SAYAK BHOWAL

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Objective

Seeking a challenging position in research & development and administrative work to leverage my expertise in cyber security, website development and maintenance. Aiming to contribute to innovative projects at the intersection of image processing, pattern recognition, high performance computing, mechine learning and practical problem-solving in fields such as information hiding and cyber forensics.

An Overview

- Technically sophisticated professional with nearly **15 years** of experience in the domain of **Image Processing and Pattern Recognition in C# .net environment and Python, Django full-stack applications**.
- Currently working in **Visva-Bharati Univarsity, Santiniketan**, a central university and an institute of national importance as **System Programmer** since **January, 2026**.
- Associated with **Centre for Development of Advanced Computing (CDAC)**, a research & development organization under **MeitY, Government of India**, Kolkata as **Project Engineer** since **July, 2011**.
- Proficient in developing business logics and algorithms.
- Excellent communication & interpersonal skills with abilities in resolving complex software issues.
- To work with a team working passionately for the growth of Engineering Sciences with a cumulative effort to serve the growing needs of the world.

Experience

- **Visva-Bharati University [🌐]** *January, 2026 - Present*
  A central university and an institute of national importance Santiniketan, Birbhum, West Bengal
  ◦ designated as System Programmer in Computer Centre
- **Centre for Development of Advanced Computing (CDAC) [🌐]** *July, 2011 - December, 2025*
  An autonomous body under MeitY, Government of India Kolkata, West Bengal
  ◦ designated as Project Engineer in the group of Advanced Signal Processing Group (ASPG)
- **Matrix Educare Private Limited** *February, 2011 - June, 2011*
  Engineer Kolkata, West Bengal
  ◦ proofreading, content writing, previous year questions solving in electronics and communication engineering subjects for engineering made easy books

Education

- **Pursuing Ph.D.** *December, 2023 - Present*
  Department of Computer and System Sciences, ***Visva-Bharati University*** Santiniketan, West Bengal
  ◦ Under supervision of Dr. Madhusudan Paul
  ◦ Research area: Information hiding, Steganography and Steganalysis
- **M.Tech. in VLSI design and microelectronics technology** *November, 2013*
  Department of Electronics and Telecommunication Engineering, ***Jadavpur University*** Kolkata, West Bengal
  ◦ M.Tech Thesis: *"A case study of low-noise amplifier design for 2.65 GHz wireless system using MOSFET BSIM4 series and CNTFET"* under supervision of Prof. Chandan Kumar Sarkar
  ◦ Percentage: 78.4%, 1st class

- **B.Tech. in Electronics and communication engineering** *July, 2010*
  JIS college of Engineering, MAKAUT, Formarly known as West Bengal University of Technology ***WBUT*** Kalyani, West Bengal
  - B.Tech Project: *"Recognition of Pose Varied Three-Dimensional Human Faces using Structured Lighting Induced Phase Coding"* under supervision of Prof. Debesh Choudhury
  - DGPA: 8.48/10
- **Higher Secondary (10+2)** *June, 2006*
  West Bengal Council of Higher Secondary Education ***(WBCHSE)*** Kanchrapara, West Bengal
  - Kanchrapara Harnett High School
  - Subjects undertaken: Bengali, English, Mathematics, Physics, Chemistry, Biology
  - Percentage: 90.9%, 1st division
- **Secondary (10)** *June, 2004*
  West Bengal Board of Secondary Education ***(WBBSE)*** Kalyani, West Bengal
  - Kalyani University Experimental High School
  - Subjects undertaken: Bengali, English, Mathematics, Physical Science, Life Science, History, Geography
  - Percentage: 82.75%, 1st division

PROJECTS

- **Digital Face Recognition System (DFRS)** *June, 2020 - Present*
  Tools: Django full stack development with FaceNet [https://www.frs.tnpolice.gov.in]
  - 1:N searching based decision support system by extracted facial features
  - Developed for State Crime Record Bureau (SCRB), Tamil Nadu Police
  - Nearly 1 million faces in the database.
  - Search time on average 6 seconds.
  - Deliver 20 nearest match faces for every search.
  - Illumination, pose, and age variations are taken care
- **Digital Fingerprint Collection System (DFCS)** *June, 2022 - Present*
  Tools: Django full stack development [https://www.dfcs.tn.gov.in]
  - Digital preservation of collected fingerprints
  - Developed for State Crime Record Bureau (SCRB), Tamil Nadu Police
  - All fingerprints of both hands are collected on a plain and rolled basis.
  - Rolled fingerprints are taken after being verified with plain fingerprints.
  - The quality of fingerprints is assured programmatically.
  - All soft biometric data and fingerprints are stored in the globally accepted NIST format.
- **CDAC Project Resource Ability Matrix (CPRAM)** *June, 2024 - Present*
  Tools: Django full stack development
  - Generate skill matrix of each employees for smoothly handle human resources
  - Developed for CDAC Human Resource Management
  - Employees can put their skill list to the application for better engagement with projects.
  - The skills of the employees are verified by experts and the corresponding group heads.
  - Group heads can give weightage for each skill as per their need.
  - HR can analyze the skill matrix and involvements of each employee and make decisions based on that.
- **Steganography: [Signature-based steganalysis]** *July, 2011 - June, 2019*
  Tools: IDA Pro, Visual Studio, C#, .Net
  - Developed the application for different law enforcement agencies in India.
  - Analyzing decryption algorithms of free steganographic tools and applications and incorporating them into the application.
  - Target was to incorporate various free steganographic tools (selected by law enforcement agencies) decryption logics into a single application that can detect and extract messages from stego media.

