POORNIMA
COLLEGE OF ENGINEERING

Approved by AICTE
Affiliated to Rajasthan Technical University, Kota
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Internship/ Training List & Sample Certificates Department of Computer Engineering Session - (2023-24)

IIIrd YEAR (Sec A)

ISI-6, RIICO Institutional Area, Sitapura, Jaipur-302022 (Rajasthan)
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• Website: www.pce.poornima.org

Dr. Mahesh Bundele
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Sitapura, JAIPUR

Poornima College of Engineering
Computer Science and Engineering
List of Internship Training (III Year) Sec-A- 2023-24
Programme Name : B.Tech. (Computer Science and Engineering Programme Code: CS

S . No.	Student Name	RegNo.	Company	Training of company/Training Location
1	AAYUSH SHARMA	PCE21CS002	Bodacious IT Hub	Bodacious IT Hub, Jaipur Rajasthan
2	AAYUSHI JAIN	PCE21CS003	LEARN AND BUILD	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
3	ABHAY JINDAL	PCE21CS004	seldom India technologies	B-33, basant vihar colony Gopalpura Bypass, Tonk Rd, above Brown Sugar, Gopalpura Mode, Jaipur, Rajasthan 302018
4	ABHAY MITTAL	PCE21CS005	INTERNPE	New Sanganer Rd, Sanganer, Maruti Nagar, Jaipur, Rajasthan 302029
5	ABHAY SINGH	PCE21CS006	seldom India technologies	B-33, basant vihar colony Gopalpura Bypass, Tonk Rd, above Brown Sugar, Gopalpura Mode, Jaipur, Rajasthan 302018
6	ABHIJEET RAI DADHICH	PCE21CS007	Crazy Media Labs	8/266, Lt. Amit Bhardwaj Marg, Malviya Nagar, Jaipur, Rajasthan
7	ABHINAV ARORA	PCE21CS008	Learn and Build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
8	ABHISHEK CHOPRA	PCE21CS009	Learn and Build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
9	ABHISHEK KUMAR	PCE21CS010	Codespeedy Tech Pvt. Ltd	Vill Maradighi, P.O. Dadpur, P.S. Rejinagar, Murshidabad, West Bengal 742189
10	ADITYA SINGH GAJAWAT	PCE21CS011	Learn and Build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
11	AJAY KUMAR SHARMA	PCE21CS012	Learn and Build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019

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12	AKSHAT WADHERA	PCE21CS013	Learn and Build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
13	AMAN GARG	PCE21CS014	9 Ethics Info Solution	S-1, B-78, Avenue Heights, Maa Karni Nagar B, Panchyawala, Vaishali Nagar, Panchyawala, Jaipur
14	AMAN GUPTA	PCE21CS015	INTERNPE	New Sanganer Rd, Sanganer, Maruti Nagar, Jaipur, Rajasthan 302029
15	AMAN RAJ	PCE21CS016	9 Ethics Info Solution	S-1, B-78, Avenue Heights, Maa Karni Nagar B, Panchyawala, Vaishali Nagar, Panchyawala, Jaipur
16	ANAND SONI	PCE21CS017	Grras	219, Himmat Nagar, Gopalpura Mod, Tonk Road, Jaipur, Rajasthan 302018
17	ANIKET LOHIYA	PCE21CS018	Learn and Build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
18	ANIKET SINGH GURJAR	PCE21CS019	seldom India technologies	B-33, basant vihar colony Gopalpura Bypass, Tonk Rd, above Brown Sugar, Gopalpura Mode, Jaipur, Rajasthan 302018
19	ANIRUDH SINGH RATHORE	PCE21CS020	Learn and Build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
20	ANISH KUMAR GUPTA	PCE21CS021	Appic softwares	41/11, New Sanganer Rd, Varun Path, Mansarovar Sector 4, Mansarovar, Jaipur, Rajasthan 302020
21	ANJALI BARI	PCE21CS022	Learn and Build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
22	ANJNA	PCE21CS023	Seldom India Technologies	B-33, basant vihar colony Gopalpura Bypass, Tonk Rd, above Brown Sugar, Gopalpura Mode, Jaipur, Rajasthan 302018
23	ANKIT PARAKH	PCE21CS024	Aaron SoftTech Pvt. Ltd.	3rd Floor PR Tower , Near Jagatpura Flyover Jaipur Rajsathan
24	ANUBHOOTI NAGAR	PCE21CS025	Kistechnosoftware Pvt. Ltd.	2nd Floor, Paramhans Marg, Mansarovar Sector 7, Shipra Path, Barh Devariya, Mansarovar 72/269, Jaipur, Rajasthan 302020
25	ARYA SETHI	PCE21CS026	Duranz IT Solutions	A-116, behind North Western Railway Headquarters, Saraswati Nagar Extension, Chainpura, Malviya Nagar, Jaipur, Rajasthan 302017

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26	ARYAN JAIN	PCE21CS027	Duranz IT Solutions	A-116, behind North Western Railway Headquarters, Saraswati Nagar Extension, Chainpura, Malviya Nagar, Jaipur, Rajasthan 302017
27	ARYAN PAREEK	PCE21CS028	Internpe	New Sanganer Rd, Sanganer, Maruti Nagar, Jaipur, Rajasthan 302029
28	ASHU GARG	PCE21CS029	Internpe	New Sanganer Rd, Sanganer, Maruti Nagar, Jaipur, Rajasthan 302029
29	AVANI AGARWAL	PCE21CS030	NOQ's pvt. ltd.	Airbnb Clone
30	AVINASH JAT	PCE21CS031	Learn and build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
31	AYUSH JINDAL	PCE21CS032	learn and build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
32	AYUSHI AGRAWAL	PCE21CS033	Internpe	New Sanganer Rd, Sanganer, Maruti Nagar, Jaipur, Rajasthan 302029
33	BHANU BANSAL	PCE21CS034	INTERNPE	New Sanganer Rd, Sanganer, Maruti Nagar, Jaipur, Rajasthan 302029
34	BHAVIK LOUNGANI	PCE21CS035	learn and build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
35	BHAVYA NATANI	PCE21CS036	Learn & Build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
36	CHARUL TONGARIA	PCE21CS037	Kistechnosoftware Pvt. Ltd.	2nd Floor, Paramhans Marg, Mansarovar Sector 7, Shipra Path, Barh Devariya, Mansarovar 72/269, Jaipur, Rajasthan 302020
37	CHETAN SHARMA	PCE21CS038	Learn and build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
38	CHINMAY JAIN	PCE21CS039	Duranz IT Solutions	A-116, behind North Western Railway Headquarters, Saraswati Nagar Extension, Chainpura, Malviya Nagar, Jaipur, Rajasthan 302017
39	DEEPAK KAMBALWAL	PCE21CS040	INTERNPE	New Sanganer Rd, Sanganer, Maruti Nagar, Jaipur, Rajasthan 302029

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40	DEEPENDRA SHARMA	PCE21CS041	learn and build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
41	DEEPESH GUPTA	PCE21CS042	INTERNPE	New Sanganer Rd, Sanganer, Maruti Nagar, Jaipur, Rajasthan 302029
42	DEVANSH KHANDUJA	PCE21CS043	INTERNPE	New Sanganer Rd, Sanganer, Maruti Nagar, Jaipur, Rajasthan 302029
43	DEVANSHI SIKHWAL	PCE21CS044	Kistechnosoftware Pvt. Ltd.	2nd Floor, Paramhans Marg, Mansarovar Sector 7, Shipra Path, Barh Devariya, Mansarovar 72/269, Jaipur, Rajasthan 302020
44	DEVANSHU SAINI	PCE21CS045	Perth Enterprises	Bus Stand Ke Pass, Love Kush Marriage Home Road, Rajgarh, Alwar, Rajasthan
45	DEVSHREE BHATI	PCE21CS046	Blue Space Technologies Pvt. Ltd.	42 a, Kusum Vihar, CBI Colony, Jagatpura, Jaipur, Rajasthan 302017
46	DHIRENDRA YADAV	PCE21CS047	Dogma soft limited	58, Sector 7 Malviya Nagar Rd, Palika Bazar, Siddharth Nagar, Sector 9, Malviya Nagar, Jaipur, Rajasthan 302017
47	DIVYA AGARWAL	PCE21CS049	learn and build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
48	DIVYANSHI GANDORIYA	PCE21CS050	Seldom India Technologies	B-33, basant vihar colony Gopalpura Bypass, Tonk Rd, above Brown Sugar, Gopalpura Mode, Jaipur, Rajasthan 302018
49	DIVYANSHU ATHWANI	PCE21CS051	LEARN AND BUILD	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
50	DIVYANSHU VAISHNAV	PCE21CS052	INTERNPE	New Sanganer Rd, Sanganer, Maruti Nagar, Jaipur, Rajasthan 302029
51	DOULI SUTHAR	PCE21CS053	Seldom India Technologies	B-33, basant vihar colony Gopalpura Bypass, Tonk Rd, above Brown Sugar, Gopalpura Mode, Jaipur, Rajasthan 302018
52	GARIMA KUNDNANI	PCE21CS054	Learn And Build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
53	GAURAV KUMAR ROY	PCE21CS055	Entrant Technology pvt. Ltd.	3rd Floor Bhamashah Techno Hub, Sansthan Path, Jhalana Gram, Jaipur, Rajasthan 302004

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54	GAURAV SHARMA	PCE21CS056	Devyut Softect Pvt Ltd	C, 5, Shanti Nagar Rd, Gujar Ki Thadi, Shanthi Nagar, Mansarovar, Jaipur, Rajasthan 302019
55	GAURAV SHARMA	PCE21CS057	Learn and Build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
56	GAURAV SINGH	PCE21CS058	Devyut Softech Pvt Ltd	C, 5, Shanti Nagar Rd, Gujar Ki Thadi, Shanthi Nagar, Mansarovar, Jaipur, Rajasthan 302019
57	GAUTAM GUPTA	PCE21CS059	Learn And Build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
58	GOKUL NARWANI	PCE21CS060	Learn And Build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
59	GOLU SAINI	PCE21CS061	Learn And Build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
60	GOURAV INDORA	PCE21CS062	DEVYUT SOFTECH PRIVATE LIMITED	C, 5, Shanti Nagar Rd, Gujar Ki Thadi, Shanthi Nagar, Mansarovar, Jaipur, Rajasthan 302019
61	HARSH SHARMA	PCE21CS063	Learn and Build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
62	HARSHAL NAMA	PCE21CS064	Zeetro Netwroks	48-49, 3rd floor, Tonk Rd, opp. Jaipur Hospital, Jai Ambey Nagar, Jaipur, Rajasthan 302018
63	HARSHIT GUPTA	PCE21CS065	Seldom India Technologies	B-33, basant vihar colony Gopalpura Bypass, Tonk Rd, above Brown Sugar, Gopalpura Mode, Jaipur, Rajasthan 302018
64	HARSHIT JAIN	PCE21CS066	Seldom India Technologies	B-33, basant vihar colony Gopalpura Bypass, Tonk Rd, above Brown Sugar, Gopalpura Mode, Jaipur, Rajasthan 302018
65	HARSHITA GUPTA	PCE21CS067	Grras Solution Pvt. Ltd.	House Price Prediction

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66	HEMANT GOUTAM	PCE21CS068	Seldom India Technologies	B-33, basant vihar colony Gopalpura Bypass, Tonk Rd, above Brown Sugar, Gopalpura Mode, Jaipur, Rajasthan 302018
67	HIMANSHI MATHUR	PCE21CS069	BMITCS pvt. ltd.	1st Floor, 51-A, Phool Colony, Gayatri Nagar 1st, Tonk Road, Sanganer, Jaipur, Rajasthan 302029, India
68	HIMANSHU RATHORE	PCE21CS070	Seldom Institute	B-33, basant vihar colony Gopalpura Bypass, Tonk Rd, above Brown Sugar, Gopalpura Mode, Jaipur, Rajasthan 302018
69	HONEY SAIN	PCE21CS071	9 Ethics Info solution	S-1, B-78, Avenue Heights, Maa Karni Nagar B, Panchyawala, Vaishali Nagar, Panchyawala, Jaipur
70	JATIN GURJAR	PCE21CS073	Entrant PVT. LTD.	3rd Floor Bhamashah Techno Hub, Sansthan Path, Jhalana Gram, Jaipur, Rajasthan 302004
71	JATIN SHARMA	PCE21CS074	Anurav Alliance PVT. LTD.	SK JANDIAL SHOPPING COMPLEX OPPOSITE SHANI MANDIR, DALHOUSIE ROAD , PATHANKOT, Punjab
72	JHALAK BORA	PCE21CS075	Learn and Build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019
73	KANIKA BANSAL	PCE21CS076	Matrix computers	10/564, Kaveri Path, opposite Kaveri Apartment, Mansarovar Sector 1, Mansarovar, Jaipur, Rajasthan 302020
74	KARISHMA	PCE21CS077	Learn and Build	Learn and Build, Metro Station, Head Office : Head Office Plot No. 6, 3rd Floor - Chase Tower Rajiv Vihar, Gopalpura Bypass Rd, opposite Metro Pillar No. 31, near Mansarovar, Jaipur, Rajasthan 302019

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Bodacious IT Hub Pvt. Ltd.

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Website : www.bodaciousithub.com, info@bodaciousithub.com

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Certificate

This is to certify that Aayush Sharma has completed the training for Core Java Technology (47% marks obtained) under the supervision of our staff members. Duration of the training was from 17 July 2023 to 28 September 2023

He / She has completed his / her training successfully and we are fully satisfied with his / her performance. We wish him / her bright future ahead.

