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Hardware Monitoring Suite

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Abstract: Hardware Monitoring Suite is a system monitoring app which will be used for tracking of hardwarecomponents such as CPU (temperatures, voltages), fan speeds, Core temperature, system hardware detection , PSU load, among others. In addition, it will also provide suggestion of better components than the current components, as well as news about latest hardware for upgrades.

I. INTRODUCTION

As currently there is a lack of user-friendly and centralized hardware monitoring tools. It is critical to keeptrack of the operational parameters of computer hardware inorder to keep it in good working order. During hardware temperature monitoring, high temperatures cause the computer system to perform erratically, potentially loweringthe equipment's service life. As a result, in unattended server rooms, cluster servers, and vast cloud server platforms, monitoring hardware characteristics is critical. Diverse manufacturers routinely make desktop computers, notebookcomputers, smart phones, tablets, and intelligent terminals that can run applications, all with significantly different hardware compositions and manufacturing techniques. The health status of the hardware device is difficult to assesseffectively. If we can do horizontal and vertical modeling analysis of historical data of various hardware parameters, as well as the health status data of similar hardware equipment, we can analyze the health condition of the hardware more effectively and perform timely maintenance.

Furthermore, most existing businesses or schools set up computer room environment monitoring systems to track computer hardware factors like temperature. The flaw is thatit requires a significant amount of hardware to run and is unable to directly monitor the temperature of the computer as well as numerous states and characteristics. At the same time, it is unable to fully utilize the resources of the existing computer system. The user's history of hardware running settings is frequently unavailable to all types of computing devices and intelligent terminal maintenance. This is also extremely inconvenient for hardware maintenance.

In this research, we present a computer hardware monitoring system based on cloud platform from the perspective of user service and on the basis of network monitoring parameters. It's a hardware monitoring solution for cloud computing that separates data collecting and storage management. The cloud-based computer hardware monitoring solution separates data storage and access. It combines modeling analysis of storage hardware parameters of massive volumes of data based on the platform to provideusers with useful hardware maintenance information. The overall design of the hardware monitoring system is Presented in this work, followed by the system structure and related essential technologies of implementation.

II. LITERATURE SURVEY

Many software engineering tasks, including program profiling, dynamic optimization, and software testing, have been successfully implemented using hardware monitoring techniques. While improvements in the efficiency of using instrumentation for program execution monitoring have been made, research revealed that the use of hardware mechanisms can eliminate or greatly reduce the need for instrumentation. The key trade-off in balancing hardware monitoring and instrumentation use is the amount and type of observations that must be made versus the efficiency required for the approach. Hardware monitoringhas been successfully used in balancing these trade-offs insoftware engineering tasks, as demonstrated in the research presented in this paper. [1]

This paper examines the differences between Node.jsand the traditional web server, IIS. Node provides a high performance, asynchronous event-based several so it is Cross platform, back-end JavaScript runtime environmentthat runs on V8 engine and executes JS code outside a webbrowser. This paper shows how the architectural choices of Node.js and traditional web server brings an affect in the way applications perform that run on them. [2]

This study presents a computer hardware monitoring system based on Cloud Platform, which separates data collecting, storage, and analysis. [3]

We comprehend how it determines the state of computer equipment's health. It is useful for hardware fault monitoring, management, and analysis.[4]

In this research paper the current top-level frameworks based on JavaScript technology analysis isgiven. There are many factors influencing the selection of a framework, and primarily the web application structure needs to be known and what kind of help should be obtained from the framework.

The analysis showed that Backbone is significantly different from AngularJS, Emberand Knockout, because it leaves a lot of decision making to developers. [5]

HTML is the predominant mark up language for web pages. It uses tags to create structured documentsvia semantics for text—such as headings, paragraphs, and lists—as well as for links and other elements. HTML also lets authors embed images and objects in page sand can create interactive forms.[6]

This paper describes the planning and execution of are cent experiment which utilized a hardware monitoring device and associated analysis programs to evaluate the performance of a computer system which is employed for real-time satellite command and control.

The evaluated system was the portion of the UnitedStates Air Force Satellite Control Facility Real-Time Data System, located in Sunnyvale, California. Communication line, processor, and channel utilization were analyzed, as was the interaction of Executive, Input/Output, and Application software modules.[7]

III. EXPERIMENTALSET-UP

The entire application has been created for the Windows andLinux platforms. The application was tested on a Windows10 system with 8GB RAM for the Windows platform. Linuxtesting is carried out in a virtual computer with the sameprocessor and 4GB of RAM. The project's technology stack is as follows: We used HTML, CSS, Tailwind, and JavaScript for the frontend. Electron is a graphical user interface framework for desktop applications that uses the JS programming language. We use node.js for the backend, which allows us to use JavaScript. System-information is the name of the library.

