



CORPORATE PROFILE.

KIT

KAROOH IT (BD) LTD.
Bangladesh

About Karooth IT (BD) Ltd.

Karooth IT (BD) Ltd. (KIT), is situated in Dhaka, Bangladesh, is a leader in developing advanced biometric solutions, including both hardware and customized software. Our commitment to delivering top-notch security solutions tailored to the unique needs of our clients ensures that we remain at the forefront of the biometric and security industry.

At KIT, our deep expertise in hardware and system integration enables us to deliver cutting-edge solutions specifically designed to address our clients' challenges. Our skilled team excels in web services API-based systems integration, which ensures seamless connectivity and enhances business efficiency. Specializing in multi-modal biometric and security solutions, we provide robust measures to safeguard valuable assets. Our unwavering dedication to professionalism and expertise allows us to transform innovative ideas into reality, delivering exceptional software solutions. Experience the transformative power of technology with KIT.

Established and registered in Bangladesh, KIT has been dedicated to offering state-of-the-art, mission-critical enterprise solutions to government agencies and UN organizations. Our relentless efforts aim to reduce operational costs, achieve faster and superior results, and drive these institutions towards the realization of the Digital Bangladesh initiative. Focused on cutting-edge technology, we strive to propel our clients forward in their digital transformation journey. By leveraging our expertise, we enable organizations to optimize their processes, enhance efficiency, and contribute to the advancement of Bangladesh's digital landscape.

RESHAPING THE IMPOSSIBLE

At KIT, we go beyond delivering solutions within the scope of our projects. We adhere to robust methodologies to ensure seamless project management, efficient risk mitigation, comprehensive training and knowledge transfer, and best practices in development and source code writing. We prioritize world-class documentation, including Inception Reports, Software Requirements Specifications, Software/System and Database Designs, Training Manuals, User Guides, and API/Source Code Documents. These rigorous standards guarantee the highest quality deliverables and empower our clients with valuable resources for continued success.

As a unified and highly skilled team, we believe in fostering a healthy software and hardware development and integration ecosystem, both in Bangladesh and globally. We recognize the importance of an open and fair environment that allows various vendors and service providers to participate. Our solutions and systems adhere to best practices in system architecture, international standards, robust technologies, frameworks, and development platforms. By following these standards, we enable other vendors to design and develop systems with ease, promoting healthy competition and driving service providers to meet the high standards we uphold. Our commitment to attention to detail in technical and user documentation ensures seamless knowledge transfer and sustained industry growth.

Mission and Vision

Mission

Our mission is to revolutionize large-scale, mission-critical software development and integration for government and UN entities by providing cutting-edge biometric solutions and secure access control systems. We aim to enhance efficiency, security, and reliability, empowering organizations to thrive in a digital world.

Vision

Our vision is to serve nations worldwide, starting with Bangladesh. We aspire to leverage our software development and integration expertise to positively impact the world, creating a better future for all through our relentless efforts and innovative solutions.

Company Overview

Established	2019, Registered Under Company act of Bangladesh
Certificate of Incorporation No.	C-158058/2019
Trade License	Dhaka, Bangladesh
BIN	002696867-0202
TIN	111878308871
Registered Office	Dhaka, Bangladesh
Contact Person	Faisal Abdul Kadir

OFFICE ADDRESS:

Dhaka Office:

- **Address:** Flat A-1, House 522, Road 7, Avenue 04, Mirpur DOHS, Dhaka-1216 Bangladesh (Corporate Office)
- **Email:** info@karoothitbd.com
- **Phone:** (+88) 0172-8888-216

Key Areas of Expertise

Biometric Solutions: Our advanced multi-modal biometric systems offer unparalleled security measures, ensuring robust protection and reliability.	Custom Software Development: We provide bespoke software solutions meticulously tailored to meet the unique requirements of each client.
System Integration: We specialize in the seamless integration of hardware and software systems, enhancing operational efficiency and connectivity.	Security Solutions: Our comprehensive security solutions safeguard assets and ensure data integrity, providing peace of mind through cutting-edge technology.

BIOMETRIC SOLUTIONS

1. Biometric Enrollment Kits

- Multi-modal biometric kits for capturing fingerprints, iris, and facial recognition data.
- Portable and robust for use in field operations.

2. Biometric Authentication Systems

- Secure access control systems using biometric verification.
- Applications include government facilities, corporate offices, and critical infrastructure.

3. Biometric Identification Systems

- Large-scale biometric databases for national ID programs, voter registration, and law enforcement.
- High accuracy and speed for real-time identification and verification.

CUSTOM SOFTWARE SOLUTIONS

1. Management Information Systems (MIS)

- Custom MIS solutions for social safety nets, healthcare, and educational institutions.
- Comprehensive modules for data management, reporting, and analytics.

2. Enterprise Resource Planning (ERP) Systems

- Tailored ERP systems to streamline business processes and enhance operational efficiency.
- Modules include finance, HR, inventory, and procurement.

3. Web and Mobile Applications

- Development of responsive web applications and mobile apps for various platforms.
- Focus on user experience and security.

SYSTEM INTEGRATION SERVICES

1. API-based Systems Integration

- Seamless integration of disparate systems through robust APIs.
- Ensures smooth data flow and interoperability between different platforms.

2. Hardware and Software Integration

- Expertise in integrating biometric hardware with custom software solutions.
- Provides end-to-end solutions for secure and efficient operations.

SECURITY SOLUTIONS

1. Cybersecurity Solutions

- Comprehensive cybersecurity services including threat detection, prevention, and response.
- Ensures protection against cyber threats and data breaches.

2. Physical Security Systems

- Implementation of advanced surveillance and access control systems.
- Solutions tailored for government, corporate, and industrial sectors.

Key Management Personnel

The driving force behind KIT's success is its exceptional key management personnel. Each member of our leadership team embodies the company's vision and mission, blending technical expertise with strategic acumen. Their collective experience and innovative approach guide KIT towards achieving its goals and maintaining its position at the forefront of the biometric and security industry. Their commitment to excellence and continuous improvement ensures that KIT consistently delivers outstanding results and drives the company forward.

Serial No	Name	Designation
1.	Faisal Abdul Kadir	Chairman & CEO
2.	Mst. Farzana Yeasmin	Managing Director

Key Technical Personnel

The key technical personnel at Karooth IT (BD) Ltd. (KIT) are the cornerstone of our company's technical expertise, bringing years of invaluable experience across various domains within the software and IT sectors. Our team excels in multiple areas, including cash transfer systems, social protection management information systems, and state-of-the-art security solutions featuring multi-modal biometrics.

Our technical team has an impressive track record of executing and delivering mission-critical projects for prestigious clients. These include government organizations, law enforcement agencies, UN organizations, and leading development banks such as the World Bank and the Asian Development Bank.

The diverse skill set and deep knowledge of our technical experts ensure that KIT stays at the forefront of technological innovation. Their commitment to excellence allows us to consistently deliver superior solutions that meet the highest standards on both national and international stages. Whether addressing complex system integrations or developing sophisticated security protocols, our team is dedicated to pushing the boundaries of what's possible, ensuring that KIT remains a leader in the industry.