Date : 10 October 2023

Signed by : Bijendra Bhati

Learn and Build
by TechieNest

CERTIFICATE

OF PROGRAM COMPLETION

LNBID : IN23F035984568

This Certificate is Proudly presented to

Aayushi Jain

who has successfully completed **45 Days Offline** Summer Training and Internship Program 2023 in **Full stack web development (MERN)** domain conducted by Learn and Build (LnB) from **15th May 2023**

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Founder & CEO

Dr. Mahesh Bundela
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Sitapura, JAIPUR

SELDOM
INDIA TECHNOLOGIES

CERTIFICATE OF COMPLETION

Certificate No: WS/4008

This is to certify that Abhay Jindal

of PCE, Jaipur

successfully completed Internship

on Android App development

During 31July23 to 15Sep23.

All the best.

SELDOM INDIA JAIPUR

Training Director
Seldom India

UAN RJ17D0087475

For Certificate Authenticity please contact us at CIC@SeldomIndia.com

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@intern PE

COMPLETION CERTIFICATE

CID : IPI#12213

To whomever it may concern

This is to certify that **Abhay Mittal** has worked as a Intern in our company from **24-July-2023 to 06- September-2023**

Please find the internship details below:

Company Name: InternPe
Location: Offline
Domain: Web Develpment
Designation: Intern

During their working period, we found him/her to be a sincere and dedicated intern with a professional attitude and very good knowledge of the job

We thank him/her for their efforts and contribution and wish him/her the best in future endeavors.

Yours Sincerely

(CEO)
InternPe

MICRO, SMALL & MEDIUM ENTERPRISES
सूक्ष्म, लघु एवं मध्यम उद्यम

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SELDOM
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CERTIFICATE OF COMPLETION

Certificate No: WS/4002

This is to certify that Abhay Singh

of PCM Jaipur

successfully completed Internship

on Web development

During 31Jul23 to 15Sep23.

All the best.

SELDOM INDIA JAIPUR

Training Director
Seldom India

UAN RJ17D0087475

For Certificate Authenticity please contact us at CIC@SeldomIndia.com

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P: +91 963 637 3959 E: hello@crazymedialabs.com
www.crazymedialabs.com

Date: 31st August, 2023

TO WHOMSOEVER IT MAY CONCERN

It is hereby certified that **Mr. Abhijeet Rai Dadhich**, has successfully completed his 30 days Internship program (From **1st August, 2023** to **31st August, 2023**) as Web Development Intern with CRAZY MEDIA LABS under the guidance of Mr. Abhinav Singh.

His internship assignment included Learning Basics of Web Development, creating web pages using HTML5, CSS3 & Bootstrap, Tailwind including basics of Javascript Framework.

We found him sincere, hardworking, inquisitive and result oriented. He worked well as part of a team during his tenure. We take this opportunity to thank him and wish him all the best for his future endeavors.

FOR CRAZY MEDIA LABS

CRAZY MEDIA LABS CML

YASHASWI GARG
Human Resource Manager

Dr. Mahesh Bundele
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Director
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Sitapura, JAIPUR

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CERTIFICATE
OF INTERNSHIP

LNBID : IN23PM88433023021

This Certificate is Proudly presented to

Abhinav Arora

who has participated in the **45 Days Offline** Summer Internship Program 2023 in **Full stack web development (MERN)** domain conducted by Learn and Build (LnB) from **01st Aug 2023**

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Founder & CEO

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CERTIFICATE

OF PROGRAM COMPLETION

LNBID : IN23PM88433693065

This Certificate is Proudly presented to

Abhishek Chopra

who has successfully completed **45 Days Offline** Summer Training and Internship Program 2023 in **Full stack web development (MERN)** domain conducted by Learn and Build (LnB) from **07th Aug 2023**

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Saurabh Bhardwaj
Founder & CEO

Dr. Mahesh Bundele
B.E. M.E. Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

CodeSpeedy Technology Private Limited

Certificate of Completion

This is presented to

Abhishek kumar

for submitting quality packets on CodersPacket.com
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Your contribution will always be helpful for developers all around the globe.
Your packets are available on this URL - https://coderspacket.com/contributor/abhishek32

Saruque Ahamed Mollick

Managing director
CodeSpeedy technology pvt. ltd
DIN Number:08380596

dated
26/08/2022 (DD/MM/YYYY)

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CERTIFICATE
OF INTERNSHIP

LNBID : IN23PM88433273039

This Certificate is Proudly presented to

Aditya Singh Gajawat

who has participated in the **45 Days Offline** Summer Internship Program 2023 in **Full stack web development (MERN)** domain conducted by Learn and Build (LnB) from **01st Aug 2023**

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Saurabh Bhardwaj
Founder & CEO

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LNBID : IN23PM88433273039

This Certificate is Proudly presented to

Aditya Singh Gajawat

who has successfully completed **45 Days Offline** Summer Training and Internship Program 2023 in **Full stack web development (MERN)** domain conducted by Learn and Build (LnB) from **01st Aug 2023**

in association with

Saurabh Bhardwaj
Founder & CEO

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

Learn and Build
by TechieNest

CERTIFICATE

OF PROGRAM COMPLETION

LNBID : IN23PM88433693060

This Certificate is Proudly presented to

Ajay Kumar Sharma

who has successfully completed **45 Days Offline** Summer Training and Internship Program 2023 in **Full stack web development (MERN)** domain conducted by Learn and Build (LnB) from **07th Aug 2023**

in association with

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Founder & CEO

Dr. Mahesh Bundele
B.E. M.E. Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

Learn and Build
by TechieNest

CERTIFICATE
OF INTERNSHIP

LNBID : IN23PM88499243475

This Certificate is Proudly presented to

Akshat Wadhera

who has participated in the **45 Days Offline** Summer Internship Program 2023 in **Full stack web development (MERN)** domain conducted by Learn and Build (LnB) from **01st Aug 2023**

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Founder & CEO

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

InTernPe
LET'S START

@internPE

COMPLETION CERTIFICATE

CID : IPI#12214

To whomever it may concern

This is to certify that **Aman Gupta** has worked as a Intern in our company from **24-July-2023 to 06- September-2023**

Please find the internship details below:

Company Name: InternPe
Location: Offline
Domain:C++ Programming
Designation: Intern

During their working period, we found him/her to be a sincere and dedicated intern with a professional attitude and very good knowledge of the job

We thank him/her for their efforts and contribution and wish him/her the best in future endeavors.

Yours Sincerely

(CEO)
InternPe

MSME
MICRO, SMALL & MEDIUM ENTERPRISES

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

Certificate *Of* Completion

This Is To Acknowledge That

Anand Soni

Has Satisfactorily Completed

Training: Python with Web Development

held on: 14th august 2023 - 07th october 2023

Grras/209274

Certificate No.

Gaurav Saluja
Director Grras Training Unit

Dr. Mahesh Bundele
B.E. M.E. Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

Learn and Build
by TechieNest

CERTIFICATE
OF INTERNSHIP

LNBID : IN23PM88434033086

This Certificate is Proudly presented to

Aniket Lohiya

who has participated in the **45 Days Offline** Summer Internship Program 2023 in **Full stack web development (MERN)** domain conducted by Learn and Build (LnB) from **07th Aug 2023**

in association with

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Saurabh Bhardwaj
Founder & CEO

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

SELDOM
INDIA TECHNOLOGIES

CERTIFICATE OF COMPLETION

Certificate No: WS/4078

This is to certify that Aniket Singh Gurjar

of PCE, Jaipur

successfully completed Internship

on Python

During 23 Aug 23 to 08 Oct 23.

All the best.

SELDOM INDIA JAIPUR

Training Director
Seldom India

UAN RJ17D0087475

For Certificate Authenticity please contact us at CIC@SeldomIndia.com

Jaipur :
27, Kailash Puri, Near Khandaka Hospital, Tonk Road,
Jaipur, Rajasthan-302018 Phone : +91-9413 240 301

Delhi :
K-108/109, Street #2, Mangal Bazar, Laxmi Nagar, Delhi-110091
Phone : +91-11-22015681, 22425681, 9911335681

www.seldomindia.com
cic@seldomindia.com
info.seldomindia@google.co
seldomindia

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-9, RIICO Institutional Area
Sitapura, JAIPUR

Learn and Build
by TechieNest

CERTIFICATE
OF INTERNSHIP

LNBID : IN23PM884360632

This Certificate is Proudly presented to

Anirudh Singh

who has participated in the **45 Days Offline** Summer Internship Program 2023 in **Full stack web development (MERN)** domain conducted by Learn and Build (LnB) from **07th Aug 2023**

in association with

Saurabh Bhardwaj
Founder & CEO

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

Appic Softwares

Date: 11/September/2023

Internship Certificate

TO WHOM SO EVER IT MAY CONCERN,

This is to certify that **Mr. Anish Gupta** was **interned** by our company during the period starting from **26th July 2023 to 11th September 2023**.

He was at under training in the post of **Web Development (HTML, CSS)** for the time he has given working with us, he demonstrated as a diligent and truthful person.

His learning skills were good and appraised by our staff.

We wish him every success in life.

HR Department

www.appicsoftwares.com

+91 9588080762

hr@appicsoftwares.com

Appic Software Development LLP

11/61 Madhyam Marg, Kaveri Path,
Mansarovar Sector 1, Mansarovar,
Jaipur, Rajasthan 302020

Learn and Build
by TechieNest

CERTIFICATE
OF INTERNSHIP

LNBID : IN23PM88433863073

This Certificate is Proudly presented to

Anjali Bari

who has participated in the **45 Days Offline** Summer Internship Program 2023 in **Full stack web development (MERN)** domain conducted by Learn and Build (LnB) from **07th Aug 2023**

in association with

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Founder & CEO

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

SELDOM
INDIA TECHNOLOGIES

CERTIFICATE OF COMPLETION

Certificate No: WS/4018

This is to certify that Anjna

of PCE, Jaipur

successfully completed Internship

on Web development

During 31 July 23 to 15 Sep 23.

All the best.

SELDOM INDIA JAIPUR

Training Director
Seldom India

UAN RJ17D0087475

For Certificate Authenticity please contact us at CIC@SeldomIndia.com

Jaipur :
27, Kailash Puri, Near Khandaka Hospital, Tonk Road,
Jaipur, Rajasthan-302018 Phone : +91-9413 240 301

Delhi :
K-108/109, Street #2, Mangal Bazar, Laxmi Nagar, Delhi-110091
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+91 9413 240 301
seldomindia
@SeldomIndia

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

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TECH AGE AT YOUR PLACE

Head Office: - 3rd Floor, PR Tower, Near Jagatpura Flyover, Jaipur-302017
Contact: +91-9782940488 | +91-7733909090
Website: www.aaronsoftech.com
Email: Hello@aaronsoftech.com

Ref. No. Aaron / Cademate / Training / 2022-23 / ASCMT2955
Date: 4 September 2023

ANKIT PARAKH
102/20 Sector 10, Kumbha Marg, Jaipur, Rajasthan.

TO WHOM IT MAY CONCERN

This is to certify that Mr. **Ankit Parakh ,** Student of **Poornima College Of Engineering, Jaipur** has successfully completed a summer internship in the field of Python with Machine learning from 17 July 2023 to 2 September 2022 under guidance of **Mr. Rahul Dadhich .** During the period of his internship program with us, he has been exposed to different processes and was found diligent, hardworking and inquisitive.

We wish him every success in his life and career.

For ***Aaron softech private limited, Jaipur***

Authorized Signatory

AARON SOFTECH PVT. LTD. ★ JAIPUR

Meenu

Meenu Swami
HR Manager

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

KISTECHNOSOFTWARE
Revolutionary Step for Revolutionary Business

REF:KTSPL/IS-MSD/Aug/23/76

CERTIFICATE

FOR INTERNSHIP

THIS IS CERTIFY THAT

Ms. Anubhooti Nagar

Was in our company as an Position on **Mern Stack Developer**
on
27 July 2023 **to** 10 September 2023

22-Sep-2023
DATE

KISTECHNO SOFTWARE PVT. LTD. JAIPUR

(Founder & Director)

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

CERTIFICATE
OF INTERNSHIP

THE FOLLOWING AWARD IS GIVEN TO

Arya Sethi

This is to certify that she has completed 45 days Internship (starting July 2023) at DURANZ. Company acknowledges her valueable contributions. We wish her luck.

DURANZ
COMPANY

KUNAL DURAN
OWNER

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

CERTIFICATE
OF INTERNSHIP

THE FOLLOWING AWARD IS GIVEN TO

Aryan Jain

This is to certify that he has completed 45 days Internship (starting July 2023) at DURANZ.
Company acknowledges his valueable contributions. We wish him luck.

DURANZ
COMPANY

KUNAL DURAN
OWNER

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
Isire Tuli Cl, Institutional Area
Sitapura, JAIPUR

@intern PE

COMPLETION CERTIFICATE

CID:IPI#12240

To whomever it may concern

This is to certify that Aryan Pareek has worked as intern in our Company from 24-July-2023 to 06- September-2023

Please find the Internship details below:

Company Name: InternPe

Location: Offline

Domain: Python Developer

Designation: Intern

During their working period, we found him/her to be a sincere and dedicated intern with a professional attitude and very good knowledge of the job

We thank him/her for their efforts and contribution and wish him/her the best in future endeavors.

