Exploring the Relationship Between Subjective Workload and System Usability in Voice User Interfaces

Hypothesis

There is a negative correlation between usability (SUS) and task load (RTLX); as usability increases, perceived task load decreases.

Results:

Findings

From the analysis conducted on the relationship between System Usability Scale (SUS) and Raw Task Load Index (RTLX) scores, the following key findings emerged:

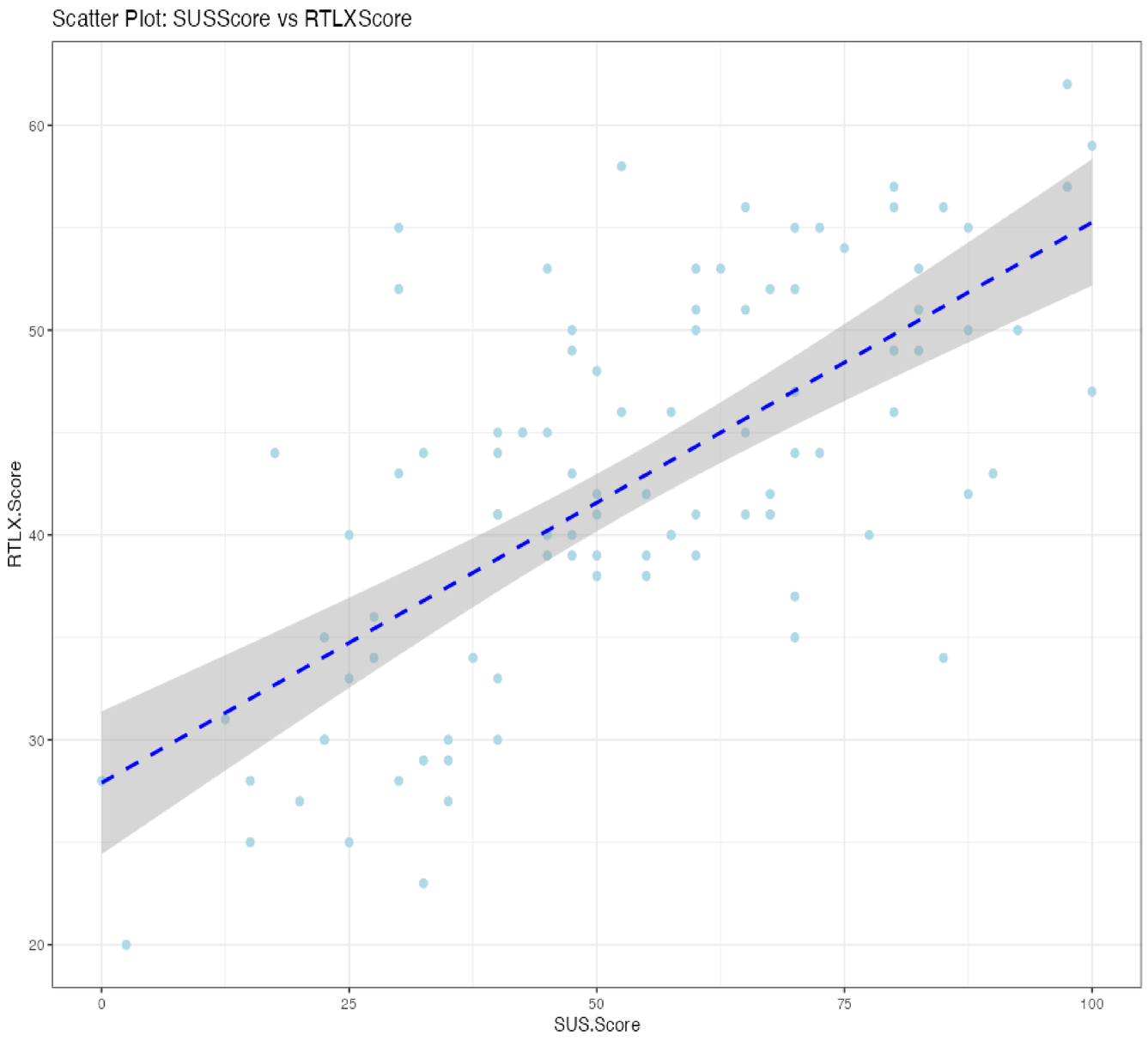
Descriptive Statistics:

1. The **mean SUS score** was **53.7**, indicating moderate usability, with individual scores ranging from 0 to 100.
2. The **mean RTLX score** was **42.59**, reflecting moderate perceived task load, with individual scores ranging from 20 to 62.
3. SUS scores showed a broader spread (with a standard deviation of 22.53), while RTLX scores were more clustered around their mean (standard deviation of 9.94).

Metric	SUS Score	RTLX Score
Mean	53.7	42.59
Median	52.5	42.5
Standard Dev.	22.53	9.94
IQR	34.38	12.75

Correlation Analysis

- Pearson Correlation analysis revealed a significant negative correlation between SUS and RTLX scores ($r = -0.673$, $p < 0.001$). This indicates that higher usability is associated with a lower perceived task load.
- The strength of the correlation (close to -0.7) suggests a substantial inverse relationship between usability and workload. The more usable a system is perceived to be, the less cognitive effort or workload users report.



Discussion

- **Interpretation**: The negative correlation (-0.673) between SUS and RTLX suggests that as usability improves (higher SUS scores), the perceived workload decreases (lower RTLX scores). This supports the hypothesis that usability and task load are inversely related.
- **Significance**: Systems with higher usability tend to be less cognitively demanding on users, which is an important consideration in user-centered design. These findings highlight the importance of focusing on usability to reduce perceived workload and improve user satisfaction.

Limitations

- **Sample Size**: The results are based on a limited sample size, which may not be fully representative.
- **Self-reported Data**: Both SUS and RTLX scores rely on participants' subjective assessments, which can introduce bias.
- **Context**: The study was conducted in a specific user context, limiting its generalizability to other domains or user interfaces.

Future Work

- **Larger Samples**: Conduct the study with a more diverse and larger sample size for more generalizable results.
- **Task Complexity**: Explore the impact of task complexity on the relationship between usability and workload.
- **Additional Metrics**: Incorporate other usability or workload measures for a more comprehensive analysis.

Conclusion

The study demonstrates a statistically significant negative correlation between usability (SUS) and task load (RTLX), reinforcing the importance of usability in reducing user workload. Further research is needed to explore this relationship across different user interfaces and contexts.

Student ID : 24216940
Student Name :Vaishnavi Kandikonda

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