Two Day Hands-on Workshop on
'Foundations of AI and Generative AI'
3rd and 4th April 2024

Organized by

Department of Computer Science & Applications

A Two Day Hands- On Workshop was organized by the Department of Computer Science and Applications on **"Foundations of AI and Generative AI"** on 3rd and 4th April 2024. The Resource Person is Mr. SANDEEP POLAVARAPU, Machine Learning Engineer Applied Scientist – Bayer R&D.

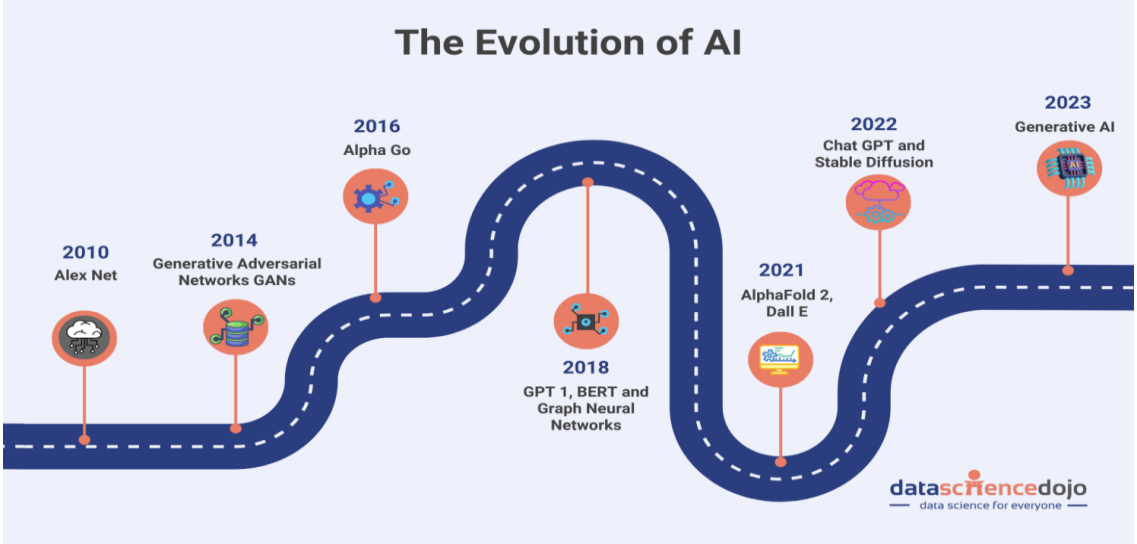
Objectives:

- Considering the growing importance of Artificial Intelligence in different sectors, a Two day workshop is intended to provide opportunities for educationalist, researchers, professionals and students to upgrade their knowledge in the area of AI.
  - To discuss the fundamentals of AI.
  - To understand the Evolution of AI.
  - To Understand the concepts of Deep Learning
  - To discuss Fine-tuning and Pre-trained Models
  - Introduction to Generative AI
  - Transformers and Attention Mechanism

DAY – 1

Topics covered:

1. **Introduction to AI Evolution:**



2. **Understanding Deep Learning:**

   Deep learning is the subset of machine learning methods based on artificial neural networks (ANNs) with representation learning.

   a) **ANN (Artificial Neural Network):** Brain-like networks that learn any kind of pattern.

   b) **CNN (Convolutional Neural Network):** Sees the world, masters image and video recognition.

   c) **RNN (Recurrent Neural Network):** Remembers sequences, tackles text and speech.

   d) **LSTM (Long Short-Term Memory):** Super-powered RNN, remembers long sequences for complex tasks.

3. **Fine – tuning and Pre – trained Models:**

   Fine-tuning leverages pre-trained models like taking a half-trained detective and giving them a specific case to specialize in, boosting accuracy and saving training time.

