Sonu Kumar Shaw

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B.Tech - Civil Engineering
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Education

Degree/Certificate	Institute/Board	Year
B.Tech. Major	Indian Institute of Technology, Guwahati	2020 - Present
Senior Secondary	Central Board of Secondary Education	2020
Secondary	Indian Certificate of Secondary Education	2018

Projects

- **TF-IDF based Problem Search Engine** *Aug. '23*
  Personal Project Website | Github
  - Implemented web scraping using **Selenium** and **Beautiful Soup** to extract problem sets from *LeetCode* and *CSES*.
  - Implemented **TF-IDF** algorithm from **scratch**, calculating **TFIDF score** for every word in each problem statement.
  - Implemented **Cosine similarity** to rank problems in alignment with search queries, ensuring optimal relevance.
  - Developed a **Node.js** application that accepts user queries and displays relevant problems via **EJS** templating.
- **IITG StackOverflow** *Jul. '23 - Aug. '23*
  Personal Project Website | Github
  - Built a **dynamic Q/A platform** with features including user authentication, post creation and deletion, voting, user profile management and profile viewing. Designed it as per **MVC architecture**.
  - Developed backend **RESTful API** using **Node.js/Express** framework and **MongoDB** as database.
  - Implemented authentication using **JWT**, ensuring only authenticated users can create posts and vote.
  - Developed the frontend using **React** and used **Redux** for efficient state management of the app.
- **Rubik's Cube Solver - using Korf's IDA* Algorithm** *Aug. '23 - Sep. '23*
  Personal Project Korf's Research Paper | Github
  - Modelled a virtual **Rubik's Cube (3x3)** in 3 different models/classes using standard data structures present in C++.
  - Achieved solving a Rubik's Cube **8** times jumbled in **under 3 seconds** using **BFS, DFS, and IDDFS** algorithms.
  - Implemented the **Korf's IDA*** Algorithm, achieving a solving time of **under 10 seconds** for a Rubik's Cube jumbled **13** times.
- **Crack Area Prediction of RC Slab under Blast Loading** *Jul. '23 - Present*
  Prof. Hrishikesh Sharma, Department of Civil Engineering, IIT Guwahati
  - Studied several research publications to validate reinforced concrete slab models in **LS-DYNA**.
  - Developing a Deep Neural Network (DNN) to forecast crack area, utilizing multiple input parameters, including percentage reinforcement, slab dimensions, blast load, and blast height.

Technical Skills

Programming languages: C/C++, JavaScript, Python*
Database Management: MySQL, MongoDB*
Web Technologies: HTML, CSS, Node.js, React*
Miscellaneous: NumPy, Pandas*, Matplotlib*, Git

Key courses taken

- **Computer Science**: Introduction to Computing, Data Structures and Algorithms, Database Management System and SQL, Operating Systems, Deep Learning.
- **Mathematics**: Linear Algebra, Real and Complex Analysis, Multivariable Calculus.

Achievements

- **Expert** on **Codeforces**: Achieved a peak rating of **1636** on the platform (Handle - *shawsk*).
  - Codeforces Round #889: Ranked **429th globally** among **26000**+ participants.
  - Codeforces Round #886: Ranked **603rd globally** among **38000**+ participants.
  - Codeforces Round #892: Ranked **752nd globally** among **30000**+ participants.
- Solved **1000**+ **programming problems** on all coding platforms combined.
- **Flipkart Grid 5.0**: Advanced to semi-final round by securing a rank in **top 1.25%** among **4 lakh** candidates.
- **Joint Entrance Examinaton '20**: Secured a rank in top **1%** among **1.17 million** candidates.
- **Young Scientist Talent Test '18**: Among **top 10** students in state.

Positions of Responsibility

- **Manager**, Udgam 2022, IIT Guwahati *Sep. '21 - Feb. '22*
  - **Headed** a team of **12 associates** in organising a highly successful Internfair with **1300**+ student registrations.
- **Senior Executive**, E-Cell, IIT Guwahati *Apr. '21 - Apr. '22*
  - **Organised** a diverse range of **entrepreneurial events** with a focus on effective moderation and engagement.

Extracurricular

- **Yuvaan - IITG Mars Rover (Robotics Club):** Contributed to autonomous task under AI module *2022*
- **Techevince '22:** Devised a solution to address campus's laundry challenges, along with a revenue model. *2022*
- **Startup Case Study, E-Cell:** Conducted an in-depth case study on the startup 'Travel Triangle'. *2021*