

Swarnamouli Majumdar

About Me

Embarking on a journey of technological innovation, I have cultivated a distinguished career spanning academia and professional realms, contributing to transformative projects that have earned national recognition. My commitment to advancing the frontiers of artificial intelligence, machine learning, and data science reflects a dedication to driving societal progress and meaningful change, particularly in the dynamic landscape of public safety technology innovation. My expertise lies in focusing on harnessing these artificial intelligence, machine learning and data science to drive societal progress and meaningful change in the public safety technology innovation space. I have had the opportunity to contribute to significant projects that have garnered national recognition. Notably, my work on the Artificial Intelligence-enabled hands-free Virtual Assistant for Law Enforcement and the Fire Safety Object Detection Machine Learning system has set benchmarks in the fields of public safety and artificial intelligence, reflecting my ability to blend advanced technical skills with real-world applications.

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Education

- **Ph.D., Management - Information Systems**
 - McGill University, 2023-Present
- **Ph.D., Information Systems**
 - University of Massachusetts Lowell, Massachusetts, 2021–2022 (Transferred)
- **Master of Science, Applied Data Science**
 - Indiana University (IUPUI), Indianapolis, 2016-2018
 - *GPA: 3.7*
- **Post Graduate Diploma, Project Management & Operations Management**
 - Ara Institute of Canterbury, 2014-2016
 - *GPA: 3.85*
- **Bachelor of Technology, Information Technology**
 - West Bengal University of Technology, 2007–2011
 - *GPA: 3.88*

Research Publications & Innovations

- **IEEE-LISAT May 2023, New York**
 - Paper Presentation: ‘Cloud based fire-safety system for fire fighters.’
 - Paper accepted for publication in IEEE Xplore.

- **IEEE-CCWC 2020, UNLV, Las Vegas**
 - Paper Presentation: ‘Zenext- A Voice Command Virtual Assistant for Voice Command and Law Enforcement.’
 - Paper accepted for publication in IEEE Xplore at IEEE 3ICT, Bahrain, 2022.
- **Best Paper award**
 - ‘A Feasibility study on the adoption of autonomous vans in rural India’ at IRTM 2022 conference.
 - Paper published in IEEE Xplore (June 2022).
- **Research on Acceptance of Voice Command IoT for Public Safety**
 - Accepted for presentation at JPIM Annual Conference 2022, Nov 13, 2022.
- **1st Prize Innovation Award National Winner**
 - AI-enabled Voice Command Virtual Assistant, a Hands-Free Device for Public Safety and 3D Application for Fire Safety with Object Detection.
 - TechToProtect National Challenge September and November 2020, hosted by NIST & PSCR.
- **2nd Prize Innovation Award Winner**
 - AT&T FirstNet Hackathon, Indianapolis, Sept 2019.
 - App name “Handy Help” connects with wearable IoT devices and Smart Home devices.
- **Program Lead - Data Analytics and AI**
 - Awarded National Award for best innovation in Analytics and AI by PSCR-NIST, 2020-2021.
 - Fire Safety in 3D: Incentivizing Homeowners to Create Pre-Incident Plans.
- **Poster Presentations:**
 - Defining ‘Superwoman’: Mapping Work-Life Balance with Technology at InWiC 2017.
 - Zenext: Voice Command Virtual assistant - IEEE CCWC 2019.
 - Alike - Fire Safety in 3D - IEEE CCWC 2019.
 - Understanding acceptance of connected refrigerated driverless vans for disaster relief distribution in rural India - IRTM 2022, WiDS 2022.

Research Work & Experience

Ph.D. Researcher

University Of Massachusetts Lowell, Aug 2021 – Dec 2022

Research focus area: AI in Crisis Technologies and Public Safety

- Understanding acceptance of connected refrigerated driverless vans for disaster relief distribution in rural India (Accepted and published - IRTM Feb 2022).
- A Framework for Mitigating Object Detection Decision-Making Bias in Driverless Cars (Accepted at IEEE-IEMCON Oct 2022, Presentation at NEAIS Oct 2022).
- A Voice Command AI Assistant for Public Safety (Accepted at IEEE-3ICT Nov 2022).
- Understanding key factors for acceptance of voice AI IoT model for rescue operations among first responders (Accepted at JPIM Research Forum Nov 2022).

