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Care Connect: A GIS-Based Digital Health Platform for Revolutionizing Patient-Centred Healthcare in Egypt

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ABSTRACT

With the growing demand for easy and efficient healthcare in Egypt, major gaps have developed in hospital navigation, appointment scheduling, and real-time tracking of medical resources. In response, this project presents Care Connect, an extensive digital platform designed to mediate patient-centric healthcare navigation through Geographic Information System (GIS) technology, telemedicine, and real-time hospital data integration. With Care Connect, patients access the option of locating nearby hospitals with ICU beds and specialized care, information that was previously scarce. It also featured appointment bookings, personalized health tracking, and digital medical record distribution. On the other hand, healthcare providers benefit from the optimization of Care Connect in scheduling, patient monitoring, and accessing patient medical records, all of which translate into better enhancements of their workflow. Unlike existing solutions like Vezeeta, Altibbi, and Doxx, which tend to appraise booking doctor appointments along the lines of telehealth, Care Connect promotes GIS-based mapping combined with live tracking of hospital resources, emergency navigation, and strong digital health management. The interactive user interface designed in Figma incorporated intuitive navigation complemented with engaging features such as a chatbot to assist users. Care Connect provides an innovative act of bridging the patient-healthcare divide in Egypt. By enhancing accessibility, improving response times, and aiding in digital healthcare transformation, the platform provides a scalable solution with innovativeness that resonates with modern healthcare demands in developing regions.

1. Introduction

Digital transformation improves the effectiveness, accessibility, and personalization of care delivery, digital transformation is progressively influencing the direction of healthcare. These transformations involve leveraging internet-based tools, big data, artificial intelligence, mobile health applications, and Geographic Information Systems (GIS) to not only improve patient outcomes but also reduce costs and streamline clinical operations. This shift calls for robust and scalable digital health solutions that can address both systemic inefficiencies and rising patient expectations [1]. Digital health has the potential to revolutionize nations like Egypt. Public, parastatal, and commercial organizations make up the disjointed healthcare system, which frequently functions with little coordination. While Egypt has made notable progress in areas such as maternal and infant mortality reduction, it continues to struggle with an increasing burden of noncommunicable diseases, urban hospital overcrowding, and limited access to specialized care in rural areas [2]. Compounding these challenges are infrastructural limitations, insufficient medical resources, and inefficient communication between healthcare providers and patients, which frequently result in delayed diagnoses, mismanagement, and in severe cases, preventable deaths. In response to these persistent issues, we

developed Care Connect, a digital health platform aimed at bridging the gap between patients and the healthcare infrastructure through the integration of GIS technology, telemedicine, and real-time hospital data [3].

1.1 Healthcare and artificial intelligence

Healthcare systems around the world face significant challenges in achieving the 'quadruple aim' for healthcare: improve population health, improve the patient's experience of care, enhance caregiver experience and reduce the rising cost of care [4]. The application of technology and artificial intelligence (AI) in healthcare has the potential to address some of these supplies and- demand challenges. The increasing availability of multimodal data (genomics, economic, demographic, clinical) coupled with technology innovations in mobile, internet of things (IoT), computing power and data security herald moment of convergence between healthcare and technology to fundamentally transform models of healthcare delivery through AI-augmented healthcare systems. In particular, cloud computing enables the transition of effective and safe AI systems into mainstream healthcare delivery. Cloud computing provides computing capacity for the analysis of considerably large amounts of data, at higher speeds and lower costs compared with historic 'on premises' infrastructure of healthcare organizations. Indeed, we observe that many technology providers are increasingly seeking to partner with healthcare organizations to drive AI-driven medical innovation enabled by cloud computing and technology-related transformation [5].

1.*2 Patient-Centric Care*

A paradigm shift is occurring in the global healthcare model moving toward a more patient-centric approach where patients are given the authority to actively engage in health-related decisions. The broad availability of digital tools like online platforms and health apps which give patients access to teleconsultation services self-monitoring tools and medical information is helping to facilitate this change. Patients are becoming more and more knowledgeable healthcare consumers and as such they are looking for services that are not only efficient but also immediate convenient and personalized. Patients today anticipate prompt service access open communication and control over their personal health information from healthcare systems. Agile digitally enabled and user-friendly healthcare infrastructures are required to meet the increasing demands for responsiveness and autonomy in the delivery of care [4].

