# Harshith Goka

Research Engineer, Samsung Research Korea

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## Experience

- **Samsung Research** — Seoul, South Korea
  On Device LLM Taskforce — *February 2024 - Current*
  Language Intelligence Team — *March 2023 - February 2024*
  Visual Intelligence Team — *September 2019 - March 2023*
- **Samsung Research** — Seoul, South Korea
  Internship @ Vision Team — *Summer 2018*

## Education

- **Indian Institute of Technology, Bombay** — Mumbai, India
  B.Tech. in Computer Science and Engineering; **CGPA:** 8.74/10 — *July 2015 - June 2019*
  - Major: **Computer Science and Engineering**
  - **Key Electives:** Foundations of Intelligent and Learning Agents, Advanced Machine Learning, Foundations of Machine Learning, Computer Vision, Design and Re-engineering of Object Oriented Programming, Parallel Programming Paradigms, Foundations of Digital Image Processing
  - **Core Courses:** Artificial Intelligence, Implementation of Programming Languages, Automata Theory, Discrete Structures, Data Analysis and Interpretation, Abstractions and Paradigms for Programming, Databases and Information Systems, Software Systems Lab, Operating Systems, Data Structures and Algorithms, Design and Analysis of Algorithms, Computer Networks, Digital Logic Design, Computer Architecture
- **Narayana IIT Academy** — Hyderabad, India
  Class 12, Board of Intermediate Education, Telangana; **Score:** 98.4% — *July 2013 - March 2015*
- **Narayana Olympiad High School** — Hyderabad, India
  Class 10, Board of Secondary Education, Andhra Pradesh; **GPA:** 9.7/10 — *March 2013*

## Skills

- **Languages:** Python, C/C++, Java, Kotlin, LaTeX, Dart, JavaScript, SQL, Rust, VHDL, C#
- **Frameworks:** Android SDK, MATLAB, Flutter, Qualcomm AI Direct Engine(QNN)
- Experienced in using popular deep learning libraries **PyTorch**, **Tensorflow**, **JAX**, **Transformers**

## Key Projects

- **Quantization for On Device LLM** — Samsung Research, Korea
  Guide: Lee Kyeunghun — *March 2024 - July 2024*
- **News Summarization** — Samsung Research, Korea
  Guide: Ko Hyeonmok — *May 2023 - January 2024*

- **Video Inpainting** — Samsung Research, Korea
  Guide: Naejin Kong — *February 2022 - December 2022*
- **Image Inpainting** — Samsung Research, Korea
  Guide: Naejin Kong — *March 2021 - December 2021*
- **Image Relighting** — Samsung Research, Korea
  Guide: Naejin Kong — *September 2019 - March 2020*
- **Attention Methods for Deep Metric Learning** — Samsung Research, Korea
  Guide: Wonsik Kim — *Summer 2018*
  - Explored different soft attention methods for deep metric learning on images
  - Developed code for a few attentions models on **Caffe** with the GPU code needed for it
  - Evaluated these different models on the dataset of clothes using the **Recall@K** metric
- **Formfly: Crowdsourced Digitising** — 11TechSquare
  Guide: Ankit Rawat — *Summer 2017*
  - Involved in developing Python code which snips image, using **SIFT**, into parts(fields) hence ensuring data privacy
  - Developed python code for snipping **Aadhaar ID** card's(Unique Identity for Indians) image to its constituent fields
  - Also uses **Google OCR** data on the image to predict which fields they represent and developed a generic interface for other Identity cards
- **Gesture Control Glove for Android** — IIT Bombay
  Institute Technical Summer Project — *Summer 2016*
  - Created a glove with flex sensors and motion sensors with bluetooth module
  - Developed an android application to connect to the glove via bluetooth and receive sensor data and process using **Dynamic Time Warping** queue based algorithm
  - Implements many Android system function calls like Volume control, Brightness control etc.
- **Predictive Music Synthesis** — IIT Bombay
  Prof. Ganesh Ramakrishnan — *Spring 2017*
  - Designed and trained a **Recurrent Neural Network** on Piano Music Notes of *Frederic Chopin* in **MIDI** files and produced music iteratively
  - Makes use of **LSTM cells** and Dense layers in the RNN for learning the patterns in the music notes
  - Analysed the outputs using **Tempograms, Spectrograms, Chromagrams** and compared with the original music
- **Indexing Schemes for Data Recording Systems** — IIT Bombay
  Prof. S. Sudarshan — *Spring 2018*
  - Hacked **postgres** internals for implementing a new index to support large continuous stream of incoming data and store it in a manner suitable for future access
  - Implemented stratergies for incremental organization of B+ trees in memory and on disk to support both insertion and queries with reasonable efficiency, and without the delays of periodic batch processing
  - Implemented the **stepped-merge algorithm** paper in C language for merging B+ trees on disk for faster queries