Publications

Journal Articles

[1] S. Bhowal and M. Paul, "Signature-based steganalysis of free steganography tools: Classification and analysis of techniques," *Cryptologia*, pp. 1–41, 2025.

[2] S. Bhowal, "Speed, noise immunity, power consumption and area comparison between different approaches of low-power viterbi decoder for digital wireless communication applications.," *Network Protocols and Algorithms*, vol. 6, no. 1, pp. 19–36, 2014.

Conference Proceedings

[1] S. Bhowal, B. Biswas, and M. PaulD, "Signature-based steganalysis and feature-augmented password cracking for steganography tool steganographx plus," in *Next-Generation Networks and Deployable Artificial Intelligence: Proceedings of NGNDAI 2025, Volume 3*, vol. 3, Springer Nature, 2026, p. 158.

[2] S. Bhowal, S. R. Dutta, and S. Mitra, "An efficient reduced set brute force attack technique for a particular steganographic tool using vername algorithm," in *2017 Fourth International Conference on Image Information Processing (ICIIP)*, IEEE, 2017, pp. 1–4.

[3] S. Bhowal, "A case study of low-noise amplifier design for 2.65 ghz wireless system using mosfet bsim4 series and cntfet," in *2014 First International Conference on Automation, Control, Energy and Systems (ACES)*, IEEE, 2014, pp. 1–6.

[4] S. Bhowal, "Transformation of acs module to csa module of low-power viterbi decoder for digital wireless communication applications," in *2013 International Conference on Advances in Computing, Communications and Informatics (ICACCI)*, IEEE, 2013, pp. 266–270.

[5] S. Bhowal and S. Maji, "A case study of illumination robust face and finger print merging identification technique using cross correlation," in *2013 International Conference on Emerging Trends in Communication, Control, Signal Processing and Computing Applications (C2SPCA)*, IEEE, 2013, pp. 1–4.

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- **Stego Check (Registration Number: SW-14497/2021 Dtd. 07/05/2021):** Signature-based steganalysis software for different multimedia format
- **Stego Scan (Registration Number: SW-14644/2021 Dtd. 17/06/2021):** Stego forensic software for artifact scaning

Skills

- **Programming Languages:** C, C++, C#, Python, Javascript, HTML, VHDL, Assembly Level Language
- **Web Technologies:** Asp.net, Django full stack
- **Database Systems:** MySQL, SQL Server, Postgres
- **Specialized Area:** Image Processing, Pattern Recognition, Steganography, Steg and Crypt Analysis
- **Other Tools & Technologies:** Reverse engineering: IDA Pro
- **Research Skills:** Steganalysis and information hiding

Honors and Awards

- **National Merit Scholarship Scheme, 2006** *November, 2006*
  West Bengal Council of Higher Secondary Education (WBCHSE)
- **Science Talent Search Examination, 1999-2000** *January, 2000*
  Jatiya Vijnyan Parishad associated with Indian Science Congress association
- **Provisional certificate on visual arts (Drawing and painting)** *November, 2000*
  Academy of Music & Fine Arts, West Bengal

Administrative and Leadership Experience

- **Single point of contact (SPoC) of DFCS project** *June, 2022 - Present*
  CDAC, Kolkata [https://www.dfcs.tn.gov.in]
  - Initiate change requests based on client requirements.
  - Server maintenance and mitigation of vulnerability and penetration testing (VAPT) issues.
  - Arrange meetings with clients and maintain regular contact for smooth progress.
- **System architect of CPRAM project** *June, 2024 - Present*
  CDAC, Kolkata [https://www.cpram.cdac.in]
  - Initiate change requests based on client requirements.
  - Server maintenance and mitigation of vulnerability and penetration testing (VAPT) issues.
  - Arrange meetings with clients and maintain regular contact for smooth progress.
  - Arrange the client's hands-on training to handle and properly use the application.
  - Design all project-related documents like installation manuals, operating manuals, etc.

Other Experience

- **C-DAC Exam Controller and Chief Invigilator** *2017 - Present*
  Indian Airforce AFCAT and Agniveer (Vayu) recruitement examination conducted by CDAC
  - Server settings for online examination
  - Arrange mock tests
  - Put Question paper decryption key
  - Take backup and upload to main server
  - Overall invigilation and report higher authority
  - Successfully conducted the examination in multiple cities

Certifications and Training

- **Training on Electronics oriented systems and instrumentation oriented systems** *June, 2009*
  Airport Authority Of India, Netaji Subhas Chandra Bose International Airport, Kolkata
- **Certified course on Cyber Security Awareness for Employees** *April, 2025*
  CDAC Cakes [https://cakes.cdac.in]

Additional Information

Father's Name: Sri Sankar Bhowal
Date of Birth: 20th September, 1987
Gender: Male
Relationship Status: Married
Languages: English (reading, writing, speaking), Bengali (reading, writing, speaking), Hindi (reading, speaking)
Interests: Painting, Recitation, Drama

Declaration

I hereby declare that the above-mentioned information is correct to the best of my knowledge, and **I** bear the responsibility for the veracity of the above-mentioned particulars.