Reproduction Guide for SARSA-FIS Hybrid Framework

This document provides the step-by-step procedure to replicate the experiments reported in 'Integrating SARSA-FIS Hybrid Learning with Game-Theoretic Insights for Sustainable Forex Trading'.

1. Platform Setup
   - Use MetaTrader 5 (build 5320 or later).
   - Enable algo-trading permissions and Expert Advisors.
   - Copy the MQL5 EA files (available upon request) into the MQL5/Experts directory.

2. Data Preparation
   - Download GBPUSD historical M15 data from 30 June 2020 to 2 July 2024.
   - Ensure the same broker feed or normalize pip values to avoid tick discrepancies.
   - Save normalized data to /MQL5/Files/ for the EA to access.

3. Initialization
   - On first run, EA generates SARSA_QTable_GBPUSD.txt, SARFIS_Weights_GBPUSD.txt, and MaxDrawdownStatus.txt automatically.
   - Ensure all three files remain in /MQL5/Files/ during operation.

4. Execution
   - Attach EA to GBPUSD M15 chart.
   - Verify journal output for Q-table and FIS updates per tick.
   - Backtest with 'Every tick' model from 1 Jan to 30 Jun 2025 for main results.
   - Optionally run 2023 period for robustness validation.

5. Result Verification
   - Compare balance curves and performance metrics (Profit Factor, Sharpe Ratio, Drawdown) with those reported in Tables 2-3 of the manuscript.
   - Validate pseudocode logic from docs/Pseudocode_Structure.txt.

6. Continuation Runs
   - Restart MT5 with the same Files directory to preserve learned weights.
   - Each subsequent run refines Q-table and fuzzy weights incrementally.

7. Reproducibility Notes

- Use identical MT5 build, tick source, and data normalization.
- Set fixed RNG seed in code for deterministic replication.
- Confirm log files and equity curves match reference outputs in /results.

Upon completion of the patent process, full executable source code and configuration files will be made available at https://github.com/jonifat/SARSA-FIS-Trading or by contacting the corresponding author (parwadi@trisakti.ac.id).