Serial No	Name	Project Roles / Designation
1.	Dr. Ferdous Hossain	Senior Consultant, Public Development
2.	Justus Oguna	Senior Consultant, MIS and Social Safety Net
3.	Gama Goodwill	Consultant, Marketing
4.	Md. Ahsan Habib	Chief Technical Officer
5.	Anwarul Islam	Chief Software Architect
6.	Al-Amin Chowdhury	Chief Information Officer
7.	Alauddin Hossain	Chief Product Officer
8.	Rezaul Karim Khan	Director, Business Development
9.	Zia Ul Hague	Database & System Administrator
10.	Arafat Hossain	Lead UK Engineer, Senior UI Designer
11.	Khairul Islam	Senior Database Specialist
12.	Nazmus Sakib	Senior UI/UX Engineer
13.	Jayed Ibrahim	Lead, Quality Assurance Engineer
14.	Md. Samiul Haque	Senior QA Engineer
15.	Rahat Islam	Business Analyst
16.	Mehedi Hasan	Senior Software Engineer
17.	Tahmim Ahmed Shibli	Senior Software Engineer
18.	Imtiaz Sayeed	Senior Software Engineer
19.	Fahim Sihab Shan	Software Engineer

20.	Mostafijur Rahman	Senior Mobile App Developer
21.	Ahsan Uddin	Mobile App Developer
22.	Moniruzzaman Khondaker	Mobile App Developer
23.	Raihan Mahamud	Mobile App Developer
24.	Shamsul Hague	Database Specialist
25.	Mizanur Rahman	Database Specialist
26.	Nazmul Huda	Database Specialist
27.	Tazul Islam	Network Engineer
28.	Ashiqur Rahman Riyadh	System Security Specialist
29.	Shams Arafat	System Security Specialist
30.	Anthony Waliaula	SQA Specialist
31.	Minhaz Rahman	Technical Writer
32.	Emad Hossain	Training and Knowledge Transfer Specialist
33.	Md. Musfikur Hasan Oli	Junior Software Engineer
34.	B M Obaydur Rahman	Junior Software Engineer
35.	Raffiul Islam	Junior Software Engineer
36.	Asif Zubayer Palak	Junior Software Engineer
37.	Nayeem Khan	Junior Software Engineer
38.	Tawsif Abdul Kadir	Junior Mobile App Developer
39.	Shoykat Saha Subrata	Junior Mobile App Developer
40.	Abdullah Al Mahmud	Junior Mobile App Developer
41.	Ashikur Rahman Ashik	Support Executive
42.	Md. Jumman	Support Engineer
43.	Syed Washinur Ashraf Evan	Support Engineer
44.	Md. Abu Naeem	Support Engineer
45.	Rubaiba Hossains	Support Engineer

Key Business Personnel

Serial No	Name	Project Roles / Designation
1.	Tahrim Shariar	Manager, Accounts & Finance
2.	Md. Arif Hossain	Manager, HR & Business Development
3.	Mohaiminul Ahsan Salim	Manager, Marketing
4.	Md. Zahiduzzaman	Business Analyst

Logistical Resources

Serial No	Item	Quantity / NOS
1.	Office Space	2200 sf
2.	Staff at Dhaka Head Office	36
3.	Staff at other Project Offices	8
4.	Number of Vehicles in Dhaka	2
5.	Conference Room (Dhaka)	1
6.	Photocopier	2
7.	Printers (Laser Jet & Inkjet)	2
8.	Computer /Laptop	36
9.	Datacenter	1
10.	Server	3
11.	Server Rack	3
12.	Telco Rack	2
13.	Core Router	1
14.	Firewall	1
15.	Core Switch	2
16.	Wi-Fi Router	2
17.	LAN Switch	6

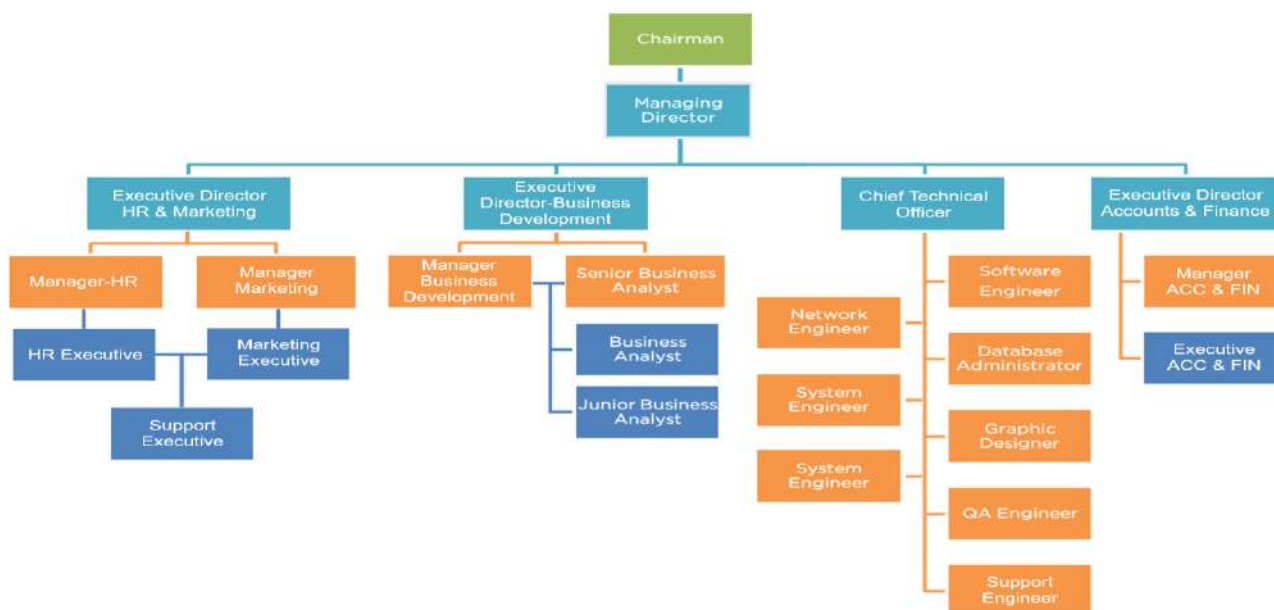
Summary of Financial Statement

Financial Data	3 years before last	2 years before last	Average
	FY 2020	FY 2021	
	BDT	BDT	BDT
Annual Turnover	11,40,586.00	15,41,260.00	1,340,923.00
Current Asset	4,33,386.00	2,20,031.00	326,708.50
Current Liabilities	3,78,937.00	81,004.00	229,970.50

Industry Membership & Certifications



Organizational Structure of KIT



Notable Projects

Sl No	Project Name	Client & Stakeholders
1	Maintenance, enhancement, and customization of the online Grievance Redress System (GRS)	Cabinet Division, Government of Bangladesh
2	Consultancy Services for the Biometrics and Management Information System (MIS) Hosting, Development, and Strengthening, South Sudan Productive Safety Net for Socio-economic Opportunities Project (SNSOP)	Ministry of Agriculture and Food Security, Government of the Republic of South Sudan
3	Supply and Delivery of 100 Biometric Gadgets of South Sudan Productive Safety Net for Socio-economic Opportunities Project (SNSOP)	Ministry of Agriculture and Food Security, Government of the Republic of South Sudan
4	Digital Social Protection Grievance Redressal System (DSP GRS) Study	Asian Development Bank (ADB)
5	Central Grievance Redress System (GRS) Upgradation for Social Safety Net Features	European Union (EU), EuropeAid, ECORYS
6	Prison Inmate Database System (PIDS) Biometric Integration Module	National Telecommunication Monitoring Center (NTMC), Bangladesh
7	Social Protection Programme for Distressed and Unemployed Workers Management Information System (SPPDUW MIS)	European Union (EU), EuropeAid, ECORYS
8	Bangladesh SPFMSP MIS Phase 4: MoE Harmonized Stipend Program (HSP) Integrated Social Protection MIS	Client: MOSW & MOWCA Main Contractor: IMC Worldwide Limited, United Kingdom
9	WFP School Meal Program Integrated Social Protection MIS and e-Payment System	Client: Environment and Social Development Organization (ESDO) on behalf of WFP Bangladesh
10	Bangladesh SPFMSP MIS Pilot: Social Protection Budget Management Unit (SPBMU) MIS and MoWCA/DWA Integrated Social Protection MIS	Client: MOSW & MOWCA Main Contractor: Maxwell Stamp PLC, United Kingdom

