# INTERNSHIP REPORT

*A report submitted in partial fulfillment of the requirements for the Award of Degree of*

**BACHELOR OF ENGINEERING**

**in**

**COMPUTER ENGINEERING**

**By**

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**Under Supervision of**

Dr.(Mrs.)B.F. More

**(Duration: 5 Week)**



# Topic: Skin Cancer Classification

### DEPARTMENT OF COMPUTER ENGINEERING

Modern Education Society’s College of Engineering ,Pune Approved by AICTE, Affiliated to SPPU, Pune

Maharashtra.

**DEPARTMENT OF COMPUTER ENGINEERING MODERN EDUCATION SOCIETY’S COLLEGE OF**

**ENGINEERING ,PUNE**



***CERTIFICATE***

This is to certify that the “**Internship report”** submitted by **Mr. Jayesh Rajesh Chordiya (72292465J)**is work done by him and submitted during 2023-24 academic year, in partial fulfillment of the requirements for the award of the degree of **BACHELOR OF ENGINEERING in COMPUTER ENGINEERING,** at **Modern Education Society’s Wadia College Of Engineering Pune .**

**College Internship Coordinator Department Internship Coordinator**

.

**Date: Head Of the Department**

**Place: Department of Computer Engineering**

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# ABSTRACT

The research internship program at Modern Education Society’s College of Engineering, Pune, a unique opportunity for students to engage in hands-on research experiences under the guidance of esteemed faculty members and researchers. This program aims to cultivate research skills, foster intellectual growth, and promote a deeper understanding of the research process

### Programs and opportunities:

As part of this research internship, we are undertaking a project on Time Table Management System. The project focuses on designing **Time Table Management System** and make this process more efficient than before.

Through this internship, we have been able to apply theoretical concepts learned in the classroom to real-world scenarios, gain practical research skills, and contribute to the ongoing efforts in the management system.

### Key parts of the report:

1.Internship Work Identification 2.Technologies used in the Internship

1. Weekly overview of Internship Activities
2. Motivation

### Benefits of the Company/Institution through our report:

1. Resume Building
2. Career Guidance 3. Growth of Skill

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### GENERAL GUIDELINES AND INSTRUCTIONS:

1. Internships are educational and career development opportunities, providing practical experience in a field or discipline. Internships are far more important as the employers are looking for employees who are properly skilled and having awareness about industry environment, practices and culture. Internship is structured, short-term, supervised training often focused around particular tasks or projects with defined time scales.
2. Core objective is to expose technical students to the industrial environment, which cannot be simulated/experienced in the classroom and hence creating competent professionals in the industry and to understand the social, economic and administrative considerations that influence the working environment of industrial organizations.
3. Engineering internships are intended to provide students with an opportunity to apply conceptual knowledge from academics to the realities of the field work/training. The following guidelines are proposed to give academic credit for the internship undergone as a part of the Third Year Engineering curriculum.

### Duration:

Internship is to be completed after semester 5 and before commencement of semester 6 of at least 4 to 6 weeks; and it is to be assessed and evaluated in semester 6.

### Internship work Identification:

* 1. Student may choose to undergo Internship at Industry/Govt. Organizations/NGO/MSME/Rural Internship/ Innovation/IPR/Entrepreneurship.
  2. Student may choose either to work on innovation or entrepreneurial activities resulting in start-up or undergo internship with industry/NGO’s/Government organizations/Micro/Small/ Medium enterprises to make themselves ready for the industry[1].
  3. Students must register at Internshala [2].

Reference:

1. https:/[/www.aicte](http://www.aicte-india.org/sites/default/files/AICTE%20Internship%20Policy.pdf)-[india.org/sites/default/files/AICTE%20Internship%20Policy.pdf](http://www.aicte-india.org/sites/default/files/AICTE%20Internship%20Policy.pdf)
2. https://internship.aicte-india.org/

**Internship Course Objectives:**

Internship provides an excellent opportunity to learner to see how the conceptual aspects learned in classes are integrated into the practical world. Industry/on project experience provides much more professional experience as value addition to classroom teaching.

* To encourage and provide opportunities for students to get professional/personal experience
* through internships.
* To learn and understand real life/industrial situations.
* To get familiar with various tools and technologies used in industries and their applications.
* To nurture professional and societal ethics.
* To create awareness of social, economic and administrative considerations in the working
* environment of industry organizations.
* To highlight the talents you already have in the field as well as your desire to learn more.

