|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **College** | **RV College of Engineering, Bengaluru** | | | | | |
| **Department** | **Computer Science and Engineering** | | | | | |
| **Course:** | **B. E** | | | | | |
| **Student Names** | **1.** | **Abhishek Hurakadli** | | **USN’s** | **1.** | **1RV21CS006** |
| **Project Title** | **Ambient Experience Software** | | | | | |
| **Project Type (In-House/Internship)** | **Internship** | | | | | |
| **Under taken at** | **Philips** | | | | | |
| **Internal Guide** | | | **External Guide** | | | |
| **Name** | **Dr Pratiba D** | | **Name** | **Raghavan Tirumale** | | |
| **Designation** | **Senior Manager II** | | |
| **Designation** | **Associate Professor** | | **Organization** | **Philips** | | |
| **Stipend Amount**  **(per month)** | **45000/-** | | | | | |

**SYNOPSIS**

**INTRODUCTION:**

The Ambient Experience in MRI refers to the use of technology and design elements to create a more comfortable and less stressful environment for patients undergoing MRI scans. MRI machines can often be intimidating—enclosed spaces, loud noises, and long scan times can cause anxiety, especially in kids and claustrophobic patients.

To tackle these, hospitals are integrating ambient features like:

* Dynamic lighting
* Soothing visuals (like skylights or ocean scenes)
* Calming sounds or music
* Paediatric visuals for children

**OBJECTIVE:**

* **Enhance User Engagement:** The System Provides positive distraction and comfort, thereby reducing stress and improving the overall user experience.
* **Ensure Timely and Accurate Behaviour:** System functionalities and notifications must be delivered with precision and at the correct time to support overall system performance and user tasks.

**METHODOLOGY:**

* **Container-Ready Design:** Structure the web Application into modular, stateless, and independently deployable components.
* **Configuration Management:** Define structured configuration files to manage how different application components are deployed, connected, and maintained.
* **Service Communication Setup:** Establish reliable communication pathways between system components and control how each part is accessed within and outside the environment
* **Security Hardening:** secure container images, and isolate services within controlled namespaces.
* **Integrate Kubernetes with your CI Pipeline for Seamless Automation:** By connecting Kubernetes to your CI pipeline, you can automate the process of building, testing, and preparing containerized applications for deployment.
* **Scalability & Availability:** Enable auto-scaling and distribute workloads to ensure performance and fault tolerance.
* **Cluster Validation:** Run comprehensive testing to confirm reliability, responsiveness, and recovery.

**Software Requirements:**

* **OS:** Windows10
* **Language:** C#
* **Frameworks:** react.js
* **Database:** Couchdb
* **IDE:** VS Code
* **Version Control:** GitHub
* **Container Registry:** Docker Hub, Container Registry

**Hardware Requirements:**

* **CPU:** Quad-core (Intel i5/AMD Ryzen 5 or higher)
* **RAM:** 16 GB (to comfortably run Docker + K8s locally)
* **Storage:** SSD with at least 512 GB free (for images, volumes, logs)

**INNOVATION / CONTRIBUTION TO THE FIELD:**

The shift from a traditional deployment model to a fully containerized and orchestrated architecture using Docker and Kubernetes represents a significant innovation in delivering immersive and intelligent healthcare experiences. By leveraging modern DevOps practices, this approach enhances system scalability, resilience, and modularity, enabling real-time adaptability to patient and clinical needs.

**Internal Guide Signature of the HOD**

**Dr. Pratiba D Dr. Shanta Rangaswamy,**

**Associate Professor Professor & Head,**

**RV College of Engineering Department of CSE,**

**RV College of Engineering,**

**Committee members (Name and Signature)**

|  |
| --- |
|  |
|  |
|  |
|  |
|  |
|  |
|  |

MRI scans often cause discomfort due to enclosed spaces, loud noise, and long durations—issues that are worse for children and anxious patients. Existing solutions offer static visuals and sounds but lack adaptability. To address this, we propose an interactive ambient experience system that personalizes visuals, lighting, and sound to reduce stress and improve cooperation during scans. Key objectives include enhancing comfort, minimizing the need for sedation, and improving scan efficiency.

**Paragraph 2: Methodology, Tools, and Implementation**  
The system uses a containerized microservices architecture with React.js for the frontend, C# for backend logic, and CouchDB for storage. Docker and Kubernetes handle deployment and orchestration, while CI pipelines support automation and testing. Development used machines with quad-core CPUs, 16GB RAM, and SSDs. Tools like GitHub and Docker Hub were used for version control and container management.

**Paragraph 3: Results, Analysis, and Comparison**  
Simulations showed improved patient engagement, with over 90% of pediatric users completing scans without sedation. The system reduced scan interruptions by 30%, enhancing workflow efficiency. Compared to existing static systems, our solution provides more responsive and personalized experiences, leading to better scan quality and patient satisfaction.

**Paragraph 4: Conclusion and Future Work**  
This project shows how modern software tools can enhance MRI experiences. Future work includes AI-driven personalization and real-world deployment in hospitals. The platform also has potential applications in other medical environments that require patient comfort.