Other Major Projects

Our diverse portfolio is a testament to the extensive skills and experience of our talented team. We have successfully executed projects across a wide range of domains, demonstrating our versatility and commitment to excellence. Each project reflects our ability to deliver tailored solutions that meet the specific needs of our clients. Below is a detailed list of our notable projects, along with the names of our esteemed clients and stakeholders:

Sl. No	Projects	Client & Stakeholders
1.	Supply of DERMALOG VF1 All-in-One Scanner Study July 2023 to July 2024	Imagine Aqua (Malaysian Visa Consultancy Firm)
2.	Bangladesh Digital Social Protection Grievance Redressal System (DSP GRS) Study November 2022 to Present	Asian Development Bank (ADB)
3.	Bangladesh Central Grievance Redress System (GRS) Upgradation featuring Design, Development, and Deployment of Necessary Social Safety Net Features and Modules for the Technical Assistance to Support Social Security Reforms (TA SSSR) Management Information System 21 June 2023 to Present	European Union (EU) EuropeAid ECORYS Netherland
4.	Bangladesh Central Grievance Redress System (GRS) Upgradation featuring Design and Development of Different Modules, Data Migration, and Maintenance Support Services August 2022 to June 2023	P4D British Council Cabinet Division, Bangladesh
5.	Bangladesh Prison Inmate Database System (PIDS) Biometric Integration Module Design, Development, and Deployment along with the Supply and Commissioning of Iris and Fingerprint Scanners with Warranty and Maintenance Support Services July 2022 to September 2022	National Telecommunication Monitoring Center (NTMC), Bangladesh
6.	Bangladesh TA SSSR Social Protection Programme for Distressed and Unemployed Workers Management Information System (SPPDUW MIS) Upgradation and Maintenance June 2022 to Present	European Union (EU) EuropeAid ECORYS Netherland
7.	RMG, Leather, and Footwear Export Oriented Industries Cash Transfer Management Information System (RLFECT MIS) Maintenance Support Services Phase 2 under the Technical Assistance to Support Social Security Reforms (TA SSSR) Project October 2021 to March 2022	European Union (EU) EuropeAid ECORYS Netherland
8.	RMG, Leather, and Footwear Export Oriented Industries Cash Transfer Management Information System (RLFECT MIS) Maintenance Support Services under the Technical Assistance to Support Social Security Reforms (TA SSSR) Project April 2021 to August 2021	European Union (EU) EuropeAid ECORYS Netherland
9.	RMG, Leather, and Footwear Export Oriented Industries Cash Transfer Management Information System (RLFECT MIS) Design, Development, and Support Services for Bangladesh TA SSSR July 2020 to March 2021	European Union (EU) EuropeAid ECORYS Netherland

Clients & Stakeholders



British Council



Asian Development Bank



European Union



Platforms for Dialogue



ECORYS UK



Cabinet Division

Government of the People's Republic of Bangladesh

Cabinet Division
Bangladesh



EUROPEAID

EuropeAid



National Telecommunication
Monitoring Center
Bangladesh



Ministry of Agriculture and Food
Security, The Republic of South Sudan

Partners



Neurotechnology

DERMALOG

DERMALOG



Innovatrics



Gemalto

HIKVISION

HIKVISION

THALES

Thales

Technical Expertise

Our team at Karooth IT (BD) Ltd. (KIT), possesses a wide array of technical expertise, demonstrated across various technologies and platforms. The table below highlights our core competencies in front-end development, back-end development, data management, content management, identity management, and enterprise service bus technologies.

FRONT-END	
Languages	HTML5, CSS3, JavaScript, ECMAScript, TypeScript, Coffee Script, SASS, LESS
UI Frameworks and Widgets	Bootstrap, jQuery UI, Kendo UI
JavaScript Frameworks	React, Backbone.js, AngularJS, Angular 2, Node.js (Loopback, Express, Koa)
Cross Platform Tools	React Native, Ionic, Cordova, PhoneGap, Xamarin

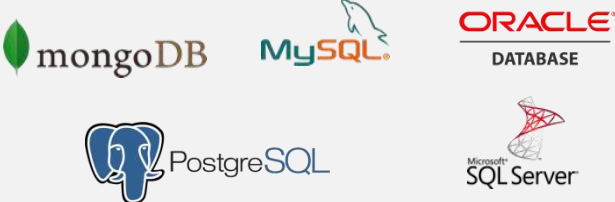
MICROSOFT .NET	
CMS	Sitefinity, Kentico, Orchard, Sitecore
Frameworks	ASP.NET (MVC, Web API, SignalR), ASP.NET Core 1.0, WPF, WCF, Entity Framework, NHibernate
Data Management	MSSQL, Azure SQL Database, MongoDB, Azure DocumentDB, Azure Table Storage, Azure Blob Storage
Caching	Memcached, Redis, Azure Cache
Searching	Elasticsearch, Azure Search
Queue	MSMQ, Azure Service Bus, Azure Queue
Cloud Computing	Amazon Web Services, Microsoft Azure Big Data, Hadoop, MapReduce, Azure HDInsight

ORACLE JAVA	
CMS	Alfresco
Frameworks	Spring (Spring Boot, Spring Data, Spring XD, Spring Integration, Spring Security), Dropwizard, JSF, Grails, Play, Hibernate, iBATIS, JasperReports
Data Management	Oracle, MySQL, PostgreSQL, Amazon RDS, MongoDB, CouchDB, Cassandra, Amazon DynamoDB
Caching	Memcached, Hazelcast, Redis, Amazon ElastiCache
Searching	RabbitMQ, ActiveMQ, Amazon SQS
Queue	MSMQ, Azure Service Bus, Azure Queue
EJB and Web Services	SSB, SLB, MDB, JAXWS, WS-Policy, WS-Security, WS-Security Policy, WS-TRUST, WS-FEDERATION

PHP	
CMS	WordPress, Drupal, Magento
Frameworks	Symfony, Laravel, Yii, Zend, CodeIgniter, CakePHP
Data Management	MySQL, PostgreSQL, Amazon RDS, MongoDB, CouchDB, Cassandra, Amazon DynamoDB
Caching	Memcached, Hazelcast, Redis, Amazon ElastiCache
Searching	Sphinx, Solr, Lucene, Elasticsearch, Amazon CloudSearch
Queue	RabbitMQ, ActiveMQ, Amazon SQS
Big Data	Hadoop, MapReduce, Amazon EMR, Apache Zookeeper, Apache HUE, Apache Ambari, Apache Kafka, Apache Spark

Technology Stack

At Karooth IT (BD) Ltd. (KIT), we leverage a comprehensive technology stack to deliver innovative and efficient solutions across various domains. Our expertise spans multiple platforms, frameworks, and tools, ensuring that we can meet the diverse needs of our clients.

Frontend	
Backend	
Data Management	
Content Management	
Identity Management	
Enterprise Service Bus	

Our seasoned experts utilize this diverse technology stack to develop and deliver robust, scalable, and efficient solutions tailored to the unique needs of our clients, ensuring excellence and innovation in every project.

Skill Matrix

Our team at Karooth IT Ltd. possesses a high level of proficiency across a wide range of technical skills. The following table represents our expertise, rated on a scale of 1 to 10, with our team scoring no lower than 8 in any category.

