

# Janvi Thakkar

ARTIFICIAL INTELLIGENCE · MACHINE LEARNING · REINFORCEMENT LEARNING · HUMAN-COMPUTER INTERACTION

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## Education

### Imperial College London

MASTERS IN COMPUTING (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

United Kingdom

2022 - Present

### Indian Institute of Technology Gandhinagar

B.TECH. WITH HONORS IN COMPUTER SCIENCE AND ENGINEERING (CUMULATIVE PERFORMANCE INDEX (CPI): 8.99/10)

Gandhinagar, India

2018 - 2022

## Publications

**Janvi Thakkar\***, Devvrat Joshi\* **FedSpectral+: Spectral Clustering using Federated Learning**, 3rd workshop on Graphs and more Complex structures for Learning and Reasoning in Conjunction with AAAI 2023 (**GCLR-AAAI'23**) [in print]

**Janvi Thakkar\***, Devvrat Joshi\* **k-Means SubClustering: A Differentially Private Algorithm with Improved Clustering Quality**, Workshop on Privacy Algorithms in Systems (PAS), International Conference on Information and Knowledge Management (**CIKM 2022**) [in print]

Shril Mody\*, **Janvi Thakkar\***, **Analysis of Image Generation using Scene graphs**, ACM India Joint International Conference on Data Science and Management of Data, Young Researcher Symposium (YRS) track (**CODS-COMAD 2022**) [pdf]

Shril Mody\*, **Janvi Thakkar\***, Devvrat Joshi\*, Siddharth Soni\*, Nipun Batra, Rohan Patil, **Geometrical Homogeneous Clustering for Image Data Reduction**, SubsetML Workshop (Poster Track), International Conference on Machine Learning (**ICML 2021**) [pdf]

\* indicates equal contribution # - manuscript is under review

## Awards & Honors

2022	<b>Gold Medal for Outstanding Performance in Arts and Culture</b> , IIT Gandhinagar	Gandhinagar, India
2022	<b>Honored with Lalita J Shah &amp; Jayantilal B Shah Scholarship</b> , IIT Gandhinagar (\$1340)	Gandhinagar, India
2021	<b>Awarded Scholarship for Excellence in Arts and Culture</b> , IIT Gandhinagar (\$270)	Gandhinagar, India
2021	<b>Honored with P.K. Kelkar Scholarship</b> , IIT Gandhinagar (\$1340)	Gandhinagar, India
2021	<b>Student Travel Grant</b> , International Conference on Machine Learning (ICML)	Online
20'16-21	<b>Academic Excellence</b> , Secondary(10/10), Senior Secondary(92.6%), and Dean's list in I-III,V semesters of UG	India
2019	<b>Academic Excellence Scholarship</b> , Highest grade point in AY 2018-19 in the discipline (\$270)	Gandhinagar, India
2018	<b>Gold Medal</b> , BeTIC Medical Innovation Challenge, 7th Inter IIT Tech Meet, IIT Bombay	Bombay, India
2018	<b>Bronze Medal</b> , Costume Designing, 3rd Inter IIT Cultural Meet, IIT Roorkee	Roorkee, India

## Experiences

### Data Scientist Intern

#### Decimal Point Analytics

Mumbai, India

MENTOR: ARBIND KUMAR

May 2021 - July 2021

- Fine-tuned two different text summarization models on custom data, i.e., an abstractive model - BART and an extractive model - BertSum with transformer classifier.
- Designed an API using the Flask framework for the text summarization task.

### Summer Research Associate

#### Lancaster University

Lancaster, United Kingdom

MENTOR: PROF. LEANDRO SORIANO MARCOLINO (REMOTE)

May. 2020 - July. 2020

- Learned models on-line of a large number of agents (swarm) and used those models for on-line planning under strong real-time constraints.
- Implemented the Monte Carlo Tree Search(MCTS), a simulation-based approach for the continuous action space for making sequential decision.
- The technique was evaluated in an "infiltration game", where an agent's goal is to reach the target guarded by an unknown patrolling swarm without any pretraining.

