digraph TradingSystem {

rankdir=LR;

node [shape=box, style=filled, fillcolor=lightblue, fontname="Arial", fontsize=12];

edge [color=navy, fontname="Arial", fontsize=10];

// 分群：資料預處理

subgraph cluster\_data\_preprocessing {

label="資料預處理";

color=lightgrey;

"資料預處理模組" [fillcolor=lightgreen];

"設定檔" [fillcolor=lightyellow];

"工具模組" [fillcolor=lightyellow];

"推播通知模組" [fillcolor=lightyellow];

}

// 分群：模型訓練

subgraph cluster\_training {

label="模型訓練";

color=lightgrey;

"信號生成模組" [fillcolor=lightgreen];

"訓練主控" [fillcolor=lightgreen];

"超參數搜尋模組" [fillcolor=lightgreen];

"批次切分與批次訓練" [fillcolor=lightgreen];

"風險優化" [fillcolor=lightgreen];

}

// 分群：模擬與測試網

subgraph cluster\_simulation\_testnet {

label="模擬與測試網";

color=lightgrey;

"模擬交易模組" [fillcolor=lightgreen];

"交易環境模組" [fillcolor=lightgreen];

"測試網模組" [fillcolor=lightgreen];

}

// 分群：監控與介面

subgraph cluster\_monitoring\_interface {

label="監控與介面";

color=lightgrey;

"GUI介面模組" [fillcolor=lightgreen];

"最佳參數推送模組" [fillcolor=lightgreen];

}

// 分群：備份與資安

subgraph cluster\_backup\_security {

label="備份與資安";

color=lightgrey;

"檢查點模組" [fillcolor=lightgreen];

}

// 分群：長期穩定性

subgraph cluster\_long\_term\_stability {

label="長期穩定性";

color=lightgrey;

"搜尋結果查詢與繪圖分析模組" [fillcolor=lightgreen];

"績效分析模組" [fillcolor=lightgreen];

}

// 分群：獎勵計算

subgraph cluster\_reward\_calculation {

label="獎勵計算";

color=lightgrey;

"獎勵計算模組" [fillcolor=lightgreen];

}

// 分群：環境配置

subgraph cluster\_config {

label="環境配置";

color=lightgrey;

".env.txt" [fillcolor=lightyellow];

}

// 數據流與依賴關係

"資料預處理模組" -> "信號生成模組" [label="數據集"];

"信號生成模組" -> "訓練主控" [label="信號"];

"信號生成模組" -> "交易環境模組" [label="信號"];

"信號生成模組" -> "測試網模組" [label="信號"];

"訓練主控" -> "超參數搜尋模組" [label="訓練參數"];

"訓練主控" -> "檢查點模組" [label="模型與優化器"];

"超參數搜尋模組" -> "交易環境模組" [label="參數"];

"超參數搜尋模組" -> "獎勵計算模組" [label="交易結果"];

"批次切分與批次訓練" -> "交易環境模組" [label="批次數據"];

"批次切分與批次訓練" -> "超參數搜尋模組" [label="批次數據"];

"批次切分與批次訓練" -> "獎勵計算模組" [label="交易結果"];

"風險優化" -> "模擬交易模組" [label="風險參數"];

"風險優化" -> "獎勵計算模組" [label="交易結果"];

"模擬交易模組" -> "交易環境模組" [label="交易數據"];

"模擬交易模組" -> "獎勵計算模組" [label="交易結果"];

"交易環境模組" -> "獎勵計算模組" [label="交易結果"];

"交易環境模組" -> "測試網模組" [label="交易數據"];

"測試網模組" -> "獎勵計算模組" [label="交易結果"];

"獎勵計算模組" -> "檢查點模組" [label="獎勵"];

"檢查點模組" -> "最佳參數推送模組" [label="參數"];

"最佳參數推送模組" -> "交易環境模組" [label="參數"];

