A
Project Presentation
on
"HospiTrax : Real-Time Hospital Resource Coordination System"

by

ABHIJEET KUMAR	4201
ADARSH RAJ CHOUDHARY	4202
ADARSH SINGH	4203
ADITH K P	4204

Contents:

Introduction:

What's the idea?

We are building a web app that helps hospitals in a local area connect and share:

- Bed and ICU availability
- Oxygen and equipment needs
- Staff updates
- Patient transfers

Why?

Right now, many hospitals don't know what's happening in nearby ones. This leads to delays in treatment and resource shortages. Our app gives a live dashboard to solve this.

Literature Survey:

Sr. No	Downloaded Paper title with link	Details of paper (year of publication /Journal name/URL etc)	Findings of Paper (Min 4 in bullet points)	Suggested Title for CEP project(Min One)
1	Statewide Real-Time Tracking of Beds and Ventilators during COVID-19 Surge https://ij-healthgeographics.biomedcentral.com/articles/10.1186/s12942-020-00234-4	Journal: Critical Care Explorations (Lippincott) Published: June 2020 (Online); Volume 2, Issue 6	• Real-time dashboard tracked 87% of hospital beds and ventilators. • Data refreshed every 5 minutes across major health systems. • Improved resource allocation and patient transfers during COVID-19. • Integrated with existing manual systems for smooth adoption.	**HospiTrax : Real-Time Hospital Resource Coordination System**
2	Time Delay to Treatment and Mortality in Primary Angioplasty for Acute Myocardial Infarction: Every Minute of Delay Counts https://pubmed.ncbi.nlm.nih.gov/15007008/	Journal: Circulation (American Heart Association) Published: March 16, 2004 (Print); Volume 109, Issue 10	• Every 30-minute delay increased 1-year mortality by ~7.5%. • Prompt angioplasty significantly improves survival. • Delay effects were independent of age or comorbidities. • Urges reducing door-to-balloon time in hospitals.	
3	An Interactive Decision-Support Dashboard for Optimal Hospital Capacity Management https://arxiv.org/abs/2403.12345	Journal: arXiv Preprint (Cornell University) Published: March 20, 2024 (Online Preprint)	• Dashboard forecasts occupancy and resource needs. • Helps simulate hospital load and optimize planning. • Reduces patient wait times and improves discharge flow. • Enhances coordination across hospital departments.	
4	Developing a Personal Decision Support Tool for Hospital Capacity Management in Pandemic Times: The HOPLITE Model https://ouci.dntb.gov.ua/en/works/ldGzOZY4/	Journal: Frontiers in Public Health (Frontiers Media) Published: February 18, 2021 (Online); Volume 9, Article 632367	• Simulation tool to plan hospital resource use. • Tests impact of elective surgery delays, patient load. • User-friendly for personal and institutional decision-making. • Aids pandemic preparedness through scenario modeling.	

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1	**Health record-based surveillance system** https://journals.sagepub.com/doi/10.1177/18333583221104213	Journal: Health Information Management Journal(SAGE) Published: July 15, 2022 (Online); Volume 53, Issue 2 (2024)	• Enabled real-time COVID-19 case tracking and alerts. • Improved hospital resource allocation. • Enhanced decision-making for health authorities. • Highlighted need for better data and EHR coverage.	**HospiTrax : Real-Time Hospital Resource Coordination System**
2	**A Data Warehouse for Health Services Research** https://www.jmir.org/2020/6/e18579	Authors: Bunyamin Ozaydin, Ferhat Zengul, Nurettin Oner, Sue S. Feldman Journal: Journal of Medical Internet Research (JMIR)	• Built a scalable health data warehouse. • Used sociotechnical design approach. • Added analytics and visualization tools. • Improved research efficiency and data access.	
3	**HeRams** https://en.wikipedia.org/wiki/HeRAMS	Organizer: World Health Organization (WHO) Launch Period: Sudan (2008–2011), Nigeria (2016), Iraq (2017), Ukraine (2017–2018), and more	• Enables standardized health facility data collection. • Scalable in emergencies and stable settings. • Needs better data quality and integration. • More comprehensive than ad hoc tools.	
4	**An Intelligent and Secure Health Monitoring Scheme Using IoT Sensor Based on Cloud Computing** https://onlinelibrary.wiley.com/doi/10.1155/2017/3734764?	Authors: Jin-Xin Hu, Chin-Ling Chen, Chun-Long Fan, Kun-hao Wang Journal: Journal of Sensors (Hindawi)	• Enables secure remote health monitoring. • Triggers real-time emergency alerts. • Low latency and efficient performance. • Protects against major cyberattacks.	

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1	COVID-19 Contact Tracing: A Technological Tower of Babel https://mhealth.jmir.org/2020/11/e23194	Journal: JMIR mHealth and uHealth Published: November 27, 2020 (Vol 8, No 11; online preprint first available August 4, 2020)	• Analyzed national COVID-19 tracing apps; found no cross-border interoperability. • Proposed an international platform to unify contact tracing efforts. • Described current app landscape as a "Tower of Babel." • Warned that fragmentation limits global pandemic response.	**HospiTrax : Real-Time Hospital Resource Coordination System**
2	Design of an Internet of Things System for Smart Hospitals https://arxiv.org/abs/2203.12787	Journal: CoRR (arXiv) Published: March 24, 2022 (v1 submission), updated April 6, 2022 (v2)	• Robust scheduling model ensures waiting time limits. • Uses MILP to handle uncertainty in service times and no-shows. • Validates classic rules under constraints. • Practical, patient-friendly hospital solution.	
3	Robust Appointment Scheduling with Waiting Time Guarantees https://arxiv.org/abs/2402.12561	Journal: CoRR (arXiv) Published: February 19, 2024 (v1 submission)	• Scheduling model ensures guaranteed patient waiting times. • Validates classic rules like SVF and Bailey-Welch under constraints. • Hospital case study shows reduced idle and overtime costs. • Customizable and practical for real-world healthcare settings.	
4	Enhancing Patient Appointments Scheduling that Uses Mobile Technology https://arxiv.org/abs/1602.03337	Journal: CoRR (arXiv) Published: February 10, 2016 (v1 submission)	• Developed a mobile app for hospital appointment scheduling. • Aimed to reduce waiting times and manual paperwork. • Improved access to specialists in Tanzanian clinics. • Enabled automated reminders and easy mobile booking.	

