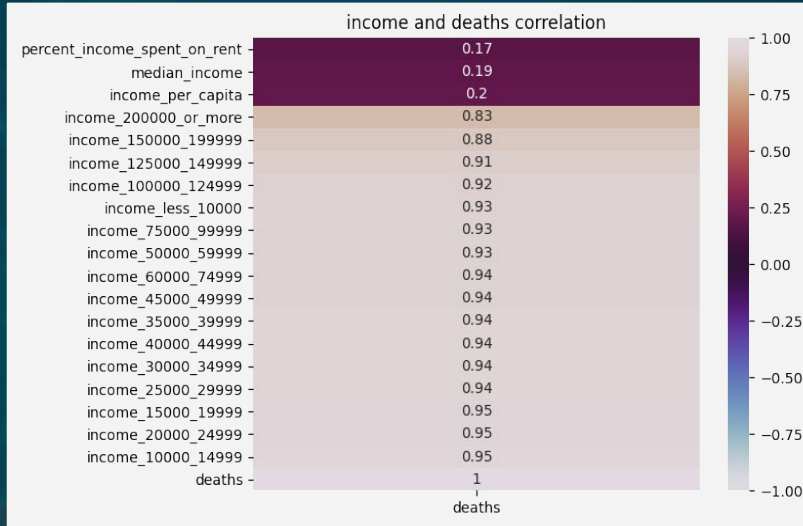


US Healthcare Capacity per county

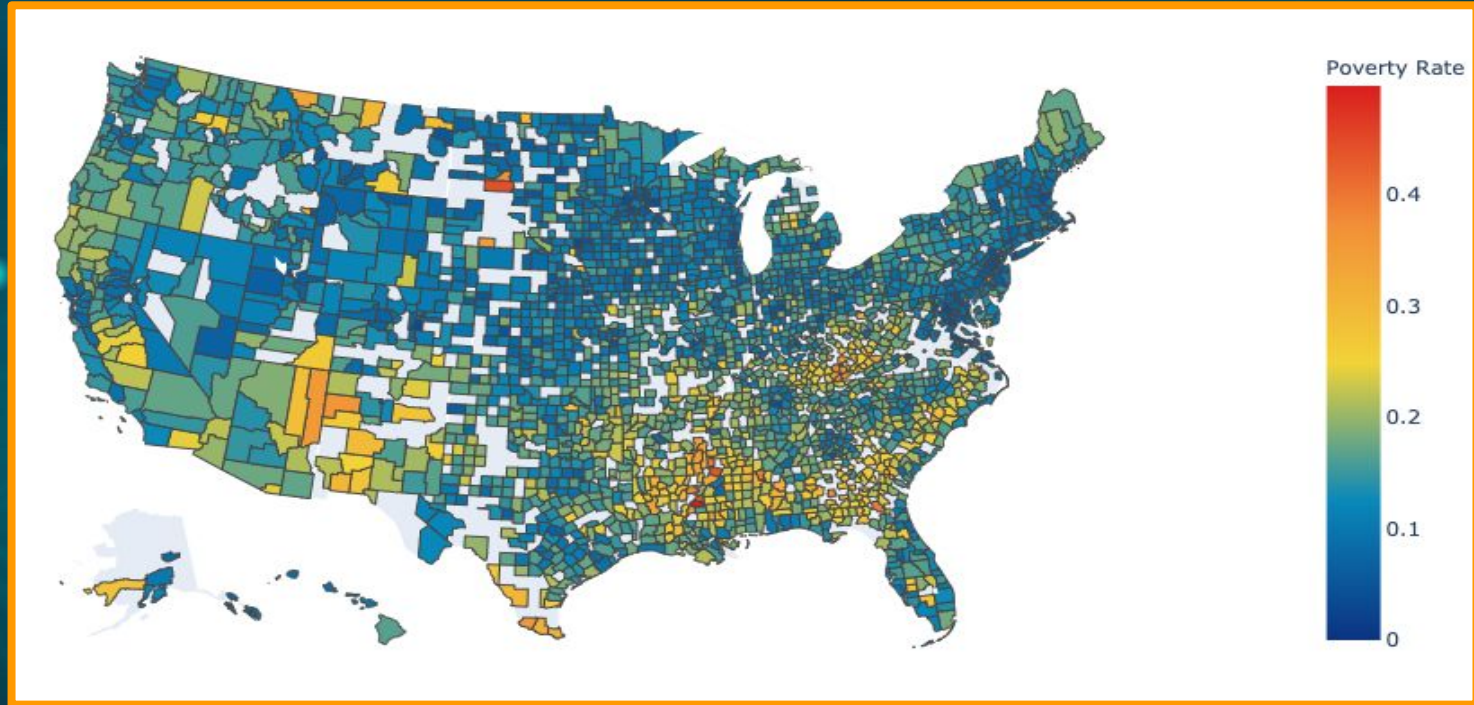
Exploratory Data Analysis

- We used 'all bed occupancy rate' from the healthcare dataset in our models so we imputed the mean and all other rows from this dataset were dropped due to high collinearity
- Create variables for death_rate, poverty_rate
- Visualized heatmap correlations
- Added leading zeros to county fips codes for use in choropleth maps