- **Compiler for a C-like language** — IIT Bombay
  Prof. Uday Khedkar — *Spring 2018*
  - Developed a compiler for a C-like language in **python**, for **MIPS instruction set** architecture
  - Supported major functionalities like function calls, if-else statements, loops and arithmetic expressions

- **Gesture Control Glove for Android** — IIT Bombay
  Institute Technical Summer Project — *Summer 2016*
  - Created a glove with flex sensors and motion sensors with bluetooth module
  - Developed an android application to connect to the glove via bluetooth and receive sensor data and process using **Dynamic Time Warping** queue based algorithm
  - Implements many Android system function calls like Volume control, Brightness control etc.

- **Restricting Playability of Copyrighted Videos** — 11TechSquare
  Guide: Ankit Rawat — *Summer 2017*
  - Developed a C# Windows Forms Application to encrypt using **Rijndael Encryption** and play videos
  - Application plays encryted files from memory without writing the decrypted data to disk
  - Also tracks the number of times and where the video was left and restricts the playability

- **Multi-Platform Chat Application** — IIT Bombay
  Prof. Varsha Apte - Course Project — *Spring 2017*
  - Developed a **Multi Threaded** C++ server application using Sockets and clients in three different clients, Android, CLI/C++ and Web(JS)
  - Developed a protocol for communication, can login/register using an LDAP server, supports Instant Messaging, Friend Requests, Blocking, Group messaging
  - Used secure salted password hashing with Argon2i algorithm for storing passwords in database

- **Scilab Julia Interface** — FOSSEE - IIT Bombay
  Guide: Shamika Mohanan — *Summer 2017*
  - Developed a toolbox for **Scilab** to call functions from libraries in **Julia**, compatible with Linux and Mac
  - Works even for functions from additional community written packages of Julia
  - Worked with both Scilab's C source and Julia's C source to convert the data representations across the languages

- **Dance Choreography using Machine Learning** — IIT Bombay
  Hackathon - Yahoo! Japan — *Spring 2017*
  - Developed a **sequence-to-sequence model** and trained the neural network in Tensorflow to learn the map from music note sequence to dance sequence and predict dance sequence on unseen music notes
  - Employs the use of **LSTMs** in the RNN part of neural network

## Scholastic Achievements

- Secured **All India Rank 25** in **JEE** (**Advanced**) out of **150,000** candidates *(2015)*

- Secured **All India Rank 8** in **JEE Main** (**B.Arch**) out of **150,000** candidates *(2015)*
- Secured **All India Rank 26** in **JEE Main** (**B.Tech**) out of **1.3 million** candidates *(2015)*
- Awarded the Kishore Vaigyanik Protsahan Yojana (**KVPY**) Fellowship held by the Department of Science and Technology, Government of India with an **All India Rank 70** *(2014)*
- Secured **State Rank 19** in **AP State Common Entrance Test** out of about **150,000** candidates *(2015)*
- Secured **State Rank 60** in **Telangana State Common Entrance Test** out of about **250,000** candidates *(2015)*
- Awarded **AP grade** for excellence (given to top 1% students) in Engineering Drawing *(2015-16)*