Your Sincerly

(CEO)
InternPe

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Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

@intern PE

COMPLETION CERTIFICATE

CID:IPI#12240

To whomever it may concern

This is to certify that Ashu Garg has worked as intern in our Company from 24-July-2023 to 06- September-2023

Please find the Internship details below:

Company Name: InternPe

Location: Offline

Domain: Python Developer

Designation: Intern

During their working period, we found him/her to be a sincere and dedicated intern with a professional attitude and very good knowledge of the job

We thank him/her for their efforts and contribution and wish him/her the best in future endeavors.

Your Sincerly

(CEO)
InternPe

MICRO, SMALL & MEDIUM ENTERPRISES
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Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

Outstanding Performance Award

PRESENTED TO

Avani Agarwal

We appreciate your commitment to going above and beyond what is expected of you. Your consistent high level of performance is a testament to your abilities and professionalism. Your dedication, diligence, and quick learning ability in applying your knowledge have set you apart as a model intern. We congratulate you on this outstanding achievement and look forward to seeing more of your exceptional work in the future.

Congratulations!!

DATE: July 2023

noqs.in/

ADIT AGARWAL

Founder, NoQs Digital

Dr. Mahesh Bundele

B.E., M.E., Ph.D.

Director

Poornima College of Engineering

ISI-9, RIICO Institutional Area

Sitapura, JAIPUR

Learn and Build
by TechieNest

CERTIFICATE
OF INTERNSHIP

LNBID : IN23F2242019703

This Certificate is Proudly presented to

Avinash Jat

who has participated in the **45 Days Offline** Summer Internship Program 2023 in **Full stack web development (MERN)** domain conducted by Learn and Build (LnB) from **21th July 2023**

in association with

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Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

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CERTIFICATE
OF INTERNSHIP

LNBID : IN23PM88434563123

This Certificate is Proudly presented to

Ayush Jindal

who has participated in the **45 Days Offline** Summer Internship Program 2023 in **Full stack web development (MERN)** domain conducted by Learn and Build (LnB) from **07th Aug 2023**

in association with

Bhardwaj
Founder & CEO

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

InTernPe
LET'S START

@intern PE

COMPLETION CERTIFICATE

CID : IPI#12217

To whomever it may concern

This is to certify that **Ayushi Agrawal** has worked as a Intern in our company from **24-July-2023 to 06- September-2023**

Please find the internship details below:

Company Name: InternPe
Location: Offline
Domain: C++ Programming
Designation: Intern

During their working period, we found him/her to be a sincere and dedicated intern with a professional attitude and very good knowledge of the job

We thank him/her for their efforts and contribution and wish him/her the best in future endeavors.

Yours Sincerely

(CEO)
InternPe

MSME
MICRO, SMALL & MEDIUM ENTERPRISES
सूक्ष्म, लघु एवं मध्यम उद्यम

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

InternPe

@intern PE

COMPLETION CERTIFICATE

CID : IPI#12221

To whomever it may concern

This is to certify that **Bhanu Bansal** has worked as a Intern in our company from **24-July-2023 to 06- September-2023**

Please find the internship details below:

Company Name: InternPe
Location: Offline
Domain: C++ Programming
Designation: Intern

During their working period, we found him/her to be a sincere and dedicated intern with a professional attitude and very good knowledge of the job

We thank him/her for their efforts and contribution and wish him/her the best in future endeavors.

Yours Sincerely

(CEO)
InternPe

MSME

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

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by TechieNest

CERTIFICATE
OF INTERNSHIP

LNBID : IN23PM88433023021

This Certificate is Proudly presented to

BHAVIK LOUNGANI

who has participated in the **45 Days Offline** Summer Internship Program 2023 in **Full stack web development (MERN)** domain conducted by Learn and Build (LnB) from **01st Aug 2023**

in association with

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Founder & CEO

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

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CERTIFICATE

OF PROGRAM COMPLETION

LNBID : IN23PM88434463115

This Certificate is Proudly presented to

Bhavya Natani

who has successfully completed **45 Days Online** Summer Training and Internship Program 2023 in **Java Core** domain conducted by Learn and Build (LnB) from **07th Aug 2023**

in association with

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Saurabh Bhardwaj
Founder & CEO

Dr. Mahesh Bundele
B.E. M.E. Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

KISTECHNOSOFTWARE
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REF:KTSPL/IS-MSD/JULY/23/75

CERTIFICATE

FOR INTERNSHIP

THIS IS CERTIFY THAT

Ms. Charul Tongaria

Was in our company as an Position on **Mern Stack Developer**
on
27 July 2023 **to** 10 September 2023

22-Sep-2023
DATE

KISTECHNO SOFTWARE PVT. LTD. JAIPUR

(Founder & Director)

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

LnB
Learn and Build
by TechieNest

CERTIFICATE
OF INTERNSHIP

LNBID : IN23PM8843013020

This Certificate is Proudly presented to

Chetan Sharma

who has participated in the **45 Days Offline** Summer Internship Program 2023 in **Full stack web development (MERN)** domain conducted by Learn and Build (LnB) from **01st Aug 2023**

in association with

CIMET COGNUS dcs+ metacube

Saurabh Bhardwaj
Founder & CEO

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

CERTIFICATE
OF INTERNSHIP

THE FOLLOWING AWARD IS GIVEN TO

Chinmay Jain

This is to certify that he has completed 45 days Internship (starting July 2023) at DURANZ.
Company acknowledges his valueable contributions. We wish him luck.

DURANZ
COMPANY

KUNAL DURA
OW

Dr. Mahesh Bundele
B.E. M.E. Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

Certificate no. - 001034

THE INTERN BAY

CERTIFICATE

OF ACHIEVEMENT

This is certify that

Date:- 14/09/2023

Deepak Kambalwal

from **"Poornima College of Engineering"** has completed 45 days offline training in **"Web Development"** demonstrating the proficiency in 'HTML,CSS,Javascript from **THE INTERN BAY.** He has done 'Select Box' as minor project and 'Portfolio' as major project.

Ayush Garg
CEO, The Intern Bay

★ ★ ★ ★ ★

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
191-B, RIICO Institutional Area
Sitapura, Jaipur

Learn and Build
by TechieNest

CERTIFICATE
OF INTERNSHIP

LNBID : IN23PM88433023021

This Certificate is Proudly presented to

DEEPENDRA SHARMA

who has participated in the **45 Days Offline** Summer Internship Program 2023 in **Full stack web development (MERN)** domain conducted by Learn and Build (LnB) from **01st Aug 2023**

in association with

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Founder & CEO

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

@internPE

COMPLETION CERTIFICATE

CID : IPI#12212

To whomever it may concern

This is to certify that **Deepesh Gupta** has worked as a Intern in our company from **24-July-2023 to 06- September-2023**

Please find the internship details below:

Company Name: InternPe
Location: Offline
Domain:Web Development
Designation: Intern

During their working period, we found him/her to be a sincere and dedicated intern with a professional attitude and very good knowledge of the job

We thank him/her for their efforts and contribution and wish him/her the best in future endeavors.

Yours Sincerely

(CEO)
InternPe

MICRO, SMALL & MEDIUM ENTERPRISES

www.internpe.in

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
RIICO Institutional Area
Sitapura, JAIPUR

@intern PE

COMPLETION CERTIFICATE

CID : IPI#12225

To whomever it may concern

This is to certify that **Devansh Khanduja** has worked as a Intern in our company from **24-July-2023 to 06- September-2023**

Please find the internship details below:

Company Name: InternPe
Location: Jhotwara, Jaipur
Domain:Android Development
Designation: Intern

During their working period, we found him/her to be a sincere and dedicated intern with a professional attitude and very good knowledge of the job

We thank him/her for their efforts and contribution and wish him/her the best in future endeavors.

Yours Sincerely

(CEO)
InternPe

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Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

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REF:KTSPL/IS-MSD/JULY/23/74

CERTIFICATE

FOR INTERNSHIP

THIS IS CERTIFY THAT

Ms. Devanshi Sikhwal

Was in our company as an Position on **Mern Stack Developer**
on
27 July 2023 **to** 10 September 2023

22-Sep-2023
DATE

KISTECHNO SOFTWARE PVT. LTD. JAIPUR

(Founder & Director)

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

PERTH ENTERPRISES

GSTIN: 08HZQPS5132H1ZQ

Ref. No.

TO WHOM SO EVER IT MAY CONCERN

Date 1-10-23

This is to certify that the student Mr. Devanshu Saini of Computer Science Engineering (CSE) department of Poornima College of Engineering (Jaipur, RAJASTHAN) has satisfactorily completed his internship in "Web Development" during the period 1 Aug 2023 to 20 September 2023 under our guidance. We sincerely appreciate his efforts.

1-10-23

Plot No 14, Vijay Nagar, Near Ambkia Dharam Kanta,
Sinwar Mode, Bindayaka, Jaipur 302012
commercial@perthent.in
9571813964
www.perthenterprises.in

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

BLUE SPACE

Dev Shree Bhati

Intern

Date: 16 September, 2023

This is to formally certify that Ms.Dev Shree Bhati A student from the esteemed Poornima College of Engineering Jaipur, pursuing B.Tech , has successfully completed an internship in **Full Stack Web Development** at Blue Space, Jaipur**.**

The internship spanned a period of 45 days, commencing on 1 August 2023 and concluding on 15 September 2023.

She has successfully completed the Internship under the supervision of Mr. Harshit Meena, Project Manager, Blue Space, Jaipur.

We here by acknowledge her efforts and accomplishments during her tenure with us and wish her every success in her future endeavors.

For Blue Space Professionals Pvt. Ltd.

Authorised Signatory

Harshit Meena
Project Manager

Yashkrit Marwal
Department Head

+91 8306013130 info@bluespaceweb.com Jagatpura, Jaipur.

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-9, RIICO Institutional Area
Sitapura, JAIPUR

The Dogma Soft

Dogma Soft Limited

ग्राहक नहीं दोस्त बनाते हैं हम™

Reg. No.: U72200RJ2011PLC36378

9/58, Palika Bazar, Malviya Nagar, Jaipur
www.dogmaindia.com | info@dogmaindia.com +91 97842 50289

Ref. No. Dogma/2023/IC/22

Date 27/05/2023

589

Internship Offer Letter

Dear Mr. Manish Dubey (HOD), This is to confirm that Dogma Soft Limited is offering Dhirendra Yadav an internship position Trainee beginning 01-07-2023 and ending 15-08-2023. This employment will responsible to serve as a curricular practical training (CPT) which is associated with the academic program at the Pornima College of Engineering at Jaipur.

The location of the internship assignment will be 9/58, Palika Bazar, Malviya Nagar, Jaipur, Rajasthan (India) -302017. Your internship manger will be Mr. Vipul Singhadiya. You will be expected to work for 8 Hours. Your employment identification number is Dogma/2023/IC/01.

On behalf of Dogma Soft Limited, I am pleased to inform you that management will view his performance continuously during his training period of learning and research.

Dogma Soft Limited Jaipur

Jitendra Yadav
27/5/23

Jitendra Yadav
Dogma Soft Limited

Dr. Mahesh Bundele
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Plant Disease Detection

A Project report submitted in partial fulfillment of requirements
of the award of the degree of

Bachelor of Technology
in

Computer Engineering

by

Harshita Gupta, PCE21CS067
Dhirendra Yadav, PCE21CS047
Divya Agarwal, PCE21CS049
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under the guidance of

Ms. Sonam Gour, Assistant Professor

(Session 2022-23)

Department of Computer Engineering

Poornima College of Engineering

ISI-6, RIICO Institutional Area, Sitapura, Jaipur – 302022

December, 2023

Department Certificate

This is to certify that Mr. Dhirendra Yadav, registration no. PCE21CS047, of the Computer Science Department of Computer Engineering, has submitted this project report entitled "Plant Disease Detection " under the supervision of Sonam Gour , working as Assistant Professor in department of Computer Engineering as per the requirements of the Bachelor of Technology program of Poornima College of Engineering, Jaipur.

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CANDIDATE'S DECLARATION

I hereby declare that the work which is being presented in this project report entitled "Plant Disease Detection" in the partial fulfilment for the award of the Degree of Bachelor of Technology in (Computer Engineering), submitted in the Department of Computer Engineering, Poornima College of Engineering, Jaipur, is an authentic record of my own work done during the period from January 2023 to July 2023 under the supervision and guidance of Ms. Sonam Gour.

I have not submitted the matter embodied in this project report for the award of any other degree.

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Name of Candidate: Harshita Gupta Registration no.: PCE21CS067	Name of Candidate: Divya Agarwal Registration no.: PCE21CS049
Signature	Signature
Name of Candidate: Dhirendra Yadav Registration no.: PCE21CS047	Name of Candidate: Abhay Singh Rathore Registration no.: PCE21CS005
Signature	
Name of Candidate: Anubhooti Nagar Registration no.: PCE21CS025	

Dated: -17/07/2023

Place: Jaipur

SUPERVISOR'S CERTIFICATE

This is to certify that the above statement made by the candidate is correct to the best of my knowledge.

(Signature)
Sonam Gour
Assistant Professor

Dated:17/07/2023

Place: Jaipur

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I would like to express my deep sense of gratitude towards management of Poornima College of Engineering including **Dr. S. M. Seth**, Chairman Emeritus, Poornima Group and former Director NIH, Roorkee, **Shri Shashikant Singhi**, Chairman, Poornima Group, **Mr. M. K. M. Shah**, Director Admin & Finance, Poornima Group and **Ar. Rahul Singhi**, Director Poornima Group for establishment of institute and providing faculties my studies.