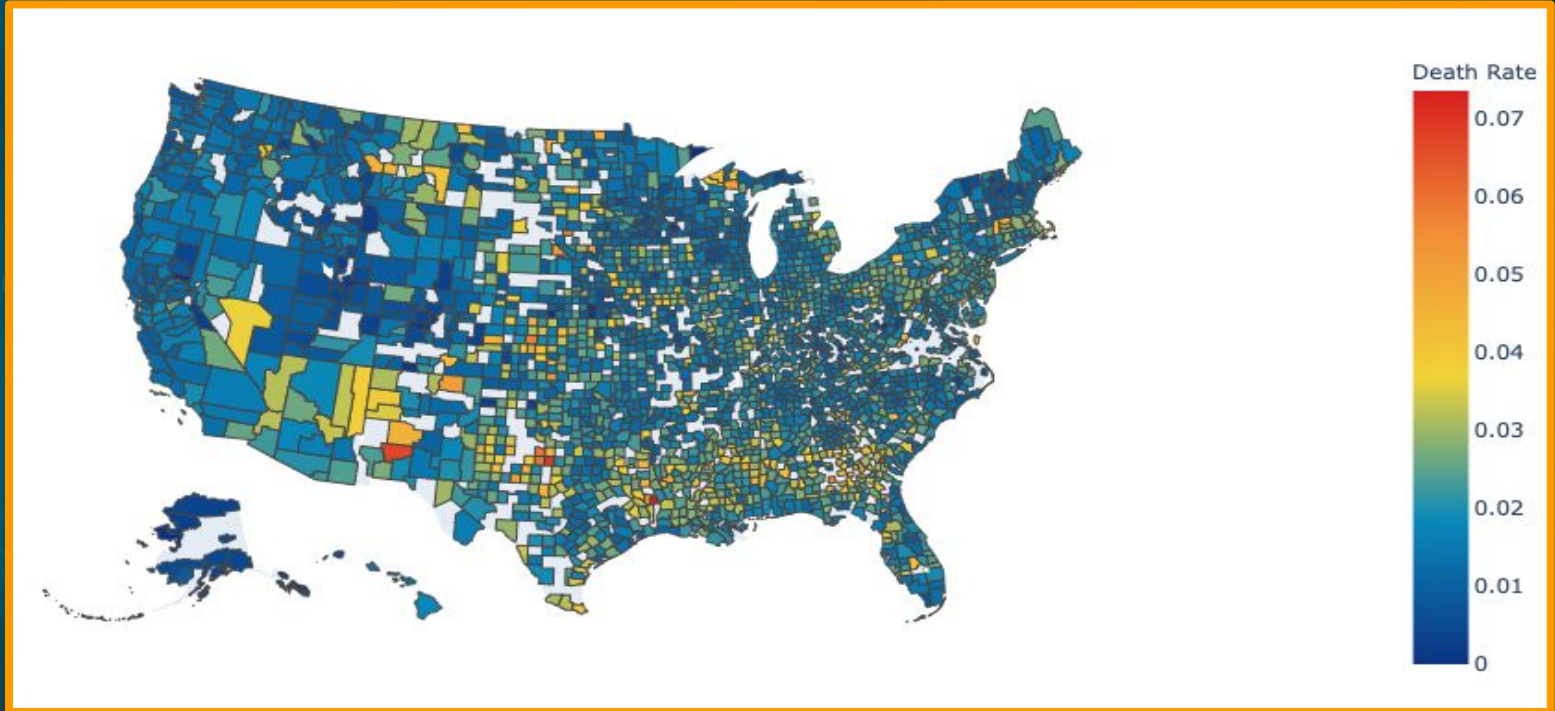
Heatmap Visualizations



Poverty Rate by US County as of June 2021



