

Institution Details



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| **Province** | Sindh | **City** | Karachi |
| **Institution** | National University of Computer and Emerging Sciences (FAST-NU) | **Campus** | Karachi |
| **Department** | Computer Science | **Degree Level** | BS |
| **Degree Program** | Computer Science | **Telephone** |  |
| **Fax** |  | | |

Supervisor Details



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| **Name** | Dr Farrukh Shahid | **Gender** | Male |
| **Mobile** | +923331287466 | **Office No** |  |
| **Email** | Mfarrukh.shahid@nu.edu.pk | **Designation** | Lecturer |
| **Qualification** | PHD | | |

Co-Supervisor Details



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| --- | --- | --- | --- |
| **Name** | Shahbaz Siddiqui | **Gender** | Male |
| **Mobile** | +923002617916 | **Office No** |  |
| **Email** | Shahbaz.siddiqui@nu.edu.pk | **Designation** | Lecturer |
| **Qualification** | Masters | | |

Head of Department Details



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| **Name** | Dr. Zulfiqar Memon | **Mobile No.** | - |
| **Email** | zulfiqar.memon@nu.edu.pk | **Gender** | Male |

Project Details



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| **Project Title** | (Use the official title of your project) | | | |  | |  |
| **Group Details** | **Member 1 Name: Sarmad Jamal**    **Member 1 Roll#: 19k-1116** | | | **Member 2 Name: Khizer Jilani**    **Member 2 Roll#: 19k-1057** | | **Member 3 Name: Mansoor Butt**    **Member 3 Roll#: 19k-1114** |  |
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| **Project Area of** | BlockChain/Web Development | | | | | |  |
| **Specialization** |  | |  | |  | |  |
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| **Project Start** | (As per FYP Calendar) | | **Project End Date** | | (As per FYP Calendar) | |  |
| **Date** |  | |  | |  | |  |
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| **Project** |  |
| **Summary (less** |  | | | | | |  |
| **than 2500** |  | | | | | |  |
| **characters)** | We are designing a medical health care system which will give patients a comprehensive, immutable log and easy access to their medical information across providers and treatment sites. Leveraging unique block chain properties, PatChain manages authentication, confidentiality, accountability and data sharing—crucial considerations when handling sensitive information. A modular design integrates with providers' existing, local data storage solutions, facilitating interoperability and making our system convenient and adaptable.For PatChain, the block content represents data ownership and viewership permissions shared by members of a private, peer-to-peer network. Blockchain technology supports the use of “smart contracts,” which allow us to automate and track certain state transitions (such as a change in viewership rights, or the birth of a new record in the system). Via smart contracts on an Ethereum blockchain [10], we log patient-provider relationships that associate a medical record with viewing permissions and data retrieval instructions (essentially data pointers) for execution on external databases. We include on the blockchain a cryptographic hash of the record to ensure against tampering, thus guaranteeing data integrity. Providers can add a new record associated with a particular patient, and patients can authorize sharing of records between providers. In both cases, the party receiving new information receives an automated notification and can verify the proposed record before accepting or rejecting the data. This keeps participants informed and engaged in the evolution of their records.  Our System prioritizes usability by also offering a designated contract which aggregates references to all of a user's patient-provider relationships, thus providing a single point of reference to check for any updates to medical history. We handle identity confirmation via public key cryptography and employ a DNS-like implementation that maps an already existing and widely accepted form of ID (e.g. name, or social security number) to the person's Ethereum address. A syncing algorithm handles data exchange “off-chain” between a patient database and a provider database, after referencing the blockchain to confirm permissions via our database authentication server.  . | | | | | |  |
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| **Project** | Our system implementation addresses the three major issues :   1. slow access to medical data 2. system interoperability 3. patient agency   if we talk about electronic health care systems (EHRs),they were never designed to manage multi-institutional, life time medical records. Patients leave data scattered across various organizations as life events take them away from one provider's data silo and into another. In doing so they lose easy access to past data, as the provider, not the patient, generally retains primary stewardship (either through explicit legal means in over 21 states, or through default arrangements in the process of providing care) , also the time it takes. Besides from the time delay, record maintenance can prove quite challenging to initiate as patients are rarely encouraged and seldom enabled to review their full record . Patients thus interact with records in a fractured manner that reflects the nature of how these records are managed  Interoperability challenges between different provider and hospital systems pose additional barriers to effective data sharing. This lack of coordinated data management and exchange means health records are fragmented, rather than cohesive . Patients and providers may face significant hurdles in initiating data retrieval and sharing due to economic incentives that encourage “health information blocking.”. When designing new systems to overcome these barriers, we must prioritize patient agency. . This proves crucial in establishing trust and continued participation in the medical system, as patients that doubt the confidentiality of their records may abstain from full, honest disclosures or even avoid treatment. | | | | | | it |