**Course Outcomes:**

On completion of the course, learners should be able to:

CO1: To demonstrate professional competence through industry internship.

CO2: To apply knowledge gained through internships to complete academic activities in a

professional manner.

CO3: To choose appropriate technology and tools to solve given problem.

CO4: To demonstrate abilities of a responsible professional and use ethical practices in day to

day life.

CO5: Creating network and social circle, and developing relationships with industry people.

CO6: To analyze various career opportunities and decide carrier goals.

## WEEKLY OVERVIEW OF INTERNSHIP ACTIVITIES

|  |  |  |  |
| --- | --- | --- | --- |
| **FIRST WEEK** | **DATE** | **DAY** | **NAME OF THE TOPIC/MODULE COMPLETED** |
|  | Monday |  |
|  | Tuesday |  |
|  | Wednesday |  |
|  | Thursday |  |
|  | Friday |  |
|  | Saturday |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **SECOND WEEK** | **DATE** | **DAY** | **NAME OF THE TOPIC/MODULE COMPLETED** |
|  | Monday |  |
|  | Tuesday |  |
|  | Wednesday |  |
|  | Thursday |  |
|  | Friday |  |
|  | Saturday |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **THIRD WEEK** | **DATE** | **DAY** | **NAME OF THE TOPIC/MODULE COMPLETED** |
|  | Monday |  |
|  | Tuesday |  |
|  | Wednesday |  |
|  | Thursday |  |
|  | Friday |  |
|  | Saturday |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **WEEK** | **DATE** | **DAY** | **NAME OF THE TOPIC/MODULE COMPLETED** |
|  | Monday |  |
|  | Tuesday |  |
|  | Wednesday |  |
|  | Thursday |  |
|  | Friday |  |
|  | Saturday |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Last** **WEEK** | **DATE** | **DAY** | **NAME OF THE TOPIC/MODULE COMPLETED** |
|  | Monday |  |
|  | Tuesday |  |
|  | Wednesday |  |
|  | Thursday |  |
|  | Friday |  |
|  | Saturday |  |

### INTRODUCTION

Skin cancer is a prevalent and potentially life-threatening condition that affects millions of people worldwide. Early detection is paramount for effective treatment and improved prognosis. With advancements in machine learning (ML) and deep learning (DL) algorithms, there has been a surge in research exploring their potential applications in medical image analysis, including the detection of skin cancer.

ML and DL algorithms have shown promise in automating the process of skin cancer detection by analyzing images of skin lesions. These algorithms can learn intricate patterns and features from large datasets, enabling them to distinguish between benign and malignant lesions with high accuracy.

Various ML and DL techniques have been employed for skin cancer detection, each with its strengths and limitations. Traditional ML algorithms such as Support Vector Machines (SVM), Random Forests, and Decision Trees have been used for feature extraction and classification tasks. These methods rely on handcrafted features and require extensive domain knowledge for effective implementation.

On the other hand, DL algorithms, particularly Convolutional Neural Networks (CNNs), have emerged as a powerful tool for image analysis tasks. CNNs can automatically learn hierarchical representations of data, eliminating the need for manual feature engineering. This ability to learn complex features directly from raw data has led to remarkable advancements in skin cancer detection.

In recent years, several studies have demonstrated the efficacy of ML and DL algorithms in skin cancer detection using various imaging modalities such as dermoscopy and digital photography. These algorithms have been trained on large annotated datasets containing images of both benign and malignant lesions, enabling them to generalize well to unseen data.

In this paper, we provide an overview of the state-of-the-art ML and DL algorithms used for skin cancer detection. We discuss their strengths, weaknesses, and potential applications in clinical practice.