4. **Introduction to Generative AI:**

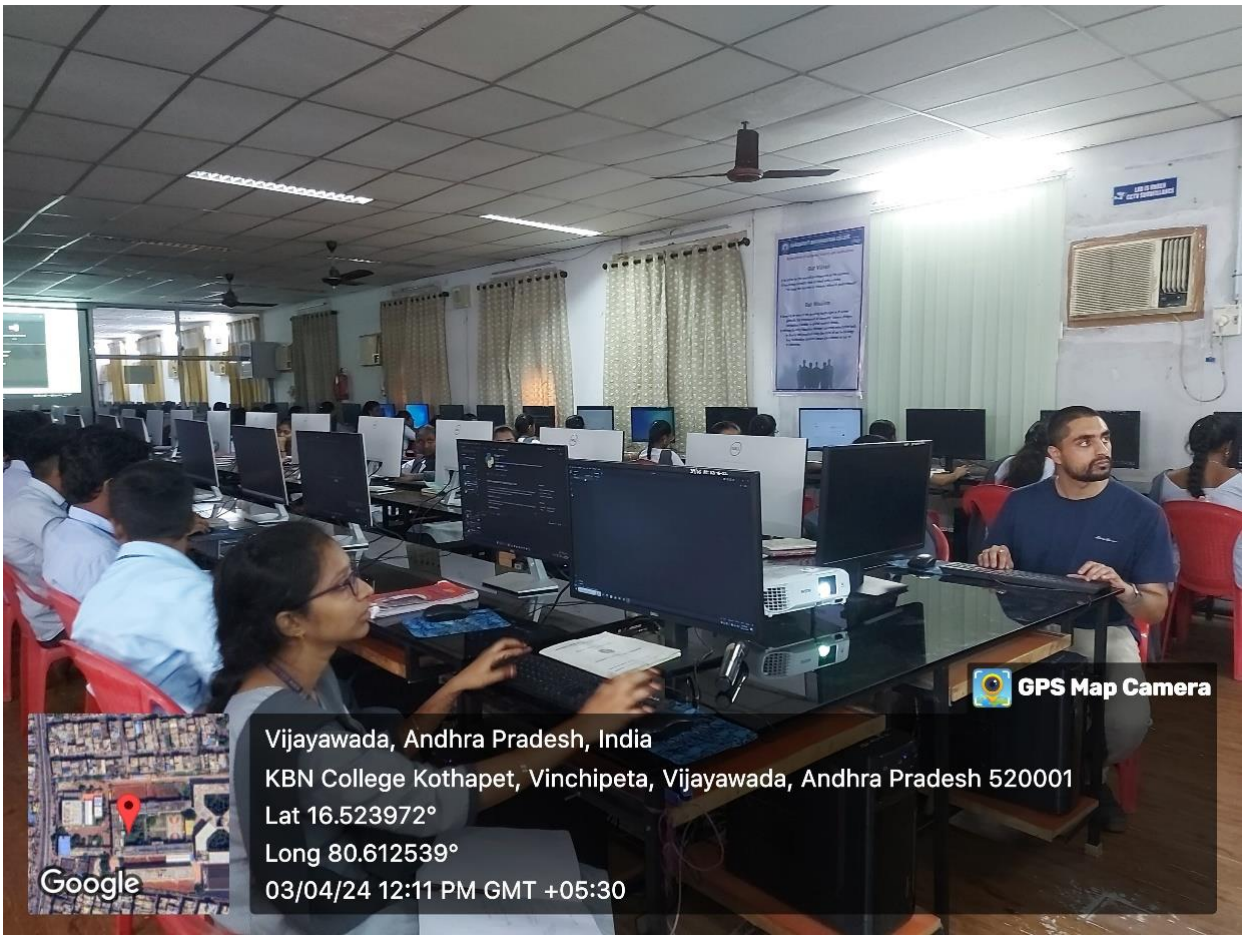
   GANs (Generative Adversarial Networks): Art competition: one creates, one critiques, leading to hyper-realistic fakes.

VAEs (Variational Autoencoders): Sketchy artist: compresses then invents, creating new but less realistic data.

Diffusion Models: De-noising artist: learns to remove noise, creating clean data from scratch.

5. **Transformers and Attention Mechanism:**

   Imagine a network that can directly compare any two parts of an input sentence (like words in a paragraph) to understand their relationships. This is unlike traditional methods that process things sequentially. This comparison is done through the attention mechanism.



