Team Members: 2
Vidya Sinha - 21- Database & system architecture designing , frontend development:Designs scalable database and system architecture for efficient data handling; develops user-friendly frontend using React with TypeScript to ensure seamless interaction and compliance with accreditation needs.

Dhruvi Patel -29- Deployment with security and Backend development:Manages secure deployment and backend development using Flask, building robust RESTful APIs, implementing JWT authentication, and ensuring data security and system reliability for accreditation processes.

PROJECT TITLE : Accreditation and Data Management assistant for Institutions

1. Introduction

So, Bodies like NBA, NAAC, Qos, NIRF, COE rank institutions on multiple criterias. As of now, all the work done till now is currently done manually, from data entry , data collection and scoring them for self assessment which eventually lead to errors and inconsistency and especially time taking and inefficiency. So there was a need for an automated accreditation and data management system which does this and simply the whole process which also be more transparent.

2. Problem Statement

As mentioned above , we don't have a solution for this , which makes the whole process time consuming , more likely to be error prone and less efficient. Faculties used to rely on spreadsheets and manual data entry to prepare the reports which again creates challenges in accuracy since there is large set of data which comprises of many students + faculties details which needs to be arranged in a way the criterias are listed and have to do this same repetitive task every time an accreditation bodies visits institution. Even the accreditation bodies struggle to verify all the manual data records across different criterias. This creates a need for a centralized, automated solution that can calculate accreditation scores, manage institutional data securely, and generate reliable reports.

3.Objectives

1, To develop an automated system that calculates scores self assessment by checking all the criteria for both accreditation bodies and institution
2. To design a centralized database for secure storage and easy retrieval of institutional data for all past years.
3. To provide standardized reporting dashboards for institutions(HOD, Admin, dean) and accreditation bodies(naac, nba etc).

4.To ensure data privacy and secure access by adopting encryption and user authentication mechanisms and role based access.

4.Relevance to ICT Domain

this project lies within the ICT domains of software development, database systems to solve a pressing educational problem. Information and communication technology relevance to this project by solving the problem ensuring scalability, efficiency, and improved decision-making for both institutions and accreditation bodies as ICT is not only about hardware and software but also about how information is collected, processed, stored, and communicated effectively to support decision-making.
The information system is designed to handle large volumes of institutional data required for accreditation (faculty records, research publications, infrastructure details, placements, etc.).
It helps ICT in the field of software engineering and automation of administration process
Manual calculations of accreditation scores are replaced by rule-based algorithms coded in programming languages like Python.

5. Feasibility Analysis

In Case of Tech stack :

1. We have used flask (python) in backend with SQLAlchemy ORM which enables modular code organization means it will be easier to maintain the code.
2. PostgreSQL in database which handles complex queries for CRUD operations and used supabase to host the database and to store the files and docs as it [provides secure, scalable file storage integrated with the database.
3. React with typescript in frontend.
4. The RESTful API architecture supports scalability, allowing easy integration with other systems or third-party services.
5. Flask Blueprints allow the application to scale by organizing code into reusable modules
6. Replacing session-based authentication with JWT improves security

In case of economic feasibility:

1. Supabase operates on a pay-as-you-go model, allowing costs to scale with usage. Its free tier supports initial development,
2. Flask, React, and TypeScript are free, eliminating licensing costs. This reduces the total cost of ownership compared to proprietary solutions
3. Cloud infrastructure allows scaling without significant upfront investment, as resources can be adjusted dynamically based on demand

In case of ethical or security also we have feasible solutions as we prioritize data privacy, user rights, and compliance like Supabase Storage's access controls and encryption ensure sensitive data (e.g., student records) is protected, aligning with privacy standards and Role-Based Access Control providing a foundation for ensuring users only access data relevant to their roles, supporting fairness and transparency. It also enhances trust by ensuring document authenticity, critical for educational applications also supports standardized data handling, facilitating compliance with educational regulations.

6.Market/User Needs Analysis

Users: Colleges, institutions and accreditation bodies (NBA, NAAC)
Need: Automated tools to reduce administrative burden, ensure transparency, and save evaluation time and managing and calculation for every year and need to reduce the repetitive work.
Support: Studies in ICT for education highlight the growing demand for digital quality assurance systems. For eg- Institutions want score computation along with managed data of every year. Accreditation bodies want real-time verification dashboards saving a lot of time and efforts of faculties.

7.Literature Review:

The Accreditation & Data Management System is designed to serve higher-education institutions (like colleges and departments), accreditation bodies such as NBA and NAAC in India, and government or regulatory agencies focused on quality assurance. These users share a common need: a better way to handle the complex, time-consuming process of collecting, validating, and organizing evidence & faculty profiles, course outcomes, placement records, and research outputs in the exact formats required by NBA and NAAC's strict Self-Assessment Report (SAR) templates. This creates a clear technical need for a system with a standardized data model and automated export or reporting features to make compliance smoother and less error-prone.

Recent reviews and reports show that higher-education institutions are increasingly turning to tech solutions like dashboards, data mining, and automation to lighten the administrative load and make their data more auditable. There's a growing market demand for tools that save time, ensure accurate score calculations for accreditation, and provide real-time dashboards for evaluators and regulators to verify information easily.

