Hospital Movement Data Analysis & Intervention Proposal

Optimizing Resource Allocation & Efficiency

Presented by Laya Sharifi, February 27

Introduction

Objective:

- To analyze hospital movement data and propose interventions to improve efficiency, resource allocation, and reduce lost events.

Agenda:

- Key Findings
- Intervention Proposal
- Success Metrics
- Conclusion

Dataset Summary

The dataset tracks hospital movement data, specifically monitoring the flow of individuals (patients, staff, or equipment) within a hospital building. **`timestamp`**, **`roomName`**, **`floorName`**, **`lost`**, **`irAssisted`**, **`moving`**

- **Movement Tracking (`moving`)**: Each entry corresponds to a time-stamped event that tracks the movement of individuals within specific rooms or floors. This helps in identifying high-traffic areas and understanding how people navigate through the hospital.

- **Lost Events (`lost`)**: Iindicates instances where an individual was lost, which could mean either the individual's location was not properly tracked . High values here may point to areas in the hospital where staff or wayfinding improvements are needed.

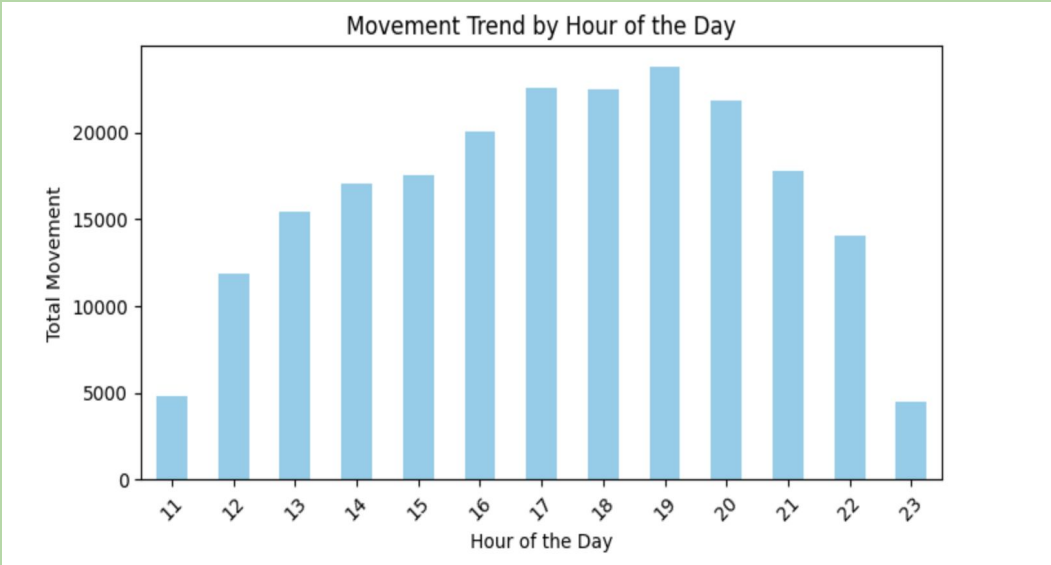
- **Staff Assistance (`irAssisted`)**: Tracks whether a patient or individual needed assistance. Analyzing this helps identify areas where assistance is most needed

Goal:
To understand patterns in hospital movement, identify areas with higher needs for assistance or potential problems (like lost individuals), and improve resource allocation and overall hospital efficiency.

Key Findings : Movement Hours

- **Peak Movement Hours:**The highest movement occurs between **17:00 and 20:00**, with a slight dip at 2**1:00 AM .**
- **Sharp Decline After 21:00 :**There is a noticeable drop in movement after **21:00** with a significant decline at **22:00** and a sharp drop at **23:00**.
- **Low Activity at the Beginning and End of the Time Frame:** Movement is at its lowest at **11:00 and 23:00**, suggesting these hours are either transition periods or times with limited hospital activity.

Time	Movement
7 pm	23798
5 pm	22555
6 pm	22511
8 pm	21852
4 pm	20021



Key Findings: Lost/Assisted Events

Lost Events:

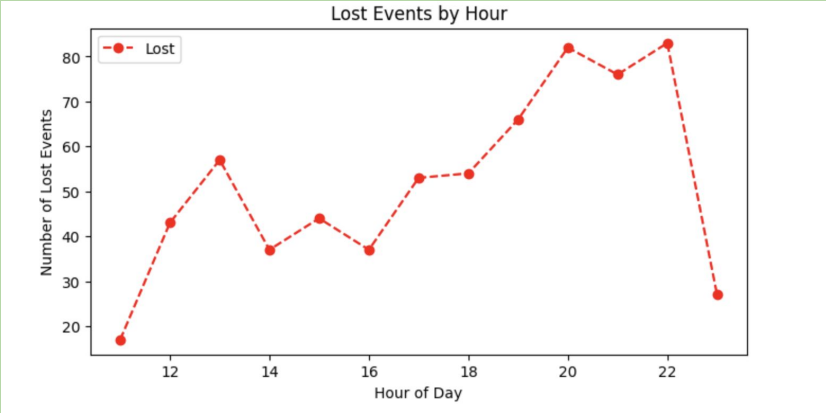
Peak Lost Events: At 1:00 pm, there might be a certain number of lost events.At 22:00 (10 PM), the number of lost events might be higher .

