**Desktop Buddy (Vee) Project Report**

**Project Overview**

The Desktop Buddy project ("vee.py") is a rich, personality-driven desktop companion that interacts with the user based on keyboard activity, mouse movements, system resource monitoring, and active application usage. Built using PyQt5, MediaPipe, and several system libraries, Vee is designed for real-time feedback, emotional interaction, entertainment, and productivity reminders.

**Key Technologies**

* **Python 3**: Main language.
* **PyQt5**: GUI and system tray management.
* **Pynput**: Capturing keyboard and mouse events.
* **psutil**: Monitoring CPU and memory usage.
* **pygetwindow**: Fetching the active window titles.
* **JSON**: Storing persistent configuration and high scores.
* **QPropertyAnimation**: Visual effects and window movement.
* **OS and Subprocess Libraries**: Handling cross-platform operations like clipboard access.

**Core Features**

**1. Personality and Mood System**

* **Mood Range**: From -10 (very negative) to +10 (very positive).
* **Positive/Negative Behavior**: Dynamically changes message tone (hype, roast, calm down).
* **Time-based Messages**: Morning, afternoon, night, and late-night shutdown messages.
* **Personalized Replies**: Adjusts messages with emojis based on time of day.

**2. Reactive Messaging**

* **Focus-Based Responses**:
  + Detects whether the user is using coding editors (VS Code) or browsers (Chrome, Firefox, etc.).
  + Responds differently based on active window title changes.
* **Resource Monitoring**:
  + Checks CPU and RAM usage every 30 seconds.
  + Warns when resources exceed thresholds (CPU >80%, RAM >85%).
* **Idle Detection**:
  + If user is inactive for >2 minutes, playful idle prompts are shown.

**3. Interactive Typing Detection**

* **Trigger Words**:
  + Reacts to common slang words (e.g., "lol", "bruh", "sus", etc.).
* **Secret Combos**:
  + Hidden Easter eggs triggered by typing specific sequences (e.g., "kittycode", "matrix", "nour").
* **Easter Eggs**:
  + Special funny or thematic responses for specific typed words (e.g., "uwu", "python", "friday").

**4. System Tray Integration**

* **Persistent Tray Icon**:
  + Options to show, hide, switch themes, toggle startup messages, switch buddy image, and exit.
* **Context Menu with Mini-Games**:
  + Games can be launched directly from right-click menu.

**5. Animation and Visual Feedback**

* **Bounce Animation**:
  + Cute bounce whenever Vee speaks.
* **Speech Bubble Styling**:
  + Color changes based on mood (positive, negative, neutral).
* **Image Switching**:
  + Alternate between two buddy images.

**6. Games (Mini Entertainment Hub)**

* **Catch the Cookie**:
  + A falling object game with a moving cookie.
  + High score system based on timing.
* **Guess the Emoji**:
  + Trivia game with emoji-based multiple-choice questions.
* **Draw Mode**:
  + Timed drawing canvas where users can create art.
  + Option to save drawings as PNG.
* **Rapid Click Challenge**:
  + Click as many times as possible in 5 seconds.
  + Tracks and updates high scores.

**Configuration Management**

* **Persistent Storage**:
  + vee\_config.json file stores user preferences, theme selection, high scores, and buddy image paths.
* **Auto-Saving**:
  + Updates happen automatically after settings changes.
* **Fallback Protection**:
  + Defaults restored if config file is missing or corrupted.

**Error Handling**

* **Resilient Listeners**:
  + Tries to initialize keyboard and mouse listeners.
  + Fallback polling if listeners fail.
* **Safe Game Launching**:
  + Games wrapped in try-except blocks.
  + Detailed traceback logging for crash diagnosis.
* **Window Detection Errors**:
  + Alternative methods and exception handling in case pygetwindow fails.

**Code Architecture**

* **Highly Modular**:
  + Separated concerns: desktop buddy management, games, configuration, system monitoring.
* **Scalable**:
  + Easy to add new themes, messages, or mini-games.
* **Thread-Safe**:
  + All timers, listeners, and UI updates are carefully managed.
* **Custom Event Handling**:
  + Right-click anywhere brings up buddy menu.
  + Dragging enabled by click-dragging the image, speech bubble, or drag bar.

**UX/UI Details**

* **Smooth Transparent Window**: Frameless, always-on-top but non-intrusive.
* **Dynamic Font Sizes**: Adjusts speech bubble font based on text length.
* **Speech Bubble Auto-Clear**: Messages fade after 4 seconds.
* **Multiple Themes**: Default, Dark, Pastel.
* **Mini-Game Aesthetics**: Games are playful, polished, and kid-friendly.

**Strengths**

* Extremely responsive and charming interaction design.
* Built-in gaming and emotional feedback loop.
* Smooth animations and visual cues enhance personality.
* Robust resource management and performance optimization.

**Areas for Potential Enhancement**

* **Cross-Platform Compatibility**: Currently relies on Windows-specific APIs for media keys.
* **Add More Emotional Depth**: Could introduce sadness, anger, excitement states.
* **Better Memory Management for Long Uptime**: After hours of idle use.
* **Expand Game Library**: More mini-games could make the buddy even more entertaining.

**Conclusion**

The Desktop Buddy (Vee) is a feature-rich, emotionally intelligent, and playful desktop companion. It masterfully blends humor, encouragement, mild trolling, and useful reminders while maintaining system performance and a strong sense of charm. Its modular design, robust error handling, and fun mini-games make it an outstanding project, suitable for further expansion into more advanced AI or productivity applications.