I would like to take the opportunity of expressing my thanks to all faculty members of the Department, for their kind support, technical guidance, and inspiration throughout the course.
I am deeply thankful to my parents and all other family members for their blessings and inspiration. At last but not least I would like to give special thanks to God who enabled me to complete my dissertation on time.

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Abstract

Horticulture assumes a significant part in non-industrial nations like India, but the food security actually stays an essential issue. The greater part of the harvests get squandered because of absence of storeroom, transportation, and plant illnesses. Over 15% of the yields get squandered in India because of illnesses and subsequently it has become one of the main issue to be settled. There is a need of programmed framework that can recognize these sicknesses and assist ranchers with finding a way proper ways to dispose of harvest misfortune. Ranchers have followed the traditional strategy for recognizing the plant illness with their unaided eyes, and it unrealistic for every one of the ranchers to distinguish these infections the same way. With the development in Man-made reasoning, there is a need to consolidate the offices of the PC vision in the field of horticulture. Profound Learning rich libraries and client as well as designer agreeable climate to work with, this multitude of characteristics make Profound Advancing as the positive technique to get everything rolling with this issue. In this paper we have utilized Profound Learning in view of the benefits it offers to work with pictures particularly in picture arrangement to obtain ad libbed results. The technique incorporates taking leaves of tainted harvests and name them according to the illness design. The pictures of contaminated leaves are handled pixel based activities are applied to work on the data from the picture. As a subsequent stage include extraction is done trailed by picture division and at the last order of harvest sicknesses in light of the examples removed from the unhealthy leaves. The CNN (Convolutional Brain Organization) is utilized for the arrangement of infections, for the exhibit reason the public dataset is utilized comprising of around 87 K pictures (RGB type pictures) including solid as well as ailing leaves. The goal is to become mindful of different plant diseases with the guide of looking at depictions. we can unequivocally analyze the plant pollution by utilizing the CNN set of rules. The exactness results uncover that this form is progressed to any conventional edge.

CHAPTER 1
INTRODUCTION

Plant disorder has a connection to issues with agricultural sustainability. unexpected farming techniques may also purpose bacteria to become blocked, as a result lowering their ability to react. one of the pillars of accuracy in agribusiness is the right and sure discovery of plant illnesses. with the intention to improve creation on this increasing greenhouse medium, good enough and effective plant/leaf infection prognosis along with activate aversion is never genuinely been greater necessary. it is vital to prevent useless abuse of cash and other belongings.

some illnesses have signs and symptoms which might be either now not straight away great or end up apparent whilst it's far too overdue to take action, wherein case an intensive study is needed. In any occasion, the majority of diseases reason a few forms of outward manifestation in the obvious variety; therefore, an educated professional's eye inspection is an exceptional method to become aware of a plant infection. For a plant scientist to diagnose a plant contamination accurately, they need to own advanced perception abilities that permit them to apprehend special facet consequences. variations in incidental reactions seen in diseased leaves ought to bring about a short judgment seeing that less experienced groundskeepers and experts may discover it more difficult to make a dedication than a skilled plant scientist. To pick out plant diseases, colour thresholding and analysis have been digital image processing approaches that were used.

PLANT DISEASES ANALYSIS AND ITS SYMPTOMS

Following are a few commonplace symptoms and symptoms of fungal, bacterial and viral plant leaf sicknesses.

1) Bacterial disorder signs and symptoms: The disease is characterised by means of the use of tiny
dwindled inexperienced spots which quickly come into view as water- soaked. The lesions growth
and then appear as dry vain spots as validated in Fig. 1.

2) Viral disorder symptoms: amongst all plant leaf sicknesses, the ones as a result of viruses are the
most difficult to diagnose. Viruses produce no telltale signs and symptoms that may be without issues located and frequently effortlessly pressured with nutrient deficiencies and herbicide injury.

Aphids, leafhoppers, whiteflies and cucumber beetle's insects are common carriers of this disease,
e. g. Mosaic Virus, search for yellow or inexperienced stripes or spots on foliage, as proven in Fig. 2.
Leaves might be wrinkled, curled and growth can be stunted.




Fig1.Bacterial disease on leaf Fig2.Viral disease on leaf Fig3.Fungal disease on leaf-downy mildew

3) Fungal sickness signs and symptoms: Plant leaf sicknesses, the ones caused by fungus are discussed underneath and tested in Fig. three., Fig. four. & Fig. 5. e. g. past due blight because of the fungus Phytophthora infesters is proven in Fig. four. It first seems on lower, older leaves like water-soaked, grey-green spots. when fungal ailment matures, the ones spots darken after which white fungal boom bureaucracy on the undersides. Early blight is as a result of the fungus Alternaria solani proven in Fig. 5. It first seems at the lower, older leaves like small brown spots with concentric earrings that shape a bull eye sample. while disease matures, it spreads outward on the leaf floor causing it to show yellow. In downy mold yellow to white patches on the top surfaces of older leaves happens. the ones regions are included with white to greyish on the undersides as demonstrated in Fig. 3

Fig4. Fungal disease on leaf-late blight

Fig5. Fungal disease on leaf-early blight

CHAPTER 2 PROBLEM STATEMENT & OBJECTIVE

"To Detect diseases on leaves of the plant and recommend the pesticide as per the types of diseases to Former"

To beat the above issues, analysts have thought about a few arrangements. Different kinds of capabilities can be utilized in AI for the order of plant sicknesses. Among these, the most wellknown include sets are customary handmade and profound learning (DL)- based highlights. Preprocessing, like picture improvement, variety change, and division, is an essential before effectively separating highlights. After highlight extraction, various classifiers can be utilized. A few famous classifiers are K-closest neighbor (KNN), support vector machine (SVM), choice tree, irregular backwoods (RF), naive Bayes (NB), calculated relapse (LR), rule age, fake brain organizations (ANNs), and Profound CNN.

Profound Convolutional Brain Organization is used in this review to distinguish tainted and sound leaves.as well as to recognize ailment in burdened plants. The CNN Model is intended to suit both sound and wiped out leaves; photographs are utilized to prepare the model, and the still up in the air by the info leaf.

- Objectives: -

    - To determine how the greater environment interacts with the host plants and disease-causing organisms.
    - To identify various diseases in plants.

To put into practice a technique for illness prevention and offering management for lowering the losses/damages brought on by diseases.

To identify plant diseases, various convolutional neural network (CNN) architectures including InceptionV3, InceptionResNetV2, MobileNetV2, and EfficientNetB0 are used illnesses based on photos of healthy and sick leaves.

CHAPTER 3 LITERATURE REVIEW

Summary-

- In paper [1], The creator depicted an in-field programmed wheat sicknesses determination framework in view of a week after week directed profound learning structure, I. e. profound different occurrence realizing, which accomplishes a distinguishing proof for wheat sicknesses and limitation for illnesses region with just picture level comment for preparing pictures in wild circumstances.

- In paper [2], The maker inspected and played out an investigation of 40 assessment tries that use significant learning techniques, applied to various green and food creation challenges. Dissect the agricultural issues under study, the specific models and frameworks used by the sources, the nature and preprocessing of data used, and the overall show achieved by the Matric used at each work under study.

- In paper [3], The author discussed convolutional neural network models that were developed to perform plant diseases detection and diagnosis using simple leaves images of healthy and diseased plants, through deep learning methodologies, Training of the models was performed with the use of an open database of 87,848 images, containing 25 different plants in a set of 58 distinct classes of [plant, disease] combinations, including healthy plants.

- In paper [6], The author provides an in-depth review of image processing techniques used for plant disease detection and diagnosis. It covers various image processing methods, such as image segmentation, feature extraction, and classification algorithms, employed to identify and differentiate healthy and infected plants based on leaf images. The authors compare the performance of different techniques and discuss their potential in practical applications.

- In paper [7], the author presents a comprehensive review of machine learning techniques for plant disease detection. It covers a wide range of machine learning algorithms, including SVM, k-NN, decision trees, and ensemble methods, applied to classify plant diseases. The authors discuss the advantages and limitations of each approach and provide insights into the performance of different classifiers based on the available datasets. They also discuss the challenges and future prospects of using machine learning in this field.

- In paper [8], the author focuses on the use of hyperspectral imaging for plant disease detection. The authors explore the principles and advantages of hyperspectral imaging in capturing spectral information for early disease detection. They discuss the spectral signatures associated with various plant diseases and present case studies where hyperspectral imaging has been successfully applied for disease diagnosis. The paper also highlights the challenges and potential future applications of this technology in precision agriculture.

- In paper [9], the author presents an extensive survey of deep learning techniques applied to various agricultural tasks, with a specific focus on plant disease detection using image classification. The authors explore different CNN architectures, including AlexNet, VGG, Inception, and ResNet, and their performance in detecting plant diseases. The paper also discusses the challenges and opportunities of using deep learning in agriculture and emphasizes the importance of large-scale datasets for model training.

Overall, these research papers provide valuable insights into the state-of-the-art techniques and methodologies used in plant disease detection projects. They cover various aspects, including deep learning, image processing, machine learning, and sensor-based technologies, offering a comprehensive understanding of the advancements and challenges in this critical area of agricultural research.

So on for all the papers….

Comparison Table

S.No	Paper title	Author's Name	Publication &Year	Approach used	Finding	S/w and H/w Required
1	Plant Disease Detection and Classification by Deep Learning	Shivkumar Badge et.al.[27]	UCSMC 2015	K-means clustering, SGDM Matrix Generation, Texture Statistics Computation, Color Cooccurrence Method, Artificial neural networks	The main goal of the research work is to increase the efficiency of the disease detection technique	——
2	Using Deep Learning for Image-Based Plant Disease Detection	Aydin Kaya et. al[28]	ELSEVIER 2019	End-to-end CNN, cross-dataset finetuning, Deep Learning features	This paper proposes a method of classification of plant species using automated plant identification systems	——

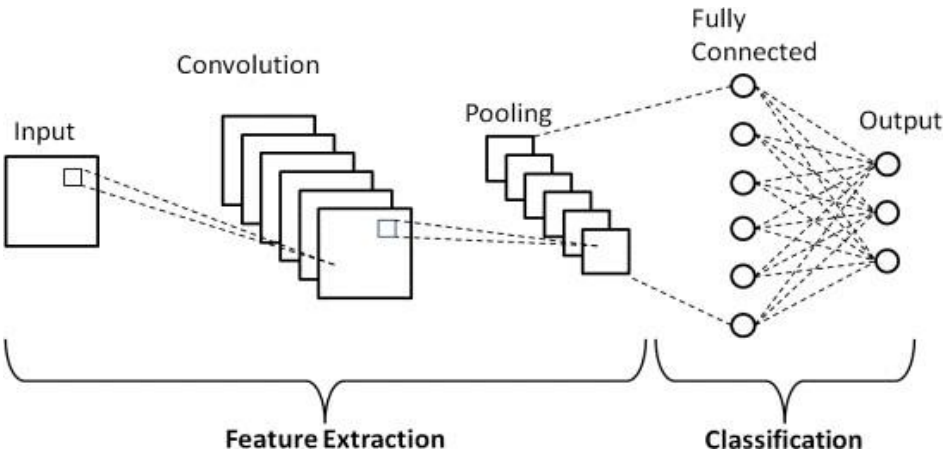
3	A Literature Review on the Detection of Plant Disease	Md.Nazrul islam et.al[29]	ICETE 2012	Genetic Algorithm(GA) and Probabilistic Neural Network (PNN).	Develop a computer vision-based recognition system automated disease detection and classification approach for plant leaves by analyzing the quality of GA and PNN	

4	Plant Diseases Recognition from Digital Images using Multichannel Convolutional Neural Networks	Stdian Stadoievic et.al[30]	Hindawi 2016	Neural Network Training, Fine-Tuning	This paper proposes a method to recognize plant disease using leaf image classification with Deep Neural Networks	——
5	Soybean Plant Disease Identification Using Convolutional Neural Network	Chia-lin Chung et .al[35]	IJCSIT 2018	Machine Learning Technique, SVM	Works in the world of agriculture on the importance of data mining techniques	——

6	A review on plant disease detection and diagnosis using image processing techniques	Meena, Priyanka, A.K. Panchal	JETIR 2017	Image Processing Techniques	This research paper provides an in-depth review of image processing technique used for plant disease detection and diagnosis	____
7	Machine Learning Techniques for plant disease detection: A review	Sladojevic, Srdjan, et al.	CMPB 2017	ML Algorithms, SVM, k-NN, Decision trees	This paper presents a comprehensive review of machine learning techniques for plant disease detection	____
8	Advances in hyperspectral imaging for plant disease detection	Mahlein, Anne-Katrin, et al.	ABR 2018	Hyperspectral imaging	This research paper focuses on the use of hyperspectral imaging for plant disease detection.	_____
9	A survey of deep learning techniques for image classification in agriculture	Mohanty, Sharada Prasanna, et al.	Big data Analytics in Agriculture, 2020	Deep Learning, CNN Architecture, AlexNEt, VGG, ResNEt	This paper presents an extensive survey of deep learning techniques applied to various agricultural tasks, with a specific focus on plant disease detection using image classification	____

CHAPTER 4
PROPOSED APPROACH

An online application that can recognize plant illness is something we are fostering. The goal is to identify various plant infections by looking at pictures. Since we are dealing with image data in this project, deep learning is what we are using. Convolution neural networks, which are a component of deep learning, are used to extract characteristics from plant leaves. We can precisely diagnose the plant illness by using the CNN Algorithm. A highly well-liked deep learning method called CNN involves robustly training many layers. It has been found to be quite effective and is also the one that computer vision programs use the most. CNN may be used to build a computational structure that processes chaotic picture inputs and converts them into the appropriate categorization output categories. In our work, a structure for this method has been created.