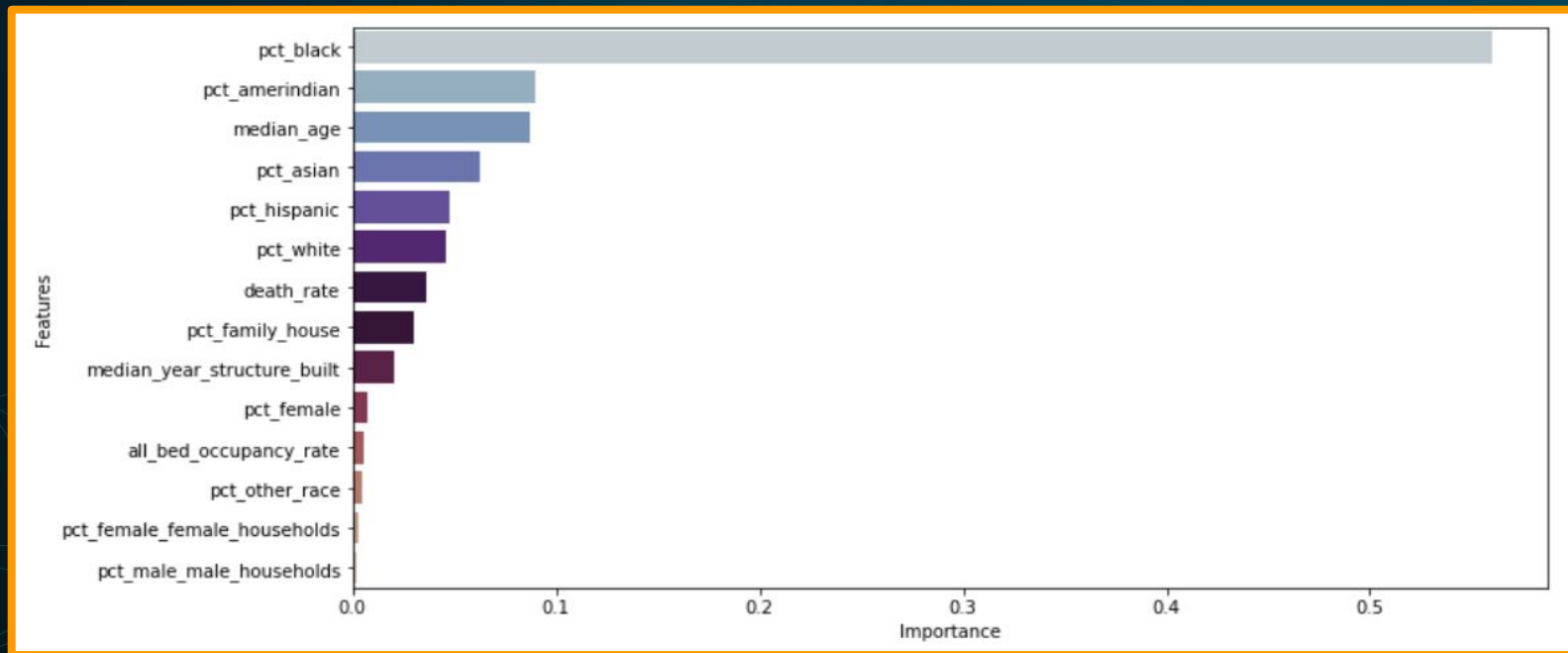
Covid-19 Death Rate by US County as of June 2021



