ICFAI Foundation for Higher Education
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IcfaiTech
Faculty of Science & Technology (FST)

One-Day Workshop On

BUILDING THE FUTURE: THE SYNERGY OF SPEECH, NLP AND GENERATIVE AI

Organized by : Alumni Relations Cell (ARC)

September 6, 2024 (Friday)

9:45 AM – 4:45 PM

FST Auditorium, VLSI Lab and Computer lab

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IcfaiTech
Faculty of Science & Technology (FST)

IcfaiTech Hyderabad, Alumni Relations Cell organizing

BUILDING FUTURE:
The synergy of Text, Speech, and Vision with Generative AI

Sept. 06, 2024

FST Auditorium, IFHE Campus

1-Day Workshop on AI
by Distinguished Alumni of IcfaiTech Hyderabad

Mr. Nayan Anand Jha
Alumnus, IcfaiTech Hyderabad (2015-19)
MS, IIIT Hyderabad,
LTRC Research Centre Senior Data Scientist, Tonik Financial

Ms. Vedarutvija Joopally
Alumnus, IcfaiTech Hyderabad (2019-23)
Generative AI Engineer, Cloud June Technologies

Mr. Maninder Singh
Alumnus, IcfaiTech Hyderabad (2005-09)
Co-founder & COO, Ahex Technologies

Mr. Nitish Gattepalli
Alumnus, IcfaiTech Hyderabad (2017-21)
Founder & CEO, Wisile.com

Inauguration at the hands of Vice Chancellor & Director

Dr. Ganesh,
VC, ICFAI Foundtion for Higher Education

Dr. K L Narayana,
Professor & Director, IcfaiTech

Alumni Relation Cell (ARC), IcfaiTech Hyderabad: *We at ARC have undertaken several initiatives towards strengthening Alumni-Students interaction and bonding. ARC regularly organizes 'Alumni Talk' series, where distinguished Alumni are invited to deliver talks on trends and practices in Industry, research potential, inspiring students to grab opportunities awaiting them. On similar lines we have launched alumni magazine 'ECHO', a quarterly magazine, where alumni write inspiring articles sharing their journeys, challenges and the risks involved. They aim to inspire, motivate and educate students for various career options. The diverse perspectives and experiences shared by our alumni have not only provided valuable knowledge but also strengthened the bonds within our community. The 1-Day workshop on AI by the Alumni is another important milestone for ARC in building strong Alumni-Institute relations.*