The goal is to identify various plant diseases by looking at photographs. In the online program

1) Client should be able to upload an image of an infected plant leaf from their device

2) CNN Model should be able to detect plant infection.

The client will then be given the name of the plant illness and some prevention advice, as well as recommendations for supplements and fertilizers.

Area of Leaf:

On this basis, the district of coin is taken into consideration. Change the apparent distance between the coin and the computerized camera and hold onto an image. Rarely, a one rupee coin with the following region is picked as the reference: Area of coin = (d/2) 2, where "d" is the coin's diameter. = π (2.5 cm/2) 2 = 4.9063 cm2 Convert this coin's shading image to grayscale to get a picture that is twice as similar. Calculate the number of pixels that make up the coin's area. assuming the coin in the image has a 148 pixel matter, then 1 pixel price equals a coin's surface area per pixel, which is 4.9063/148, or 0.03315 cm2. Think of the leaf example. maintain a same perceived distance from the coin instance. Transform the color image into its grayscale counterpart. to determine the number of pixels involving the leaf's area, convert to pairs. If we assume that the area of the leaf has a pixel count of 3724, then the area of the leaf equals the pixel count number times the cost of one pixel, or 3724 * zero.03315, or 123.4506 cm2.

Grayscale conversion algorithm:

Step 1: Start

Step 2: Capture Leaf Images Step

Step 3: Convert Color Image to Grayscale Step

Step 4: Convert Grayscale to Binary Step

Step 5: Count the number of pixels around the leaf Step

Step 6: Multiply Pixel Count by Pixel Value Step

Step 7: Compare with database image

Step 8: Stop

CANNY edge detection technology:

Below are the steps of the smart edge detection algorithm. The algorithm runs in five separate steps.

1. Smoothing: To eliminate noise, blur the image.
2. Find Gradient: We need to mark the edges of the image where the magnitude of the gradient is large.
3. Non-maximal suppression: Only local maxima should be marked as edges.
4. Double Thresholding The edges of the image with significant gradients must be highlighted.
5. Edge tracking with hysteresis: The final edge is determined by suppressing all edges that are not connected to a very distinct (strong) edge.
6. Smart detection: Operators with intelligence perform tasks in stages. The image is then smoothed, and a straightforward 2-D first derivative operator is used to highlight areas of the image with high first spatial derivatives.
7. The gradient is each direction's first derivative of the image. This suppression level is not maximal. The central difference method can be used to compute the slope.

$\partial X(x,y)=[(x+1,y)-(x-1,y)]/2$
$\partial Y(x,y) = [(x,y+1)-(x,y\_1)] /2$

8. Gradient amplitudes are used in non-maximum suppression techniques on both the vertical and horizontal axes.

The size can be calculated as follows: Size=($\partial X(x)$ *$\partial X(y)$+ $\partial Y(x)$* $\partial Y(y)$) edge histogram Each sheet has its own edge characteristics. The edges of leaves can be wavy, smooth, or serrated. Additionally dissimilar are the leaf vein patterns and the midrib direction. I therefore extract this information using this approach. This uses the Canny edge detection technique.

algorithm:

Step 1: Start
Step 2: Capture Leaf Images
Step 3: Convert Color Image to Grayscale
Step 4: Apply the Canny Edge Detection Algorithm
Step 5: Calculate Histogram Method for detecting plant diseases.

Identification of plant leaf disease involves five crucial procedures. Images are gathered for processing using a digital camera or the internet, which includes picture improvement, segmentation, feature extraction, and classification. Affected and helpful zones are divided during image preprocessing. Finally, plant leaf diseases are found to exist. He started by taking a leaf sample and taking an RGB photograph of it. Here are some detailed suggestions:

RGB image capture

1) Convert the input image to color space
2) Segment your components
3) Get useful segments
4) Compute texture features
5) Configure a neural network for detection

A. *Image acquisition:* First, digital camera photographs of several leaves were obtained at the necessary resolution to enhance quality. Clearly, the structure of the image database depends on the application. The image database itself enhances the classifier's effectiveness and controls the algorithm's robustness.

B. Image preprocessing: Preprocessing this image in order to improve the image data is the second stage. This reduces undesirable distortions and enhances image characteristics that are crucial for subsequent processing and analysis tasks. This comprises picture augmentation, image segmentation, and color space conversion. First, his HSI color space is represented by her RGB image of some leaves. Color spaces are designed to make it simpler to express colors in a uniform, widely recognized manner. Because it is based on how people perceive color, the HSI (Hue, Saturation, Intensity) color model is well-liked (Gonzalez and Woods, 2008). Hue is

an aspect of color that relates to the prevailing color that an observer perceives. Intensity is the size of the light's amplitude, whereas saturation is the degree of purity or quantity of white light supplied to a colour. It is simple to switch between different color spaces. After transformation, H content is taken into consideration for additional analysis. Since they don't add any new information, the S and I components are left out. Image segmentation is a technique used to transform photos into something more meaningful and understandable. Image segmentation is a key method in digital image processing since it serves as a precursor for feature extraction and pattern identification. There are numerous methods for segmenting images. Discussed below.

1) Region-based: Using this method, pixels related to items are grouped. It is necessary to shut the segmentation-recognized region. There are no gaps at this time from missing subpixels. Perfect segmentation serves as the foundation for this. Segmentation is permitted with restrictions. Each step assigns at least one pixel to that position and takes that into consideration. Brink floats are immediately converted to vectors after additions in colors and textures are discovered. The next step is the detection of these edges for further segmentation.

2) Edge-based: Segmentation can also be performed using partial detection strategies. There are various techniques. Slope, Log, Sly, Sobel, Laplacian, Robert. This technique identifies segmentation boundaries. Edges are detected to identify image discontinuities. Classification uses both fixed and adaptive functions of support vector machines.

3) Threshold-based: This is the simplest type of segmentation. Here segmentation is done by a threshold obtained from the histogram of these edges in the original image. So if the edge detection is accurate, the threshold is also accurate. Segmentation by thresholding is less computationally intensive compared to other techniques. A drawback of this segmentation technique is that it is not suitable for complex images.

4) Feature-based clustering: Clustering can also be used for segmentation. A histogram is created from the image, and clusters are placed on it. The unsupervised fuzzy C approach is used to cluster color picture pixels for segmentation. Regular images go under this. Fragmentation results from noise in photos. For texture image segmentation, a straightforward clustering k-means technique is employed. By gathering comparable pixels, segment the image. By using feature clustering, which is changed in accordance with color components, segmentation is accomplished. Additionally, segmentation is solely dependent on picture attributes. Segmentation takes features into account. For segmentation, the discrepancy between intensity and color values is used. Low-level picture segmentation is now possible with improved k-means. Creating color clusters repeatedly in color space with regard to the image space using fuzzy membership functions is the basis of the fuzzy clustering approach used to segment a color image. When recognizing color ranges, this strategy works well. real-time segmentation using clustering. It is accurate to capture the virtual region of interest for segmentation. By using several thresholds, the image is crudely segmented. A fuzzy C-means clustering process is used to enhance it. When utilized with multispectral images, this is quite beneficial. K-means clustering is a segmentation technique for regional growth. A cylindrical color space determinant is

used in the clustering processes used in image segmentation. Histograms are used to create surfaces, which thresholding then recognizes as clusters. The clustering procedure does not require a set number of color groups when a modified self-organizing feature map (MSOFM) is used. The resemblance between each color group is taken into account, and this is also customizable. Color extraction is enhanced when color group numbers match.

5) Model-based: Model-based segmentation is a method for segmenting data using Markov Random Fields (MRF). To segment colors, a built-in range smoothing limitation is visible in the MRF. Identify edges precisely by combining MRF and edge detection.

C. Feature extraction Following segmentation, sections of interest, including the affected area, are excised. The importance of a given sample can be ascertained using the features that are extracted in the following stage, which is the extraction of significant features. Actually, color, shape, and texture aspects are among the most common image features. Currently, while identifying plants, the majority of studies focus on the structure of plant leaves. Plant diseases are divided into various kinds using textural characteristics. As will be discussed below, there are various feature extraction techniques.

1) Texture analysis techniques: Surfaces are examples of lopsided spatial dispersion of various picture forces, generally amassed in the singular pixels that make up the picture. Surfaces are alluded to as evaluating the spatial connections between materials in a picture. A few properties assume a significant part in depicting surfaces. Consistency, routineness, thickness, linearity, directivity, harshness, unpleasantness, stage, recurrence. A strategy to describe surface power in four fundamental classifications: factual, primary, fractal, and sign handling. Statistics: Measurements types incorporate grayscale histograms, grayscale co-event frameworks, autocorrelation works, and run length grids for surface extraction. Structural: The primary surface model expects that a surface is a mix of surface natives. Adroitly, underlying surface examination is acted in two primary advances. H. Derivation of placement rules and extraction of texture elements. The two-dimensional wavelet transforms and the gabor transform are two alternative structural approaches that are taken into consideration. Fractals: Numerous natural surfaces exhibit selfsimilarity and roughness statistical features at different scales. In the realm of image processing, fractals have grown to be particularly helpful and well-liked for simulating these characteristics. Processing of signals Due to their characteristics, textures are especially well suited for this kind of examination. There are also spatial domain filters, Fourier domain, and 2D Gabor functions.

2) Texture Feature Extraction Method: From the input image, interesting and pertinent features are extracted using the extraction process. A texture feature extraction method is a process for removing texture information from an image. The common extraction methods used with texture fields are described in this section. Co-occurrence of color technique: The statistical distribution of intensity combinations

recorded at particular points in relation to one another in the image is used to compute the texture features in statistical texture analysis. A statistical method is called a gray-level co-occurrence matrix (GLCM). Long used for texture categorization, this feature extraction technique. In the area of texture classification, it was a crucial feature extraction method for calculating associations between pixel pairs. The resulting GLCM can be used to calculate texture features. Energy, entropy, uniformity, contrast, and correlation. However, in recent years, GLCM has been combined with various approaches rather than being utilized in isolation. We demonstrate some alternative GLCM implementations in addition to the conventional one. Second-order statistical one-dimensional GLCM. The color co-occurrence matrix's many color spaces can also use it. To extract statistical texture information, one approach is to use the Grayscale Spatial Dependency Matrix (SGDM) technique. Properties are contained in the gray-level spatial dependency matrix (SGDM). Energy, Correlation, Local Uniformity, and Contrast. Gabor Wavelet: Gabor Wavelets are another name for Gabor Filters. This is a common signal processing technique. The orientation, standard deviation, and radial center frequency are some of the parameters that make up a Gabor filter. By specifying a group of radial center frequencies and directions, this can be employed. The Gabor filter must be lowered to prevent dimensionality problems since signal processing techniques generate high feature sizes. The feature space can be effectively condensed using principal component analysis (PCA). Although they are frequently supplemented with other techniques, gabor filters are frequently used for texture classification.

Wavelet Transform: Another signal processing technique used extensively in pattern identification and image processing is the wavelet transform. It is increasingly being employed as a crucial element in texture classification. Today, a number of wavelet transforms, including the Haar wavelet and the Daubechies wavelet, are often utilized. The most often employed wavelet transform among them is the DWT. Generally speaking, frequency domain information is more reliable than spatial domain information. As a result, wavelet transformations are more intricate and time-consuming, but they often result in better, more accurate features.

Principal Component Analysis: principles component analysis (PCA) is a statistical method that converts a set of observations of possibly correlated variables into a set of values of linearly uncorrelated variables known as principles components. Greater than or equal to the number of primary components are the original variables. Depending on how the original variable is relative scaled. Based on real eigenvectors, PCA is the most straightforward multivariate analysis. PCA and factor analysis are closely connected.

D. MATLAB was used to create the Classifier Software functions. There are several neural network classifiers used for training and testing. The textural features are categorized as follows:

1) K-Nearest Neighbors: The K-Nearest Neighbors classifier is a straightforward machine learning algorithm that performs classification by locating the samples that

are nearest to the query and using their neighbors to ascertain the query's class. It's finished. The class that a particular point belongs to in an ANN is determined by computing the smallest distance between that point and any other point. Nearest Neighbors is a classifier that doesn't need any training. Due to its lack of robustness to noisy data, it cannot be applied to huge numbers of training samples. The Euclidean distance between the test and training samples is calculated while classifying plant leaves. Similar dimensions are thus found, and the class of test samples is determined as a result. A sample is categorized according to the class with the highest support from its k closest neighbors, receiving the most votes in the process. K is a positive, typically tiny integer. The sample is just placed in the class of its closest neighbor when k = 1. It is helpful to select k as odd for binary (two-class) classification issues. If you pick your features wisely, nearest neighbor approaches are simple to use and produce excellent results. For simple detection issues, K-Nearest Neighbor (KNN) classifiers are appropriate. Slow learning is ANN algorithms' fundamental flaw. H. Nothing is learned from the training data by it. The categorization process only makes use of the training data itself. Due to the algorithm's requirement to compute distances and sort all training data for each prediction, this method also has the downside of being extremely sluggish when there are many training samples. In addition, for high numbers of training samples, it is not robust to noisy data. Since it is so sensitive to the existence of irrelevant information, the nearest neighbor approach has one of the most fundamental flaws.