Skill Category	Technologies/Tools	Proficiency
Front-End Development	HTML5, CSS3, JavaScript, TypeScript, React, Angular, Bootstrap	10
Back-End Development	ASP.NET, Spring Boot, Node.js, PHP, Laravel, Django	10
Data Management	MSSQL, MySQL, PostgreSQL, MongoDB, Oracle, Cassandra, Redis	10
CMS Development	WordPress, Drupal, Sitefinity, Sitecore, Alfresco	10
Cloud Services	AWS, Microsoft Azure, Google Cloud Platform	9
Big Data & Analytics	Hadoop, Spark, Kafka, Elasticsearch, Apache HUE	8
Mobile Development	React Native, Ionic, Xamarin, Android, iOS	8
API Development	RESTful APIs, GraphQL, SOAP	9
Security Solutions	Multi-modal Biometrics, Cybersecurity, Encryption, SSL/TLS	9
DevOps & CI/CD	Jenkins, Docker, Kubernetes, Ansible, Terraform	8
System Integration	API-based Integration, Hardware and Software Integration	9
Project Management	Agile, Scrum, Kanban, Waterfall	10

This skill matrix reflects our team's commitment to maintaining a high standard of expertise, ensuring that we deliver exceptional solutions for our clients across all areas of technology.

Karooth IT (BD) Ltd. (KIT) , stands as a beacon of innovation and excellence in the biometric solution, Software and IT industry. Our comprehensive expertise, commitment to quality, and global presence enable us to deliver exceptional solutions that drive success and transform industries. We look forward to continuing our journey of reshaping the impossible and making a positive impact across the globe.

Why Choose Karooth IT (BD) Ltd. (KIT)?

Proven Expertise and Experience

Karooth IT (BD) Ltd. (KIT) stands out in the industry due to its unparalleled expertise and extensive experience in delivering advanced biometric solutions and custom software development. Our track record includes numerous successful implementations across various sectors, including government agencies, law enforcement, and international organizations. Our team of highly skilled professionals brings a wealth of knowledge and technical acumen, ensuring that each project we undertake meets the highest standards of excellence.

Innovative Solutions

At KIT, innovation is at the core of everything we do. We leverage the latest technologies and industry best practices to develop cutting-edge solutions tailored to the unique needs of our clients. Our commitment to continuous improvement drives us to explore new methodologies and tools, ensuring that our solutions are not only effective but also future-proof.

Client-Centric Approach

We believe that the success of any project lies in understanding and addressing the specific needs of our clients. KIT adopts a client-centric approach, working closely with stakeholders to ensure that our solutions align with their objectives and deliver tangible results. Our dedication to client satisfaction is reflected in our comprehensive support and training programs, designed to empower our clients and ensure seamless operation and maintenance of our systems.

Comprehensive Service Offering

KIT offers a broad spectrum of services, from biometric systems and custom software development to system integration and cybersecurity solutions. Our holistic approach allows us to provide end-to-end solutions that address all aspects of our clients' requirements. Whether it's developing a robust MIS for social safety nets or implementing a secure biometric authentication system, KIT has the expertise to deliver.

Global Reach with Local Expertise

With our headquarters in Dhaka, Bangladesh, and different international project KIT combines global reach with local expertise. This strategic presence enables us to serve clients across various regions, leveraging our understanding of local contexts to deliver solutions that are both effective and culturally relevant. Our international experience ensures that we can navigate the complexities of different markets, providing reliable and scalable solutions.

Commitment to Quality and Security

Quality and security are paramount at KIT. We adhere to stringent quality assurance processes and security protocols to ensure that our solutions are robust, reliable, and secure. Our systems comply with international standards, and we continuously monitor and update our security measures to protect our clients' data and operations from evolving threats.

Sustainable and Scalable Solutions

KIT is dedicated to creating sustainable solutions that can grow with our clients' needs. Our systems are designed with scalability in mind, allowing for seamless expansion and integration as requirements evolve. We focus on building resilient infrastructures that support long-term success and sustainability.

Strong Partnerships

Our collaborations with leading technology partners, including Neurotechnology, DERMALOG, Innovatrics, Gemalto, HIKVISION, and Thales, enable us to leverage the latest advancements in technology and deliver superior solutions. These partnerships enhance our capabilities and ensure that we remain at the cutting edge of innovation in the biometric and IT industry.

Choosing Karooth IT (BD) Ltd. means partnering with a company that is dedicated to your success. Our comprehensive expertise, commitment to quality, and client-focused approach make us the ideal partner for your biometric and IT needs. Let us help you transform your challenges into opportunities with our innovative solutions and professional excellence.

Quality Assurance Process of KIT

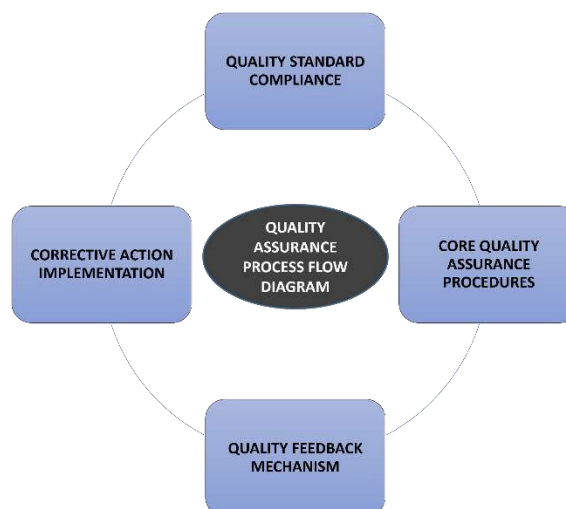
1. Quality Standards Compliance

- **Commitment to Best Practices**
Karooth IT aligns its quality standards with industry best practices to ensure reliable, high-quality services. We adhere to recognized QA frameworks, setting internal benchmarks to maintain a consistent quality level across all projects.

2. Core Quality Assurance Procedures

- **Organization of Tasks and Roles**
Clear task definitions and role assignments based on team expertise optimize workflows and ensure accountability. Project documentation includes training plans, knowledge transfer guidelines, and standards for comprehensive project documentation.
- **Work Verification & Testing**
A structured approach defines testing tools, protocols, and reporting steps, empowering QA engineers to ensure all features meet functional and performance requirements. This allows early identification and correction of potential issues.
- **Material Receiving & Supplier Qualification**
For hardware-involved projects, vendors undergo a thorough assessment to verify product specifications and compatibility. Karooth IT evaluates supplier reliability to ensure consistent standards, even in the absence of external certifications.
- **Quality Feedback Mechanism**
QA professionals actively assess in-house developments and third-party materials. By gathering client and stakeholder feedback, we integrate user insights and continuously enhance the project's quality.
- **Corrective Action Implementation**
Based on QA feedback, we collaborate closely with development teams to implement corrective actions, aligning final deliverables with client requirements and ensuring satisfaction.

Flow Diagram for Quality Assurance Process:



Risk Mitigation Process of KIT

1. Risk Identification and Assessment

- **Project Risk Profiling**
Before starting each project, we assess and document potential risks, focusing on challenges unique to Karooth IT's environments in Bangladesh.
- **Risk Analysis**
Risk analysis tools assess the severity and likelihood of each risk, helping the team prioritize actions and address risks proactively.

2. Preventive and Mitigative Strategies

- **Preventive Actions**
By identifying risks early, we implement preventive strategies such as workflow optimization, resource management, and regulatory compliance to reduce risk impact.
- **Contingency Planning**
We develop contingency plans for unavoidable risks, helping mitigate any adverse effects on timelines or project quality.