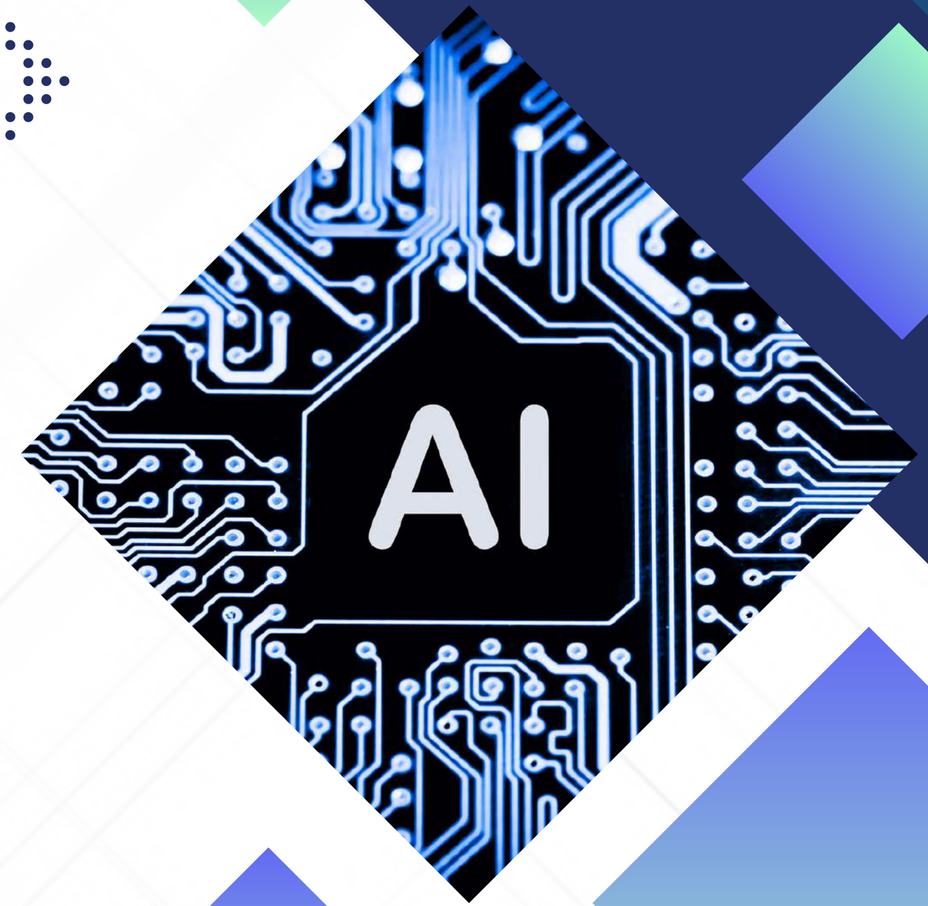
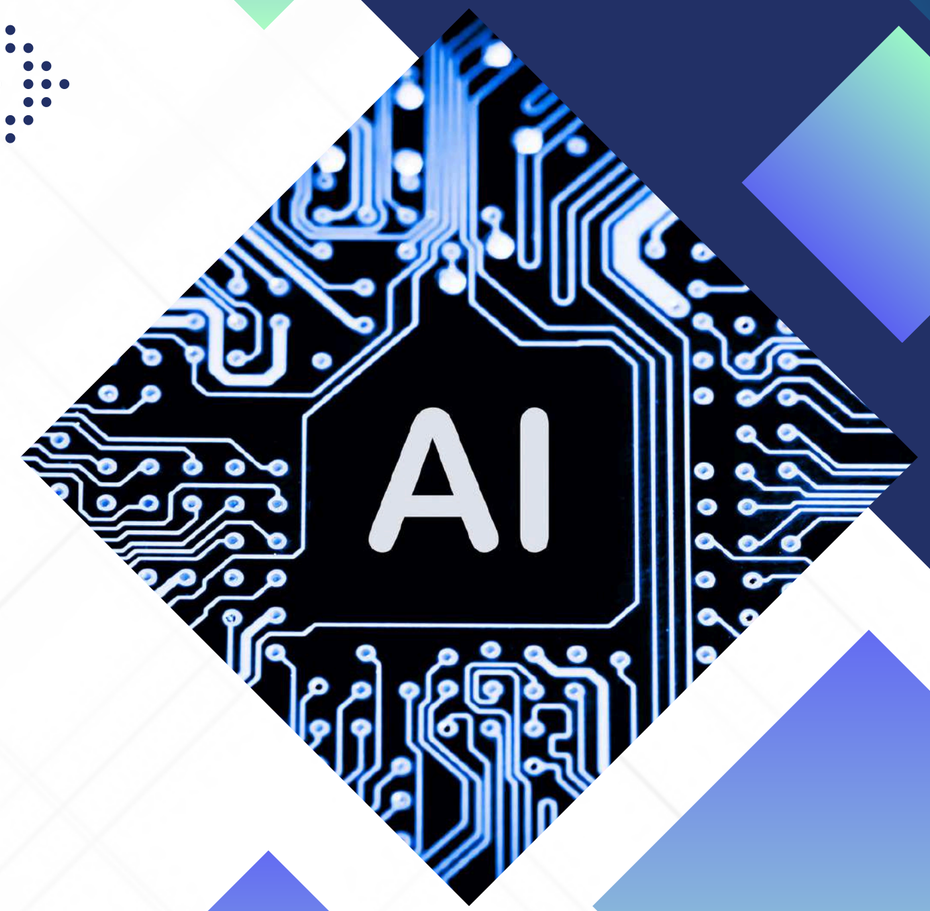


Table of CONTENTS



Introduction

The workshop titled "Building the Future: The Synergy of Speech, NLP, and Generative AI" was held on September 6, 2024, at the FST Auditorium. The event commenced with the official launch of the "Echo" magazine, setting an exciting tone for the day. This workshop, meticulously designed, broughttogether experts and alumni from various fieldsto share their knowledge and experiences, offeringvaluable insights into the latest advancements in speech technologies, Natural Language Processing (NLP), and Generative AI.

