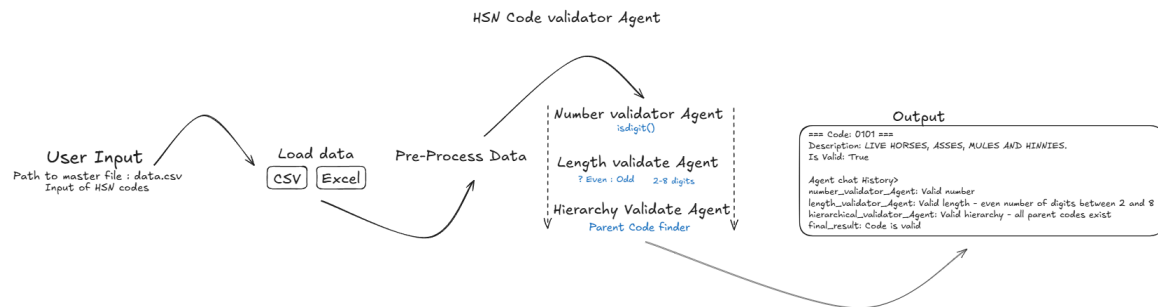


# HSN-Code-validation-agent

## Agent Design:



## Project Structure

```
HSN_agent/
├──
├── init.py          # Package initialization, data loading
├──
├── agent.py        # Main agent implementation
├──
├── config.py       # Configuration and HSN dictionary
├──
└── data.csv        # HSN code data
```

## Agent Architecture

- **Base Agent:** Uses Google's ADK (Agent Development Kit)
- **Model:** Uses gemini-2.0-flash for processing
- **Core Components:**
  - Validation tools
  - Hierarchy checking
  - Analysis generation

## Tools Implementation

# Three main tools:

1. `validate_hsn_codes()`

- Input: Single code or list of codes
- Checks: Format (2-8 digits, even length)
- Output: Validation status and message

2. `check_hierarchies()`

- Input: Single code or list of codes
- Checks:
  - Existence in HSN dictionary
  - Parent code validation
- Output: Hierarchy status and description

3. `analyze_validation_results()`

- Input: Single code or list of codes
- Combines results from both tools
- Generates comprehensive analysis

---

## Prompt Engineering

```
root_agent = Agent(
    name="hsn_agent",
    model="gemini-2.0-flash",
    description=(
        "Agent to validate and analyze multiple HSN codes with detailed format
    ),
    instruction=(
        "You are a helpful agent who validates multiple HSN codes and provide
        "For each validation request:\n"
        "1. Process single or multiple HSN codes\n"
        "2. Validate each code's format (2-8 digits, even length)\n"
        "3. Check each code's existence in the HSN hierarchy\n"
```

```
"4. Verify all parent codes exist for each code\n"
"5. Provide comprehensive analysis of validation results\n"
"6. Include descriptions of valid codes and their parent codes\n"
"7. Give clear guidance on how to fix any issues found"
),
tools=[validate_hsn_codes, check_hierarchies, analyze_validation_results]
)
```

---

## Data Flow



Input → Validation → Hierarchy Check → Analysis → Output

- Input: HSN code(s)
- Validation: Format checking
- Hierarchy: Parent code validation
- Analysis: Comprehensive report generation
- Output: Detailed analysis with descriptions

---

## Key Features

- Batch processing support
  - Progress tracking with tqdm
  - Detailed error messages
  - Parent code validation
  - Comprehensive analysis output
-

⇒ The agent is simple in its structure and fulfils the problem statement, It has two necessary tools which validates the output and provides the output, We have used the gemini-2.0-flash model using its API. And, thus have been tested in the ADK web interface for all edge cases.