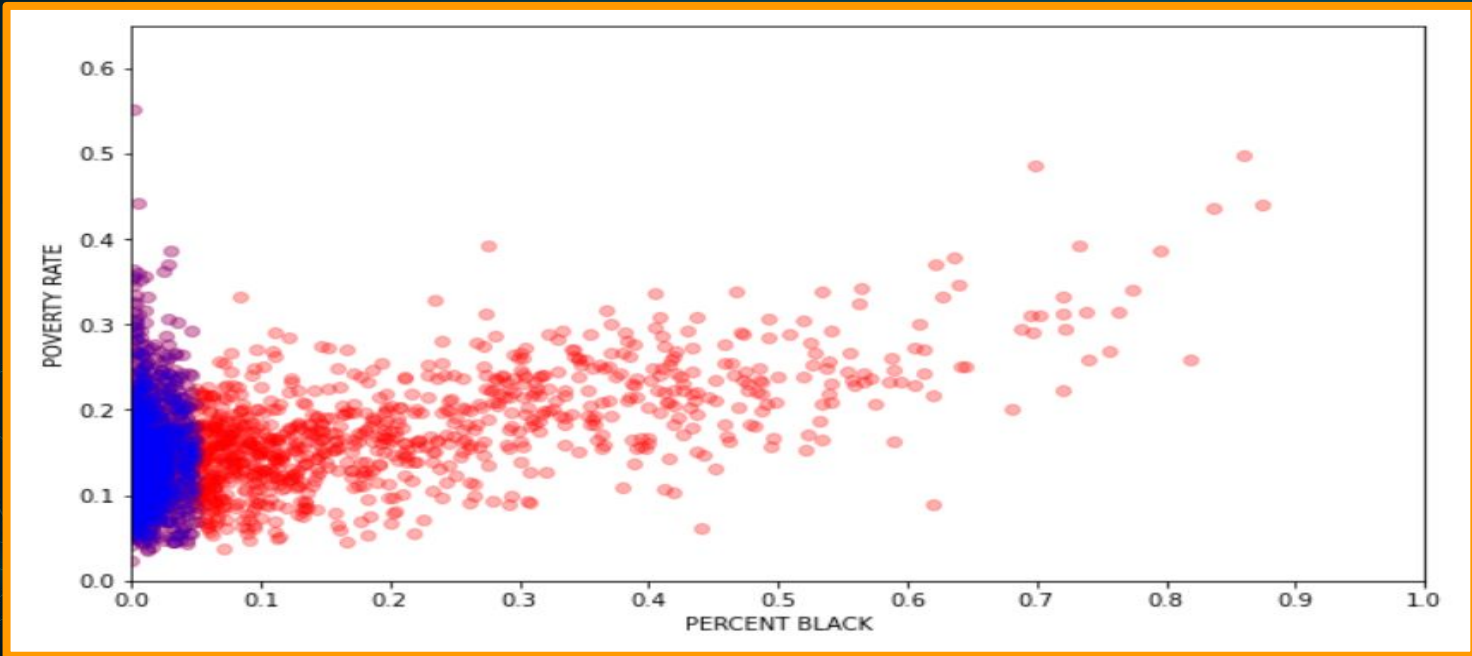
Poverty Rate - Models & R2 Scores

Model	Lasso	Linear Regression	Random Forest Regressor	Ada Boost Regressor	Gradient Boosting Regressor
Test	0.481	0.442	0.431	0.376	0.133
Cross Val Mean	0.419	0.425	0.462	0.349	0.348
Cross Val Std	0.065	0.063	0.058	0.006	0.062

