RV College of Engineering®
Mysore Road, RV Vidyaniketan Post,
Bengaluru - 560059, Karnataka, India

EL OBSERVATION RECORD

# Experiential Learning

## For the IV Semester B.E PROGRAMS (ACY 2024-25)
## CS-A

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| Topic | DEPT PROJECT : TELLER LOOP |
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| Subject Faculty | Dr. K Badarinath, Dr. Deepmala N, Dr. Krishnappa HK, Dr. Sowmya |
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# Abstract

| Section | Details |
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| **Problem Statement** | To manually transport via staff or trolleys not only consumes time and resources but also increases the likelihood of human error, contamination risks, and delivery delays, especially during emergencies. |
| **Proposed Solution** | A Teller Loop System, also known as a pneumatic tube transport system (PTS), is a network of vaccum tubes used to send capsules containing medications, documents, or samples quickly and securely between various hospital departments. |
| **Key Technologies Used** | • Carrier Capsules: Sealed containers for medicines or samples.<br>• Pneumatic Tubes: Network of vacuum/suction-enabled tubes.<br>• Stations/Terminals: Entry and exit points across different hospital departments.<br>• Central Control System: Controls routing, speed, and security.<br>• Sensors & IoT Modules: Real-time tracking and alerts.<br>• Backend: Python (FastAPI, Flask)<br>• Frontend: React.js<br>• Database: Django<br>• Cloud/Edge Platforms: AWS IoT Core, Azure Sphere |

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| **Workflow Summary** | 1. System performance audit:<br><br>Analyze capsule dispatch logs and routing delays and identify bottlenecks in high-traffic or priority paths.<br><br>2. Intelligent dispatch & routing<br><br>• Implement dynamic path selection based on current load.<br>• Use smart routing algorithms (e.g., a*, dijkstra) to minimize travel time.<br>• Incorporate priority flags for emergency capsules.<br><br>3. Real-time load balancing<br><br>• Monitor capsule queues across stations.<br>• Distribute dispatch timing to prevent congestion.<br>• Auto-adjust routing based on network pressure.<br><br>4. Integration with hospital systems<br><br>• Automate capsule dispatches triggered by pharmacy/lab orders.<br>• Sync metadata like department, urgency level, and contents type. |

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| **Evaluation Approach** | 1. Performance of the waste detection model (YOLOv5) based on accuracy and speed.<br>2. Route optimization success rate using the Nearest Path Algorithm.<br>3. Effectiveness of IoT sensors in monitoring water quality.<br>4. Real-time responsiveness of the dashboard using WebSockets.<br>5. Overall efficiency measured by reduction in waste and cleanup time. |
| **Objectives** | 1. Reduce manual labor involved in the delivery of medicines and medical items.<br>2. Provide minimalistic and user friendly interface for quick and easy transport<br>3. Minimize the turnaround time for medicine and sample transport between departments.<br>4. Ensure secure and contamination-free transfer<br>5. Optimize resource utilization and increase hospital efficiency.<br>6. To provide a smoother user experience and help society in a novel way. |