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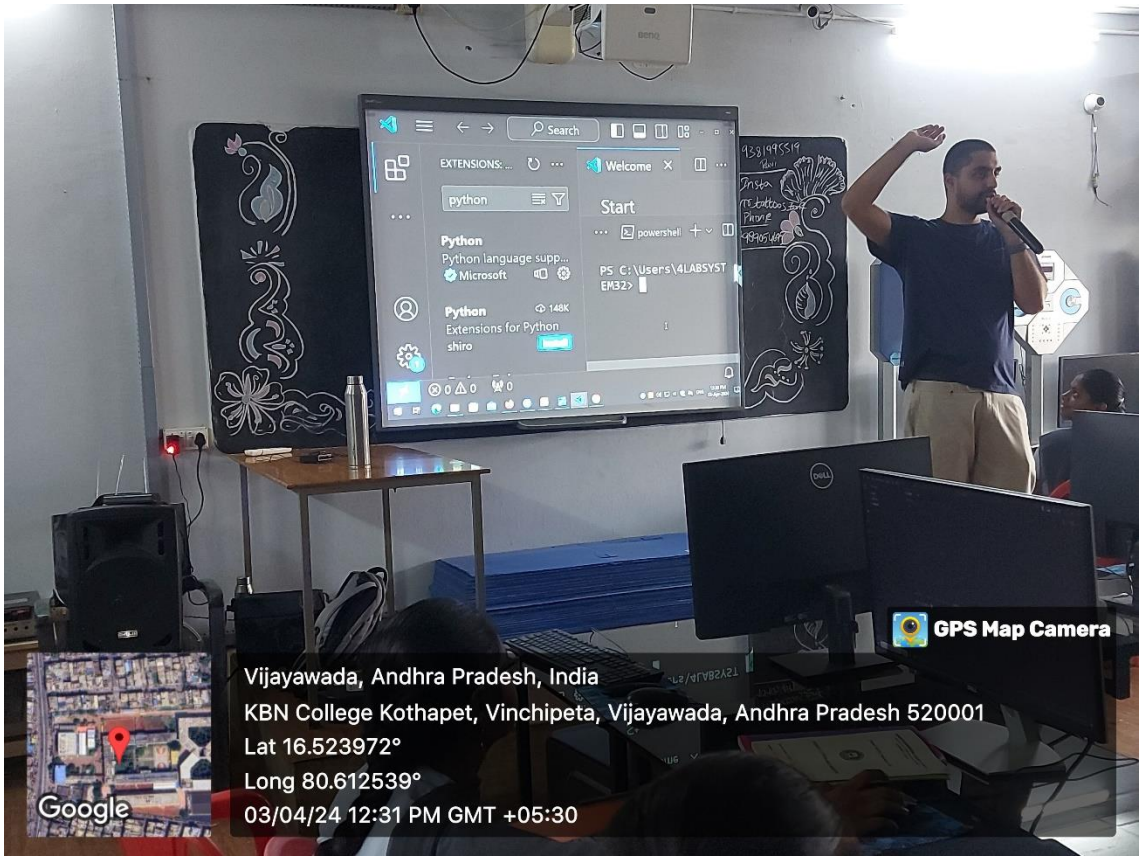
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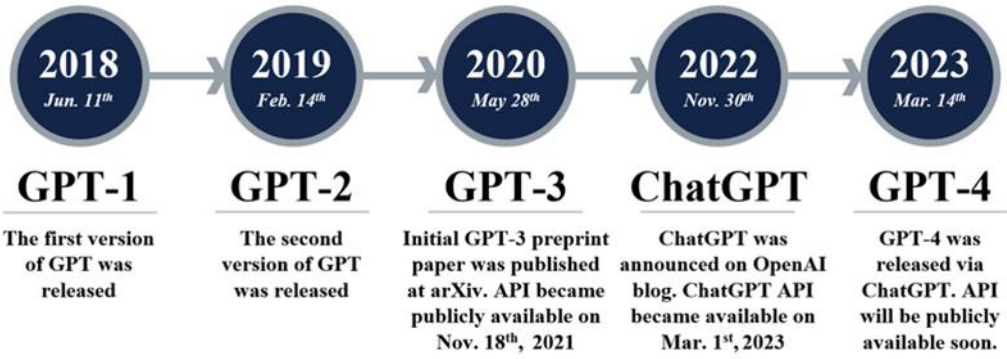
DAY – 2

Topics covered:

1. **Large Language and Vision Models:**
   a) **BERT:** Processes text in both directions to understand context, used for tasks like question answering.
   b) **GPT:** Generates realistic and creative text in response to a wide range of prompts and questions.
   c) **LLAMA:** Google AI's LLM under development, details not public.
   d) **Mistral:** Facebook AI's factual LLM, excels at question answering and summarization.
   e) **Gemini:** Google AI's LLM under development, details not public.

2. **Breakthrough of ChatGPT and OpenAI:**



3. **Open Source in AI:**

a) **Hugging Face:** This isn't a single project, but a community and platform for open-source machine learning tools. Hugging Face provides pre-trained models, datasets, and tools specifically designed for natural language processing (NLP) tasks.

b) **Llama2 (likely referring to LaMDA 2) :** The Llama 2 is a cutting-edge series of large language models developed by Meta, designed to excel in natural language processing tasks.

c) **LangChain:** It is a sophisticated framework designed to streamline the development of applications powered by language models, particularly large language models (LLMs).

d) **Pinecone:** Pinecone is a cutting-edge vector database that serves as a powerful tool for storing and searching through dense vectors efficiently. This database is specifically designed to handle high-dimensional vectors, making it ideal for applications that require semantic similarity calculations and real-time retrieval of data.

4. **Vectors and Embeddings, Vector Database:**

   A vector database is a specialized database designed to store and retrieve information represented as vectors. These vectors are multi-dimensional arrays of numbers encoding the key features of a data point. Imagine them as unique fingerprints for data in a high-dimensional space.