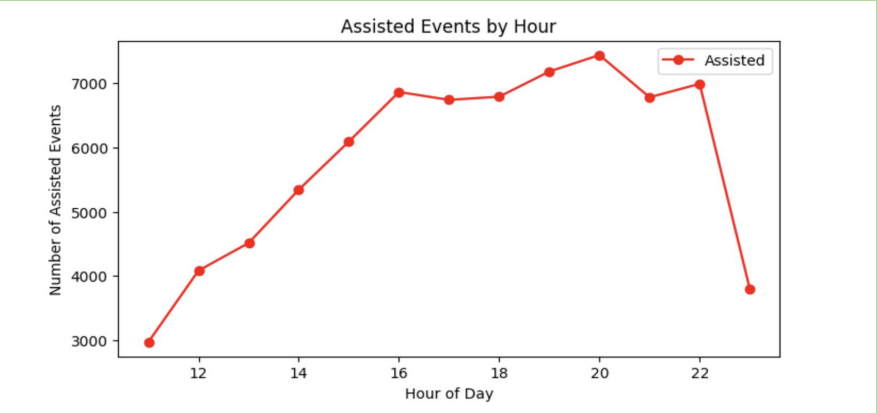
The trend suggests that the number of lost events increases as the day progresses, peaking in the evening or nighttime.

Assisted Events:

Peak Assisted Events: The highest number of assisted events occurs around **20:00**,

Sharp Drop is seen at 23:00, indicating that fewer assistance events occur late at night, possibly due to lower patient/staff activity.





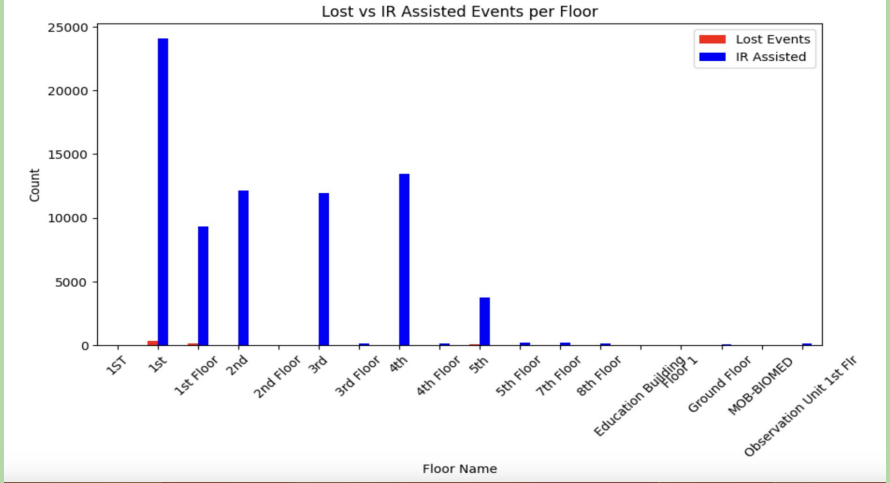
Room/Location Anomalies:

Top 5 room for lost/irAssisted

roomName	lost	irAssisted
CORRIDOR BETWEEN RM 21-26	65	0
M2 storage	41	0
ALCOVE	39	10
MAIN CAFETERIA SITTING AREA (CAFETERIA)	37	180
Ambulatory Services	29	0

Bottom 5 lost/irAssisted

roomName	lost	irAssisted
14 (OBS)	0	0
201	0	0
201-209 Corridor	0	0
202	0	0
202 (POSTPARTUM)	0	0



Proposed Interventions

Optimized Resource Allocation:

- More staff during peak hours (based on movement data).
- Real-time location systems (IoT-based RTLS).

Focus on High-Traffic Rooms:

- Increase resources (nurses, equipment) in rooms or floors
- Consider **wayfinding systems** for better navigation of the building

Reducing Lost Events:

- Implement predictive models to forecast busy periods.
- Increase staff presence during peak activity times.

Success Metrics

Staff Efficiency:

- Time to assist, movement per unit of time.

Reduced Lost Events:

- Track lost events before and after intervention.

Room Utilization:

- The percentage of time a room or floor is occupied during certain hours (especially peak movement times).

Hospital Operational Metrics

- Hospital Throughput and Wait Times

Staff and Patient Feedback:

- Survey results on resource allocation and hospital navigation.

Success Measurement

Before vs. After:

- Comparison of key metrics (average response time, number of lost events).

Quantitative Metrics:

- Use numbers, percentages, and graphs to show expected improvements.

Staff/Patient Satisfaction:

- Provide survey or interview results or feedback

Conclusion

The success of the intervention will be determined by improvements in these key metrics:

- **Reduced lost events** and improved wayfinding (staff presence and signage).
- **Faster response times** and more efficient movement during peak hours.
- **Higher room utilization** and better space management.
- **Positive staff and patient feedback**, confirming a smoother operation.
- **Improved operational metrics** like reduced wait times and increased throughput.

Q&A