Sourya Roy

Costa Mesa, California
(951)-425 8035
sroy004@ucr.edu
Google Scholar

Education

Sept. 2016 – March 2022 **Ph.D. in Computer Science**, *UC Riverside*, GPA: 3.93/4, *Riverside, California*
Advisor: Silas Richelson, Amey Bhangale

August 2011 – May 2015 **B.E. in Instrumentation and Electronics Engineering**, *Jadavpur University*, GPA: 8.48/10, *Kolkata, India*

Experience

2022-Present **Data Scientist**, *Foursquare Inc.*, Los Angeles

2017-2022 **Graduate Student Researcher at UC Riverside**, *UC Riverside*, Riverside

2015-2016 **Visiting Researcher**, *IIT Kharagpur*, India

Summer'21 **Summer Research Intern**, *Intel AI Lab*, San Diego

Summer'20 **Summer Research with Prof. Shachar Lovett**, *UC San Diego*, San Diego

Research Interests

Theoretical Computer Science, Machine learning

Selected Papers

Almost Ramanujan Expanders from Arbitrary Expanders(Link), *Fernando Granha Jeronimo, Tushant Mittal, Sourya Roy, Avi Wigderson(Alphabetically sorted), FOCS'22*

Mixing of 3-term progressions in Quasirandom Groups(Link), *Amey Bhangale, Prahladh Harsha, Sourya Roy(Alphabetically sorted), ITCS'22*

Learning Spatial-Temporal Graphs for Active Speaker Detection(Link), *Kyle Min†, Sourya Roy†, Subarna Tripathi, Tanaya Guha, Somdeb Majumdar(† : First authors), ECCV 2022.*

List-Decoding XOR Codes Near the Johnson Bound(Link), *Silas Richelson, Sourya Roy(Alphabetically sorted), In submission(2022).*

Analyzing Ta-Shma's Code via the Expander Mixing Lemma(Link), *Silas Richelson, Sourya Roy(Alphabetically sorted), In submission(2022).*

Locally Testable Non-Malleable Codes(Link), *Silas Richelson, Sourya Roy(Alphabetically sorted authors list), In submission.*

Exploiting transitivity for learning person re-identification models on a budget(Link), *Sourya Roy, Sujoy Paul, Neal E. Young, Amit K Roy-Chowdhury, CVPR'18.*

W-TALC: Weakly-supervised Temporal Activity Localization and Classification(Link), *Sujoy Paul, Sourya Roy, Amit K Roy-Chowdhury*, *ECCV'18.*

Incorporating Scalability in Unsupervised Spatio-Temporal Feature Learning(Link), *Sujoy Paul, Sourya Roy, Amit K Roy-Chowdhury*, *ICASSP'18.*

Theory Projects

2021-2022 **Construction of almost Ramanujan expanders from arbitrary expanders**

- We gave an efficient algorithm that transforms any family of weak expanders to a family with near optimal expansion.
- Our result implies improved parameters for other combinatorial objects such as quantum expanders, monotone expanders etc.

2021-2022 **List Decoding of Ta-Shma's near-optimal code at Johnson Bound**

- We designed a SDP based efficient decoding algorithm for Ta-Shma's breakthrough, almost Gilbert-Varshamov bound achieving binary code.
- Our algorithm is capable of list decoding up to the Johnson bound which vastly improves the existing results.

2021 **Mixing of 3-term progressions in Quasirandom Groups**

- We proved a more than a decade old conjecture on 3-term progressions by Gowers.
- Informally, we showed that a *sufficiently* large subset of Quasirandom Group must contain a length three progression inside it.

2019-2020 **Provably secure message encoding scheme with validity testing**

- We proposed an information-theoretically secure generalization of locally testable codes.
- The proposed code is called locally testable non-malleable codes(LTNMC).
- On a very high level, LTNMC ensures that highly tampered codewords will get caught by a properly designed fast tester algorithm.

Applied Projects

2022- **Metrics for selection and value assessment of large scale data sources.**

- Built unsupervised location data quality metrics.
- Built optimized resource allocation framework using tools from operations research. Very high Projected impact on cost savings.

2021-2022 **Multi-modal data analysis using graph neural networks(GNN)**

- Built a SOTA GNN model (AVA-2022 2nd place winner) for active speaker detection.

2017-2019 **Data labeling scheme for reducing annotation in Person Re-id**

- Developed a graph based annotation scheme that minimizes labeling requirement.
- Analyzed large graphs (3 millions edges) and reduced required annotation by 80-90%.

2017-2018 **Weakly supervised activity localization and classification in videos**

- We proposed a novel loss function for the task and our algorithm achieved SOTA results.

Research Talks

2022 **Mixing of 3-term progressions in Quasirandom Groups**, *ITCS 2022*

2020 **Locally testable non-malleable codes**, *Socal Theory Day.*

2020 **Locally testable non-malleable codes**, *CS Theory Seminar at UC San Diego.*

Teaching Assistant Experience

Fall'17	**Probability and Stochastic Processes**, *Duties: leading discussions, grading*
Winter'18	**Design and analysis of algorithms**, *Duties: leading discussions, grading*
Spring'17,'20	**Combinatorial Optimization**, *Duties: leading discussions, grading*
Winter'21	**Intro to Python Programming**, *Duties: leading lab, grading*
Spring,Fall'21	**Intro to Programming with C++**, *Duties: leading lab*

Reviewing activities

Journals:	**Information Processing Letters, Information Sciences, Pattern Recognition, IEEE TCSVT**
Conferences:	**FSTTCS'21**

Awards

Dean's distinguished fellowship, *September 2016*, UC Riverside

Technical Skills

Programming	**Python, Matlab, CPLEX, Gurobi, C++(basic)**
Deep Learning/ML	**Spark, Databricks, Pytorch, Tensorflow, Pytorch-Geometric, OpenCV, Scikit-learn, Kubernetes, SQL, Jupyter**