Sources :

NAAC Revised University Manual / SSR guidelines (NAAC official manuals, PDF)
Link: NAAC : Official NAAC manuals and SSR/SAR templates that list required data fields, evidence types and formats institutions must submit for accreditation useful to justify the exact data model and reporting features your system must support.

NBA Self-Assessment Report (SAR) formats and Accreditation Documents (NBA official site / PDFs)
Link: NBA India : NBA's SAR templates and general/manual documents showing program-level scoring items, required tables and the e-NBA submission process authoritative source for implementing NBA scoring logic and export formats.

Haris, A.S.; Washizaki, H.; Fukazawa, Y. *Systematic Review of Utilized ICTs in Quality Assurance and Accreditation of Higher Education* (EAI / 2018)
Link: EUDL : A systematic literature review identifying existing ICT uses for QA/accreditation, observed gaps (limited automation, region-specific studies), and recommendations supports the claim that demand exists and gaps remain for standardized automated tools.

Hussain, M.; Al-Mourad, M.; Mathew, S.; Hussein, A. *Mining Educational Data for Academic Accreditation: Aligning Assessment with Outcomes* (2016/2017; indexed / conference/journal)
Link: IDEAS/RePEc : Presents a framework using educational data mining/learning analytics to align assessment data with student learning outcomes and to reduce manual accreditation workload useful for the technical basis of automated indicator computation.

UNESCO *Higher Education Global Data Report (Working Document, 2022)* / UNESCO higher education resources
Link: Right to Education : Global higher education data and trends highlighting scale and importance of QA and institutional data useful for market context and showing why scalable ICT solutions are needed.

Educational Data Mining / Learning Analytics review (recent review 10-year EDM overview)
Link: SpringerLink : A recent systematic review of EDM techniques and their applications in education, showing mature methods (classification, aggregation, dashboards) that can be repurposed for automated accreditation indicators and validation.

8. Novelty:

Existing solutions for accreditation, like spreadsheets or basic MIS tools, usually focus on one framework (e.g., NBA or NAAC) and lack full automation from data collection to validation, scoring dashboards. Some research prototypes use learning analytics or custom data models, but they don't cover the entire process.

Our system stands out with three key improvements:

1. Supports Multiple bodies : It works with all formats and allows flexible scoring rules.
2. Data management and Dashboards: It checks score or data instantly, shows gaps, and provides live dashboards with evidence for accreditation officers, instead of just static reports.
3. Secure, Cloud-Based Access: It offers role-based access for all levels of heads whether its HoD , admin or dean,

9.Conclusion

The Accreditation and Data Management Assistant is designed to tackle a challenge that many institutions and accreditation bodies have struggled with for years: handling data and scores efficiently while maintaining accuracy. Instead of relying on repetitive manual work, the system automates score calculations, improves data reliability, and makes reporting much simpler.

Ideation and Stakeholder Needs Analysis

Stakeholders Identification List:

1. Accreditation Bodies: Require consistent, accurate, and transparent data for evaluating institutions. Their main challenge lies in verifying large amounts of information without delays or errors.
2. Institutions: Face significant administrative burdens in preparing accreditation reports, which often leads to human error and inefficiency. They need automated, reliable tools to handle compliance requirements.
3. Faculty and Administrative Staff: Spend excessive time on manual documentation and data entry instead of focusing on teaching, research, or student support. They require simplified workflows and error-free reporting mechanisms.

Needs Analysis

Accreditation Bodies need standardized, tamper-proof data submissions, and real-time monitoring of institutional compliance. Instituition struggle with weak ICT systems and lack of integrated tools for accreditation data management. Manual processes lead to delays and inconsistencies. Adding to this faculty/Admin Staff experience burnout due to repetitive administrative tasks, highlighting the need for automation.

Problem Statement

Accreditation and data management in instituitions are still heavily dependent on manual, repetitive tasks and disconnected ICT systems. This leads to wasted time, frequent errors, and inconsistent reporting, making the whole process slow and unreliable. Institutions spend too many resources on paperwork while accreditation bodies struggle to verify accuracy and maintain transparency in the self assessment rounds. The core issue is the absence of a single, ICT-driven platform that can bring everything together automating data management, ensuring real-time compliance, and easing the overall administrative workload.

Solution Ideation

The Automated Accreditation Dashboard is a centralized platform that simplifies score computation, compliance tracking, and accreditation reporting with role-based dashboards for faculty, admins, and auditors. It reduces manual errors and boosts transparency with auto-calculated scores and real-time monitoring. The Secure Cloud-Based Data Repository stores institutional data and evidence securely, offering encrypted, remote access ensuring accessibility,

standardization, and scalability. Uses technique to flag missing documentation, detect inconsistencies, and generate reports.

ICT Relevance

In our project the Ict topics like 1. Cloud computing 2. Data Management Systems and automation in EdTech are some of the topics which are implemented.

where-:

Cloud computing plays a key role in the Accreditation and Data Management Assistant by offering secure, scalable storage and enabling access from anywhere, whether for institutions or accreditation bodies. Alongside this, data management systems ensure that records remain well-structured and tamper-proof, which is critical for maintaining trust and transparency in quality assurance processes. Another important aspect is automation in EdTech, which helps cut down repetitive administrative tasks and streamlines workflows. By bringing these elements together, the system not only addresses real-world challenges in accreditation but also strengthens ICT-driven governance in higher education, allowing institutions to focus more on delivering quality learning experiences.