5. **Retrieval Augmented Generation (RAG) Models:**

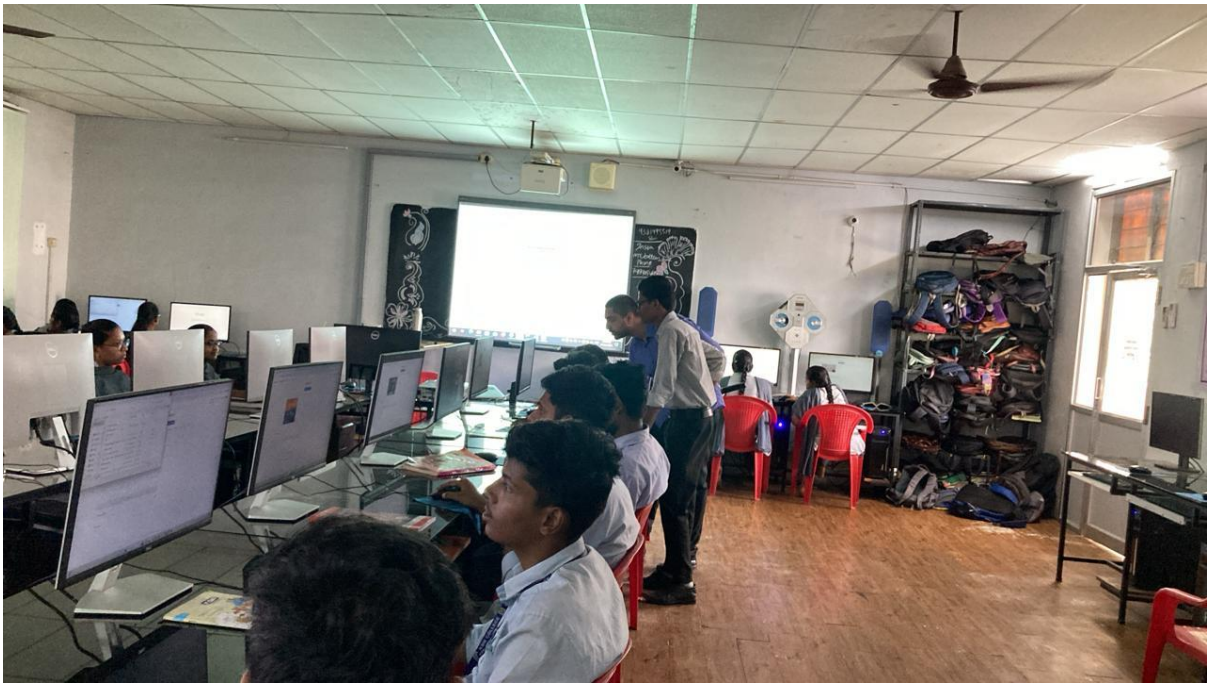
   It mainly incorporate three main components:

a) **Retriever**: This part finds relevant text passages from a vast collection of text (corpus) based on a given prompt or query.

b) **Augmenter**: This component processes the retrieved passages, potentially altering or combining them to create a more informative input for the generator.

c) **Generator**: This component leverages the processed information from the retriever and augmenter to generate new text that is coherent, relevant, and follows the style of the original corpus.

Project: Create a simple project using Hugging Face and Lang chain.