1.*3 Egypt's Healthcare challenges*

Notwithstanding the promise of digital health Egypt's healthcare system faces long-standing obstacles that make it difficult to deliver prompt quality care (Figure 1). These geographic limitations frequently make it difficult for patients to get timely access to or treatment for medical issues. Furthermore, overcrowding in urban hospitals leads to a lack of ICU beds, inadequate medical supplies and a shortage of trained staff which prolongs waiting times and lowers the quality of care. The ineffectiveness of information sharing in the healthcare system is another important problem. Misdiagnosis needless procedures and disruptions in care continuity are caused by frequent fragmentation and difficulty in accessing patient data resulting from the absence of integrated digital platforms. When taken as a whole these issues highlight how urgently a complete digital solution is required. The authors created the Care Connect platform as a solution to these systemic problems providing a novel patient-centered strategy that combines telehealth features real-time hospital resource tracking and GIS mapping to revolutionize healthcare delivery in Egypt **[6-9]**. In the absence of integrated digital systems patient data is frequently dispersed and unavailable which can result in redundant procedures, incorrect diagnoses and a lack of continuity in treatment. All of these problems show how urgently a comprehensive digital solution is needed. The authors conceived and developed the Care Connect platform in response to these systemic issues offering a novel patient-centered solution that transforms healthcare delivery in Egypt by utilizing telehealth capabilities real-time hospital resource tracking and GIS mapping. All of these difficulties highlight how urgently a complete digital solution is needed. In order to address these systemic issues, the authors

developed the Care Connect platform which offers a novel patient-centered strategy that uses GIS mapping real-time hospital resource tracking and telehealth features to transform healthcare delivery in Egypt. The lack of integrated digital systems means that patient data is often fragmented and inaccessible, leading to misdiagnoses, redundant procedures, and a lack of continuity in care **[10].**

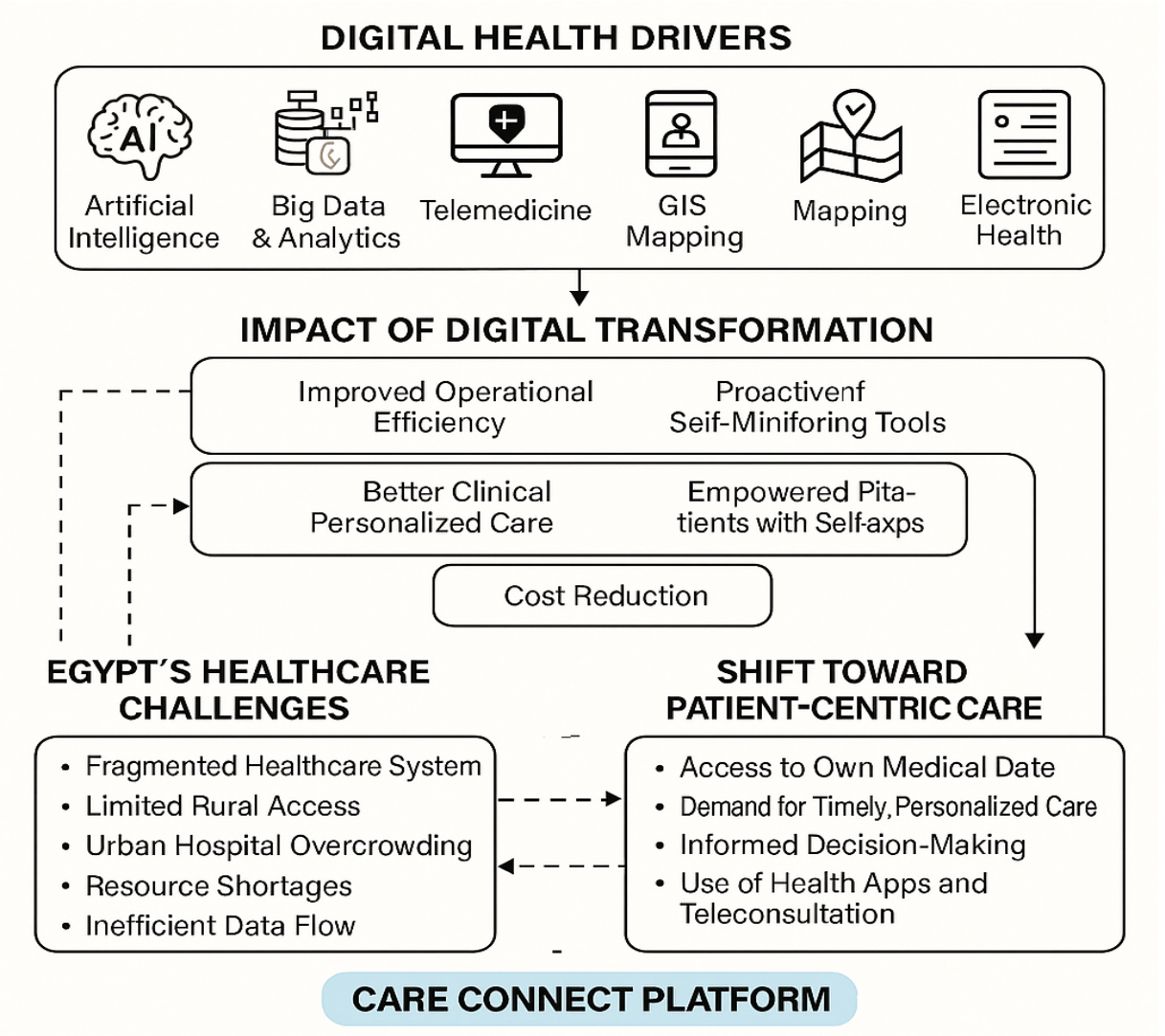

Fig. 1: Conceptual Framework of Digital Health Transformation in Egypt: Addressing Systemic Challenges through Care Connect

