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Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SCHOOL OF COMPUTER SCIENCE AND ENGINEERING (SCOPE)

FALL SEMESTER 2025 -2026

PROJECT ABSTRACT

SLOT: E1 + TE1

PROGRAMME NAME: M. Tech Integrated (MID)

Course Name & Code: CSI3019 - Advanced Data Compression Techniques

TEAM MEMBERS:

- 1. LOKESHWARI G – 22MID0033**
- 2. ANU SWATHI V R – 22MID0257**
- 3. SUBASHREE S – 22MID0269**

REAL-TIME CHAT APPLICATION WITH ON-THE-FLY TEXT COMPRESSION SUPPORTING EMOJI AND MULTILINGUAL MESSAGES

PROJECT ABSTRACT:

With the growing use of chat-based communication in diverse environments — including multilingual, emoji-rich, and low-bandwidth settings — optimizing text transmission has become increasingly important. This project proposes the development of a real-time chat application that incorporates on-the-fly text compression techniques to reduce message size before transmission and restore it at the receiver's end. The system aims to intelligently compress messages containing Unicode characters, such as emoji's and multilingual text (e.g., Tamil, Hindi, Arabic), which traditional compression methods often struggle to handle efficiently.

The novelty of the proposed system lies in its adaptive compression framework: the application dynamically selects the most appropriate lossless compression algorithm (Run-Length Encoding, Huffman, or LZW) based on message content characteristics such as character repetition, length, and Unicode presence. The chat platform also includes a real-time compression analytics dashboard for comparing compression efficiency across different algorithms and message types.

Developed using open-source tools such as Python, Socket.IO, the system is designed to be lightweight, scalable, and deployable on web or mobile environments. The outcome of this work is expected to improve message delivery speed and reduce bandwidth usage, especially in communication systems used in resource-constrained or multilingual regions.