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OUTCOME

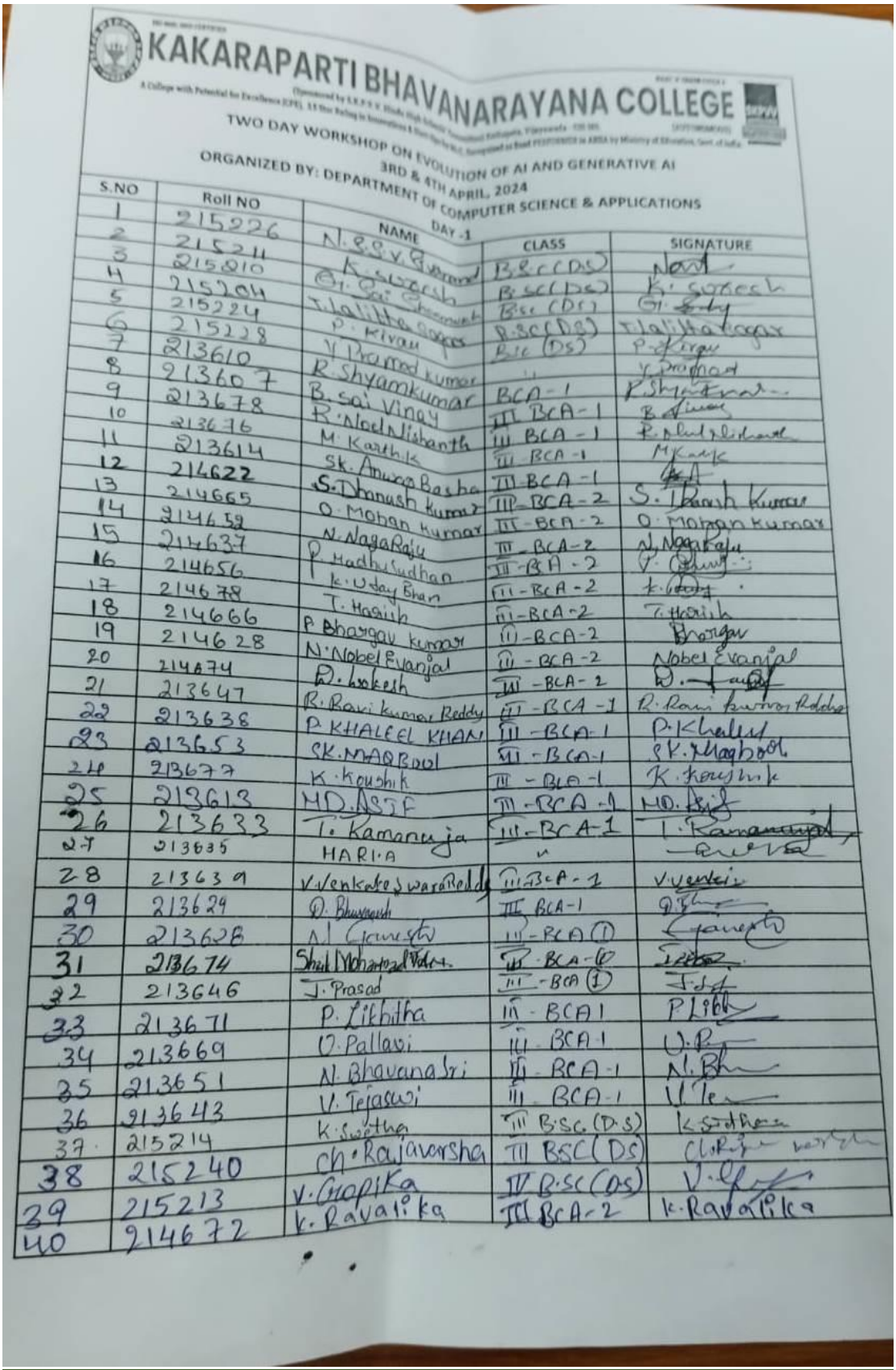
By this workshop, the students gained the knowledge about the following:

1. Discussed the fundamentals of AI.
2. Discussed about Deep learning Techniques
3. Discussed about open source AI.
4. Experienced hands-on experience on Hugging Face and Lang chain project.

Total No. of Participants: **75**

DAY – 1

ATTENDENCE SHEET



KAKARAPARTI BHAVANARAYANA COLLEGE

TWO DAY WORKSHOP ON EVOLUTION OF AI AND GENERATIVE AI

3RD & 4TH APRIL, 2024

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DAY -1

S.NO	Roll NO	NAME	CLASS	SIGNATURE
1	215226	N.S.S.V. Gurand	B.Sc (DS)	[illegible]
2	215211	K. Suresh	B.Sc (DS)	K. Suresh
3	215210	G. Sai Shanmukh	B.Sc (DS)	G. [illegible]
4	215204	T. Lalitha Sagar	B.Sc (DS)	T. Lalitha Sagar
5	215224	P. Kiran	B.Sc (DS)	P. Kiran
6	215228	Y. Pramod Kumar	"	Y. Pramod
7	213610	R. Shyamkumar	BCA-1	R. Shyamkumar
8	213607	B. Sai Vinay	III BCA-1	B. Vinay
9	213678	R. Noel Nishanth	III BCA-1	R. Noel Nishanth
10	213676	M. Karthik	III BCA-1	M. Karthik
11	213614	Sk. Anwar Basha	III BCA-1	[illegible]
12	214622	S. Dhanush Kumar	III BCA-2	S. Dhanush Kumar
13	214665	O. Mohan Kumar	III BCA-2	O. Mohan Kumar