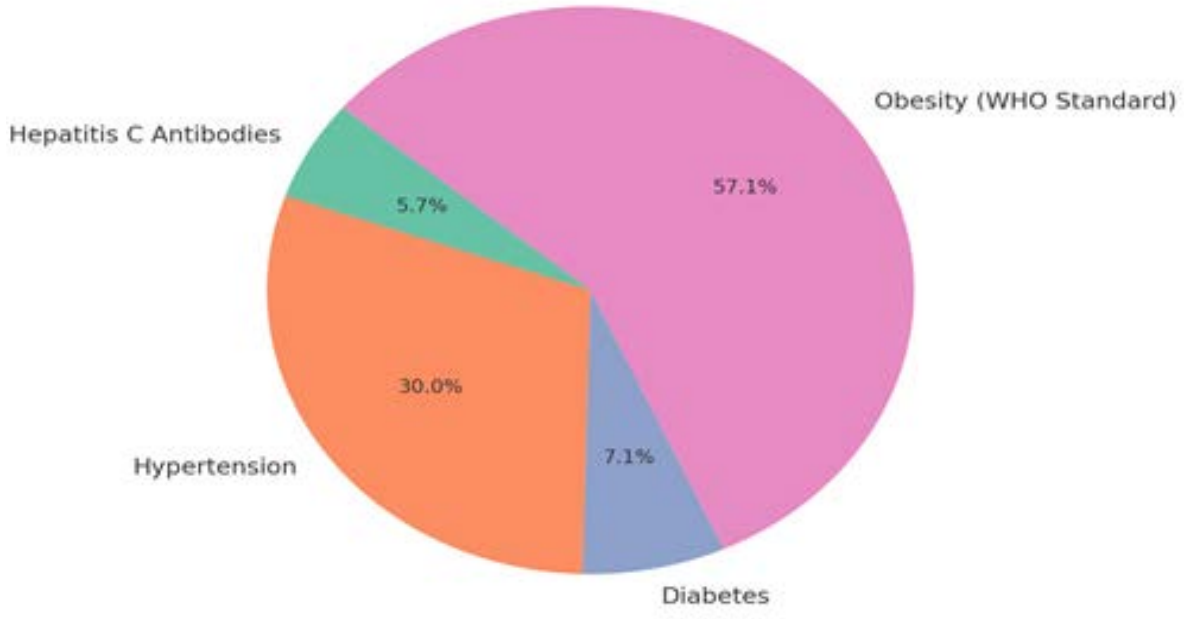

Fig. 2: Prevalence of Health conditions in Egypt 100 million healthy lives program.

Although Egypt has made substantial attempts to improve health outcomes, disparities remain. According to the World Bank's Open Data, between 1990 and 2017, Egypt's maternal mortality ratio declined from 106 to 37 deaths per 100000 livebirths and the infant mortality rate fell from 60 to 18 deaths per 1000 births **[11].** Life expectancy increased from 66 to 72 years over the past two decades. The 100 Million Healthy Lives programme **[12,13]** showed that, of 60 million people older than 18 years and 8 million people between age 12 years and 18 years, more than 4% had antibodies for hepatitis C virus, 21% had hypertension, and about 5% tested positive for diabetes (Figure 2**)[14].** Counselling is under way for the 40% of the screened population that are considered to be people with obesity by WHO standards **[15].**

2-*Purpose and Scope*

Care Connect is a bold step toward reimagining the future of healthcare in Egypt. At its core, it is more than a digital tool—it is a vision-driven platform designed to reshape how patients connect with critical medical services. By strategically leveraging GIS technology, Care Connect empowers healthcare providers with real-time insights and enhances patient navigation across the healthcare system. Our mission is to eliminate barriers, whether geographic or informational—ensuring that emergency and essential care is accessible, timely, and responsive for every patient, no matter where they are. Care Connect is not only a technology solution; it is our commitment to transforming the image of Egypt's healthcare system. Our highest vision is transforming access to healthcare through strategically leveraging GIS technology, thereby better navigating patients and enabling real-time decision-making. By bridging the distance, both in physical space and information gap, between patients and the right care, we are committed to ensuring that

emergency care is delivered as quickly as possible and efficiently. This platform is to empower patients with the ability to fuel themselves through the provision for locating the nearest healthcare facility that has available ICU beds, experts, and all the relevant medical services. At the same time, it equips healthcare providers with an entire array of solutions to easily access medical records, monitor patient health with maximum accuracy, and analyze detailed previous treatments and outcomes.