IV. PROPOSED SYSTEM

A. Explanation of Proposed System

Core desktop application powered by electron and node.js. System information library: - It is a System and OS information library for node.js.

Core modules of the application are:

1) Hardware information module
2) Realtime monitoring module
3) UtilityModule

OSD(OnScreenDisplay) overlay drawn over windows that displays selected outputs rendered ontop of the currently running application.

B. Design Flow And Block Diagram:

1) Core Module, which is the Hardware information module. It gives the specification of the information system it is running on.
2) The user can interact with the real time monitoring module which is contained on a separate page for better interaction.
3) The user can then access the utility module which houses various overlay tools like FPS counters, latency, ping tests, etc.

C. Block Diagram

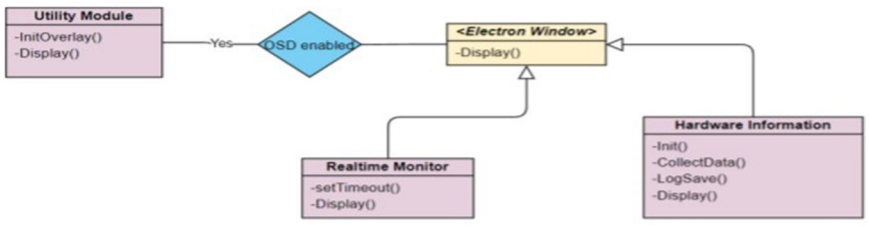


Figure 3.1: Design Flow

D. Modules

1) Module-1

Hardware information module:

a) Displays static information about the system hardware, and temporarily logs to a file.

b) This information includes make/model of the CPU, GPU, RAM speeds and clock timings, OS information and HDD usage.

2) Module-2

Realtime monitoring module:

a) Displays real-time info about the system in a dynamic manner.

b) Uses node libraries that are wrappers of low level C libraries to get real-time information about system CPU temperatures, fan speeds, power voltages, SSD speeds, and VRAM usage, etc.

c) Output is verbose and cross platform, irrespective of the OS.

3) Utility Module

a) This module houses various small tools to improve system monitoring workflow.

b) This includes, but not limited to: FPS counter, latency and ping test and real-time data like CPU and GPU temps and usage.

c) All these utilities, shown on your screen through OSD (On-screen display).

E. Pseudocode Algorithm

1) Call IPC Renderer and listen for EVENT

2) For every component of page:

3) Display Component

4) Listen for EVENT

5) If EVENT or Button is pressed

6) Send IPC Signal

7) If IPC Signal:

8) Execute SysInfo/OpenHardwareTools API

9) Obtain relevant data

10) Send Data to Renderer

11) Display Data on Frontend

12) News function:

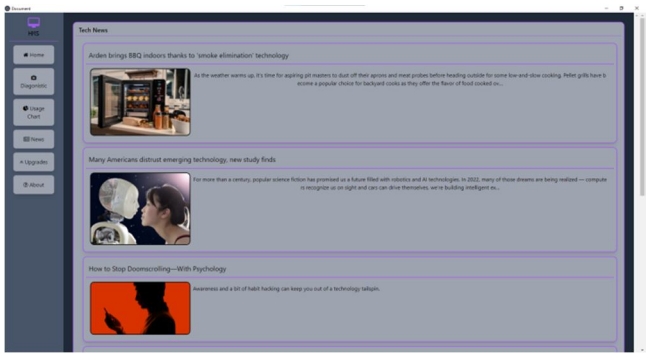
13) Fetch NewsAPI

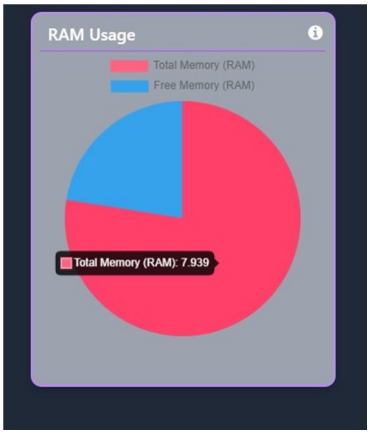
14) Obtain relevant data

15) Send Data to Renderer

16) Display Data on Frontend

F. Expected Output





V. RESULTS

The HW monitoring system integrated with a news API is proposed in this paper. Through regularly reading individual sensors of the computing devices. It can improve the healthcare of the Computing System, allowing it to function smoothly for a long period of time.