14	214652	N. Naga Raju	III BCA-2	N. Naga Raju
15	214637	P. Madhusudhan	III BCA-2	P. [illegible]
16	214656	K. Uday Bhan	III BCA-2	K. [illegible]
17	214678	T. Harish	III BCA-2	T. Harish
18	214666	P. Bhargav Kumar	III BCA-2	Bhargav
19	214628	N. Nobel Evanjal	III BCA-2	Nobel Evanjal
20	214674	D. Lokesh	III BCA-2	D. [illegible]
21	213647	R. Ravi Kumar Reddy	III BCA-1	R. Ravi Kumar Reddy
22	213638	P. KHALEEL KHAN	III BCA-1	P. Khaleel
23	213653	SK. MAQBOOL	III BCA-1	SK. Maqbool
24	213677	K. Koushik	III BCA-1	K. Koushik
25	213613	MD. ASIF	III BCA-1	MD. Asif
26	213633	T. Kamanuja	III BCA-1	T. Kamanuja
27	213635	HARI.A	"	[illegible]
28	213639	V. Venkateswara Reddy	III BCA-1	V. Venkat
29	213629	D. Bhavanesh	III BCA-1	D. [illegible]
30	213628	N. Ganesh	III BCA (1)	Ganesh
31	213674	Shaik Mohammad Yadav	III BCA-(1)	[illegible]
32	213646	J. Prasad	III BCA (1)	J. [illegible]
33	213671	P. Likhitha	III BCA 1	P. Likh
34	213669	U. Pallavi	III BCA-1	U. P
35	213651	N. Bhavanasri	III BCA-1	N. Bh
36	213643	V. Tejaswi	III BCA-1	V. Te
37	215214	K. Swetha	III B.Sc (D.S)	K. Swetha
38	215240	Ch. Rajavarsha	III BSC (DS)	Ch. Rajavarsha
39	215213	V. Gopika	IV B.Sc (DS)	V. [illegible]
40	214672	K. Ravalika	III BCA-2	K. Ravalika