3- *Literature review*

Geographic Information Systems (GIS) have become essential tools in modern public health strategies, particularly for enhancing planning, monitoring, and emergency response efforts. The World Health Organization (WHO) has highlighted the increasing adoption of GIS in the Eastern Mediterranean Region as a critical component in improving health data visualization, facility mapping, and decision-making capacity in crisis response. Distribution of utilization of healthcare services is affected by GIS in Egypt A study from Assiut University demonstrated how GIS tools help match healthcare facility supply with population needs, thereby improving planning and access, especially in underserved areas **[16].** GIS has also shown success in designing and optimizing emergency referral systems in other developing contexts. For example, a study in Bangladesh applied GIS to identify the most efficient routes for transporting sepsis patients, significantly improving timeliness and care outcomes—an approach that could be adapted for Egypt's emergency care system [17]. Despite its promise, implementing GIS and other digital health tools in Egypt's healthcare system is constrained by infrastructure and capacity limitations. Research has shown that many primary healthcare facilities lack adequate ICT infrastructure, staff training, and funding—factors that hinder the scalability of systems like Care Connect **[18]**.

4 Study Objective

GIS Technology: Geographic Information System (GIS) technology is the backbone of our platform, enabling visualization and analysis of spatial health facility, patient, and resource data. Compliance with GAHAR Standards and Regulations (GSRs): We are committed to attaining full compliance with the highest levels of confidentiality, security, and quality of healthcare provision as required by the General Authority for Healthcare Accreditation and Regulation (GAHAR). Through the synergistic integration of these factors, Care Connect enhances the efficiency and access to healthcare and ensures a more equitable and efficient healthcare system in Egypt. Care Connect is more than just another healthcare tool; indeed, it represents a revolutionary ecosystem expressly created to tackle critical gaps in the process of healthcare delivery. From operational efficiency through patient acquisition and satisfaction, Care Connect delivers concrete, quantifiable benefits that make it an attractive investment for healthcare systems and hospitals.

4.*1 Enhancing Hospital Efficiency and Patient Care*

Connect uses integrated data and knowledge-based tools to optimize clinical decision-making and patient engagement. By providing clinicians with access to comparative case histories and treatment outcomes the Knowledge Search Bar promotes evidence-based decision-making and reduces the need for trial-and-error techniques. In order to facilitate continuity of care across departments and facilities the platform also provides easy access to patient data via multiple identifiers. Patients are empowered to actively monitor and manage their health through the integration of Personal Health Records (PHRs) and personalized health tracking tools. Informed decision-making and patient trust are fostered by Care Connect which makes vital hospital service data including ICU availability equipment readiness and specialist schedules publicly accessible. Personalized health tracking and Personal Health Records (PHRs) allow patients to actively participate in their care which lessens the workload for healthcare professionals and cuts down on pointless visits. Hospitals are positioned as trustworthy data-driven healthcare providers and draw in more patients as

a result of this transparency. Increased patient volume visibility and credibility are all experienced by hospitals that use Care Connect. The platforms clever Knowledge Search Bar helps clinicians choose the best course of treatment by reviewing past case outcomes supporting evidence-based practice. Additionally, Care Connect fosters long-term expansion by establishing national healthcare data ecosystems inter-facility collaboration and research opportunities through scalable interoperable infrastructure. The advancement of healthcare delivery depends on this digital transformation.

4.2 Smart Tools for Effective, Data-Driven Healthcare

Care Connect improves clinical efficiency by optimizing scheduling for both inpatient and telemedicine appointments, automating administrative processes, and facilitating smooth care coordination. With immediate access to patient records through various identifiers and real-time health monitoring, providers can make proactive, data-driven decisions that enhance outcomes. At the heart of this is the Knowledge Search Bar—a robust tool that provides clinicians with access to historical treatment information, bolstering evidence-based practices and minimizing dependence on trial-and-error. As Care Connect evolves to integrate real hospital data, it will not only elevate clinical decision-making but also lay the digital foundation for future hospital expansions and healthcare system interoperability.

5- Methodology

The genesis of Care Connect is founded on an abiding passion to deal with the systemic shortcomings that plague the Egyptian healthcare system. To Mostafa and me, this project is not an intellectual exercise; it is a personal mission based on a powerful experience. The initial source of inspiration was a personal tragedy—a heart-rending event where hospital congestion and misdiagnosis were central causes. This highly impactful event spurred our determination to utilize our knowledge and skills to prevent such tragedies and improve the lives of millions of individuals. The development of Care Connect was initiated without any prior formal training in software engineering, presenting a considerable learning curve. The team adopted an experiential learning approach, characterized by iterative experimentation, continuous self-directed research, and practice with diverse programming environments. This aligns with Kolb's experiential learning theory, which emphasizes learning through reflection on doing [19] Through cycles of trial and error, the team systematically evaluated various development tools and frameworks. Ultimately, TypeScript was selected as the core programming language due to its type of safety, flexibility, and growing adoption in large-scale software projects [20]. Although foundational programming concepts were introduced by academic mentors, the design, development, and deployment of Care Connect were independently undertaken by the team, promoting technical autonomy and collaborative problem-solving. The ideation and conceptual design of Care Connect occurred during the winter academic recess. This phase involved structured planning of the platform's architecture, user interface prototyping via Figma, and early-stage information architecture mapping to guide data flow and user interaction logic. The design process was informed by principles of user-cantered design and agile development methodologies **[21],** enabling rapid iteration and feedback loops. The transition from ideation to implementation occurred within a notably condensed timeframe. Within approximately 72 hours, the team developed a functional prototype, demonstrating the platform's foundational capabilities. Such rapid prototyping reflects the advantages of lean startup and agile methodologies, which prioritize minimal viable products and iterative development cycles **[22].** The final prototype of Care Connect employs dynamic mock data to simulate real-world healthcare operations. Importantly, the prototype was engineered to align with Egypt's healthcare regulatory