2) Radial Basis Function: Spiral Premise Capability (RBF) is a genuine esteemed capability whose worth relies just upon the separation from the beginning. An ordinarily utilized measurement is Euclidean distance. RBF is an organization wherein stowed away unit enactment depends on the distance between the info vector and the model vector.

3) Artificial Neural Networks: Counterfeit neurons are fundamentally a designing way to deal with natural neurons. An ANN comprises of a few hubs, called neurons. Brain networks are generally coordinated in layers. In a brain organization, every neuron in the secret layer gets signals from every one of the neurons in the info layer. The strength of each sign and the offset is communicated as a weight and a consistent, which is determined all through the learning period. At the point when the sources of info are weighted and added, the outcome is changed utilizing the result move capability. The exchange capabilities utilized are sigmoid, exaggerated digression or one stage. Backpropagation is a brain network learning calculation (Rumelhart and McClelland, 1986) utilized in layered feedforward fake brain organizations. Backpropagation is a type of directed preparing. Initially, the ANN began as a solitary neuron, proposed in the model by McCulloch and Pitts during the 1940s (McCulloch and Pitts, 1943). In 1958, Blunt Rosenblatt proposed the Perceptron, which is the least difficult single-layer network with loads and predispositions that can be prepared to deliver a careful objective vector when given the relating input vector. This organization comprises just of information neurons and result neurons. It can take care of straight issues. The Multi-facet Perceptron (MLP) is one of the criticism brain

networks that has at least one layers between the information and result layers. Feedforward implies that information streams in a single bearing from the information layer to the result layer (forward). Various layers of neurons have a non-straight transmission capability that permits the organization to learn non-direct and direct connections among information and result vectors. The multi-facet perceptron (MLP), which can be prepared utilizing a back-spread calculation (Rumelhart and McClelland, 1986), is an exceptionally famous decision among numerous scientists.

E. Probabilistic Brain Organization (PNN) Probabilistic Brain Organization (PNN) is a forward brain organization, in light of Parzen window. In a PNN, tasks are coordinated into a four-layer, multi-facet sending organization. PNN is essentially utilized in characterization issues. The principal layer is an info layer that computes the distance between the info vector and the preparation input vector. The subsequent layer totals the commitment of each info type and delivers its net result as a likelihood vector. The third Example class contains one neuron for each occasion in the preparation dataset. It stores the upsides of the indicator factors for the case with the objective worth. The example neurons include the upsides of the class they address. The result layer looks at the weighted decisions in favor of each target classification collected in the model layer and uses the most elevated votes to anticipate the objective class. Since PNNs are a lot quicker than multi-facet perceptron networks, their preparation stage requires just a single pass through the preparation models. PNNs can be more precise than multi-facet perceptron networks which are additionally generally inhumane toward exceptions. To work on the general execution, the result of the PNN can be additionally handled by another classifier, and since this is extremely quick, the PNN is utilized in web-based applications where a classifier is required. constant. The fundamental drawback of PNN is that it requires enormous extra room.

1) Support Vector Machine: A Help Vector Machine (SVM) is a non-direct classifier. This is a recent fad in AI calculations utilized in many example acknowledgment issues including surface characterization. In SVM, the info information is planned nonlinearly to straightly deteriorated information in complex space which gives great arrangement execution. SVM augments the limit distance between various layers. The division of classes is finished with various pieces. SVM is intended to work with just two layers by characterizing the hyperplane to divide the two layers. This is finished by amplifying the edge between the hyperplane and the two layers. The examples nearest to the edge that have been chosen to characterize the hyperplane are called help vectors. The idea behind a support vector machine is depicted in the following figure. In order to tackle the issue, alternative two-layer SVMs are used, either one versus all or one against one, to create multi-class classification. The highest output function or the related largest number of votes is then used to decide the winning class. Researchers are one of SVM's key benefits.

1) Its prediction accuracy is high.

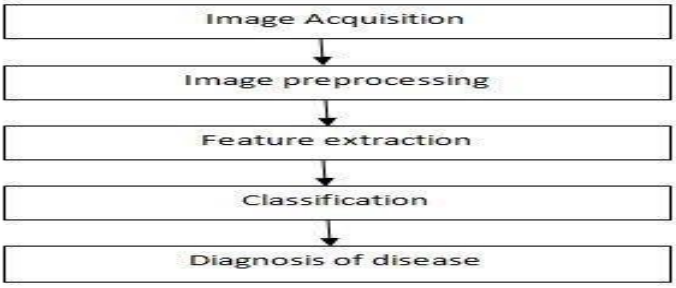


Fig 6. Steps engaged with the proposed strategy for plant infection identification

2) Even when the training examples have errors, it still functions properly.
3) its sparse solution and its geometric interpretation;
4) Like neural networks, SVMs' computational complexity is independent of the input space's dimensions.

SVM's drawbacks include:

1) A lengthy training period is needed for this classifier.
2) It is challenging to comprehend the learnt function in SVM (weight).
3) A significant portion of the training set's support vectors were utilised to carry out the classification.

CHAPTER 5
Implementation

In [ ]:
```
import numpy as np
import pickle
import cv2
from os import listdir
from sklearn.preprocessing import LabelBinarizer
from keras.models import Sequential
from keras.layers.normalization import BatchNormalization
from keras.layers.convolutional import Conv2D
from keras.layers.convolutional import MaxPooling2D
from keras.layers.core import Activation, Flatten, Dropout, Dense
from keras import backend as K
from keras.preprocessing.image import ImageDataGenerator
from keras.optimizers import Adam
from keras.preprocessing import image
from keras.preprocessing.image import img_to_array
from sklearn.preprocessing import MultiLabelBinarizer
from sklearn.model_selection import train_test_split
import matplotlib.pyplot as plt
```

In [ ]:
```
EPOCHS = 25
INIT_LR = 1e-3
BS = 32
default_image_size = tuple((256, 256))
image_size = 0
directory_root = '../input/plantvillage/'
width=256
height=256
depth=3
```

In [ ]:
```
def convert_image_to_array(image_dir):
    try:
        image = cv2.imread(image_dir)
        if image is not None :
            image = cv2.resize(image, default_image_size)
            return img_to_array(image)
        else :
            return np.array([])
    except Exception as e:
        print(f"Error : {e}")
        return None
```

In [ ]:
```
image_list, label_list = [], []
try:
    print("[INFO] Loading images ...")
    root_dir = listdir(directory_root)
    for directory in root_dir :
        # remove .DS_Store from list
        if directory == ".DS_Store" :
            root_dir.remove(directory)

    for plant_folder in root_dir :
        plant_disease_folder_list = listdir(f"{directory_root}/{plant_folder}")

        for disease_folder in plant_disease_folder_list :
            # remove .DS_Store from list
            if disease_folder == ".DS_Store" :
                plant_disease_folder_list.remove(disease_folder)

        for plant_disease_folder in plant_disease_folder_list:
            print(f"[INFO] Processing {plant_disease_folder} ...")
```

```
    for plant_folder in root_dir :
        plant_disease_folder_list = listdir(f"{directory_root}/{plant_folder}")

        for disease_folder in plant_disease_folder_list :
            # remove .DS_Store from list
            if disease_folder == ".DS_Store" :
                plant_disease_folder_list.remove(disease_folder)

        for plant_disease_folder in plant_disease_folder_list:
            print(f"[INFO] Processing {plant_disease_folder} ...")
            plant_disease_image_list = listdir(f"{directory_root}/{plant_folder}/{plant_disease_folder}/")

            for single_plant_disease_image in plant_disease_image_list :
                if single_plant_disease_image == ".DS_Store" :
                    plant_disease_image_list.remove(single_plant_disease_image)

            for image in plant_disease_image_list[:200]:
                image_directory = f"{directory_root}/{plant_folder}/{plant_disease_folder}/{image}"
                if image_directory.endswith(".jpg") == True or image_directory.endswith(".JPG") == True:
                    image_list.append(convert_image_to_array(image_directory))
                    label_list.append(plant_disease_folder)
    print("[INFO] Image loading completed")
except Exception as e:
    print(f"Error : {e}")
```

In [ ]:
```
image_size = len(image_list)
```

In [ ]:
```
label_binarizer = LabelBinarizer()
image_labels = label_binarizer.fit_transform(label_list)
pickle.dump(label_binarizer,open('label_transform.pkl', 'wb'))
n_classes = len(label_binarizer.classes_)
```

In [ ]:
```
print(label_binarizer.classes_)
```

In [ ]:
```
np_image_list = np.array(image_list, dtype=np.float16) / 225.0
```

In [ ]:
```
print("[INFO] Spliting data to train, test")
x_train, x_test, y_train, y_test = train_test_split(np_image_list, image_labels, test_size=0.2, random_state = 42)
```

In [ ]:
```
aug = ImageDataGenerator(
    rotation_range=25, width_shift_range=0.1,
    height_shift_range=0.1, shear_range=0.2,
    zoom_range=0.2,horizontal_flip=True,
    fill_mode="nearest")
```

In [ ]:
```
model = Sequential()
inputShape = (height, width, depth)
chanDim = -1
if K.image_data_format() == "channels_first":
    inputShape = (depth, height, width)
    chanDim = 1
model.add(Conv2D(32, (3, 3), padding="same",input_shape=inputShape))
model.add(Activation("relu"))
model.add(BatchNormalization(axis=chanDim))
model.add(MaxPooling2D(pool_size=(3, 3)))
model.add(Dropout(0.25))
model.add(Conv2D(64, (3, 3), padding="same"))
model.add(Activation("relu"))
model.add(BatchNormalization(axis=chanDim))
model.add(Conv2D(64, (3, 3), padding="same"))
```

```
model.add(Dropout(0.25))
model.add(Conv2D(64, (3, 3), padding="same"))
model.add(Activation("relu"))
model.add(BatchNormalization(axis=chanDim))
model.add(Conv2D(64, (3, 3), padding="same"))
model.add(Activation("relu"))
model.add(BatchNormalization(axis=chanDim))
model.add(MaxPooling2D(pool_size=(2, 2)))
model.add(Dropout(0.25))
model.add(Conv2D(128, (3, 3), padding="same"))
model.add(Activation("relu"))
model.add(BatchNormalization(axis=chanDim))
model.add(Conv2D(128, (3, 3), padding="same"))
model.add(Activation("relu"))
model.add(BatchNormalization(axis=chanDim))
model.add(MaxPooling2D(pool_size=(2, 2)))
model.add(Dropout(0.25))
model.add(Flatten())
model.add(Dense(1024))
model.add(Activation("relu"))
model.add(BatchNormalization())
model.add(Dropout(0.5))
model.add(Dense(n_classes))
model.add(Activation("softmax"))
```

In [ ]:
```
model.summary()
```

In [ ]:
```
opt = Adam(lr=INIT_LR, decay=INIT_LR / EPOCHS)
# distribution
model.compile(loss="binary_crossentropy", optimizer=opt,metrics=["accuracy"])
# train the network
print("[INFO] training network...")
```

In [ ]:
```
history = model.fit_generator(
    aug.flow(x_train, y_train, batch_size=BS),
    validation_data=(x_test, y_test),
    steps_per_epoch=len(x_train) // BS,
    epochs=EPOCHS, verbose=1
    )
```

In [ ]:
```
acc = history.history['acc']
val_acc = history.history['val_acc']
loss = history.history['loss']
val_loss = history.history['val_loss']
epochs = range(1, len(acc) + 1)
#Train and validation accuracy
plt.plot(epochs, acc, 'b', label='Training accurarcy')
plt.plot(epochs, val_acc, 'r', label='Validation accurarcy')
plt.title('Training and Validation accurarcy')
plt.legend()

plt.figure()
#Train and validation loss
plt.plot(epochs, loss, 'b', label='Training loss')
plt.plot(epochs, val_loss, 'r', label='Validation loss')
plt.title('Training and Validation loss')
plt.legend()
plt.show()
```

In [ ]:
```
print("[INFO] Calculating model accuracy")
scores = model.evaluate(x_test, y_test)
print(f"Test Accuracy: {scores[1]*100}")
```

In [ ]:
```
print("[INFO] Saving model...")
pickle.dump(model,open('cnn_model.pkl', 'wb'))
```

In [ ]:
```
loaded_model = pickle.load(open('cnn_model.pkl', 'rb'))
```

In [ ]:
```
loaded_model = pickle.load(open('path\\cnn_model.pkl', 'rb'))
```

In [ ]:
```
image_dir="path\\plantdisease_dataset\\PlantVillage\\Potato___Early_blight"

im=convert_image_to_array(image_dir)
np_image_li = np.array(im, dtype=np.float16) / 225.0
npp_image = np.expand_dims(np_image_li, axis=0)
```

In [ ]:
```
result=model.predict(npp_image)

print(result)
```

In [ ]:
```
itemindex = np.where(result==np.max(result))
print("probability:"+str(np.max(result))+"\n"+label_binarizer.classes_[itemindex[1][0]])
```

CHAPTER 6
CONCLUSION & FUTURE SCOPE

Conclusion

Around the world, plant diseases pose a serious danger to agricultural output and food security. For prompt intervention and efficient treatment, early detection and correct identification of plant diseases are essential. Convolutional neural networks (CNNs), a deep learning technology, have recently become effective instruments for automatically detecting plant diseases. The objective of this article is to provide a thorough analysis of how CNNs are used to identify plant diseases.