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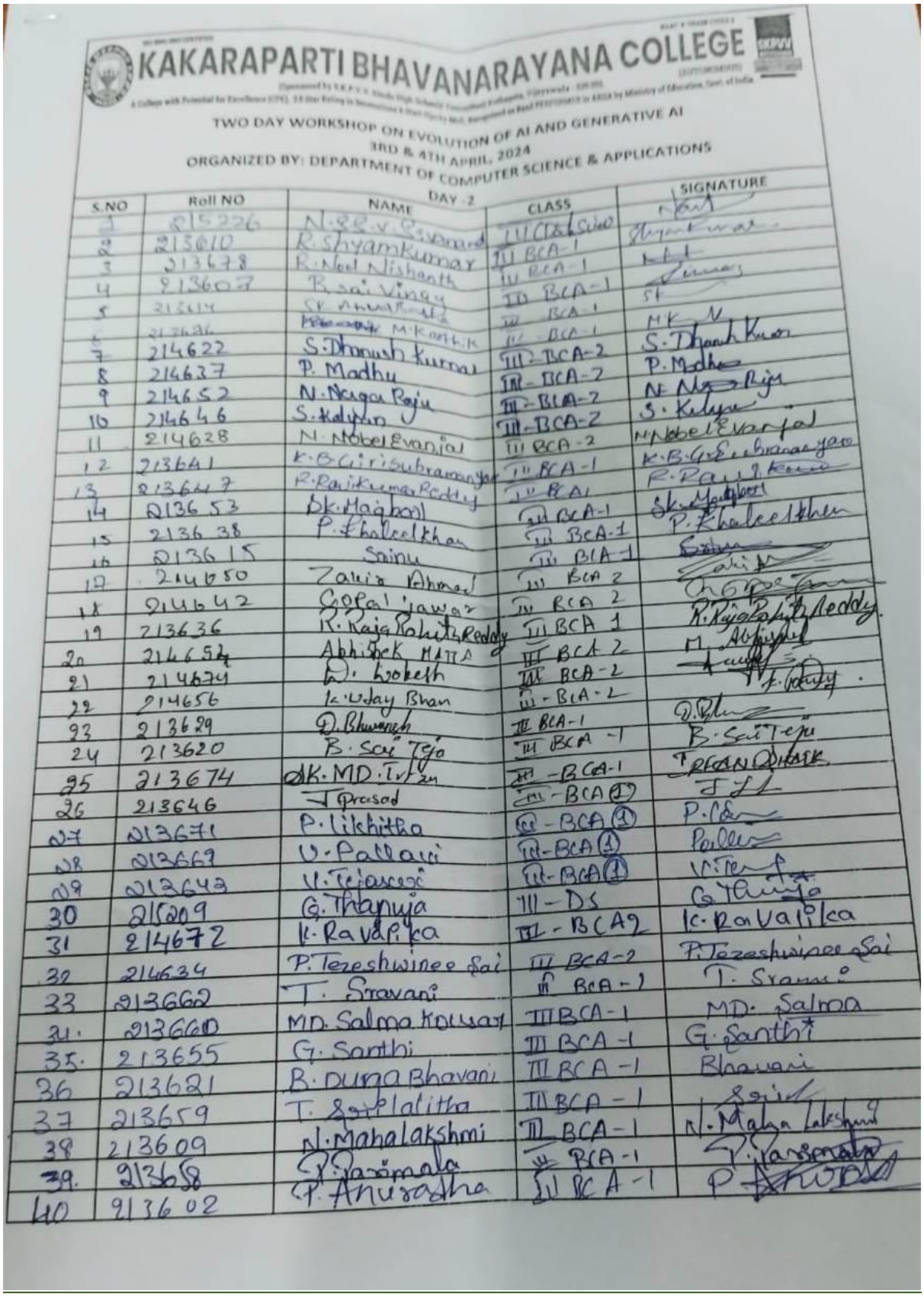
41	214634	P. Tejeshwinee Sai	III BCA-2	P. Tejeshwinee Sai
42	213660	T. Sravani	III BCA-1	T. Sravani
43	213655	G. Santhi	III BCA-1	G. Santhi
44	213681	B. Durga Bhavani	III BCA-1	B. Bhavani
45	213659	T. Sri Lalitha	3rd BCA-1	
46	213609	N. Mahalakshmi	III BCA-1	N. Maha Lakshmi
47	213668	P. Jasimala	III BCA-1	P. Jasimala
48	213602	P. Anuradha	III BCA-1	P. Anuradha
49.	213623	MD. Koshi Sultana	III BCA-1	
50.	213679	Ch. Pujitha	III BCA-1	
51.	213675	AS. Manasa	III BCA-1	
52.	215220	T. Surya Deepika	III DS	T. Suraya
53.	215216	A. Pabbinidu	III DS	
54.	215232	P. Sravani	III DS	P.
55.	215229	N.D.D.L Kavya	III DS	
56	215217	A. Nagalakshmi	III DS	A. Lakshmi
57	215221	K. Clara	III DS	K. Clara
58	213665	Ch. Manathanjali	III BCA-1	Ch.
59	213642	V. Mohana Priya	III BCA-1	V. Mohana Priya
60	213656	D. Harika	III BCA-1	D. Harika
61	213666	M. Tahnavi	III BCA-1	M. Tahnavi
62	214621	I. Harika	III BCA-2	
63	213663	G. Mouna	III BCA-1	
64	213670	M. Manasa	III BCA-1	M. Manasa
65	213667	R. Suvigna	III BCA-1	R. Suvigna
66	213654	R. Durga	III BCA-1	R. Durga
67	213661	P. Sree Lekha	III BCA-1	P. Sree Lekha
68	213664	V. VENKATI	III BCA-1	V. Venkati
69	214605	G. Maheswari	III BCA-2	G. Maheswari
70	214623	D. Sony	III BCA-2	D. Sony
71	215222	Ch. Vasavi	III BSC-DS	Ch.
72	215215	S. Charishma Sankari	III BSC-DS	S. Sankari