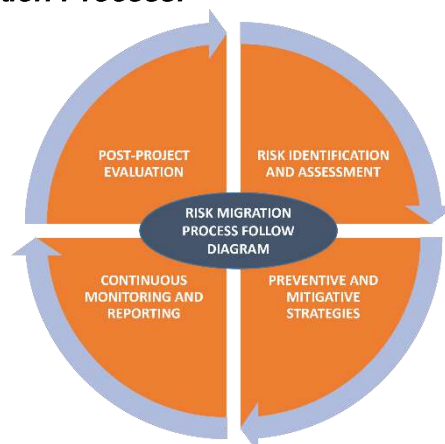
3. Continuous Monitoring and Reporting

- **Regular Risk Audits**
Periodic audits evaluate the effectiveness of risk mitigation measures, and findings help refine and strengthen Karooth IT's risk management strategies.
- **Stakeholder Communication**
Transparent communication keeps clients and stakeholders informed about risks and mitigation actions, allowing for collaborative insights and informed decision-making.

4. Post-Project Evaluation

- After project completion, a post-project review assesses risk management effectiveness. Lessons learned are documented to improve future processes and enhance resilience in both local and international projects.

Flow Diagram for Risk Mitigation Process:



Our Solutions

- Enrollment** Enrollment solution is available both in workstation and mobile kit editions. Based on the requirement of the client, the enrollment station can facilitate biometric fingerprint capture, demographic data capture, photograph capture with automatic enhancement and adjustments, iris capture, document scanning, cars or other vehicles' photo capture etc.
- AFIVS** Modern and cutting-edge technology and algorithm powered Automated Fingerprint Identification and Verification System aka AFIVS provides precision fingerprint matching and verification including 1:1 verification, 1: n identification and verification, and de-duplication etc. Our solution, in any mission critical environment, provides faster and more secure performance.
- IIVS** The Iris Identification and Verification System provides industry standard instant iris matching and recognition. Individuals can be identified through scanning their eye and granted access to secure facilities, can be used to criminal verification systems as well.
- Voice Recognition** Using the Voice Recognition System (VRS), a person's voice can be identified by the machine and the commands can be carried out accordingly. This helps using voice commands in access-restricted scenario where the identification of the voice owner is critical to the safety and security.
- HGIVS** Hand Geometry Identification and Verification System (HGIVS) lets the system recognize individuals scanning their hand shapes. This technology can particularly be useful for access control and HRM solutions to track sign in and sign out times of the employees.
- Smart Cards** Smart cards are very efficient and a popular choice in restricting access to facilities and often be tagged with other identification and verification systems. RFID based cards lets contactless scan of the card while chip-based smartcards are more secure but requires smartcard reader devices.
- Id & Access** Identity and Access Management solution are comprised of all or some of the before mentioned solutions where enrollment is used to capture the required data from the end users and other id and verification systems are used jointly to ensure a rock solid, secure access control.
- Mobile & e-Banking** Secure and top-notch mobile and e-banking solutions ensures for the end users that they are going to get the most reliable and seamless service experience while doing any kind of transactions over the internet or using their mobile network. Promise of safe transactions gives the users peace of mind.
- Payment Cards** Customized payment cards can be deployed for closed loop payment systems within a public organization or school or library to enable the members, students or employees of the organization make payments through their cards and control the spending via pre-paid balance top-up.

Ecommerce	A great challenge and weakness of the widely spread ecommerce websites is ensuring the security of the website itself as well as the security of their users. "ISTL ecommerce solutions" not only comes with user-friendly interfaces and experiences for the end users, but makes sure strong security for the system and its users.
HRM	Human Resource Management solution developed by ISTL lets the employers keep track of each and employee of the organization, seamlessly manage the payroll system, while ensuring an uptime of 99% with robust security and privacy through data encryption and cloud security technologies.
POS	Industry-grade Point of Sale solution, designed and developed by ISTL, has the capability to be deployed across nationwide chain shops. Data integrity and security makes sure that the online transactions and business sales reports are secure and cannot be sniffed around by external data thieves. Easy POS GUI enables the employees serve customers faster and accurate.
School Management	Multi-functioning and highly modular School Management solution features learning management system (LMS), school employee and resource management, student attendance records, financial transaction through payment gateway, library management system and closed loop payment methods etc.
ERP	Enterprise Resource Planning (ERP) is a powerful and secure suite of business analysis and management solutions integrated into one solution to make sure central management of the organization and mining connected data to generate more meaningful reports and analytics.
Vehicle Tracking	Vehicle Tracking solution makes intelligent use of the GPS, mobile network and remote mechanics to ensure the control of corporate fleet control through easy user interfaced application on both mobile and web. Some of the features include, but not limited to, engine immobilization, live location and speed tracking, battery tampering alert, fuel theft control etc.
Utility Billing	Utility Billing management system streamlines the preparation and distribution of mass volume utility billing, consumers database, automatic line disconnection or unpaid overdue bill alert, reports and analytics showing the most regular and top users of the utility etc.
Helpdesk	World class helpdesk application and management software lets the helpdesk service provider organizations have total peace of mind because the solution not only helps the desk employees manage their client remotely more successfully, but efficient employee scheduling, recording of conversation, tracking helpdesk activities makes it a complete must-have solution.
Card Personalization	Card Personalization solution includes a mixture of high-end app and hardware to enable the users design and preview the card exactly as it would look like after being printed, make necessary adjustment and print mass volume cards with personalized design and information.

Pioneering Excellence in South Sudan

South Sudan Productive Safety Net for Socio-economic Opportunities Project (SNSOP)

The South Sudan Productive Safety Net for Socio-economic Opportunities Project (SNSOP) is a groundbreaking initiative designed to transform livelihoods, foster resilience, and enhance socioeconomic opportunities across South Sudan. This ambitious project, supported by the World Bank and developed collaboratively by Karooth IT (BD) Limited, targets 96,000 vulnerable households, including refugees and host communities, in 15 Counties. SNSOP builds on the success of its predecessor, the South Sudan Safety Net Project, expanding its scope to deliver cash transfers, livelihood opportunities, and advanced technological solutions to drive efficiency, transparency, and empowerment.

The SNSOP Management Information System (MIS), developed in-house by **Karooth IT (BD) Limited (KIT)**, exemplifies the company's reputation as a leading technology innovator from Bangladesh. KIT's advanced system architecture seamlessly integrates external entities, such as banks and government organizations, via secure APIs and VPN connections, ensuring efficient and protected data exchange. At the grassroots level, KIT has deployed state-of-the-art fingerprint capturing devices, enabling precise biometric data collection to prevent fraud and ensure unique beneficiary identification. This data is channeled into a secure Demilitarized Zone (DMZ), fortified with dual reverse proxies that act as a robust shield against cyber threats. Within the highly secure data center, KIT employs load balancers to optimize workload distribution across application servers, which power both the MIS operations and the Automated Fingerprint Identification System (AFIS). These servers interface with a dedicated database, meticulously designed to store sensitive MIS and biometric data securely. Hosted on government-secured servers, this scalable and efficient system underscores KIT's commitment to innovation, security, and excellence, marking a milestone achievement in national-scale technological initiatives.

Payments are currently underway in *Central Equatoria, Munuki Block-B, JIIBA*, at the *Saint John Payment Center*.