The workshop aimed not only to impart technical knowledge but also to inspire innovative thinking and fostercollaboration among participants. It served as a platform for bridging the gap between theoretical concepts and practical applications, highlighting how these technologies can be harnessed to solve real-world problems.

Introduction

Distinguished speakers, includingesteemed alumni of IcfaiTech Hyderabad, led sessions that provided a comprehensive understanding of how speech technologies, NLP, and Generative AI are interlinked, and how their synergy is driving innovation across various industries, from fintech and healthcare to regional language processing and AI-driven project management. The event featured a mix of insightful presentations, interactive discussions, and hands-on sessions, ensuringparticipants gained both theoretical foundations and practical experience. The workshop culminated in a deeper appreciation of the potential and challenges of integrating speech, NLP, and Generative AI in creating future-forward solutions.

Inaugural Session

The event began with a warm welcome to the audience, followed by the traditional lamp lighting ceremony. A magazine was launched, and mementos were presented to the guests as tokens of appreciation. The Student Secretary delivered an inspiring speech, followed by addresses from the Director and the Vice-Chancellor, highlighting the importance of AI technologies in shaping the future.

First Session:

Speaker: Mr. Nayan Anand Jha, Senior Data Scientist, Tonik Financial

Topic: Text-to-Speech (TTS), Speech Recognition, and Deep LearningTechniques

Summary:

Text-to-Speech (TTS):

Mr. Jha introduced FastSpeech and compared it with other models, focusing on advancements in speechrecognition and transcription. He discussed the principles of deep learning architectures, including FastSpeech 2, and played various audio examples to demonstrate these concepts.

Prosody:

He explained prosodyas the element that providesmelody to speech,covering aspects like stress/prominence (duration & energy/amplitude), rhythm (beat), and intonation (phonetic variation, Pitch/F0). Mr. Jha also touched on phrasing (brief silences in speech) and pitch stylization using ToBi software.

Sessions Overview contd...

TTS Details:

The session delved into the intricacies of text processing and speech synthesis, highlighting TTS evaluation characteristics such as Type 1 and Type 2 errors. He emphasized that accuracy is not the only metric to consider; other parameters are equally important. He also covered text normalization, linguistic, and phonetic analysis.

Mr. Jha explaineddifferent speech synthesistechniques, including format synthesis, unit selection-based synthesis (SPSS), and end-to-end speech synthesis.

End-to-End Speech Synthesis:

He traced the evolution of TTS modelingfrom early architectures to fully end-to-end models currently in use. Thesession included a detailed explanation of the Tacotron 2 model, which employs convolutional neural networks (CNN), as well as an overview of WaveNet architecture and the incorporation of prosody into Tacotron 2.

Second Session

Speaker: Mr. NitishGattepalli, Founder & CEO, Wisile.com Topic: Generative AI

Summary:

Generative AI Overview:

Mr. Gattepalli beganby introducing Generative AI, describing it as a revolutionary type of AI technology capable of generating diversecontent, including text, images,audio, and synthetic data. He emphasized its importance in the current AI landscape and its growing impact on various industries.

Industry Applications:

Drawing from his experiences as the founder of agile.com and vigile.com, Mr. Gattepalli shared real-world examplesof how Generative AI is being utilizedto automate tasks, develop

programming bots, and create innovative applications such as Dialogue Port. These applications showcase the potentialof Generative AI to transformbusiness operations and enhance productivity.

Sessions Overview contd...

AI Advancements: The session providedan in-depth look at the evolution of AI, particularly focusing on multi-modal AI systems capable of processing and generating not just text, but also audio and video. Mr. Gattepalli elaborated on how transformers and Large Language Models (LLMs), like those powering ChatGPT, have become foundational technologies in the AI field. He discussed the technological breakthroughs that have enabled these models to perform complex tasks and engage in human-like conversations.

