

Job Title: Postdoctoral Fellow, Department of Computer Science, under the funded title of “Dirac Labs Innovation Fellow”

Reports to: Assistant Prof. Debayan Gupta, Department of Computer Science

Location: Ashoka University, NCR, Sonapat, Haryana, India - 131029

Experience (in years): N/A

Nature of work: Research in using Machine Learning on data from quantum magnetometry and gravimetry data for substrate analysis and navigation

About Ashoka University:

Ashoka University -India's premier interdisciplinary teaching and research university. An institution that has become a beacon of academic excellence in less than 10 years since its inception. At Ashoka, we encourage you to embrace the new, push the boundaries for continuous learning, and adapt to a world of constant change Because we believe that each Ashokan is capable of becoming a thought leader.

As part of our thriving and committed workforce, you will:

Be Mission-Driven: Champion interdisciplinary learning, innovative pedagogy, and academic rigor to transform Indian higher education.

Think Strategically: Collaborate with visionary minds to shape the future of higher education through strategic planning and a forward-thinking approach.

Act Authentically: Embrace authenticity and integrity, fostering an inclusive and supportive environment where every voice is valued.

Take Accountability: Own your work and drive positive change, as an empowering individual seeking to make a meaningful contribution.

Build Collaboration: Experience the power of teamwork and diverse perspectives, working collectively towards our shared goals.

Deliver Excellence: Strive for excellence in all aspects, upholding the highest standards of academic excellence, student support, and professional development opportunities.

At Ashoka University, we are on a mission to redefine higher education and create a remarkable space where innovation and collaboration thrive. As a **pioneering force in interdisciplinary learning**, we **continually grow and adapt** to stay at the forefront of educational excellence with emphasis on inclusivity and equal opportunity. Our philosophy revolves around **care, well-being, and connection**, which are deeply embedded in everything we do.

When you join our community, you become part of an extraordinary journey in which you can unleash your potential and make a meaningful impact. Where education empowers, where innovation thrives, and where excellence and humility coexist. We truly believe the world will enrich itself when there is progress with purpose.

About (Name of the Department):

Department of Computer Science.

Role and Responsibilities:

Join our fast-paced, research-focused team dedicated to developing advanced algorithms and techniques for real-time positioning and navigation using multi-sensor data. In this postdoctoral position, you will work on:
Magnetic Navigation:

Develop and refine machine learning models to enhance magnetic navigation.
Conduct research on advanced filtering and sensor fusion techniques for robust, real-time position estimation.
Gravity Modeling & Inversion:

Lead efforts in gravity modeling and inversion problems to complement and enhance navigation frameworks.
Integrate gravitational data with magnetic and other sensor inputs to improve overall system performance.
Collaboration & Dissemination:

Work closely with quantum physicists and experts from various disciplines to integrate complex sensor data.
Design experiments, analyze complex datasets, and publish findings in academic journals, contributing to the broader scientific community.

This is a collaborative project between Ashoka University and Dirac Labs, funded by the United States–India Science & Technology Endowment Fund.

About the Professor:

Debayan Gupta is currently an Assistant Professor of Computer Science at Ashoka University, where he teaches a course on security and privacy as well as an introductory programming class. He is also a visiting professor and research affiliate at MIT and MIT-Sloan.

Debayan's primary areas of interest include privacy-preserving computation and machine learning. He has helped start a number of companies in India and abroad, and as such, holds board positions in a number of start-ups.

About Dirac Labs:

For decades, GPS has guided us from point A to B. But with over 240,000 GPS disruptions reported globally in 2022, its reliability is under threat.

Dirac Labs is revolutionizing navigation with cutting-edge technologies designed to be robust against blocking and spoofing. By integrating advanced quantum sensors with machine learning, the company accurately determines location using the Earth's magnetic field—offering a reliable, precise, and independent positioning solution.

Qualifications:

PhD or equivalent experience in Machine Learning, Robotics, Physics, Geophysics, or related fields.

Skills Required:

- Strong proficiency in Python and hands-on experience with ML frameworks (e.g., TensorFlow, PyTorch).
- Expertise in probabilistic methods, filtering algorithms (e.g., Kalman, particle filters), and sensor fusion.
- Solid understanding of navigation systems, signal processing, geophysics, and gravitational modeling.
- Demonstrated experience in gravity modeling and inversion problems, supported by a proven track record of research and relevant publications.
- Ability to design rigorous experiments and analyze complex, real-world datasets.
- Excellent problem-solving skills and proven experience working in interdisciplinary teams.

Bonus Points For:

- Experience with quantum sensing or magnetic field mapping.
- Knowledge of physics-based modeling, simulations, and inversion algorithms.
- Background in deploying machine learning models in real-time systems.
- Hands-on experience with hardware integration or sensor calibration.
- Proficiency in C++ or embedded systems programming.

Application Submission Process:

We invite you to embark on this journey by submitting your application to Ashoka University's <Department Name>. To ensure your candidacy receives the attention it deserves, kindly follow the application submission process outlined below:

Prepare an Updated CV: Showcase your professional accomplishments, skills, and experiences in an updated curriculum vitae.

Submit Your Application: Email your CV to debayan.gupta@ashoka.edu.in, ensuring the subject line reads as follows: "Designation – Department Name _Applicant Name>". This will help us efficiently process your application.

Include Essential Details: Along with your CV, kindly provide the following information:

- Last compensation received: We value your expertise and acknowledge the importance of fair compensation.
- Expected salary: Share your aspirations for growth and remuneration.
- Notice period: Inform us of the time required to transition from your current role, if applicable.

Pursuit for Excellence: At Ashoka University, we strive for excellence in all aspects of our operations. Therefore, only shortlisted candidates will be contacted as part of our rigorous selection process.

Adherence to Deadlines: To ensure fairness and efficiency, please submit your application by 25th March 2025. Applications received after the deadline will not be considered.

We look forward to receiving your application as we embark together on a remarkable journey of professional growth and development. Join our exceptional community at Ashoka University, where excellence is nurtured, and aspirations are transformed into reality.

