Sourish Sarkar

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Education

Indian Statistical Institute — Master of Science in QMS
Statistical Quality Control, Operation Research — *Aug. 2024 – July. 2026*

West Bengal University of Technology — Kalyani Government Engineering College
Bachelor of Technology, Information Technology — *Aug. 2017 – Aug 2021*

Experience

Data Scientist — Dec 2021 – Aug 2024
Tata Consultancy Services — *Kolkata*

- **Optimizing Predictive Maintenance Models**: Spearheaded efforts to optimize an existing predictive model aimed at reducing unscheduled engine failures for an aviation client. Leveraged data-driven insights to track engine performance and predict potential failures, enabling proactive maintenance. This optimization reduced the burden of emergency servicing and ensured operational continuity for airline operators by aligning maintenance schedules effectively.
- **Minimizing Operational Disruptions**: Developed solutions to predict engine failures, ensuring readiness for scheduled maintenance and reducing unscheduled downtimes. Proposed actionable strategies to mitigate risks, including timely repairs, engine replacements, or validated clearance for continued operation. This approach enhanced resource planning, reduced costs for unscheduled services, and supported seamless airline operations.
- Implemented data preprocessing pipelines using Python to streamline feature extraction and improve model accuracy.
- Integrated advanced statistical methods and machine learning algorithms to refine predictive maintenance models, achieving higher precision.

Research

Three-Player Dynamic Auction Bridge | *Python, Algorithm, Simulations* — March 2025 – Continue

- **Game Innovation & Design:** Invented a novel three-player variant of Auction Bridge where opponents and partners are dynamically assigned after the bidding phase. This contrasts with the fixed roles in traditional four-player bridge, introducing greater strategic depth and requiring more adaptable gameplay mechanics.
- **Algorithm Development & Strategic Framework:** Developed a suite of algorithms to support newly introduced dynamic strategies—optimistic, defensive, attacking, and bluff. For No-Trump calls, designed an Optimistic Strategy Algorithm that uses probabilistic models to evaluate high-card strength and determine optimal card sequences (e.g., high-card-first or low-card-first) based on game state analysis.
- **Game Mode Enhancements:** Introduced detailed game plans tailored for both fixed trump and no-trump settings, adapted for a 3-player model. Designed and implemented strategy trees for general play and defeat-seeking plays, ensuring a balance between skill-based decision-making.
- **Point System & Role Assignment Scheme:** Proposed a dynamic point-based calling (bidding) system that determines fixed partners and opponents post-call. This innovation preserves the core mechanics of traditional Auction Bridge while integrating flexible role assignment to enhance strategic complexity.
- **Simulation, Evaluation, and Visualization:** Conducted extensive simulations to evaluate the performance and competitiveness of the new strategies under varied game conditions. Designed data visualizations to compare traditional and proposed models across key metrics such as win rates, average points per call, and strategic success rates, demonstrating the skill-centric nature of the new format.
- **Leadership & Project Management:** Led the end-to-end development of the project, from concept design to simulation and analysis. Coordinated research, algorithm design, and data visualization efforts, ensuring timely completion of the research paper and effective collaboration among contributors.

Projects

Combinatorial Analysis in Rummy | *Python, Algorithm, Game Thoery* November 2024 – Continue

- **Objective:** Developed a combinatorial framework to analyze and optimize strategies in Rummy, focusing on achieving complete hands and improving gameplay through innovative methods.
- **Key Contributions:** Developed innovative strategies to optimize Rummy gameplay, focusing on achieving complete hands and improving decision-making. Applied enumerative methods to calculate the minimum distance to a complete hand, replacing dynamic programming for computational efficiency. Designed multiple strategies,including Defeat Seeking (maximizing opponent penalties), Min-Score (minimizing player's score), and Minimum Distance (focusing on the shortest path to a valid hand). Introduced probabilistic methods to evaluate expected cards needed for a complete hand and created rules for deciding whether to draw from the open deck or closed deck.Collaborated with the design team to develop advanced game mechanics, such as dynamic strategy adjustments and probabilistic gameplay simulations, paving the way for a new Rummy variant. Implemented capped scoring systems to ensure realistic outcomes and balanced gameplay
- **Collaborations:** Supported the design team in creating an advanced Rummy variant, incorporating new gameplay features such as probabilistic card predictions and dynamic strategy adjustments.
- **Future Prospects:** Preparing a research paper to explore Rummy's mathematical and strategic complexities for game development applications.

Car Price Prediction | *Python, Machine Learning, Statistical Modeling* Aug 2024 – Sept 2024

- Developed a Random Forest Regression model to predict car prices using various key features.
- Performed feature selection, Model selection, and cross-validation to improve accuracy.
- Analyzed factors like fuel type, engine size, and curb weight impacting prices.

Flight Ticket Prediction | *Python, Machine Learning* Sept 2024 – Oct 2024

- Built a Random Forest model to predict flight ticket prices based on departure time, number of stops, duration, and other key features.
- Optimized model performance through feature engineering and hyperparameter tuning.

Skills

Languages: Python, C
Technical Skills: Machine Learning, Statistics for Data Science, Statistical Quality control, Operation Research, Dataiku, Statistical Analysis, Power BI(Basic), Project Management, Microsoft Excel.
Libraries: Pandas, NumPy, Matplotlib, SciPy, Scikit-learn.
Soft Skills: Communication, Training, Problem-Solving, Presentation, Customer-Focus, Time Management.

Certifications, Achievements

- **All India Rank – 7,** ISI Entrance Exam
- **Dataiku core designer,** Dataiku
- **Technical Excellence Certificate,** TCS