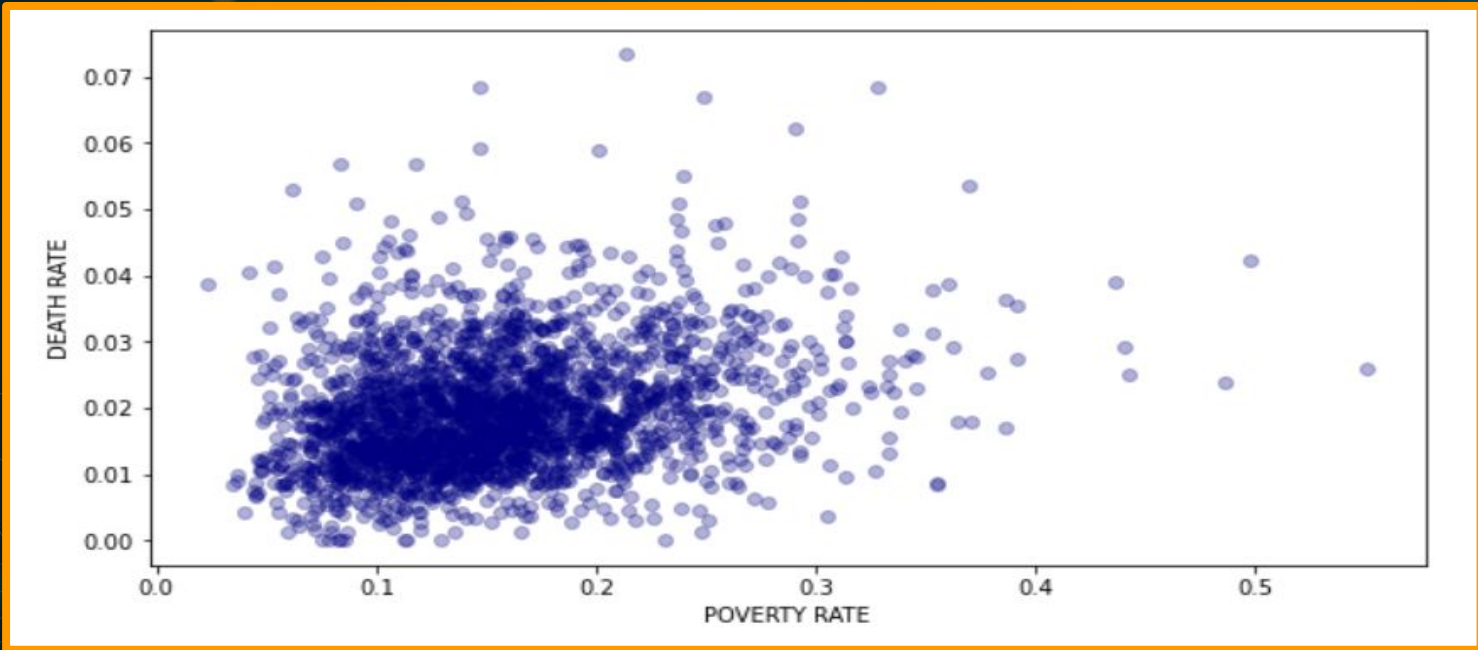
Top 20 Feature Importances for Poverty Rate