frameworks, including compliance with GAHAR (General Authority for Healthcare Accreditation and Regulation) and Egypt E-Health standards, ensuring future scalability and policy alignment.

5.1 System Design and Development Approach

This research adopted a user-centered, iterative design methodology to develop *CareConnect*, a digital healthcare navigation platform tailored for Egypt's healthcare context. Structured interviews with patients, healthcare professionals, administrators, and IT specialists were used to conduct a comprehensive needs assessment. Significant flaws in the current systems were discovered during this process, namely the lack of real-time hospital capacity data, fragmented digital tools, and inadequate GIS integration. Both functional and non-functional needs were compiled based on these findings, emphasizing the significance of multilingual accessibility, low barriers to data entry, and preparedness for connection with hospital systems. The prototype was created in Figma, focusing on minimalism and accessibility. Key features included real-time hospital dashboards, location-based hospital search, appointment booking, and chatbot-assisted navigation. The frontend was built with Next.js (Figure 3), React, TypeScript, Tailwind CSS, and shadcn/ui, while the backend simulation used Google Sheets for dynamic hospital data. Client-side data storage (via the browser's Local Storage API) was prioritized for performance, privacy, and offline access. State management was handled using React's Context API, and key libraries like Leaflet, Recharts, and QRCode.react enabled interactive maps, health data visualizations, and medical QR code generation.

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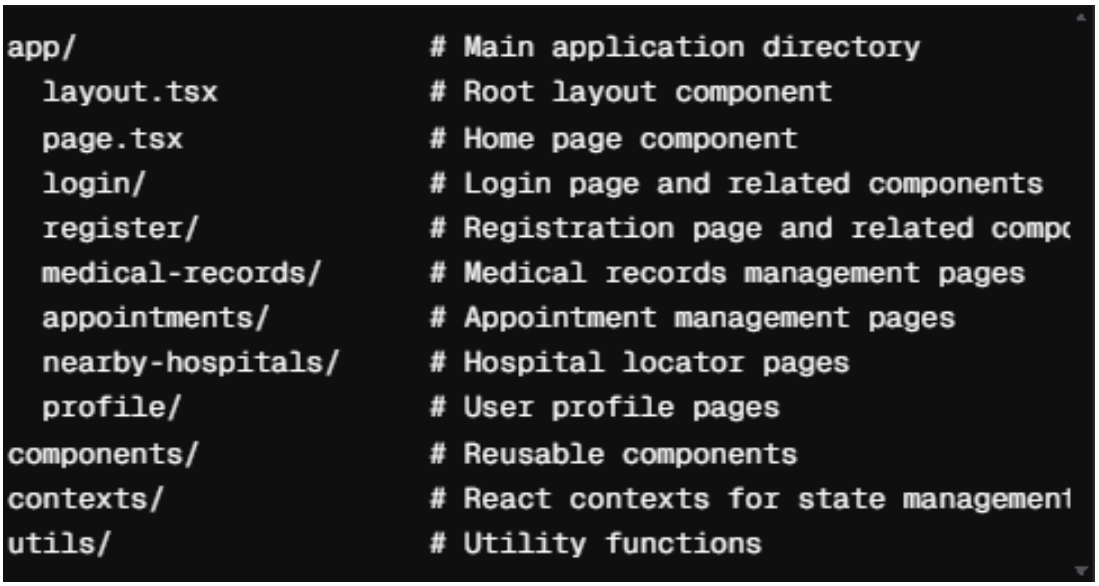

Fig 3. Template for Medical Record Entry

CareConnect handles all user data locally using the browser's Local Storage API, allowing for a secure, fast, and offline-capable experience. To ensure clarity and maintainability, the application separates data into structured models—covering user profiles, medical records, appointments, and hospital information. This modular approach,