Independent Research

Crisis Technologies Innovation Lab, IU Bloomington and IUPUI Indianapolis, Aug 2016 – Aug 2023

- Zenext: Transforming Public Safety through AI-enabled Hands-free Technology. (Research Project TTP by PSCR-NIST).

- Fire Safety in 3D: Incentivizing Homeowners to Create Pre-Incident Plans. (Research Project TTP by PSCR-NIST).
- Got You Covered: Mapping LTE Capabilities to Save Lives. (Research Project TTP by PSCR-NIST).
- Handy Help connects with wearable IoT devices and Smart Home devices to send emergency notifications using geofencing to the nearby community first responders to provide immediate aid before law enforcement officers arrive. (AT&T Innovation Award 2019).
- Usability of Smartphone for Older Adults. (CHI LBW 2017).

Professional Experience

Sr. Data Analytics

System Soft Technologies (Boston, Massachusetts), Feb 2021 – Aug 2023

1. Planned software development projects, gather requirements from stakeholders, prioritize tasks, manage expectations.
2. Employed Agile methodology, gather business requirements using brainstorming sessions, Master Scrum, User Stories documentation, and the JAD approach.
3. Utilized data mining and statistical analysis with Oracle SQL Developer Data Modeler.
4. Collaborated with development teams, configure business rules, translate Functional Requirement Specifications into Technical Design, Code, and Test.
5. Leveraged BI tools such as Power BI, Tableau, and Looker, report key performance indicators, develop data quality improvement plans.
6. Conducted complex logical analyses, formulate qualitative and quantitative models of management problems.

Sr. Business Intelligence Engineer

State Street Corp. (Boston, Massachusetts), Aug 2021 – Feb 2023

1. Planned software development projects, gathering requirements from stakeholders, and managing task prioritization to meet operational and analytics needs.
2. Conducted research, analysis, and developing insights on product configuration and requirements for enhanced business practices.
3. Designed data pipelines and validating business rules to incorporate AI models into products, while also making recommendations and implementing improvements.
4. Established and nurturing relationships with business and integrated stakeholders to ensure effective collaboration and alignment with organizational goals.
5. Developed a comprehensive product roadmap with risk management capabilities and conducting critical path evaluations for strategic decision-making.
6. Provided biweekly product milestones reporting to leadership and ensuring the achievement of goals in areas such as customer satisfaction, safety, quality, and team member performance.

Technical Program Lead - Data Analytics

Motional AD Inc. (Boston, Massachusetts), Aug 2020 – Aug 2021

1. Conducted thorough analysis and auditing of diverse vehicle performance metrics, providing essential support not only to the metrics team but also to other critical teams such as test engineering, automation, and the tools group.
2. Facilitated the organization's overall tools development needs by actively engaging with various teams, including product management, safety and testing, and operations across different time zones.
3. Collaborated closely with data engineering teams to identify and address data quality issues, proactively contributing to the enhancement of data collection and reporting processes, and defining, implementing, and visualizing performance metrics.

4. Partnered effectively with the project management office (PMO) to ensure seamless coordination of program deliverables. Take a lead role in the development and upkeep of comprehensive reports and key metrics dashboards tailored for senior management, including the CTO.
5. Drove cross-functional collaboration to implement process improvements based on the insights gleaned from vehicle performance metrics, continually striving for operational excellence and efficiency enhancements.
6. Spearheaded initiatives to standardize and optimize data collection processes, collaborating closely with data engineering teams to ensure consistent data quality and accurate reporting across a spectrum of projects and initiatives.

Sr. Data Analyst (R&D)

System Soft Technologies (Indianapolis, Indiana), Feb 2020 – Aug 2020

1. Collaborated closely with the product team to define key performance indicator (KPI) metrics and devise strategies for data analysis. Propose and execute product analytics initiatives such as customer segmentation and sentiment analysis, creating user stories to elicit comprehensive requirements.
2. Developed innovative data visualization techniques to transform raw data into illustrative, data-driven models, facilitating the creation of reporting dashboards for strategic decision-making. Analyze and process complex data sets using advanced querying, visualization, and analytics tools.
3. Provided recommendations and implement improvements to current business practices, emphasizing accurate measurement, data completeness, and cleanliness to enhance overall data quality.
4. Led Data Governance, Analytics, and reporting for Agency-wide Implementation, ensuring a cohesive and standardized approach to data management across the organization.
5. Established and nurtured agency-wide reporting and analytics functions, supporting Enterprise Data Governance initiatives and serving as the focal point for Data Governance leadership.