Convolutional Neural Networks have shown remarkable success in various computer vision tasks, including image classification and object detection. CNNs are particularly well-suited for plant disease detection due to their ability to learn intricate patterns and features directly from images. By leveraging large datasets of labelled images, CNNs can learn to distinguish between healthy and diseased plants with high accuracy. Moreover, CNNs have shown the potential to detect diseases at early stages, enabling proactive intervention before significant damage occurs. By leveraging transfer learning, where pre-trained CNN models are fine-tuned on plant disease datasets, researchers have been able to achieve high accuracies even with limited training data. This transfer learning approach significantly reduces the need for large labelled datasets, which can be time-consuming and expensive to create.

Convolutional Neural Networks have revolutionized the field of plant disease detection by providing accurate, reliable, and scalable solutions. The ability of CNNs to learn complex features from images has enabled the development of robust models capable of detecting diseases across different plant species. With further advancements in data collection, model training, and deployment strategies, CNNs have the potential to become an integral tool in precision agriculture, supporting farmers in disease management and ensuring global food security. By leveraging the power of deep learning, we can work towards a more sustainable and resilient agricultural future.

Future scope

The future of plant disease detection using Convolutional Neural Networks (CNNs) is promising, with several exciting developments and advancements on the horizon. As technology and research progress, we can expect the following trends and improvements in this field:

Enhanced Accuracy and Robustness: CNN models will continue to improve in accuracy and robustness. With access to larger and more diverse datasets, researchers can train CNNs to detect a wider range of plant diseases with even higher precision. Additionally, the development of novel architectures and optimization techniques will further enhance the ability of CNNs to handle complex variations in plant images, leading to more reliable and consistent disease detection.

Transfer Learning and Few-Shot Learning: Transfer learning will play a crucial role in the future of plant disease detection. Pre-training CNN models on large-scale datasets from related tasks, such as general image recognition, will allow for fine-tuning on smaller plant disease datasets. Few-shot learning techniques will also become more prevalent, enabling CNNs to adapt to new and emerging diseases with limited labeled samples, making the technology more accessible to areas with data scarcity.

Edge Computing and Real-Time Detection: As computational power and efficiency improve, there will be a shift towards deploying CNN-based disease detection systems on edge devices. This move to edge computing will allow real-time processing of plant images directly in the field, reducing latency and enabling faster responses to disease outbreaks. Real-time detection will facilitate timely interventions, minimizing the spread of diseases and reducing crop losses.

Multi-Spectral and Hyperspectral Imaging: CNNs can be extended to work with multi-spectral and hyperspectral imaging data. These advanced imaging techniques can capture additional spectral information beyond the visible spectrum, providing valuable insights into plant health. Combining CNNs with multi-spectral and hyperspectral data will enable more comprehensive and accurate disease detection, potentially identifying diseases at even earlier stages.

Drone and UAV-Based Plant Disease Monitoring: The use of Unmanned Aerial Vehicles (UAVs) or drones equipped with high-resolution cameras can revolutionize plant disease detection. These aerial platforms can cover large agricultural areas efficiently, providing timely and comprehensive data for CNN-based disease detection models. The integration of drones and CNNs will enable precision agriculture and targeted interventions, reducing the need for manual scouting and improving overall crop management.

Explainable AI for Better Interpretability: As CNN models become more complex, the need for interpretability and explainability will increase. Research in the field of explainable AI will focus on developing methods that provide meaningful insights into why a CNN model makes certain.

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Review RTPL

Plant Disease Detection

Divya Agrawal[1,*], Anubhooti Nagar[1], Dhirendra Yadav[1], Abhay Singh Rathore[1], Kashish Khandelwal[1], Sonam Gour[2]

Abstract

Plant growth is a crucial requirement for farmers since it provides a pathway for their livelihood. Plant damage and growth are correlated with one another. Despite their best efforts, farmers frequently fail to grow healthy crops because of ill plants. Plant disease is currently a dangerous problem for farmers, customers, the environment, and the global economy. Major health problems in plants are caused by excessive pesticide use. Image processing may be the most reliable method of predicting and obtaining precise findings for plant disease diagnosis. Deep convolutional neural networks are used in this research to improve accuracy and training effectiveness. Many uninformed farmers would benefit from our program by receiving accurate disease information that will help them boost their productivity. An online application that can recognize plant illness is something we are fostering. The goal is to identify various plant infections by looking at pictures. We can precisely diagnose plant illness by using the CNN algorithm. The accuracy results demonstrate that this model is superior to any conventional frame.

Keywords: Plant Diseases, Deep Learning, Convolutional Neural Networks.

INTRODUCTION

Plant disease has a connection to issues with agricultural sustainability. Unfamiliar farming techniques may cause bacteria to become blocked, thus reducing their ability to react. One of the pillars of accuracy in agribusiness is the ideal and certain discovery of plant illnesses. To improve construction in this expanding greenhouse medium, adequate and effective plant/leaf infection diagnosis including prompt aversion is never actually been more necessary. It is crucial to prevent needless abuse of money and other assets. Some diseases have symptoms that are either not immediately noticeable or become obvious when it is too

late to take action, in which case a thorough study is required. In any event, the majority of diseases cause some form of outward manifestation in the apparent range.

Therefore, a trained professional's eye inspection is a great technique to identify a plant infection.

For plant scientists to diagnose a plant infection accurately, they must possess superior insight skills that allow them to recognize distinctive side effects. Variations in incidental reactions seen in diseased leaves could result in a quick judgment since less experienced groundskeepers and experts might find it harder to decide than a trained plant scientist. To identify plant diseases, colour thresholding and analysis were two digital image processing approaches that were used.

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RELATED WORK

1. The authors of the research study [1] with a publication date of 2021 review the prediction of plant diseases using image processing and soft computing methods. Here, image processing is utilized to identify plant issues.
2. In a research paper [2], as per an exploration dairy in 2019 plant illness recognition is finished utilizing AI and a shrewd edge discovery calculation.
3. The authors conduct a thorough assessment of the identification of plant diseases using convolutional neural networks on images in their research paper [3]. The paper explained their drawbacks as well as successful use cases.
4. Paper [4] examines perceiving plant illnesses as well as distinguishing spoiled plant parts. The data photographs are taken first, followed by pictures dealing with. The fundamental goal of this assessment is to advance and work on the computational channels of a mind network methodology to achieve further developed results. This study integrates an endeavor to choose the degree of polluted plant areas.

PROPOSED SYSTEM

We are cultivating a web-based application that can recognize plant infections [5]. The goal is to recognize different plant defilements from photographs. Significant learning is being used in this assignment since we are overseeing picture data. Convolution mind associations, a kind of significant learning, are used to remove properties from plant leaves. Using CNN Estimation, we can unequivocally investigate plant sickness. CNN, a popular significant learning methodology, incorporates completely getting ready many layers. It is extremely convincing and is moreover the one for the most part consistently used by PC vision programs. CNN can be used to fabricate a computational plan that processes wild picture information sources and converts them into reasonable grouping yield classes. Development for this methodology has been made in our work (Figure 1).

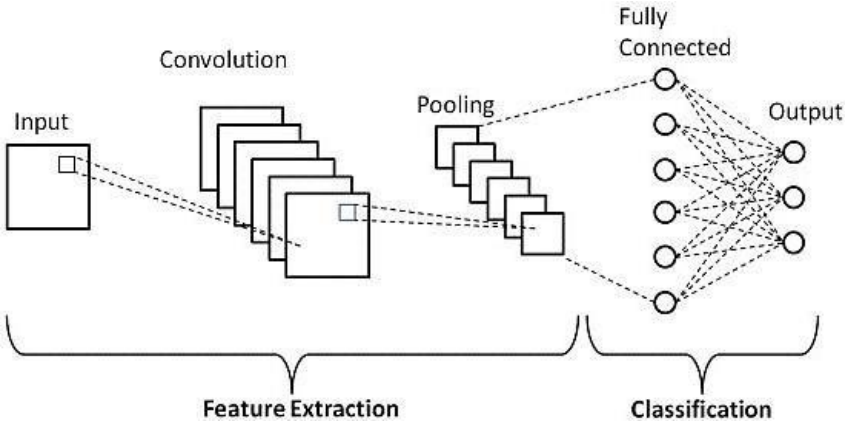

Figure 1. CNN architecture.

REQUIREMENTS

The objective is to distinguish different plant illnesses by inspecting photos. In the electronic application.

1. From their device, the client should have the choice to move an image of a debased plant leaf.
2. The CNN model ought to be prepared for recognizing plant illness.
3. Finally, the client will be given the name of the plant disease as well as some balance tips, as well as ideas for improvements and excrement Table 1.

Table 1. Requirements

a.	**Software Requirements**	b.	**Hardware Requirements**
1.	Backend: Python 3.7	1.	RAM: 4GB and higher
2.	Frontend: HTML, CSS	2.	Processor: Intel i3 and above
3.	Framework: Flask	3.	Hard Disk: 500GB (minimum)

METHODOLOGY Image Dataset Acquisition

The Plant Village dataset was gotten from Kaggle. This instructive file contains 39 particular sorts of plant leaves and establishment pictures. There are 61,486 pictures in the dataset [6]. The CNN model ought to expect 35 remarkable classes. As shown in Figure 2, the accumulated dataset involves around 20636 photos from about 15 special classes. The tomato, pepper, and potato crops were singled out because they are among the most remarkable plant species on earth all around, and in Iraq explicitly. The dataset integrates photos of all huge leaf contaminations *that could exist.*

NAME	NO OF CLASSES	NAME OF CLASS
Apple	04	Apple: 'scab', 'Black_rot', 'Cedar_apple_rust', 'healthy'
Blueberry	01	Blueberry: 'healthy'
Cherry	02	Cherry: 'Powdery_mildew', 'healthy'
Corn	04	Corn: 'Cercospora_leaf_spot', 'Common_rust', 'Northern_Leaf_Blight', 'healthy'
Grape	03	Grape: 'Black_rot', 'Esca', 'Leaf_blight', 'healthy'
Orange	01	Orange: 'Haunglongbing'
Peach	02	Peach: 'Bacterial_spot', 'healthy'
Bell Pepper	02	Bell_pepper: 'Bacterial_spot', 'healthy'
Potato	03	Potato: 'Early_blight', 'Late_blight', 'healthy'
Rasberry	03	Raspberry: 'healthy'
Soyabean	01	Soybean: 'healthy'
Squash	01	Squash: 'Powdery_mildew'
Strawberry	02	Strawberry: 'Leaf_scorch', 'healthy'
Tomato	05	Tomato: 'Bacterial_spot', 'Early_blight', 'Late_blight', 'Leaf_Mold', 'Septoria_leaf_spot'

Figure 2. Dataset Description.

Pre-processing of Images

To get the model and speed up the planning cycle while evaluating assessment precision, the photos in the dataset are scaled to 128 × 128 pixels. the philosophy for working on the data or goal factors either helps with accelerating the taking care of the train. safeguarding the accuracy of the data in the image after a hardship.

Train and Test Split

An organization is prepared by obtaining pieces in convolution layers and loads in completely associated layers to take out disparities between yield expectations and predefined ground truth marks on a preparation dataset. The testing dataset is utilized to give an objective assessment of the last plan fit on the preparation dataset.

Model Creation

We use a convolutional cerebrum association for a model age. We similarly showed the channel size and shape for the Conv layer and Pool layer.

Web Application Creation

Following the creation of this model, we will make a web application with Carafe.

On the web, the application client will need to move a plant picture and sort out what kind of disease it has. Figure 3 The application will in like manner recommend upgrades and fertilizers, as well as approaches to hindering the contamination.

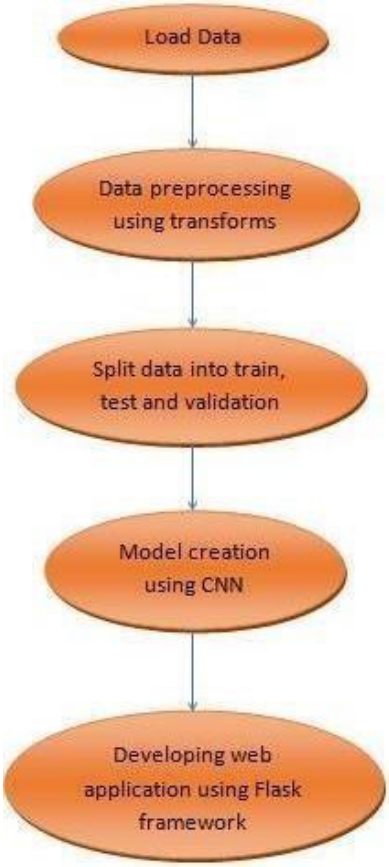

Figure 3. Diseases Detection steps.