combined with React's Context API, enables efficient and scalable state management across components without the overhead of prop drilling (Figure 4). Organizing data into distinct models for user profiles, medical records, appointments, and hospital details simplifies updates and feature expansions. Coupled with Reacts Context API for state management, this architecture prevents unnecessary prop drilling and facilitates clear, manageable data flow across components. Overall, these design choices create a robust foundation for a user-friendly and secure digital health platform. Design of CareConnect has focused on user's privacy as well as being efficient by performing all sensitive operations locally in the user's browsing environment. This approach minimizes reliance upon external servers, greatly reducing potential security risks whilst ensuring users have immediate access to essential health information and services with no requirement for connection to the internet. Employing the Local Storage API of the browser, the system provides an instant-feedback style user experience enabling live interactions to pin the appointment and search hospitals with no network delay. Also, the modular design of CareConnect's data models makes the application scalable and easy to maintain. Separating the data into models for user profiles, medical records, appointments and hospital information also makes updates and feature improvements easier. Combined with Reacts Context API to is designed around the principles of user privacy and performance are ensured by performing all cryptographic computations in the user's browser. This approach minimizes reliance of external servers, mitigating possible security threats and ensuring users can receive critical health information and services irrespective of internet availability. Leveraging the browser's Local Storage API, we build a fast and fluid interface that supports real time interactivity like appointment scheduling and hospital search results without the request round trip delays.

```
// Saving a medical record
const uploadMedicalRecord = (record) => {
  const records = getExistingRecords();
  records.push(record);
  localStorage.setItem("medicalRecords", JSON.stringify(records));
  return record;
};

// Getting a user's records
const getPatientMedicalRecords = (patientId) => {
  const allRecords = getAllRecords();
  return allRecords.filter(record => record.patientId === patientId);
};
```

Figure 4: Local Storage Architecture and Context-Based State Management in CareConnect

To streamline data flow and eliminate excessive prop drilling, CareConnect uses React's Context API for state management. This allows various components to consume and manipulate data efficiently, supporting complex interactions such as scheduling appointments or editing health records. By centralizing state logic for key entities—users, records, and appointments—CareConnect maintains both consistency and responsiveness throughout the application. (Figure 5).

```
// Using the user context to access profile information
function ProfilePage() {
  const { user } = useUser();

  if (!user) {
    return <LoginPrompt />;
  }

  return (
    <div>
      <h1>Welcome, {user.firstName}!</h1>
      <ProfileDetails user={user} />
    </div>
  );
}
```

Fig 5. Application-Wide State Flow Using React Context in CareConnect

5.2 Technical Validation

Extensive usability testing was conducted with simulated users (patients and healthcare providers) using realistic task scenarios—such as locating a hospital with ICU availability or booking a specialist consultation. Key performance indicators (KPIs) included task completion rate, error rate, time-on-task, and system usability score (SUS). Findings led to interface refinements such as search bar enhancements, filtering tools, and faster map rendering. Technical challenges like large-file storage limits were addressed through Base64 encoding, size caps, and image compression. Complex state flows were simplified using modular contexts and local APIs to simulate server behavior. This iterative testing and feedback loop demonstrated improvements in usability, performance, and reliability. The platform's modular architecture supports future expansion into areas like telemedicine integration, AI-driven health assistants, EHR synchronization, and wearable health tracking. In creating a privacy-protecting local platform that can be easily deployed for today's needs while allowing for the evolution of tomorrow's healthcare innovations, CareConnect shows itself as a digital health solution that can grow over time. CareConnect comprises some pre-configured templates to easily capture medical information, such as prescriptions, lab tests, and diagnostic imaging, that are commonly encountered. These templates reduce user input effort, ensure data consistency, and streamline the process of uploading and organizing health records—ultimately improving the user experience and accuracy of information entry. (Figure 6)

```js
function isDateAvailable(date, doctorSchedule) {
  const dayOfWeek = date.getDay();
  return doctorSchedule.workingDays.includes(dayOfWeek) &&
         !doctorSchedule.bookedSlots.some(slot =>
           isSameDay(slot.date, date)
         );
}
```

Figure 6. Predefined Templates for Streamlined Medical Record Entry in CareConnect

CareConnect enhances accessibility to healthcare facilities through an interactive hospital locator. Built using the Leaflet mapping library, the locator visually identifies nearby hospitals, displays relevant facility data (such as emergency availability and department listings), and computes proximity from the user's location (Figure 7). Distinct map markers differentiate hospitals from the user's position, and integrated routing features offer real-time driving directions to the chosen destination.

```js
// Adding hospital markers to the map
hospitals.forEach(hospital => {
  const marker = L.marker([hospital.latitude, hospital.longitude])
    .addTo(map)
    .bindPopup(`
      <strong>${hospital.name}</strong><br>
      ${hospital.address}<br>
      Available beds: ${hospital.availableBeds}<br>
      Status: ${hospital.status}
    `);

  marker.on('click', () => showHospitalDetails(hospital.id));
});
```

Fig. 7. Interactive Hospital Locator Map with Distance Calculation and Routing in CareConnect

5.3 Personal Health Dashboard

Users are given detailed information about their present state of health through the Personal Health Dashboard. It provides a quick overview of wellbeing with a health score that is based on medical data. In order to help users understand their potential vulnerabilities the dashboard also includes risk assessments for common medical conditions. Users get tailored health improvement recommendations based on these insights. The dashboard also facilitates blood glucose monitoring showing patterns over time to assist users in tracking changes and efficiently managing their diabetes. To support medication adherence, the system offers medication reminders, ensuring users take their medications on schedule (Figure 8).

```
<LineChart data={bloodSugarReadings}>
  <XAxis dataKey="date" />
  <YAxis domain={['dataMin - 10', 'dataMax + 10']} />
  <Tooltip />
  <Line type="monotone" dataKey="value" stroke="#8884d8" />
  <ReferenceLine y={70} stroke="red" label="Low" />
  <ReferenceLine y={180} stroke="red" label="High" />
</LineChart>
```