### PROBLEM STATEMENT

## Problem Statement

**“Investigate the effectiveness of various ML & DL algorithms, such as Support Vector Machines (SVM), VGG16, Convolutional Neural Network in extracting relevant features from skin lesion images and classifying them as benign or malignant”**

Investigating the effectiveness of various machine learning (ML) and deep learning (DL) algorithms for skin cancer detection involves a meticulous examination of their capabilities in feature extraction and classification tasks. Support Vector Machines (SVM), a widely-used ML algorithm, operates by finding an optimal hyperplane to separate benign and malignant lesions in a high-dimensional feature space. SVM effectively utilizes features like texture, color, shape, and size descriptors for discrimination. On the other hand, VGG16, a pre-trained deep learning model, can serve as a potent feature extractor. Through transfer learning, VGG16 learns hierarchical representations of features from images, capturing both low-level and high-level features. Convolutional Neural Networks (CNNs), specifically designed for image processing tasks, offer an end-to-end learning approach, obviating the need for manual feature engineering. CNNs automatically extract discriminative features from raw pixel data through multiple layers of convolutional, activation, and pooling operations. These features are then used for classification, with the network learning to map input images directly to class labels. To investigate these algorithms' efficacy, each would be trained on annotated skin lesion images and evaluated using performance metrics such as accuracy, sensitivity, specificity, and area under the ROC curve. Comparative analyses would reveal which algorithm achieves optimal performance, guiding their potential application in clinical settings for early skin cancerdetection.

### Objectives

### Skin cancer detection using Machine Learning (ML) and Deep Learning (DL) techniques are multifaceted, aiming to leverage advancements in computational methods for improved diagnosis and treatment.

### 1.Early Detection: The primary objective is to enable early detection of skin cancer lesions, particularly melanoma, which significantly enhances treatment outcomes and survival rates. ML and DL techniques can automate the analysis of skin lesion images, facilitating timely diagnosis.

### 2.Accuracy Improvement: ML and DL algorithms strive to achieve high levels of accuracy in classifying skin lesions as benign or malignant. By leveraging large datasets and sophisticated algorithms, the goal is to minimize false positives and false negatives, thereby enhancing diagnostic accuracy.

### 3.Automation and Efficiency: Another objective is to automate the process of skin cancer detection, reducing the reliance on manual inspection by dermatologists. ML and DL algorithms can analyze vast amounts of image data rapidly, enabling efficient screening and diagnosis, especially in resource-constrained healthcare settings.

### 4.Feature Extraction: ML and DL techniques aim to extract relevant features from skin lesion images, such as texture, color, shape, and size descriptors. The objective is to identify discriminative features that distinguish between benign and malignant lesions, improving the algorithm's predictive performance.

### 5.Generalization and Robustness: ML and DL models should generalize well across diverse populations and imaging modalities. The objective is to develop algorithms that are robust to variations in skin types, lighting conditions, and imaging equipment, ensuring consistent performance in real-world scenarios.

### 6.User-Friendly Interfaces: In addition to accurate detection, ML and DL systems should offer user-friendly interfaces for healthcare professionals. The objective is to design intuitive software or applications that enable seamless integration into clinical workflows, allowing dermatologists to interpret and validate algorithmic findingseffectively.

### MOTIVATION

Detecting skin cancer using machine learning (ML) and deep learning (DL) techniques provides compelling motivations across various aspects of healthcare. Firstly, early detection facilitated by ML and DL can significantly improve patient outcomes by enabling timely intervention and treatment, ultimately saving lives. Secondly, the enhanced diagnostic accuracy achieved by these algorithms reduces the risk of misdiagnosis, providing dermatologists with valuable support in lesion classification. Moreover, the automation of skin cancer detection streamlines the diagnostic process, making it more efficient and cost-effective, thus improving healthcare delivery. ML and DL algorithms also contribute to accessible healthcare by extending dermatological care to remote or underserved areas, where access to specialists may be limited. By identifying suspicious lesions early, these techniques not only improve patient outcomes but also lead to reduced healthcare costs by preventing the progression of the disease to advanced stages that require more extensive treatments. Furthermore, the development of ML and DL algorithms fosters research and innovation in medical imaging and computer vision, driving advancements in diagnostic tools and treatment modalities. Lastly, by empowering healthcare providers with advanced diagnostic capabilities, ML and DL techniques augment human expertise, leading to more informedclinicaldecisions.

