



# PORTFOLIO

Harsh Chopra

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# Hello,

## I'm Harsh Chopra

*Student at Indian Institute of Technology ,  
Bombay*

I'm passionate about machine learning, data analytics, and software development, with a strong interest in building AI-driven solutions that create meaningful real-world impact. My work spans deep learning, image processing, and natural language processing, where I enjoy combining analytical problem-solving with creative innovation.

Outside academics, I have a deep interest in traveling and exploring diverse cultures, reading lots of books, and sports such as table tennis. I also enjoy solving the Rubik's Cube .



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# Education

Selected as one of the two students to take up the upcoming spring semester at the KAIST , Seoul , South Korea .

## 2023-Present IIT, Bombay

Currently a third-year undergraduate at IIT Bombay, majoring in Metallurgical Engineering and Materials Science with dual minors in Computer Science and Artificial Intelligence & Data Science.

## 2010-2023 Seedling Modern High School

# Reconstructing Lecture Summaries using NLP Techniques

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- Built an NLP pipeline using TF-IDF, Doc2Vec, and Sentence-BERT, achieving a silhouette score of 0.79.
- Leveraged UMAP with cosine similarity to improve clustering quality and enhance thematic separation.
- Developed an interactive Streamlit application for top-3 summary retrieval, featuring heatmaps, bubble charts, and semantic similarity graphs.

Github Link : [Link to the github](#)

# Mess Digitalization

## Mess-I : Institute Developers Community

- Built the UI and integrated JWT authentication APIs for an external login system supporting non-IITB LDAP users.
- Utilized Sphinx documentation for the Flask backend to ensure long-term maintainability and reproducibility.
- Implemented real-time communication across devices by integrating WebSockets in Flask using Socket.IO.

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# Facial Recognition System using Siamese Neural Network

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- Developed a real-time object detection pipeline using the YOLOv8 architecture integrated with neural network modules.
- Gained hands-on experience with convolutional neural networks (CNNs) and image preprocessing techniques using OpenCV.
- Studied and implemented a Siamese neural network, building a fully functional facial recognition model.

Github Link : [Link to the github](#)

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# Context-Aware Conversational AI Agent

- Built a robust RAG (Retrieval-Augmented Generation) system using FAISS and MiniLM to retrieve relevant content from markdown notes.
- Integrated Tavily, Wikipedia, and a calculator via keyword routing and safe expression parsing using AST.
- Prototyped reasoning agents with Plan-Execute-Refine loops, tool chaining, and persona-aware prompting for adaptive task execution.

# Projects to take up this winter :

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1. PAN INTER-IIT Meet : Working on developing a mobile-compatible photo editor as part of the Adobe problem statement. This involved designing and implementing an efficient, user-friendly image editing solution optimized for mobile devices while ensuring high performance, responsive UI, and seamless functionality across varying screen sizes.
2. Colorization of grayscale images as a part of Digital Image Processing

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# Why Japan

I want to do an internship in Japan because it has one of the best environments in the world for learning cutting-edge technology, high-quality engineering practices, and disciplined teamwork.

Japan has some of the world's most innovative industries of robotics, electronics, automobiles, AI, and being able to learn from professionals in such an environment would significantly shape my technical abilities. At the same time, I admire the Japanese work ethic like respect, punctuality, attention to detail, and teamwork as well as the rich Japanese heritage which will help me develop both professionally and personally.

I also want to understand how Japan manages large-scale projects with such consistency and quality. Learning these processes would be extremely valuable for my future career. Overall, an internship in Japan is an opportunity to learn global-standard skills, contribute to high-impact projects, and grow in a culturally rich and technologically advanced environment.

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# ***Thank you***

## **Contact Details**

**Phone :**     *+91-6367862667*

**Linkedin :**   *[My-Linkedin](#)*

**Email :**     *23b2407@iitb.ac.in*