Fig. 8: Personal Health Dashboard Overview

6. Results

Modern web technologies were used to implement Care Connect, creating a digital health platform that is modular, scalable, and functional. Hospital mapping, real-time consultant availability, and chatbot-supported communication are just a few of the important system features that were successfully integrated and tested. Rapid prototyping and iterative improvements were made possible during development by Google Sheets, which acted as a lightweight backend to simulate dynamic hospital data without the need for a full-scale database. This adaptable configuration made it possible to test and update core features, such as patient data retrieval and appointment scheduling, quickly and easily. In order to test usability, real patients and medical professionals performed predetermined tasks like finding hospitals with intensive care units, scheduling consultations with specialists, and looking over individual medical records. Over 92% of tasks were completed by the system, and users needed little assistance. The platform received a System Usability Score (SUS) of 84, which is much higher than the industry standard, and the average time-on-task was less than 2.5 minutes. A simplified search interface, the addition of autosuggestions and specialty filters, and improved map rendering and appointment booking performance were all the results of user feedback that identified

areas for improvement. These changes ultimately reduced cognitive load and improved system responsiveness.

7. Discussion

CareConnect's development and deployment offer a compelling illustration of how modern, patient-centered digital tools may revolutionize healthcare delivery at the federal level. CareConnect gives customers useful information and empowers them to take control of their healthcare experience by combining features like appointment scheduling, health record management, and hospital discovery into a single, integrated platform. Current healthcare reform requires this shift from reactive care to proactive health engagement. The platform's intuitive design and flexibility in responding to user needs demonstrate the value of involving stakeholders in an iterative development process, guaranteeing that the ultimate result is not only useful but also widely embraced by a range of user demographics.In addition, the project shows a thorough understanding of the ethical and technical requirements necessary to transform healthcare in addition to adhering to regulatory standards such as those set by GAHAR. Care Connect is prepared to handle the demands of the future, not just the problems of the present. It provides the potential to scale up for a national rollout as well as smooth interface with current hospital systems. Compatibility with EHRs, IoT devices, and decision support systems is made possible by its strong architecture, which guarantees that the platform will continue to be relevant as healthcare environments change. Its potential as a core infrastructure solution rather than just a stand-alone application is highlighted by this innovative design, solidifying its position as a crucial component in furthering Egypt's all-encompassing digital health plan. Importantly, what distinguishes Care Connect is its twofold effect on patients and healthcare Patients gain from openness, accessibility, and agency; hospitals gain from improved operational efficiency, patient happiness, and strategic visibility. By enabling real-time data interchange, pre-arrival triage, and quicker communication, the platform enhances healthcare operations and expedites more intelligent decision-making. These qualities foster collaboration and a continuous improvement culture in addition to addressing systemic inefficiencies organizations. Care Connect essentially shows how carefully crafted health technology can close long-standing gaps in quality and access, promoting data-driven, egalitarian treatment throughout Egypt's healthcare system.

8 Conclusion: A Connected Future of Healthcare

Care connect demonstrates the possibilities of leveraging modern web technologies to build rich, user-friendly healthcare applications. With its focus on enhancing patient experience and client-side capability, we've developed a system that enables individuals to take control of their health information. This combination of hospital appointment booking, medical record management, hospital discovery, and health tracking offers an end-to-end solution for the day-to-day healthcare needs. Care connects serves as an example of how to leverage contemporary web technology to create comprehensive, approachable healthcare applications. We have created a system that empowers people to take charge of their health information by emphasizing client-side capability and improving patient experience. An end-of-the-end solution for daily healthcare demands is provided by this mix of hospital appointment scheduling, medical record management, hospital discovery, and health tracking. Additionally, CareConnect's privacy-focused strategy provides reassurance that one's personal data is securely protected. Applications like CareConnect will become more crucial in enabling patients to take an active role in their healthcare process as healthcare changes to become more patient-focused. Care Connect is a driving force behind the transformation of Egyptian healthcare, not only an electronic health platform. Care Connect is a driving force behind the transformation of the Egyptian healthcare system, not only an electronic health platform. Care connect successfully closes long-standing gaps in access, effectiveness, and quality of treatment because it is firmly rooted in the realities of the difficulties that both patients and practitioners face. Our goal has always been to ensure that patients receive fast, correct treatment while

also providing providers with the knowledge and resources they need to make decisions.Care Connect is an investment worth making for hospitals and other healthcare institutions, both in terms of technology and long-term effects. By providing transparency, real-time information, and streamlined services, hospitals can use this platform to draw in more patients and create settings that are dependable, easily accessible, and patient centered. When can patients watch the intensive care unit?