### LITERATURE SURVEY

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. ­No** | **Title of Paper** | **Author** | **Description** |
| 1. | “Detection of Skin Cancer Using SVM” | POORNIMA M , Dr. SHAILAJA 1M.Tech(2nd year)student, Biomedical signal processing and Instrumentation, Dept. of I.T., SJCE, Mysuru, Karnataka, India 2Associate Professor, Dept. of I.T., SJCE, Mysuru, Karnataka, India | Paper proposes a method for using image processing to detect Melanoma Skin Cancer early. By analyzing skin lesion images, the system assesses parameters like color, size, and shape to classify the lesion as non-Melanoma or Melanoma cancer. This approach could significantly aid in the timely diagnosis and treatment of this dangerous cancer type. |
| 2. | “Timetable Management System Web Application Development” | G. Renuga Devi  , M. Deepa  , V. Harisha  , Dr. S.  Amutha [2020] | This time table management system provides a function to create and view the time table for the specific staff and student. This system also contains a database that stores staff and student allotted subject details and notifications before time |
| 3. | “Academia Timetable Management System: A Review” | Aniket Pawar  , Aditya Chavan , Akib Mulla, Omkar Musmade [2023] | In this paper, we studied the benefits and challenges of implementing an automated time table system, as well as the different approaches and algorithms used to create effective schedules. It also provides the potential |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  | impact of these systems in academic field |
| 4. | “Utilization of Timetable Management System to a Medium Scaled University” | Chaya Andradi, Saminda Premaratne [2020] | In this paper, they discuss about a framework of utilizing timetable management system to a medium scale university for resource optimization |

* + - 1. **SYSTEM ANALYSIS**

### Requirement Analysis

#### Existing System:

### Proposed System:

### SOFTWARE REQUIREMENTS SPECIFICATIONS

#### Software Requirements/configuration:

* Operating system : Windows 10/11
* Coding Language : Python

#### Hardware Requirement:

* System : Laptop, PC
* Hard Disk : Any hard disk feasible according to requirement
* Ram : 4 GB / 8GB / 16 GB and further

### METHODOLOGICAL DETAILS

**Data Collection and Preprocessing:**

Gather a dataset of skin lesion images along with their corresponding labels indicating whether they are malignant or benign.Preprocess the images, which may include resizing, normalization, and noise reduction, to ensure consistency and enhance the quality of the data.

**Feature Extraction:**

Extract relevant features from the preprocessed images. These features could include color histograms, texture descriptors (e.g., local binary patterns), shape descriptors (e.g., area, perimeter), and other characteristics that may distinguish between malignant and benign lesions.Feature extraction techniques aim to capture the discriminative information present in the images while reducing dimensionality.

**Feature Selection (Optional**):

Depending on the dimensionality of the feature space and the computational resources available, you may perform feature selection to identify the most informative features that contribute to the classification task. Techniques such as correlation analysis or feature importance ranking can be employed for this purpose.

**Training the SVM Model**:

Split the dataset into training and testing sets to evaluate the performance of the model.Train the SVM model using the training data, where the features extracted from the images serve as input vectors, and the corresponding labels (malignant or benign) serve as target outputs. The SVM algorithm seeks to find the optimal hyperplane that best separates the data points of different classes while maximizing the margin between the hyperplane and the support vectors.

**Model Evaluation:**

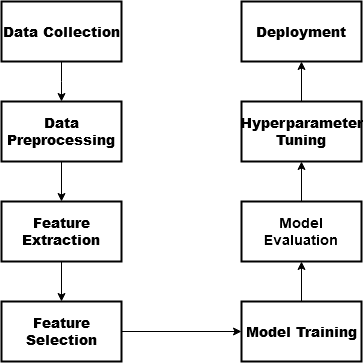
Evaluate the performance of the trained SVM model using the testing dataset.Common evaluation metrics for binary classification tasks include accuracy, precision, recall, F1-score, and area under the receiver operating characteristic curve (AUC-ROC). Analyze the confusion matrix to assess the model's ability to correctly classify malignant and benign lesions.

**Model Optimization:**

Fine-tune the SVM model by adjusting hyperparameters such as the choice of kernel function, regularization parameter (C), and kernel-specific parameters (e.g., gamma for radial basis function kernel). Perform cross-validation or grid search to find the optimal hyperparameters that maximize the model's performance on the validation set.

**Deployment and Validation**:

Deploy the optimized SVM model for real-world applications, such as assisting dermatologists in diagnosing skin lesions. Continuously monitor and validate the model's performance on new data to ensure its reliability and effectiveness in skin cancer detection.



### RESULT

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### CONCLUSION

### BIBLIOGRAPHY