DAY – 2

ATTENDENCE SHEET



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DAY -2

S.NO	Roll NO	NAME	CLASS	SIGNATURE
1	215226	N.SS.V.Sivanand	III CD&SWO	[illegible]
2	213610	R.Shyamkumar	III BCA-1	Shyam Kumar
3	213678	R.Neel Nishanth	III BCA-1	[illegible]
4	213607	B.sai Vinay	III BCA-1	[illegible]
5	213614	SK Anwar Basha	III BCA-1	SK
6	213626	M.Karthik	III BCA-1	M.K.N
7	214622	S.Dhanush Kumar	III-BCA-2	S.Dhanush Kumar
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14	213653	Sk.Maqbool	III BCA-1	Sk.Maqbool
15	213638	P.Khaleelkhan	III BCA-1	P.Khaleelkhan
16	213615	Sainu	III BCA-1	Sainu
17	214650	Zakir Ahmad	III BCA 2	Zakir
18	214642	Gopal Jawar	III BCA 2	Gopal Jawar
19	213636	R.Raja Rohith Reddy	III BCA 1	R.Raja Rohith Reddy
20	214654	Abhishek MATTA	III BCA 2	M.Abhishek
21	214674	D. Lokesh	III BCA-2	[illegible]
22	214656	K.Uday Bhan	III-BCA-2	K.Uday
23	213629	D.Bhuvanesh	III BCA-1	D.Bhu
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38	213609	N.Mahalakshmi	III BCA-1	N.Maha Lakshmi
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44	213675	Manasa	III BCA-1	Manasa.
45	215220	I. Surya Deepika	III Bsc(DS)	I. [illegible]
46	215221	K. Chara	III Bsc(DS)	K. Chara
47	215232	P. Sravani	III Bsc(DS)	P. Sravani
48	215229	H. D. R. L. Kavya	III Bsc(DS)	H. [illegible]
49	215216	A. Poornima	III Bsc(DS)	A. [illegible]
50.	(K-Score) 215214	K. Swetha	III B.sc(DS)	K. [illegible]
51.	214613	K. Nikitha	III BCA-2	Nikitha
52.	214603	R. Dharani	III BCA-2	Dharani
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61	213654	R. Durga	III BCA-1	R. Durga
62	213645	CH. Mamathanjali	III BCA-1	CH. Mamu
63	213661	P. Sreelekha	III BCA-1	P. Sreelekha
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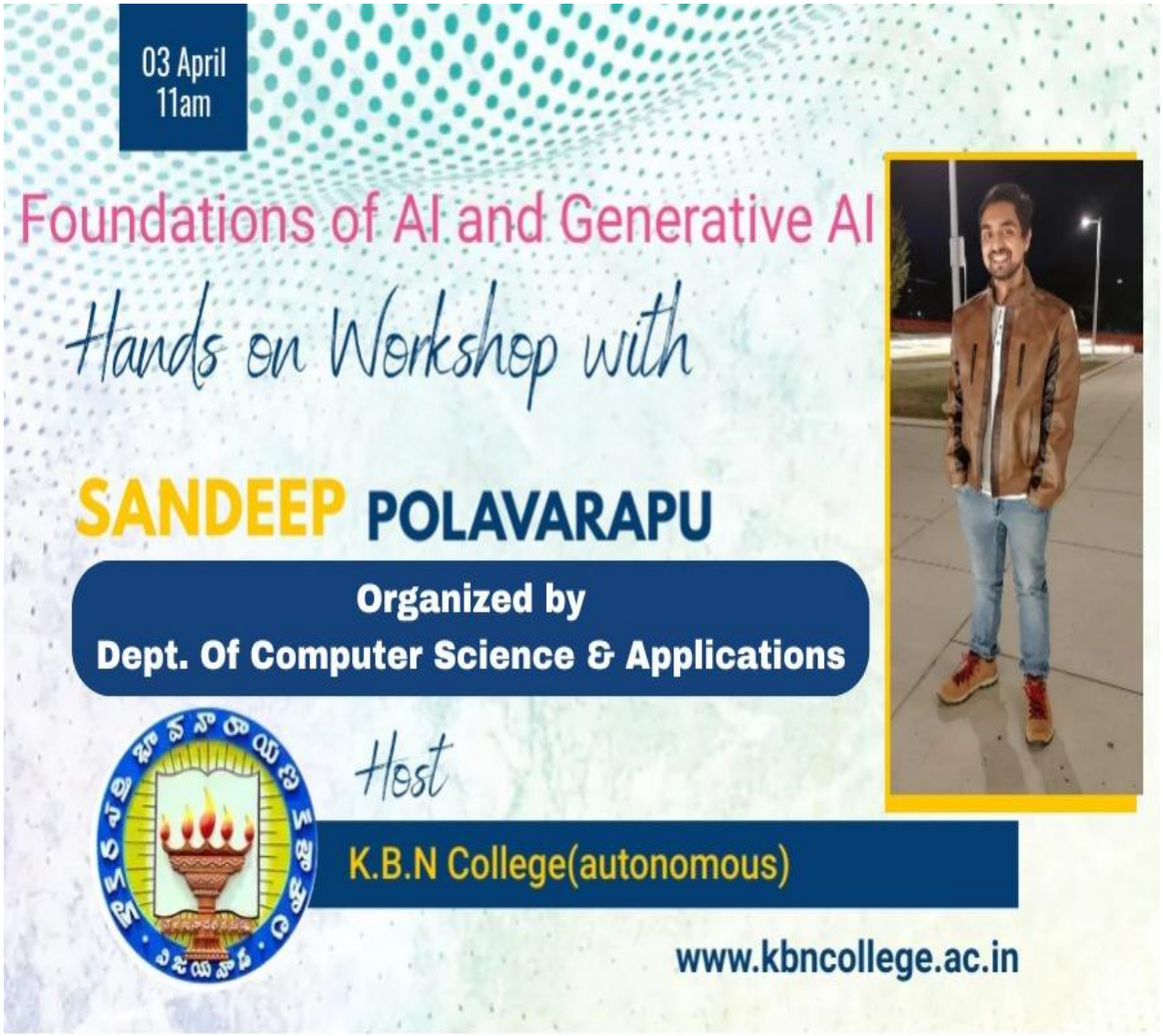
66	214617	D. Varshitha	III - BCA-2	D. Varshitha
67	214623	D. Sony	III - BCA-2	D. Sony
68	~~S. Sarvani~~ 215215	S. Sarvani	III-BSC-DS	Ch. S. Sarvani
69	~~Ch. Vasantha~~ 215222	Ch. Vasantha Devi	III-BSC-DS	Ch. Vasantha Devi
70	215213	V. Gopika	III-BSC-DS	V. Gopika
71	215240	Ch. Raja Varsha	III-BSC-DS	Ch. Raja Varsha

FELICITATION

Dr. V. Narayana Rao, Principal, Mr. P.L. Ramesh, Vice Principal, Dr. M. Venkateswara Rao, Vice Principal, Dr. T. Bhagya Kumar Intermediate Principal and Mr. P. Ravindra HOD of Computer Science and Application felicitated the resource person P. Sandeep.

INVITATION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