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| **than 2500** |  | | | | | |  |
| **characters)** |  | | | | | |  |
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| **Literature Review / Background Study** | (This section contains all the literature review or background study you have done for your project. All the references must be sequenced acc to References section) | | | | | |  |
| **Project Implementation Method (less than 2500 characters)** | Our approach is based on the Agile Scrum development methodology, which can be thought of as a series of short, reflexive sprints, this seemed to be the most suitable method of development because of its flexible and non-rigid characteristics as opposed to the traditional waterfall approach.  For the purpose of systematically and timely creating this complex and lengthy project we started making weekly goals for ourselves in which we would define a task for ourselves as a goal every week in order to make sure the successful completion of our project within the designated time. This project will be following MVC architecture,where our model will be our test network that we choose,it can be either ropsten,rinkeby.View is where our end user will be communicating with the data,it will be on React or can be on NEXT,since it optimizes the SEO and our controller will be ether.js which will help our contracts getting deployed on test networks and communicating with the React js on the frontend | | | | | |  |
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| **Benefits of the** |  | | | | | |  |
| **Project (less** |  | | | |  | |  |
| **than 2500 characters)** |  | | | | | |  |
|  | The benefits of the project are listed below:   1. Easy to use GUI dark/light mode. 2. The application will be able to put a patient data on a block chain Network. 3. The user data will be secure and can be retrieve easily by our web App. 4. For each user there will be a separate node containing user data making it more secure. 5. Our system supplements pointers with on-chain permissioning and data integrity logic, empowering individuals with record authenticity, auditability and data sharing. 6. Our System will be build robust, modular APIs to integrate with existing provider databases for interoperability | | | | | |  |
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| **Technical** |  | | |  |
| **Details of Final Deliverable (less than 2500 characters)** | The project will be a Web application. Its frontend will be on React/Next will be using MUI with tailwind css to make it a bit more professional and responsive,smart contracts will be written on solidity,will be using ropsten or rinkeby to deploy them on test network,for testing our contracts will be using Mocha and Chai and ether.js will help us integrating our contracts with React | | |  |
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| **Final Deliverable of the Project** | The modules which will be used in this project are as follow:   * User Friendly GUI * A User Portal * Subscription Packages for different Users * Add a medical record to a system * Export PDF of any medical Report * Automation notification/alert to user for appointment * Previous medical Records * Secure and fast data retrieving | | |  |
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| **Core Industry (Optional)** | As suggested by Supervisor |  |  |  |
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| **Other** |  |  |  |  |
| **Industries**  **(Optional)** |  |  |  |  |
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| **Core** | BlockChain , Web3,React,Solidity,hardhat |  |  |  |
| **Technology** |  |  |  |  |
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| **Other** |  |  |  |  |
| **Technologies (Optional)** |  |  |  |  |
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| **Sustainable** |  |  |  |  |
| **Development** |  |  |  |  |
| **Goals**  **(Optional)** |  |  |  |  |
|  |  |  |  |  |
| References     |  |  |  | | --- | --- | --- | | 1. List and number all bibliographical references here like this. 2. A.B. Smith, C.D. Jones, and E.F. Roberts, “Article Title”, Journal, Publisher, Location, Date, pp. 1-10. 3. Jones, C.D., A.B. Smith, and E.F. Roberts, Book Title, Publisher, Location, Date |  |  | | |  |  |  |
| Project Key Milestones | |  |  |  |
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| **Elapsed time in (days or weeks or month or quarter) since start of the project** | | **Milestone** | **Deliverable** |  |
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| Month 8 |  |  |  |  |
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Project Equipment Details



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| **Item(s) Name** | **Type** | **No. of Units** | **Per Unit Cost (in Rs)** | **Total (in Rs)** |
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