# Ganeshan Malhotra

ganeshanmalhotra@gmail.com | ganeshan007 | https://ganeshan007.github.io/website/

## Education

Aug 2017 - Aug 2021 **Birla Institute of Technology and Science (BITS)-Pilani, Goa**, India
Bachelor of Engineering in Electronics and Instrumentation
**GPA: 8.67; ranked $7^{th}$ out of $110$ students**

## Publications and Submissions

- Megha Sundriyal, **Ganeshan Malhotra**, Md. Shad Akhtar, Shubhashis Sengupta, Andrew E. Fano, Tanmoy Chakraborty. "Document Retrieval and Claim Verification to Mitigate COVID-19 Misinformation" accepted at *Proceedings of the Workshop on Combating Online Hostile Posts in Regional Languages during Emergency Situations* [Paper]
- **Ganeshan Malhotra**, Abdul Waheed, Aseem Srivastava, Md. Shad Akhtar, Tanmoy Chakraborty. "Speaker and Time-aware Joint Contextual Learning for Dialogue-act Classification in Counselling Conversations" accecpted at *The 15th ACM International Conference on Web Search and Data Mining (ACM-WSDM 2022)* [Paper]
- Ozge Alacam, **Ganeshan Malhotra**, Eugen Ruppert, Chris Biemann. "Gaze-based Multimodal Meaning Recovery for Noisy/Complex Environments" accepted at *23rd ACM International Conference on Multimodal Interaction (ACM-ICMI 2021)* [Paper]
- Rahul Bajpai, Adwait Kulkarni, **Ganeshan Malhotra**, Naveen Gupta. "Outage analysis of OFDMA based NOMA aided full-duplex cooperative D2D system" accepted at *27th International Conference on Telecommunication (ICT 2020)* [Paper]

## Work Experience

Aug 2021 - Present **Machine Learning Engineer at Quantiphi, Inc.**

- Designed a Medical Knowledge Graph using the ICD-9 ontology and MIMIC-IV dataset stored on the Neo4j Graph Database.
- Developed a BERT based Question Answering model enabling the the KG to be used for Medicine Recommendation.

## Research Experience

Mar 2021 - Aug 2021 **Research Collaborator at LT Group, University of Hamburg, Germany**
Advisors: Dr. Ozge Alacam and Prof. Chris Biemann

- Investigated the efficacy of combining Gaze embeddings with other modalities to enhance text comprehension
- Designed a Bidirectional-LSTM model for Gaze features and combined these embeddings with state-of-the-art Transformer models
- Results showed that integrating eye movements improve the performance of unimodal Language Models by $\sim 20\%$ and can compensate for missing information when language and visual modalities fail

Jul 2020 - Jul 2021 **Research Intern at LCS2, IIIT Delhi, India**
Advisors: Prof. Md. Shad Akhtar and Prof. Tanmoy Chakraborty

- Led a team of four to develop a Dialogue Act Classification model to cater to mental health counselling conversations.
- Curated one of the largest datasets called **HOPE** for mental health counselling conversations consisting of $\sim 13k$ utterances; designed new annotation guidelines and taxonomy of labels
- Designed a novel architecture called **SPARTA** using Speaker and Time aware attention for dialogue act classification

May 2019 - Aug 2019 **Research Intern at CSIR-CEERI, Pilani, India**
Advisor: Dr. Sumeet Saurav

- Worked on a new method for the early detection of drowsiness in drivers
- Extracted eye state features using a facial landmarks detector; used bi-directional LSTMs to incorporate the temporal features;deployed the model to institue server

## Projects

**COVID-19 Detection using Chest X-Rays** [Code]

- Used Deep Convolutional network based on Resnet-121 enhanced with BEASF and CLAHE to detect COVID-19 pneumonia using ChestX-Rays.
- Achieved an accuracy of $0.657$ and F1 score of $0.793$

**AI- Story Generator** [Code]

- Trained a GPT-2 model on novels of Sherlock Holmes to generate new plots given an initial prompt of words.
- Achieved an accuracy of $93.2\%$ on training data and served the model using Streamlit library

**Sentiment Analysis on Multi-Modal Data**

- Classified memes as hateful or not using image and the text associated with it.
- Used Glove Embeddings for text and ResNet50 for images, combined the two signals using Decision Fusion Layer.

**Video Classification Using Keras** [Code]

- Used ResNet50 (pretrained on ImageNet Dataset) as the base model to classify videos in the Youtube Action Dataset.
- Extracted each frame from the video and Used Rolling Average for prediction to use temporal information

**Elevator Control System**

- Designed a complete architecture for elevator control using the Intel 80x86 architecture.
- Used ModelSim tool for the simulation of architecture

## Responsibilities

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| **Teaching Assistant**, Analog Electronics | Assisted Dr. Ramesha CK in designing projects and assignments for the course. |
| **Teaching Assistant**, Electrical Machines | Assisted Dr. Shashidhara Kotian in taking lab sessions, designed assignments and held office hours. |
| **Volunteer** | ACL-IJCNLP 2021; EMNLP 2020; CoLING 2020 |
| **Treasurer** | Managed the accounts of Punjabi Virsa, BITS Pilani, Goa for the 2019-20 session. |

## Awards and Achievements

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| **Gold Medalist** | Springdales Childrens School, Kota, Class 12, 2017 |
| **Top 1% in 1.5 million candidates** | Joint Entrance Examination Mains, 2017 |
| **Finalist** | Flipkart GRID Hackathon 2019 |
| **Certificate Of Honour** | Awarded by **Hon'ble HRD Minister of India** for securing the first position in District Kangra, 2015 |

## Skills

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|---|---|
| Programming Languages: | Python, C++, C, Java, LaTeX |
| Other: | Pytorch, Keras,TensorFlow, Numba, Spacy, Git, NLTK, Docker |

## Relevant Courses

Digital Image Processing, Data Structures and Algorithms, Neural Networks and Fuzzy Logic, Deep Learning, Machine Learning, Object Oriented Programming, Discrete Mathematics, Quantum Information Computing, Probability and Statistics, Signals and Systems, Linear Algebra, Symbolic Logic, Digital Design