

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY,
BELAGAVI**



**A PROJECT REPORT ON
“HARM ANTICIPATION: ACTION RECOGNITION WITH (C3D)
CONVOLUTIONAL NEURAL NETWORK”**

Submitted in partial fulfillment for the award of the Degree of

**BACHELOR OF ENGINEERING
IN
COMPUTER SCIENCE & ENGINEERING**

By

KRISHNA SAPAGALE	4AL20CS062
MANOJ SANIKAM	4AL20CS070
NIKHITA	4AL20CS085
PRAJWAL M SHETTY	4AL20CS093

Under the Guidance of

Mr. Kiran B V

Senior Assistant Professor



**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY
MOODBIDRI-574225, KARNATAKA**

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ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY
MIJAR, MOOBBIDRI D.K. -574225, KARNATAKA



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
CERTIFICATE

This is to certify that the project entitled "**HARM ANTICIPATION: Action recognition with (C3D) convolutional neural network**" has been successfully completed by

KRISHNA SAPAGALE

4AL20CS062

MANOJ SANIKAM

4AL20CS070

NIKHITA

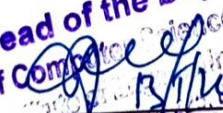
4AL20CS085

PRAJWAL M SHEETY

4AL20CS093

the bonafide students of DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING, ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY of the VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI during the year 2023-24. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of Projectwork prescribed for the Bachelor of Engineering Degree.


Mr. Kiran B V
Project Guide

Head of the Department
Dept. of Computer Science & Engineering
Alva's Institute of Engineering and Technology
Mijar, MOOBBIDRI D.K. Karnataka, India

Dr. Manjunath Kotari
Head Of the Department

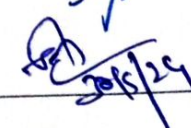
External Viva


Dr. Peter Fernandes
Principal
Alva's Institute of Engg. & Technology,
Mijar, MOOBBIDRI - 574 225, D.K

Name of the Examiners

1. Dr. Manjunath Kotari
2. Shreejith K.B

Signature with Date


30/5/24

30/5/24

ABSTRACT

C3D convolutional neural networks (CNNs) offer a promising approach to recognizing actions that could lead to harm in videos. These C3D models are skilled at extracting features that combine spatial information (what's in the frame) with temporal information (how things move over time), making them well-suited for analyzing human actions. The process typically involves collecting video data with varying degrees of harm (violence, hazards, safe actions), preprocessing the videos for consistency, and then training the C3D network to distinguish between harmful and safe actions. While C3D CNNs show promise, it's important to consider potential limitations like biases in the training data, the complexity of real-world environments, and the need for even earlier harm detection. In recent years, action recognition has gained significant attention in the field of computer vision due to its wide range of applications, including video surveillance, human-computer interaction, and sports analysis. Convolutional neural networks (CNNs) have emerged as powerful tools for this task, demonstrating state-of-the-art performance in various benchmarks. Among these architectures, the C3D (Convolutional 3D) network has shown remarkable efficacy in capturing both spatial and temporal features from video data. In this paper, we propose a novel approach for action recognition, termed HARM (Hierarchical Action Recognition Model), which leverages the strengths of the C3D network for robust anticipation of human actions. Action recognition in video data plays a crucial role in various applications, ranging from surveillance to human-computer interaction. In this paper, we present HARM, a novel Hierarchical Action Recognition Model, utilizing the C3D convolutional neural network architecture. HARM integrates contextual information across different temporal scales, enabling robust anticipation of human actions. Through experiments on benchmark datasets, including UCF101 and HMDB51, HARM demonstrates superior performance compared to existing methods. Our findings highlight HARM's efficacy in action anticipation and its potential for real-world applications. These models excel at extracting features that encompass both spatial and temporal information from video data.