At the core of SNSOP lies a sophisticated and secure Management Information System (MIS), seamlessly integrated with biometric technologies to ensure data accuracy, prevent fraud, and streamline operations. This centralized system comprehensively addresses every facet of project implementation by capturing detailed demographic, geographic, and biometric data of beneficiaries (participants), ensuring precise targeting and inclusivity. Participants are registered in two categories to receive financial benefits: Labor-

based Intensive Payment (LIPW) for those who can work, and Direct Income Support (DIS) for those unable to work, like the chronically ill, disabled, or female-headed households. The payment

operation is jointly managed by the Ministry of Agriculture and Food Security (MAFS) and the Ministry of Gender, Child, and Social Welfare (MGCSW), with funding provided by the World Bank. The system links work-based programs to compensation through automated wage disbursement, maintaining accountability and transparency while empowering households through livelihood training, business plan development, and grant distribution. By facilitating access to financial services and tracking progress with robust audit mechanisms, the system drives sustainable impact and socioeconomic growth. A structured and secure grievance platform addresses beneficiary concerns, including gender-based violence, reinforcing SNSOP's commitment to equity and social justice. Additionally, advanced dashboards, data visualization, and real-time reporting provide decision-makers with actionable insights, enabling evidence-based strategies that foster agricultural development and economic opportunities. The integration of G2P payment systems ensures timely and transparent fund transfers, significantly enhancing the efficiency and reliability of social protection programs.

What sets SNSOP apart is its holistic approach to capacity building and sustainability. Extensive training programs empower staff at the Ministry of Agriculture and Food Security (MAFS) and the Ministry of Gender, Child, and Social Welfare (MGCSW) to operate and maintain the systems independently. With 24/7 technical support, updated training manuals, and comprehensive documentation, the project fosters long-term institutional growth and efficiency.



This image shows the impactful G2P payment through SNSOP system which captures key stakeholders- **Hon. Josephine Lagu, Minister of Agriculture and Charles Undeland, Country Director of World Bank** with beneficiaries. It powerfully illustrates the collaborative partnership driving social protection and economic empowerment in South Sudan.

By addressing the immediate needs of vulnerable households

while laying the foundation for sustainable development, SNSOP epitomizes transformative change. Its innovative use of technology, data-driven decision-making, and focus on inclusive growth ensure that it not only alleviates poverty but also builds resilience and promotes self-reliance across South Sudan. As a flagship initiative in the region, SNSOP stands as a testament to the power of strategic collaboration, innovation, and a steadfast commitment to socioeconomic progress.

Beneficiaries gather at the payment center and eagerly awaiting the final approval of the payment system to receive their vital financial support. This organized and inclusive process reflects SNSOP's commitment to transparency, empowerment, and delivering tangible benefits to vulnerable communities in South Sudan.



The image showcases a vibrant and collaborative scene at a payment center, where stakeholders from the Ministry of Agriculture and Food Security (MAFS), the Ministry of Gender, Child, and Social Welfare (MGCSW), and the World Bank work hand-in-hand to ensure the seamless disbursement of funds to authorized beneficiaries. Under the shade of large tents, attendees sit attentively while

officials and community representatives coordinate the process to bring financial relief directly to the hands of those who need it most. Together for progress and sustainability!

Transforming Social Protection through RWCSI MIS with G2P Integration

The successful development and implementation of the RWCSI MIS with G2P integration is a landmark achievement for Karooth IT (BD) Limited. It showcases the company's ability to deliver:

- **Mission-critical public sector solutions** under emergency conditions.
- **End-to-end digital transformation** of complex, multi-stakeholder workflows.
- **Sustainable and scalable systems** that empower governments and uplift lives.

This project reaffirms KIT's role as a **trailblazer in e-governance and digital social protection**. It stands as a testament to what is possible when technology meets empathy, and innovation is guided by a vision for social good. In the wake of global socio-economic disruptions caused by the COVID-19 pandemic, nations around the world grappled with the urgent need to deliver timely and transparent financial assistance to their most vulnerable populations. In Bangladesh, one of the most affected segments was the Ready-Made Garment (RMG) sector, the backbone of the nation's export economy. In response, the European Union, through its Technical Assistance to Support Social Security Reforms (TA SSSR) program, initiated the **RMG Workers Cash Support Initiative (RWCSI)**. At the heart of this initiative stood a groundbreaking digital solution—a **Social Protection Management Information System (MIS)**, designed and implemented by Karooth IT (BD) Limited (KIT), in joint venture with ISTL.

This innovative system, seamlessly integrated with **Government-to-Person (G2P)** payment infrastructure, stands today as a **milestone achievement for Karooth IT (BD) Limited**, showcasing its leadership in **digital transformation, public sector technology, and social protection**.

SPDOW MIS

Not secure 119.148.46.106:8080/mis/act-min/dashboard

Website Inbox (1/3) - xFDL... YouTube Face Hiring, Rec... ChatGPT DesiSeek - Info Se... Sign in - Nagin A... Login - Altwiser Speech to Text Ser... ATG Admin Panel devkaranbhd.co... How to restart m... Test - Meeting E... 28

Social Protection Programme for Distressed and Unemployed Workers (SPDOW) MIS

Home English Admin

Last Updated: 10/04/2025 10:05:03

Dashboard

Outstanding Activities

Activity Type	Total Number	Link
Applicants Awaiting Submission to Association	9	Click the Link
Applicants Awaiting Approval by Associations	128	Click the Link
Applicants Awaiting Approval by PIC	1	Click the Link
Applicants Awaiting Enrollment by DoL	10	Click the Link
Payment cycles Awaiting for sending the SPBMU MIS	4	Click the Link
Bounced back EFTs Awaiting for correction	893	Click the Link
Grievances Awaiting for redress	24	Click the Link

Worker Registry and Applicant Statistics

Association	Number of Factories	Worker Registry Statistics			Applicant Statistics			
		Total Workers	Male Workers	Female Workers	Number of Factories with Applicants	Total Applicants	Male Applicants	Female Applicants
Total	5,759	52,018	22,577	29,441	79	15,575	6,108	9,467
BKMEA	817	3,565	1,652	1,913	10	3,594	1,616	1,978
BGMEA	4,699	45,243	19,578	25,765	53	11,216	4,180	7,036
LFMEA	170	3,106	1,344	1,762	12	844	302	542
BFLLEA	68	2	2	0	3	7	7	0
Test	5	2	1	1	1	4	3	1

Dashboard of RMG Workers Cash Support Initiative (RWCSI) MIS

Visionary Digital Infrastructure for Emergency Social Protection

The RWCSI MIS was born out of an urgent necessity: to design a **robust, scalable, and secure digital platform** that could facilitate end-to-end delivery of financial support to thousands of RMG workers who had lost employment due to the pandemic. This required not just technical excellence, but deep sensitivity to social impact, inclusiveness, and accountability. KIT rose to the challenge, creating a digital architecture that offered **real-time tracking, streamlined registration and validation, seamless G2P payments, and efficient grievance redress**.

What sets this MIS apart is its **full-cycle integration**: from capturing initial worker data to disbursing cash directly into beneficiaries' accounts—every step was digitized, verified, and recorded. This dramatically reduced delays, leakages, and errors that plague traditional cash transfer mechanisms.

Pioneering Government-to-Person (G2P) Integration

A core highlight of the system is its **integration with Bangladesh's G2P payment gateway (SPBMU)**, a sophisticated web service platform that enables secure, direct digital transfers from government sources to citizens. By linking the MIS with this infrastructure, Karooth IT (BD) Limited helped user in a new era of **digitally verifiable, auditable, and automated financial support**.

The payments module enabled payroll generation, batch disbursements, real-time reconciliation dashboards, and successful/failed transaction tracking—all powered by secure APIs. This level of integration not only ensured **rapid cash support** to beneficiaries, but also **empowered public institutions** with data transparency and operational control.