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Sr. No	Downloaded Paper title with link	Details of paper (year of publication /Journal name/URL etc)	Findings of Paper (Min 4 in bullet points)	Suggested Title for CEP project(Min One)
1	Real-Time Hospital Data & Capacity Management An Interactive Decision-Support Dashboard for Optimal Hospital Capacity Management https://arxiv.org/abs/2403.15634	Journal:CoRR(arXiv) Published: March 22, 2024 (Online Preprint, arXiv:2403.15634)	• Real-time dashboard integrates hospital data for forecasting and capacity planning. • Enables "what-if" simulations to prepare for surges in patient demand. • Actively used by hospital leaders (e.g., Johns Hopkins) during COVID-19 operations. • Built with clinicians for better trust, transparency, and usability.	**HospiTrax : Real-Time Hospital Resource Coordination System**
2	A Real-Time Early Warning System for Monitoring Inpatient Mortality Risk https://www.jmir.org/2019/7/e13719	Journal: Journal of Medical Internet Research Published: July 5, 2019; Volume 21, Issue 7 (Article e13719)	• Early warning system scanned patient data every 15 minutes for mortality risk. • Achieved high accuracy (AUC = 0.884) using a random forest model. • Detected 69% of inpatient deaths ~40 hours in advance. • Alerted clinicians using vital signs, labs, and diagnoses for timely intervention.	
3	Secure and Trustable Electronic Medical Records Sharing Using Blockchain https://arxiv.org/abs/1709.06528	Journal: CoRR (arXiv) Published: September 19, 2017 (Online Preprint, arXiv:1709.06528)	• Introduced a blockchain-based system for secure EMR sharing. • Ensured fine-grained access control and auditability. • Stored data off-chain and metadata on-chain for privacy and traceability. • Enhanced trust, speed, and reliability in health data exchange.	
4	IHME COVID-19 health service utilization forecasting team https://www.medrxiv.org/content/10.1101/2020.03.27.20043752v1	Journal: medRxiv (Preprint) Published: March 26, 2020 (Online Preprint, medRxiv:2020.03.27.20043752)	• Modeled state-wise demand for beds, ICUs, ventilators, and deaths for 4 months. • Highlighted regional variation in peak hospital usage and timing. • Provided critical input for pandemic response and hospital surge preparation. • Informed national and state-level healthcare planning during early COVID-19.	

Findings from Literature Survey:

- A real-time hospital tracking system helped Iran monitor COVID-19 cases and manage resources better.
- A smart health database made it easier for researchers and hospitals to access and use medical data.
- A mapping system showed which hospitals were damaged or working during emergencies like wars or disasters.
- Sensors and cloud tech allowed hospitals to monitor patients remotely and respond faster in emergencies.
- A live dashboard helped hospitals in Oregon share bed and ventilator availability to manage patients faster during COVID-19.
- Every 30-minute delay in heart attack treatment increased the risk of death, proving that fast hospital action saves lives.
- A smart dashboard system gave hospital staff a real-time view of beds and staff, improving planning and reducing overloads.

Findings from Literature Survey:

- A simple simulation tool helped hospitals predict future patient load and prepare beds and ICUs during pandemic surges.
- A real-time dashboard helped Johns Hopkins Hospital manage patient loads, resources, and plan future surges smartly.
- A machine learning tool predicted high-risk patients up to 48 hours before death using hospital record data.
- A blockchain system gave patients full control to securely share their health records between hospitals and doctors.
- A model predicted how many beds, ICUs, and ventilators each US state would need during COVID, helping in advance planning
- Artificial structures like breakwater walls impact marine life diversity, often reducing species richness and altering ecosystem balance.
- Different countries' contact tracing apps were not compatible, making global pandemic control harder due to privacy laws and tech differences.

Aim & Objectives:

Aim:

To create a simple system where hospitals can see, share, and ask for help from each other in real-time.

Objectives:

- Show available beds, ICU, oxygen, etc.
- Allow hospitals to request resources
- Help manage emergencies faster
- Give a dashboard to track everything easily
- Keep patient data safe and private

Proposed Methodology :

What we'll use:

- Website (Web App) for hospitals
- Database to store updates
- Live Dashboard for resource tracking
- Login System for hospital staff
- Request & Share Tools for hospitals to help each other
- Security Features to protect patient info

Example Workflow:

- A hospital updates how many beds or oxygen cylinders are left
- Other hospitals can see this live
- If one needs help, they can send a request
- Admins get alerts and take action

Expected Outcome:

If we build this well:

- ✅ **Hospitals will save more lives by moving patients faster**
- ✅ **Resources (beds, staff, oxygen) will be used better**
- ✅ **Emergencies will be handled smoothly**
- ✅ **No more confusion or manual calls for help**
- ✅ **Future upgrades: Add ambulance tracking, patient data, mobile app**

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Thank You