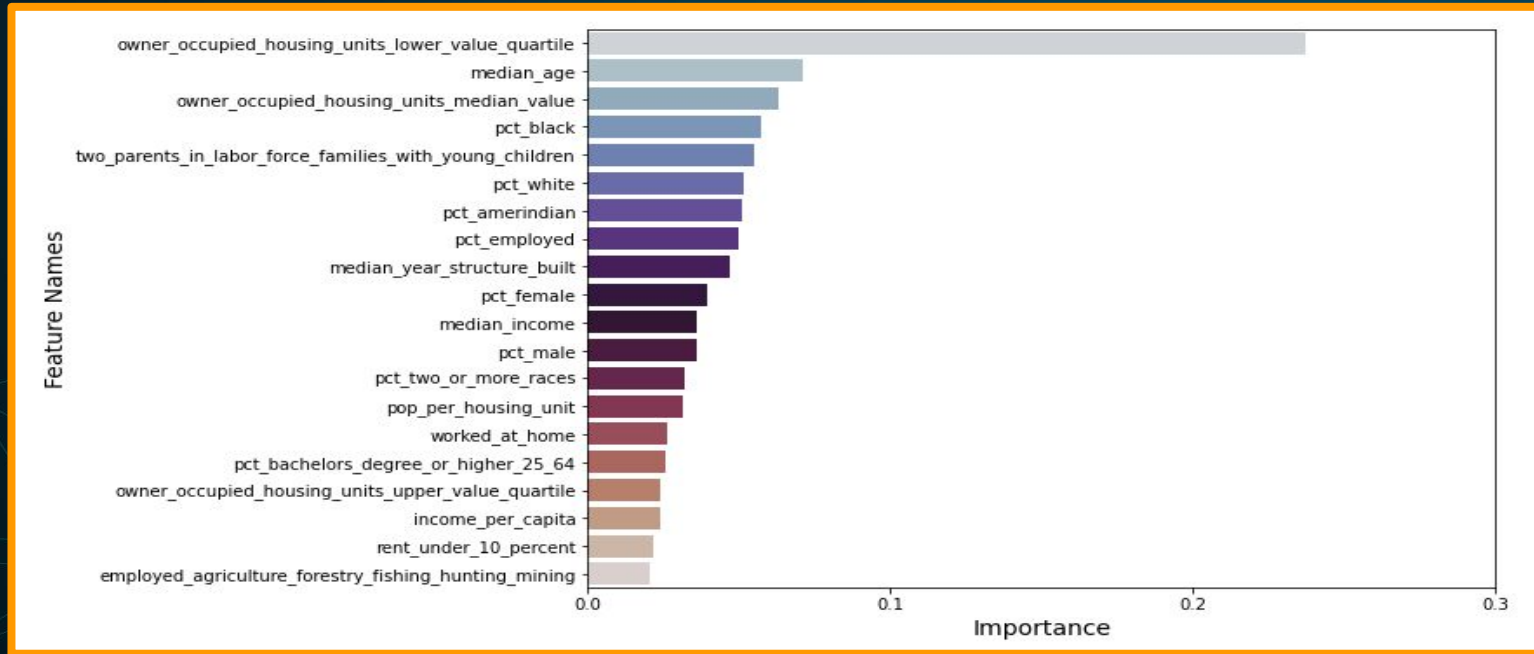
Percent Black Population vs. Poverty Rate



Poverty Rate vs. Death Rate



Top 20 Feature Importances for Death Rate



Death Rate - Models & Scores

Model	Baseline	Linear Regression	Random Forest Regressor	Ada Boost Regressor	Gradient Boosting Regressor	Voting Regressor
RSME	0.00893	0.00775	0.00715	0.00768	0.00719	0.00712
Test	-	0.246	0.358	0.259	0.352	0.364
Cross Val Mean	-	0.272	0.352	0.271	0.348	0.360
Cross Val Std	-	0.072	0.047	0.053	0.046	0.048

Results and Conclusions

Results

- Voting Regressor Model had best results
- Model RMSE: 0.00712 vs Baseline RMSE: 0.00893
- But Low R^2 score - 0.364

Conclusions

- Poverty rates and covid death rates are related
 - Percent of population living in low income housing
 - Median income
- Lives can be saved if resources and funds are properly allocated to communities in need



Next Steps

- Looking at insurance rates vs death rates
- Look at percent of population working in service industry vs death rates
- Sentiment analysis of political ideations in higher death rate communities
- Look at top news outlets in communities vs death rate

THANKS!

Do you have any questions?

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