With the tool chain created for this project, we have created a software to monitor HW across any PC platform regardless of OS and also integrated various monitoring and news services that are usually not found together, into a centralized software. For this, we used libraries and a news API which automatically checks the host Operating System, executes appropriate commands and shows output in a similar manner irrespective of the OS.

The project is also modular in that any new PC component's readings can be acquired when needed or a certain reading can be removed if it is undesired. So a user can customize their perfect setup with ease.

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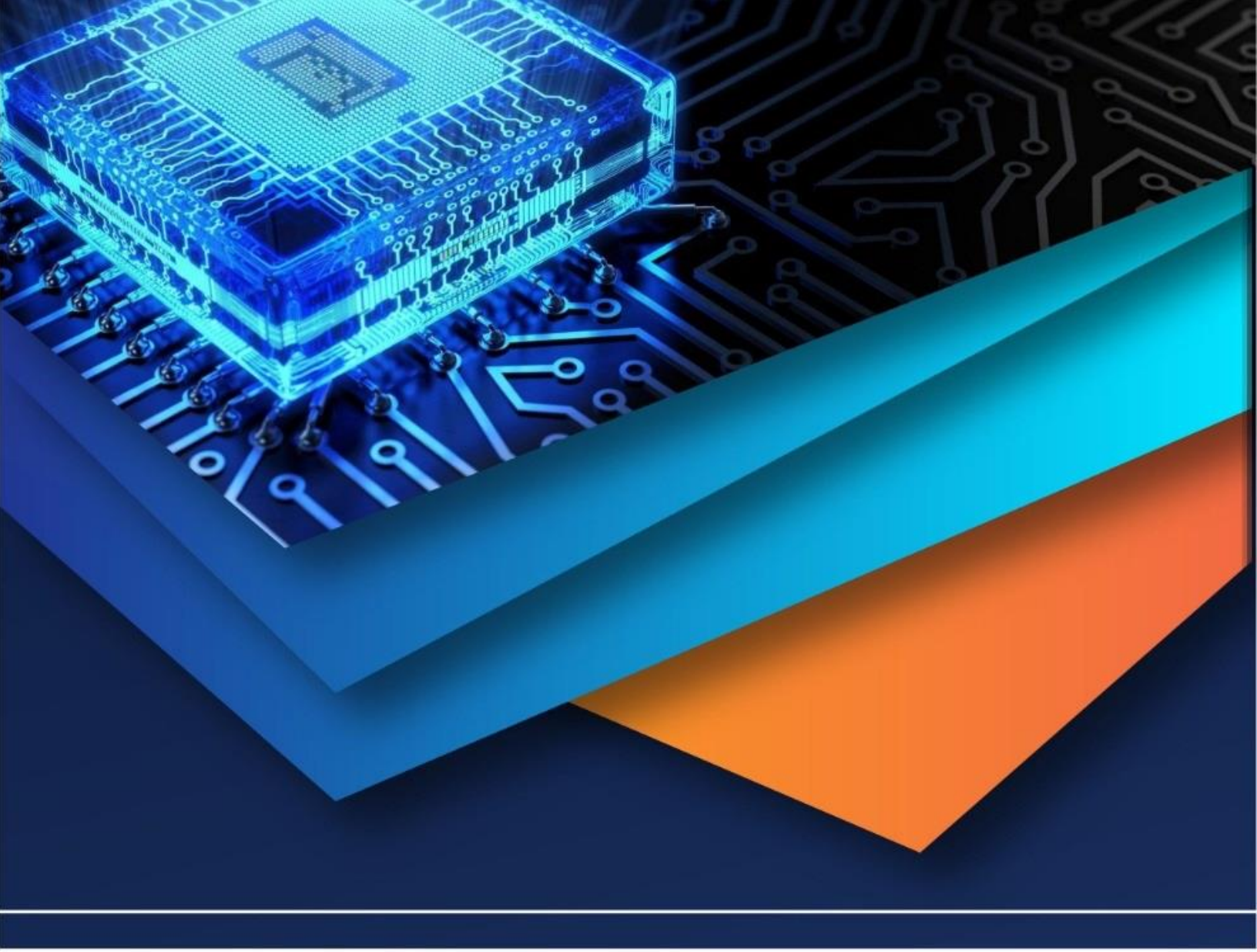

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