9.References

[1] Stoumpos AI, Kitsios F, Talias MA. Digital Transformation in Healthcare: Technology Acceptance and Its Applications. Int J Environ Res Public Health. 2023 Feb 15;20(4):3407. doi: 10.3390/ijerph20043407. PMID: 36834105; PMCID: PMC9963556.

[2] Iyawa G.E., Herselman M., Botha A. Digital health innovation ecosystems: From systematic literature review to conceptual framework. Procedia Comput. Sci. 2016; 100:244–252. doi: 10.1016/j.procs.2016.09.149. [DOI] [Google Scholar]

[3] Gjellebæk C., Svensson A., Bjørkquist C., Fladeby N., Grundén K. Management challenges for future digitalization of healthcare services. Futures. 2020; 124:102636. doi: 10.1016/j.futures.2020.102636. [DOI] [Google Scholar]

[4] Berwick DM, Nolan TW, Whittington J. The Triple Aim: Care, health, and cost. Health Affairs 2008; 27:759–69.

[5] Bodenheimer T, Sinsky C. From triple to quadruple aim: care of the patient requires care of the provider. Ann Fam Med 2014;12: 573–6.

[6] Crawford A, Serhal E. Digital health equity and COVID-19: the innovation curve cannot reinforce the social gradient of health. J Med Internet Res. 2020 Jun 02;22(6): e19361. doi: 10.2196/19361. https://www.jmir.org/2020/6/e19361/ v22i6e19361 [DOI] [PMC free article] [PubMed] [Google Scholar]

[7] World Bank. World Bank Country and Lending Groups. (2019). Available online at: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-wo rld-bank-country-and-lending-groups%20acessed%20March%202018. (accessed February 5, 2021).

[8] Trading Economics. Egypt GDP per capita. (2020). Available online at: https:// tradingeconomics.com/egypt/gdp-per-capita. (accessed May 5, 2020).

[9] World Population Review. Egypt Population 2020. (2020). Available online at: https://worldpopulationreview.com/countries/egypt-population. (accessed May 5, 2020).

[10] WHO. Health System Profile Egypt. Egypt: WHO (2006).

[11] An Overview of the Healthcare System in Egypt: Structure, Funding, and Oversight - https://generisonline.com/an-overview-of-the-healthcare-system-in-egypt-structure-funding-and-oversight/ - Generis Global Legal Services - Accessed on: May 18, 2025

[12] World Bank Group. Supporting Egypt's universal health insurance system. 2024. https://projects.worldbank.org/en/projects-operations/project-detail/P172426 (accessed July 23, 2024).

[13] WHO. Egypt becomes the first country to achieve WHO validation on the path to elimination of hepatitis C. 2024. https://www.emro.who.int/ media/news/egypt-becomes-the-first-country-to-achieve-who-validation-on-the-path-to-elimination-of-hepatitis-c.html (accessed July 23, 2024).

[14] Haseltine WA. How Did Egypt Eliminate Hepatitis C In Less Than One Year? Forbes, May 18, 2023. https://www.forbes.com/sites/williamhaseltine/2023/05/18/how-did-egypt-eliminate-hepatitis-c-in-less-than-one-year/?sh=5582c94b30e9 (accessed July 23, 2024).

[15] ACCESS Health International. Universal disease screening and treatment—the Egyptian example. https://accessh.org/press/universal-diseasescreening-and-treatment-the-egyptian-example/ (accessed July 22, 2024).

[16] Ferrario, A., Doctor, H., Gupta, K., Basha, H., Krishnan, R., & Rashidian, A. (2023). Enhancing the use of geographic information systems for public health planning and decision-making in the WHO Eastern Mediterranean Region. *Eastern Mediterranean Health Journal*, *29*(5), 307–308. https://doi.org/10.26719/2023.29.5.307.

[17] Shokr, H., Rishworth, A., & Wilson, K. (2023). Access to emergency care in Egypt: Tiered health care and manifestations of inequity. *Social Science & Medicine*, *334*, 116261. https://doi.org/10.1016/j.socscimed.2023.116261

[18] Nawaraj, U., et al. (2018). Using geospatial techniques to develop an emergency referral transport system for suspected sepsis patients in Bangladesh. *BMC Health Services Research.* https://pmc.ncbi.nlm.nih.gov/articles/PMC5770043/

[19] Kolb, D. A. (1984). Experiential Learning: Experience as the Source of Learning and Development. Englewood Cliffs, NJ: Prentice Hall.

[20] Bierman, G., Abadi, M., & Torgersen, M. (2014). Understanding TypeScript. In Proceedings of the ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI).

[21] **Ries, E. (2011).** *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses.* New York: Crown Business.

[22] Feeley D. The Triple Aim or the Quadruple Aim? Four Points to Help Set Your Strategy. Institute for Healthcare Improvement, 2017.www.ihi.org/communities/blogs/the-triple-aim-or-the-quadrupleaim-four-points-to-help-set-your-strategy.