The STPL DSL interface can be tested at the following link:
https://tinyurl.com/stpl-dsl-interface

Problem Formulation

With the rise in autonomous vehicles, the dependency of robust perception systems rise in conjunction.

Spatio-Temporal Perception Logic (STPL) is used to write formal requirements for perception systems; however, writing requirements in the specification language with no interface or development support leads to the following issues:

- Requirements become verbose and complex to manage.
- Safety assurance depends on the user’s ability.
- STPL is limited to expert users with knowledge in temporal and spatial logic.

Interface Components

The designed domain-specific language (DSL) interface supports the following set of components to reduce overhead and development time and increase accessibility.

Language Server

The interface implementation utilizes a Language Server Protocol to support the set of interface components.

Pattern Matching

The implementation takes advantage of regular expressions (regex) to perform pattern matching, syntax highlighting, indentation, and snippet insertion.

The use of a TextMate grammar enabled the syntax highlighting. For example, to match the entry point of a function declaration, the following regex is used:

```
^\s*(func)\s+\(\?[A-Za-z_][A-Za-z0-9-]*/\s*\)
```

This regex is described as: “At the start of a line, match zero or more whitespace characters until func is matched, then match one or more whitespace characters with a lookahead matching any alpha character or underline followed by zero or more alphanumeric characters or whitespaces and ending with ()”.

Results

The DSL interface can be expanded to support:

- Hovering to detail temporal operators, functions, etc.
- Real-time diagnostics and error reporting
- Embedded languages to capture STPL string syntax.

Future Work

The STPL DSL interface can be tested at the following link:
https://tinyurl.com/stpl-dsl-interface