Comprehensive Modular System Architecture

The RWCSI MIS is not a monolithic platform but a **modular, web-based solution** built on a highly scalable, de-normalized database structure and secure cloud infrastructure. It includes:

- **Registration Module:** Bulk/Manual uploads with real-time data validation.
- **Selection Module:** Dynamic eligibility rules engine with transparency checks.
- **Enrollment & Beneficiary Registry:** Digitally tracks workers' lifecycle.
- **Payment Module:** Fully automated G2P disbursement workflows.
- **Grievance Management System:** Secure public-facing form with workflow.
- **Reporting & Analytics:** Real-time dashboards, gender/district disaggregation.
- **Administration & Security:** Role-based access, audit trails, and master data control.
- **Technology Module:** Responsive UI, GoB-approved hosting, API-based interoperability.

Through these modules, KIT ensured **every stakeholder—from factory reps to government officers—could access the system with clarity, purpose, and security**.

Project Execution Excellence

The scope of work, meticulously executed by Karooth IT (BD) Limited and ISTL, spanned the full software lifecycle—from UI/UX design and system architecture to live deployment, user training, documentation, and post-launch support. Notably:

- 8 major functional modules were developed and integrated.
- Comprehensive training was delivered to government and field staff.
- Six months of maintenance and minor enhancements were provided post-deployment.
- A complete source code and documentation package was handed over to the Government of Bangladesh for future scalability and ownership.

Every deliverable was completed on time, under budget, and with an unwavering commitment to quality. The project was not just a technology deployment—it was an **institutional capability-building initiative** that left behind a lasting impact.

Social and Institutional Impact

The RWCSI MIS touched thousands of lives by enabling rapid and fair financial assistance to laid-off garment workers. It helped:

- **Reduce financial distress** for vulnerable workers.
- **Promote trust and transparency** in social safety nets.
- **Strengthen government capacity** in digital social protection.

Moreover, this system has now become a **blueprint for future social protection programs** in Bangladesh. Its architecture can be adapted for broader initiatives like climate resilience payments, universal social pensions, and conditional cash transfers.

Detailed Case Study: South Sudan Productive Safety Net for Socio-economic Opportunities Project (SNSOP)

Client: Government of the Republic of South Sudan through the Ministry of Agriculture and Food Security (MAFS) and the Ministry of Gender Child and Social Welfare (MGCSW)

Consultant: ISTL & KIT JV

Project Objective: Enhance the National Safety Net Delivery System through the integration of a robust Management Information System (MIS) and biometric technology.

Introduction

The South Sudan Productive Safety Net for Socio-economic Opportunities Project (SNSOP) is a World Bank-supported initiative aimed at improving the efficiency and effectiveness of cash transfers and socio-economic opportunities to 96,000 poor and vulnerable households across 15 counties, including refugee-hosting areas. The project addresses key pain points in data management, beneficiary verification, and payment disbursement.

Problems Identified

1. Data Management Inefficiencies

- **Problem:**
 - Disparate systems led to data inconsistencies and silos.
 - Dependency on Alpha Commercial Bank (ACB) for biometric data management resulted in lack of direct control over the data.
- **Solution:**
 - Centralized the Management Information System (MIS) and Automated Fingerprint Identification System (AFIS) under SNSOP control.
 - Migrated MIS and biometric databases to a government-hosted cloud environment,

ensuring cohesive and secure data management.

2. Verification Challenges

- **Problem:**
 - Manual verification processes were prone to errors and delays.
 - Lack of integration between demographic and biometric data hindered efficient verification.
- **Solution:**
 - Implemented AFIS and Facial Recognition System (FRS) for automated and accurate beneficiary identification.
 - Integrated biometric and demographic data within the MIS for seamless verification processes.

3. Payment Disbursement Issues

- **Problem:**
 - Inefficient payment processes with high dependency on external parties.
 - Security concerns in handling and disbursing payments.
- **Solution:**
 - Developed a secure payment system integrated with MIS, facilitating automated payroll generation and verification.
 - Utilized a Payment Service Provider (PSP) for secure and efficient disbursement, supported by comprehensive reconciliation processes.

Solutions Provided by KIT

1. Centralized System Architecture

- **Description:**

- Consolidated application server, AFIS server, and database server under SNSOP MIS control.
- Enhanced data management and decision-making insights through a unified system architecture.

2. Advanced Biometric Solutions

Fingerprint Matching Process:

Algorithm: Fingerprint Matching

- 1. Data Collection:** - Capture fingerprint images using handheld devices or mobile apps. - Preprocess images to enhance quality (e.g., noise reduction, contrast enhancement).
- 2. Feature Extraction:** - Extract unique fingerprint features such as minutiae points (ridge endings and bifurcations). - Use algorithms like Gabor filters or Fast Fourier Transform (FFT) for feature extraction.
- 3. Matching:** - Compare extracted features against stored fingerprint templates in the AFIS database. - Use matching algorithms like Minutiae-based Matching or Ridge-based Matching. - Calculate a similarity score based on the number and spatial relationship of matching minutiae points.
- 4. Decision:** - Set a threshold for similarity score to determine a match. - If the score exceeds the threshold, the fingerprints are considered a match; otherwise, they are not.

Deduplication Process:

Algorithm: Biometric Deduplication

- 1. Data Collection:** - Collect biometric data (fingerprints, facial images) from beneficiaries.
- 2. Preprocessing:** - Enhance and normalize biometric data for consistency.
- 3. Feature Extraction:** - Extract unique features from biometric data (e.g., minutiae points in fingerprints, facial landmarks).
- 4. Matching and Comparison:** - Compare new biometric data against existing records in the AFIS and FRS databases. - Use fingerprint matching and

facial recognition algorithms to calculate similarity scores.

- 5. Deduplication:** - Identify duplicate records based on similarity scores. - Merge or flag duplicate records to maintain unique beneficiary identities.

- 6. Update Database:** - Update the MIS and AFIS databases with deduplicated records.

Face Matching Process:

Algorithm: Facial Recognition

- 1. Data Collection:** - Capture facial images using mobile apps or handheld devices. - Ensure proper lighting and angle for high-quality images.
- 2. Preprocessing:** - Detect and align faces in images using techniques like Histogram of Oriented Gradients (HOG) or Deep Learning-based detectors. - Normalize images (e.g., resize, grayscale conversion).
- 3. Feature Extraction:** - Extract facial features using algorithms like Local Binary Patterns (LBP), Eigenfaces, or Deep Learning models (e.g., CNNs).
- 4. Matching:** - Compare extracted facial features against stored templates in the FRS database. - Calculate similarity scores using distance metrics (e.g., Euclidean, Cosine).
- 5. Decision:** - Set a threshold for similarity score to determine a match. - Confirm identity if the score exceeds the threshold.

Comprehensive Mobile and Registration Tools

• Mobile Application:

- Developed a user-friendly mobile app enabling field staff to capture and verify biometric data on the go.
- Integrated real-time data synchronization with the central MIS and AFIS.

• Handheld Registration Tools:

- Provided handheld devices for on-field biometric data capture.

- Streamlined the registration process, ensuring accuracy and reducing manual errors.

System Interaction and Workflow

1. Registration System:

- Beneficiaries registered using handheld devices and mobile apps.
- Data captured includes demographic and biometric details (fingerprints and facial recognition).

2. Verification and Deduplication System:

- Biometric data sent to AFIS for deduplication.
- Unique records migrated to SNSOP MIS for further processing.