IT Technical Data Analyst - Engineering R&D

Cummins Inc.(Columbus, Indiana), Jun 2018 - Dec 2019

1. Gathered and meticulously documented business requirements for analytical reports, conducting data mapping sessions to grasp business needs. Created user stories and UI prototypes for final requirements and led process improvements by designing Power Automate flows.
2. Executed data classification and successfully implemented multiple dashboards for in-house metrics, contributing to a more informed decision-making process.
3. Conducted SWOT analysis and market research for an external-facing sales website, actively participating in digital marketing initiatives to enhance online presence and customer engagement.
4. Assisted in automating reporting functionality using Tableau reporting, Dashboards, and Scorecards (KPI), streamlining data visualization for effective decision support.
5. Developed interactive dashboard visualizations to conduct ad-hoc analysis and what-if scenarios, generating insightful reports based on key performance indicators (KPIs).
6. Ensured comprehensive quality assurance, maintaining data specifications and report accuracy even amid process and tool changes.
7. Took the lead in developing an automated data onboarding process for the internal search engine, significantly enhancing usability and run-time performance by 50% for over 200 employees worldwide through automated data integrity checks.
8. Led a large-scale predictive analytics BI project for oil sample analysis, anticipating a departmental revenue increase of 75% and \$400k cost savings. This project, utilized by 300+ employees, involved effective collaboration and communication with stakeholders in a cross-functional environment.

Data Analysis Researcher

CPS Global Pvt Ltd. (New Delhi, India), Jun 2013 - May 2016

- Manipulated, cleaned, and visualized large datasets, data manipulation using statistical modeling and data mining.

- Redesigned business processes in production increasing baseline accuracy and precision by 45% and 20% respectively.
- Designed metrics to capture data that measures product sales performance, seasonality of sales, translated business problems into analytical solutions, created targets for driving business performance.
- Created interactive dashboards/visualizations for actionable process performance measures, metrics, and KPIs for reporting.
- Analyzed and led A/B testing for website redesign site to elicit customer reviews and product validation before launch.
- Demonstrated leadership independently and provided analytical direction in deploying supervised machine learning model in OMR product, resulting in 20+ new features, reduction of 20% in load time of reports, an increase of 15% operation time.
- Communicated with engineering and business audience, drove two complex projects involving multiple teams.

Programmer Data Analyst

Cognizant Technology Solutions (Kolkata, India), Sep 2011 - Jan 2013

- Analyzed data from multiple data sources, conducted trends and patterns analysis to figure out the root cause of data issues to improve data quality.
- Worked with engineering and product management teams in conducting large-scale data analysis to influence business recommendations in driving cost-benefit and impact analysis.
- Created various artifacts for projects which include specification documents, data mapping, and data analysis documents.
- Articulated business questions and converted technical concepts into simple terms to present to diverse, technical, and non-technical audiences; created Dashboard metrics to extract information.

Skills

- **Programming Languages:** SQL, R, Java, Python
- **Statistics/Machine Learning:** Exploratory Data Analysis, Clustering, Sentiment Analysis, Regression, Random Forests, Hypothesis Testing, Statistical Analysis, Business Analytics, A/B testing
- **Visualization:** Tableau, Power BI, Looker
- **Research Methodology:** Ethnography, field research, interviews, quantitative methodologies, survey design, formative and summative usability testing, mixed methods, user research, human-centered design research

References / Publications

Below is a list of my media prints /publications/research articles/presentation videos:

1. Team Zenext - NIST PSCR
2. Tech to Protect Award - IU News
3. Zenext - Transforming Public Safety - NIST PSCR
4. IUPUI Team Wins \$112K for Voice-Controlled Tech - WISHTV
5. Zenext Application - UXfolio
6. IUPUI Team, CPD Partner on Project - YouAreCurrent
7. IEEE CCWC Poster Sessions
8. Tech to Protect Challenge Team - SOIC IUPUI
9. WIDS Cambridge 2022 Research Presentation