"最佳參數推送模組" -> "測試網模組" [label="參數"];

"最佳參數推送模組" -> "績效分析模組" [label="交易結果"];

"績效分析模組" -> "搜尋結果查詢與繪圖分析模組" [label="績效數據"];

"搜尋結果查詢與繪圖分析模組" -> "GUI介面模組" [label="報表與圖表"];

"GUI介面模組" -> "推播通知模組" [label="通知"];

"工具模組" -> "資料預處理模組" [label="錯誤記錄、硬體監控"];

"工具模組" -> "信號生成模組" [label="錯誤記錄"];

"工具模組" -> "訓練主控" [label="錯誤記錄"];

"工具模組" -> "超參數搜尋模組" [label="錯誤記錄、硬體監控"];

"工具模組" -> "模擬交易模組" [label="錯誤記錄、硬體監控"];

"工具模組" -> "交易環境模組" [label="錯誤記錄、硬體監控"];

"工具模組" -> "測試網模組" [label="錯誤記錄、硬體監控"];

"工具模組" -> "獎勵計算模組" [label="錯誤記錄、硬體監控"];

"工具模組" -> "檢查點模組" [label="錯誤記錄、硬體監控"];

"工具模組" -> "風險優化" [label="錯誤記錄"];

"工具模組" -> "批次切分與批次訓練" [label="錯誤記錄"];

"工具模組" -> "績效分析模組" [label="錯誤記錄、硬體監控"];

"工具模組" -> "最佳參數推送模組" [label="錯誤記錄、硬體監控"];

"工具模組" -> "搜尋結果查詢與繪圖分析模組" [label="錯誤記錄、硬體監控"];

"工具模組" -> "GUI介面模組" [label="錯誤記錄、硬體監控"];

"推播通知模組" -> "資料預處理模組" [label="通知"];

"推播通知模組" -> "信號生成模組" [label="通知"];

"推播通知模組" -> "訓練主控" [label="通知"];

"推播通知模組" -> "超參數搜尋模組" [label="通知"];

"推播通知模組" -> "模擬交易模組" [label="通知"];

"推播通知模組" -> "交易環境模組" [label="通知"];

"推播通知模組" -> "測試網模組" [label="通知"];

"推播通知模組" -> "獎勵計算模組" [label="通知"];

"推播通知模組" -> "檢查點模組" [label="通知"];

"推播通知模組" -> "風險優化" [label="通知"];

"推播通知模組" -> "批次切分與批次訓練" [label="通知"];

"推播通知模組" -> "績效分析模組" [label="通知"];

"推播通知模組" -> "最佳參數推送模組" [label="通知"];

"推播通知模組" -> "搜尋結果查詢與繪圖分析模組" [label="通知"];

"設定檔" -> "資料預處理模組" [label="參數"];

"設定檔" -> "信號生成模組" [label="參數"];

"設定檔" -> "訓練主控" [label="參數"];

"設定檔" -> "超參數搜尋模組" [label="參數"];

"設定檔" -> "模擬交易模組" [label="參數"];

"設定檔" -> "交易環境模組" [label="參數"];

"設定檔" -> "測試網模組" [label="參數"];

"設定檔" -> "獎勵計算模組" [label="參數"];

"設定檔" -> "檢查點模組" [label="參數"];

"設定檔" -> "風險優化" [label="參數"];

"設定檔" -> "批次切分與批次訓練" [label="參數"];

"設定檔" -> "績效分析模組" [label="參數"];

"設定檔" -> "最佳參數推送模組" [label="參數"];

"設定檔" -> "搜尋結果查詢與繪圖分析模組" [label="參數"];

"設定檔" -> "GUI介面模組" [label="參數"];

"設定檔" -> "推播通知模組" [label="參數"];

"設定檔" -> "工具模組" [label="參數"];

".env.txt" -> "推播通知模組" [label="環境變數"];

".env.txt" -> "測試網模組" [label="API金鑰"];

}