### Summer Intern

#### Capgemini, India

Gandhinagar, India

MENTOR: ASHISH BUCH

April. 2020 - May. 2020

- Designed a model for identifying contextual similarity based on the test ID and keyword from a large number of test cases and requirement documents written in English.
- Used Universal Sentence Encoder (USE) model for generating contextual embeddings of a word document and cosine similarity for measuring the percentage analogous in the test cases

# Postions of Responsibility

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2020-2021 **Secretary of Art Club**, Palette, IIT Gandhinagar

India

2020-2021 **Web Developer, Jashn 9.0**, Intra Institute Cultural Fest, IIT Gandhinagar

India

2020-2021 **Core Member**, Codechef Campus Chapter - GRASP

India

2019,2020 **Team Leader, National Robotics Competition: eYantra -2019 and 2020**, IIT Gandhinagar Team

India

2019-2020 **Organizer**, Inter College Technical Fest, Ignite 5.0, IIT Gandhinagar

India

# Projects

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## Open Problems in Federated Learning and An Approach to Federated Graph Clustering

IIT Gandhinagar

MENTOR: PROF. ANIRBAN DASGUPTA

Jan. 2022 - April 2022

- Explored open issues in FL and proposed a state-of-the-art FL algorithm to handle the problem of federated graph clustering.
- Used power iteration method that employs a subtle strategy to synchronize the eigenvectors among clients.
- Tested the proposed power iteration approach on the ego-facebook and email-Eu-core dataset and obtained a similarity of 99.8% and 98.85%, comparable to that of global clustering.

## Implementing VR Environment for Autistic and Stroke patients

IIT Gandhinagar

MENTOR: PROF. UTTAMA LAHIRI

Jan. 2022 - April 2022

- Developed two virtual reality (VR) environments - A drawing challenge concentrating on children with autism and a football-themed balance training challenge that focuses on stroke sufferers.
- Integrated both the environments with the tracker and calibrated the designed environment with the real-world task.

## Differentially Private k-means clustering with Guaranteed Convergence

IIT Gandhinagar

MENTOR: PROF. ANIRBAN DASGUPTA

Aug. 2021 - Dec. 2021

- Proposed a variant of differentially private k-means clustering: SubCluster Guarantee algorithm with guaranteed convergence
- For given  $\epsilon$ -privacy budget the implementation improves the clustering quality over the current-SOTA algorithm while maintaining the same differential privacy requirements.

## Analysis of Image Generation using Scenegraph Report

IIT Gandhinagar

MENTOR: PROF. SHANMUGANATHAN RAMAN

Jan. 2021 - April. 2021

- Analyzed the pipeline involved in generating an image using scene graphs from textual descriptions of the image.
- Re-implemented the process of converting text to a scenegraph and an image to a scenegraph. And then, the generated scenegraphs are passed to a model, which creates an image from the scenegraph.
- Tested on MSCOCO and Visual Genome dataset using different similarity metrics.
- Paper Publication at CoDS-COMAD 2022, Author list: Shril Mody, Janvi Thakkar

## Geometrical Homogeneous Clustering for Image Data Reduction Report Presentation

IIT Gandhinagar

MENTOR: PROF. NIPUN BATRA

Jan. 2021 - April. 2021

- Proposed a novel approach to reduce an image dataset using a Geometrical Homogenous Clustering(GHCIDR).
- Acquired an accuracy of 99.35 % and 81.10%, and a training data reduction of 87.27% and 32.34%, on MNIST, and CIFAR10 respectively.
- Paper Publication at ICML 2021, Author list: Shril Mody, Janvi Thakkar, Devrat Joshi, Siddharth Soni, Nipun Batra, Rohan Patil

## Twitter Analysis of COVID19 Repository Presentation

IIT Gandhinagar

MENTOR: PROF. ANIRBAN DASGUPTA

March. 2021 - Apr. 2021

- Analyzed data collected by extracting tweets containing important trending hashtags about the COVID-19 pandemic using Twitter API - Tweepy.
- Used various analytical tools such as clustering, text summarization, semantic analysis, and geobased analysis to get specific and useful insights from the tweets.

## MiniWhatsApp Repository

IIT Gandhinagar

MENTOR: PROF. SAMEER KULKARNI

Oct. 2020 - Nov. 2020

- Implemented a Mini-WhatsApp tool that supports features such as chatting(individual/group), file sharing, and profile creation.
- Understood and implemented Peer-to-peer communication for the individual chat and concurrent server for group-chat.
- Provided an option to see the status of other online users and request for the group chats.

# Technical Knowledge

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**Programming Languages:** Python, HTML, CSS

**Comfortable:** C, JAVA, C++, SQL, Bash Scripting, Javascript, Bootstrap

**Tools:** Git, IntelliJ, Visual Studio, Eclipse, Android Studio, MATLAB, Autodesk Inventor,  $\text{\LaTeX}$ , Mininet, Django

# Relevant Coursework

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**At IIT Gandhinagar:** Machine Learning, Data Science, Operating System, Databases, Discrete Mathematics, Compilers, Theory of Computation, Computer Networks, Data Structures and Algorithm (I & II), Computer Organization and Architecture, Computing, Calculus, Differential Equation, Linear Algebra [[transcript](#)]