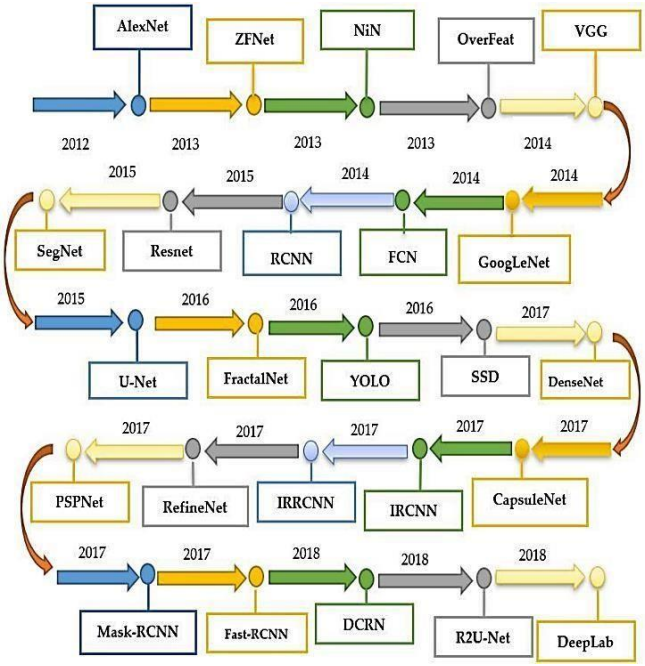

Figure 4. Summary of the evolution of various deep learning models from 2012 until now.

Plant Disease Detection by well-known DL Architecture

After AlexNet was introduced, many cutting-edge DL models/architectures for image recognition, segmentation, and classification emerged (as shown in the Figure 4 and Table 1) [7]. The study done to identify and categorize plant diseases using well-known DL architectures is presented in this part. Additionally, in other related papers, improved/modified DL architectures and novel visualization techniques were used to produce better outcomes. The PlantVillage dataset, which features 54,306 photos of 14 distinct crops with 26 plant diseases, has been the most commonly used of all of them. Additionally, they evaluated the chosen DL models using various performance indicators.

RESULTS

The results presented in this section are related to preparing the entire informative file because CNN can learn highlights. when applied to datasets with greater significance [8]. We won't look into any results that were made with unique images. By adjusting the limits, a general precision of 96.7% was achieved (Figure 5 a&b)

The final results achieved after the development of the frontend application after incorporating the model are shown in the Figure 6 below.

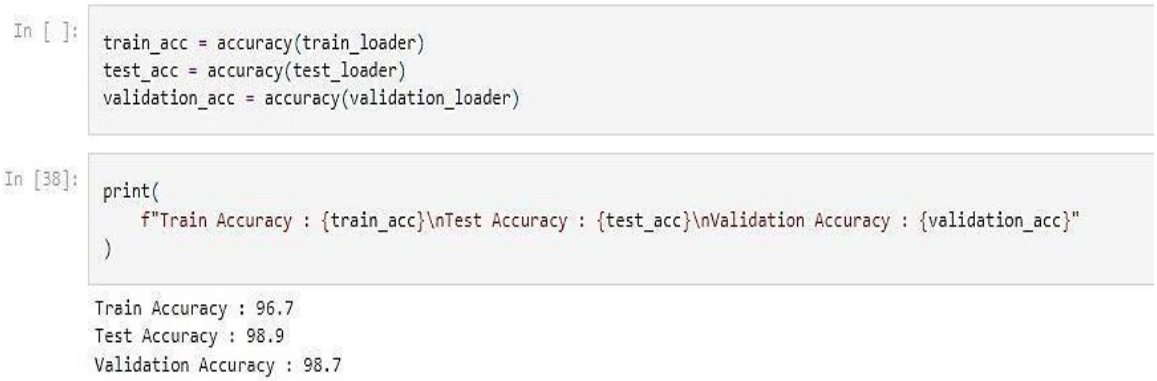

Figure 5. (a) Accuracy Statistics from analyzing the data.

```
In [8]:
def single_prediction(image_path):
    image = Image.open(image_path)
    image = image.resize((224, 224))
    input_data = TF.to_tensor(image)
    input_data = input_data.view((-1, 3, 224, 224))
    output = model(input_data)
    output = output.detach().numpy()
    index = np.argmax(output)
    print("Original : ", image_path[12:-4])
    pred_csv = data["disease_name"][index]
    print(pred_csv)

In [53]:
single_prediction("test_images/Apple_ceder_apple_rust.JPG")

Original :  Apple_ceder_apple_rust
Apple : Cedar rust

In [ ]:
train_acc = accuracy(train_loader)
test_acc = accuracy(test_loader)
validation_acc = accuracy(validation_loader)

In [38]:
print(
    f"Train Accuracy : {train_acc}\nTest Accuracy : {test_acc}\nValidation Accuracy : {validation_acc}"
)

Train Accuracy : 96.7
Test Accuracy : 98.9
Validation Accuracy : 98.7
```

Figure 5. (b): Model Testing.

Figure 6. Final results of plant disease detection.

CHALLENGES Problem with Small Dataset Size

Significant learning methodologies are correct now commonly used in various PC vision endeavors, plant sicknesses, and vermin revelation, and it is comprehensively seen as a

specific application in cultivation [9]. There are lacking of instances of agricultural plant diseases and disturbances open. Self accumulated educational files are minimal in size and strenuous to name when appeared differently from open standard libraries. The most fundamental issue standing up to establish contamination and disturbance revelation is the issue of little models, regardless of the way that ImageNet datasets contain more than 14 million model data. Before long, some plant diseases have a low event and a massive cost of disorder picture getting, achieving a couple or dozen planning data assembled, limiting the use of significant learning methods in the field of plant affliction disclosure. Conspicuous verification of disorders and vermin there by and by three remarkable solutions for the issue of little models.

Enhancement, Synthesis, and Generation of Data

An imperative piece of planning significant learning models is data upgrade. An upgraded data escalation procedure can deal with the distinguishing proof of plant ailments and disturbances [10]. The most notable strategy for developing plant disorders and disturbance pictures is to get more models by reflecting, turning, moving, misshaping, isolating, contrasting change, and so on for the main plant diseases and vermin tests. Also, GANs and VAE can make more various guides to progress confined.

Classical Network Model Fine-tuning and Transfer Learning

Move learning (TL) is the most well-known approach to moving data acquired from gigantic nonexclusive datasets to explicit areas with restricted amounts of data. While move learning is used to make a model for as of late assembled unlabeled models, it can begin with a planning model considering a similarly known dataset [11]. It will in general be applied to limited plant disease and bug disclosure after tweaking limits or modifying parts, diminishing the cost of model planning and allowing the convolution cerebrum association to conform to little model data. Oppenheim et al. used typical light to assemble tainted potato pictures of various sizes, shades, and shapes and gathered them by adjusting the VGG association. The disclosures showed that move learning was convincing to get ready for new associations.

Too et al. used changes and differences to survey different customary associations. The outcomes of the examinations revealed that the precision of Thick Nets improved with the number of emphases. Chen et al. used move learning and tweaking to recognize rice disease pictures under complex establishment conditions and achieved a typical precision of 92.00%, showing that move learning beats standard readiness strategies.

Design of a Reasonable Network Structure

The example prerequisites can be enormously decreased by planning a sensible organizational structure. By joining three variety parts, Zhang et al. made a three-channel convolution brain network model for plant leaf infection acknowledgment. Each TCCNN channel is comprised of three variety RGB leaf infection pictures. Liu et al. exhibited a better CNN technique for recognizing grape leaf infections. To stay away from overfitting and diminish the number of boundaries, the model utilized a profundity divisible convolution as opposed to a standard convolution. The underlying construction was applied to the model for the various sizes of grape leaf injuries to work on the capacity of multi-scale highlight extraction. This model

beats the standard ResNet and GoogLeNet structures as far as union speed and exactness during preparation. This calculation's acknowledgment precision was 97.22%.

Early Detection Through Fine-grained Identification of Lesions of Small Size the Earliest Detection of Small Lesions

Early acknowledgment of plant diseases is essential for enhancing yield. Considering the sensitive thing's little size, different down-looking at processes in the significant part extraction organization will by and large neglect restricted scope objects in the early conspicuous verification of plant diseases and bugs. Additionally, on account of the establishment disturbance issue on the assembled pictures, the colossal degree complex establishment could achieve more objective pictures. Given the absence of existing estimations, the improvement orientation of the little thing acknowledgment computation is explored, and a couple of systems, for instance, the thought part is proposed to deal with the display of the minimal objective area.

APPLICATIONS

Farmers in certain nations lack adequate centers or even the understanding of ways to touch professionals. As a result, consulting professionals is luxurious and time-eating.

In this situation, the endorsed technique proved to be beneficial for tracking large agricultural fields. It is likewise less difficult and much less luxurious to become aware of ailments robotically by surely searching on the symptoms and symptoms the plant leaves.

Plant sickness detection via way of means of sight is an extra time-eating and erroneous procedure that could most effectively be executed in restricted locations.

Automatic detection, on the opposite hand, calls for much less work, is quicker, and is extra accurate.

It additionally has vital educational studies value.

This task is vital in agriculture to grow the yield.

CONCLUSIONS

Isolated and customary picture managing techniques, which control plant tangle notoriety attempts in unambiguous levels and affiliations, plant difficulty/tainting character structures utilizing gigantic critical decision tie everything considered them from start to finish comprehensive of extraction, which has a wide improvement validity. This thing will help different ranchers who're uninformed to get positive assessments by and large issues and help with affecting their yield. plant jumble disclosure progress is quickly making, it is far changing from clinical assessment to creating programming, there might be a massive capability between gifted packs in certified shocking spot spaces, and there are two or three issues to be settled.

FUTURE SCOPE

Degrees of progress that may be finished to the task is with recognizing plant issues ought to be prepared for finding where the photograph of the leaf is taken so we can see what kind of vegetation ought to be created or should now right now not be filled in that specific locale.

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During his internship,**Gaurav Singh** demonstrated a strong understanding of the fundamental concepts of **Web Development** , including **HTML, CSS**, and **JavaScript , React .** . .

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Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

Certificate

OF COMPLETION

THIS CERTIFICATE IS PRESENTED TO

Miss Himanshi Mathur

ON SEPTEMBER 15, 2023

for completing the seven-week internship programme
conducted in July - September, 2023 on
"Full Stack Web Development"

RISHI MATHUR
DIRECTOR

BANSAL-MATHUR
IT Consultancy Services

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
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ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

SELDOM
INDIA TECHNOLOGIES

CERTIFICATE OF COMPLETION

Certificate No: WS/4072

This is to certify that Himanshu Rathore

of PCM Jaipur

successfully completed Internship

on Flutter With Dart

During 31July23 to 16Sep23.

All the best.

SELDOM INDIA JAIPUR

Training Director
Seldom India

UAN RJ17D0087475

For Certificate Authenticity please contact us at CIC@SeldomIndia.com

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CERTIFICATE

OF INTERNSHIP

Cert. ID: ES-202359

This certificate is proudly presented to

Honey Sain

who has participated in the 45 days offline Summer Internship Program 2023 in Web Development domain conducted by 9Ethics Info Solutions from 01st Aug 2023.

Pradeep Soni
Co-Founder & CTO

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

Entrant TECHNOLOGIES

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Internship Certificate

This Certificate is Proudly presented to **Mr. JATIN GURJAR** who has participated in the 45 Days Offline Internship Program 2023 in Front End web development from **ENTRANTE TECHNOLOGIES PVT. LTD.** from 05 August 2023 to 20 September 2023.

for ENTRANT TECHNOLOGIES PVT. LTD.

Authorized Signatory(Director)

Bharat Kumar

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

Anurav Alliance Pvt. Ltd.

SCO 3019-20, Second Floor,
Sector 22, Chandigarh, 160022.
+91-7891002852

Email. : info@anuravallinz.in

Ref No: AA211-J058

Date: 21/09/2023

To Whom It May Concern

This is to confirm that MR **JATIN SHARMA**, bearing RIC NO: **J066** is attached to Project – **AdhyayanOnline** while undergoing internship with the company from 05 August 2023 to 20 September 2023.

He did an excellent job in his assigned role of Backend **Developer: JAVA**. During his Internship period with us, we find him a person who is reliable and able to ensure the assigned tasks are completed in a timely Manner.

He is a friendly and independent person. Hence, he had an excellent rapport with many or our staff. He would be an asset to any employer and I strongly recommend him for any endeavor he chooses to pursue.

Thank You !
Your Faithfully,

Saurav Kashyap (Director)

CERTIFIED
ISO 27001:2013

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
RIICO Institutional Area
Sitapura, JAIPUR

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by TechieNest

CERTIFICATE
OF INTERNSHIP

LNBID : IN23PM88438063341

This Certificate is Proudly presented to

Jhalak Bora

who has participated in the **45 Days Offline** Summer Internship Program 2023 in **Python Progamming** domain conducted by Learn and Build (LnB) from **07th Aug 2023**

in association with

Saurabh Bhardwaj
Founder & CEO

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

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Certificate
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KANIKA BANSAL

has successfully completed training / internship in

FULL STACK WEB DEVELOPMENT

From *1 August, 2023* to *15 September, 2023* at our Jaipur Centre.

We wish you a bright future ahead.

K. Bhatia	14211	15 September, 2023
Kamal Bhatia Director	Certificate ID	Date of Issue

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

Head Office: 10/564, Kaveri Path, Mansarovar, Jaipur-302020
Mobile No. : 94147 52750, 94149 30104, 0141 2399633
Website: www.matrixcomputers.in
E-mail : matrixcomputers.in@gmail.com

Learn and Build
by TechieNest

CERTIFICATE
OF INTERNSHIP

LNBID : IN23PM88433023021

This Certificate is Proudly presented to

KARISHMA

who has participated in the **45 Days Offline** Summer Internship Program 2023 in **Full stack web development (MERN)** domain conducted by Learn and Build (LnB) from **01st Aug 2023**

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Saurabh Bhardwaj
Founder & CEO

Dr. Mahesh Bundele
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