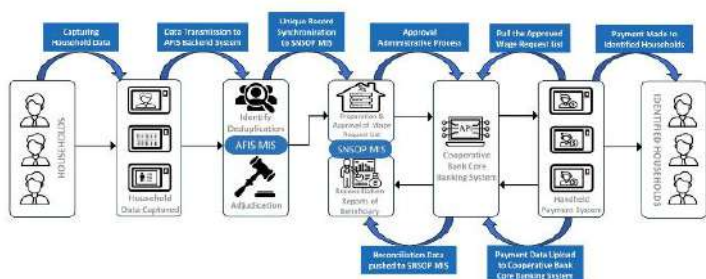
3. Payment System:

- MIS generates payroll based on verified beneficiary data.
- Payments disbursed via a secure API to a Payment Service Provider (PSP).
- PSP handles physical disbursements and sends reconciliation reports back to MIS.

Table: Key Components of the Solution and Their Roles:

Component	Role
Central MIS	Centralized data management and decision support
AFIS	Biometric deduplication and identity verification
Mobile Application	Field data entry and retrieval
Handheld Registration Tools	Biometric data capture during beneficiary registration
Payment Service Provider (PSP)	Physical disbursement and payment verification

Process Flow Diagram



Conclusion

The SNSOP project, led by ISTL & KIT JV, effectively addressed key challenges through advanced biometric and MIS solutions. The integration of AFIS and FRS enhanced beneficiary verification, while the centralized system architecture and secure payment processes improved data management and operational efficiency. These solutions ensured that the intended beneficiaries received timely and accurate support, aligning with the project's objectives of enhancing transparency, accountability, and efficiency in social protection programs in South Sudan.

Case Study: Grievance Redress System (GRS) Project

Client: Cabinet Division, Government of Bangladesh

Consultant: Karooth IT Limited

Project Objective: Maintenance, enhancement, and customization of the online Grievance Redress System (GRS) to improve efficiency, accountability, and transparency in handling grievances.

Introduction

The Grievance Redress System (GRS) project aims to enhance the existing system to better manage and resolve grievances submitted by citizens. This project, undertaken by Arc Bangladesh Limited, focuses on addressing the specific pain points in the existing system and implementing solutions to ensure a more effective and user-friendly grievance redress mechanism.

Pain Points Identified

1. Inefficient Grievance Handling

- **Problem:**
 - The existing system had slow processing times for grievances.
 - Manual intervention was often required, leading to delays and inconsistencies.
- **Solution:**
 - Implemented an automated workflow for grievance handling.
 - Enhanced the system to support faster processing and resolution of grievances.

2. Lack of Integration and Data Sharing

- **Problem:**
 - The system lacked proper integration with other

government services and databases.

- Data silos made it difficult to share information and track grievances effectively.

- **Solution:**

- Integrated the GRS with the National e-Service Bus and other relevant government databases.
- Developed APIs for seamless data exchange and interoperability.

3. Poor User Experience

- **Problem:**
 - The user interface was not intuitive, making it difficult for citizens to file and track grievances.
 - Lack of a mobile-friendly platform limited accessibility.
- **Solution:**
 - Redesigned the user interface for better usability and accessibility.
 - Developed mobile applications for both Android and iOS platforms.

4. Limited Reporting and Analytics

- **Problem:**
 - The system lacked robust reporting and analytics capabilities.
 - Difficulties in generating insights and tracking performance metrics.
- **Solution:**
 - Developed a comprehensive reporting and analytics module.

- Implemented dashboards for real-time monitoring and analysis of grievance data.

Actions Taken by Arc Bangladesh Limited

1. System Process Flow

The enhanced GRS system follows a streamlined process flow to ensure efficient grievance management:

1. Grievance Registration:

- Citizens submit grievances through web or mobile applications.
- System captures and validates the details.

2. Grievance Handling:

- Automated workflow routes the grievance to the appropriate department.
- Assigned officials review and address the grievance.

3. Grievance Tracking:

- Citizens can track the status of their grievances in real-time.
- Notifications and updates are sent to keep citizens informed.

4. Resolution and Feedback:

- Once resolved, the outcome is communicated to the citizen.
- Citizens can provide feedback on the resolution process.

2. System Architecture and Technology Used

The GRS system leverages modern technologies and a microservices architecture to ensure scalability, flexibility, and robustness:

• Frontend:

- Web UI: Developed using Angular.

- Mobile UI: Developed using Flutter for cross-platform compatibility (Android and iOS).

• Backend Services:

- Developed using Spring Boot for building microservices.
- RESTful APIs for communication between services.

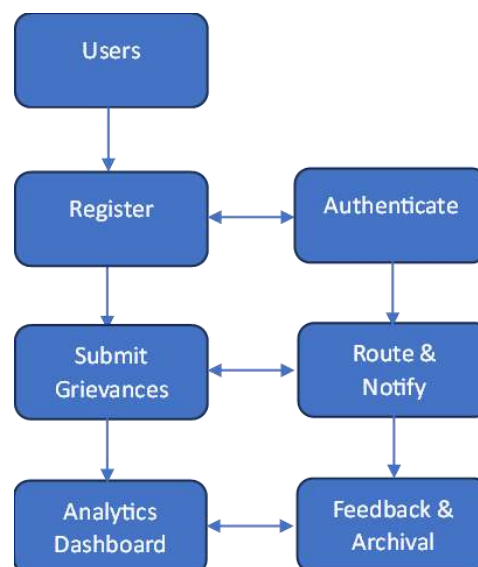
• Database:

- Relational Database: PostgreSQL for structured data.
- NoSQL Database: MongoDB for unstructured data and high scalability.

• Cloud and Security:

- Hosted on AWS for scalability and reliability.
- Implemented security measures including OAuth 2.0 for authentication and SSL/TLS for data encryption.

System Architecture Diagram



Technology Stack

Component	Technology
Frontend (Web UI)	Angular
Frontend (Mobile UI)	Flutter
Backend	Spring Boot
Database (Relational)	PostgreSQL
Database (NoSQL)	MongoDB
Cloud Hosting	AWS
Security	OAuth 2.0, SSL/TLS

Detailed Algorithms and Processes

Automated Workflow for Grievance Handling:

Algorithm: Grievance Handling Workflow

- 1. Receive Grievance:** - Input: Grievance details submitted by citizen. - Validate the input data for completeness and correctness.
- 2. Assign Department:** - Based on the type of grievance, determine the responsible department. - Assign the grievance to the appropriate department's queue.
- 3. Notify Assigned Official:** - Send notification to the responsible official about the new grievance. - Update grievance status to "Assigned".
- 4. Review and Action:** - Official reviews the grievance and takes necessary action. - Update the grievance status based on the action taken (e.g., In Progress, Resolved).
- 5. Citizen Notification:** - Notify the citizen about the status of their grievance. - Provide updates at each stage of the process.
- 6. Feedback Collection:** - After resolution, request feedback from the citizen. - Store feedback for further analysis and system improvement.

Integration and Data Sharing via API:

Algorithm: Data Integration and API Management

- 1. API Gateway Setup:** - Configure API Gateway for secure access and routing. - Define API endpoints for various services (e.g., Grievance Submission, User Management).
- 2. Data Exchange:** - Use RESTful APIs to enable data exchange between GRS and other government systems. - Ensure data integrity and consistency during the exchange process.
- 3. Data Synchronization:** - Implement mechanisms to synchronize data between relational and NoSQL databases. - Use scheduled jobs for periodic data updates and consistency checks.
- 4. Security Measures:** - Apply OAuth 2.0 for secure authentication and authorization. - Use SSL/TLS for data encryption during transmission.

Conclusion

The GRS project, executed by Arc Bangladesh Limited, successfully addressed critical pain points in the existing system through comprehensive enhancements and modern technological solutions. The integration of automated workflows, improved user interfaces, robust reporting, and seamless data sharing significantly enhanced the system's efficiency, transparency, and user satisfaction. This project demonstrates a strategic approach to leveraging technology for effective governance and citizen service delivery.



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