Interactive Session: This session was particularly engaging, as Mr. Gattepalli involved the audiencein discussions about the practical applications of Generative AI. He introduced the ChatGPT app, explaining how it allows users to interact with AI models in real-time. To illustrate its capabilities, he played a sample video demonstrating how users can engage in conversations with the GPT model, making the conceptof Generative AI more accessible and relatable to the participants.

Sessions Overview contd...

Use Casesand Future Prospects:

In the latter part of the session, Mr. Gattepalli explored various use cases of Generative AI, from content creation to AI-driven project management. He also discussed the future prospects of this technology, highlighting emerging tools and frameworks like CrewaI, LangChain, and LangGraph, which can be used to build sophisticated AI agents. These discussions provided valuableinsights into the potential advancements in AI and the exciting opportunities they present.

Lunch Break:

Participants enjoyeda break and had the opportunity to network with peers and speakers.

Photo Session:

Following the lunch break, a photo session was organized, bringing together all the core committee members of the ARC (Academic Research Committee), faculty coordinators, the Director, and the distinguished alumni speakers. This moment captured the collaborative spirit of the event, highlighting the joint effortsof the organizing team and the faculty in making the workshop a success.

Third Session:

Speaker: Ms. Vedarutvija Joopally, Generative AI Engineer

Topic: Natural LanguageProcessing, Computer Vision,and Deep Learning

Summary:

Introduction and Agenda:

Ms. Joopally commenced her session with a brief introduction, sharing her professional background and expertise in generative AI, natural languageprocessing (NLP), and computer vision. She then outlined the agenda for the session, providing the audience with a roadmap of the topics she would cover.

Generative AI:

Diving into the core of her presentation, Ms. Joopally offered a comprehensive overview of Generative AI. She demystified its architecture by breaking it down into simpler components, making it accessible even to those who were new to the concept. She discussed how generative models like transformers and Large Language Models (LLMs) function, explaining their ability to generate coherent and contextually relevant content across various modalities, such as text and images. Her explanations were reinforced with examples, demonstrating how these models are applied in real-world scenarios, from text generation to creative content production.

Sessions Overview contd...

Swecha Telugu AI:

Ms. Joopally also introduced the Swecha TeluguAI initiative, a projectclose to her heart that focuses on leveraging generative AI to support regional languages. She showcased how this initiative is creating AI models that can understand and generate content in Telugu, highlighting the importance of preserving and promoting linguistic diversity through technology. The initiative not only serves as a significant step towards inclusive AI but also as a pioneering effort in regional language processing. Ms. Joopally shared some of the challenges faced in developing AI for less-resourced languages and the innovative solutions her team employed to overcome them.

Applications and Future Directions:

Expanding on the potential of generative AI, Ms. Joopally discussed its applications in various fields, such as content creation, automated translation, and personalized user experiences. She emphasized the importance of ethical considerations in AI development, particularly when dealing with sensitive data and cultural contexts. The session concluded with a forward-looking discussion on the future of AI, whereMs. Joopally exploredemerging trends and technologies that could further enhance the capabilities of generative AI, particularly in NLP and computer vision.

Fourth Session

Speakers: Sai Kiran and Pritam,Representatives from AHEX Technologies Topic: Artificial Intelligence

Summary:

Introduction to AI:

Sai Kiran and Pritam beganthe session by introducing the fundamental concepts of Artificial Intelligence (AI).They provided a historical perspective on AI development, explaining how the field has evolved from rule-based systems to the advanced machine learning and deep learning models used today.

Key AI Technologies:

The speakers delved into key AI technologies, such as machine learning, neural networks, and natural language processing (NLP). They explained how these technologies work together to enable machines to learn from data, make decisions, and even understand and generate human language. Their explanations were accompanied by examples from various domains, making complex concepts more relatable to the audience.

Sessions Overview contd...

Industry Applications:

A significant portionof the session was dedicatedto discussing the real-world applications of AI across different industries. Sai Kiran and Pritam highlighted how AI is transforming sectors like healthcare, finance, manufacturing, and customer service. They provided case studies of AI-powered solutions developed by AHEX Technologies, showcasing their practical impact on business processes and efficiency.

Emerging Trends and Challenges:

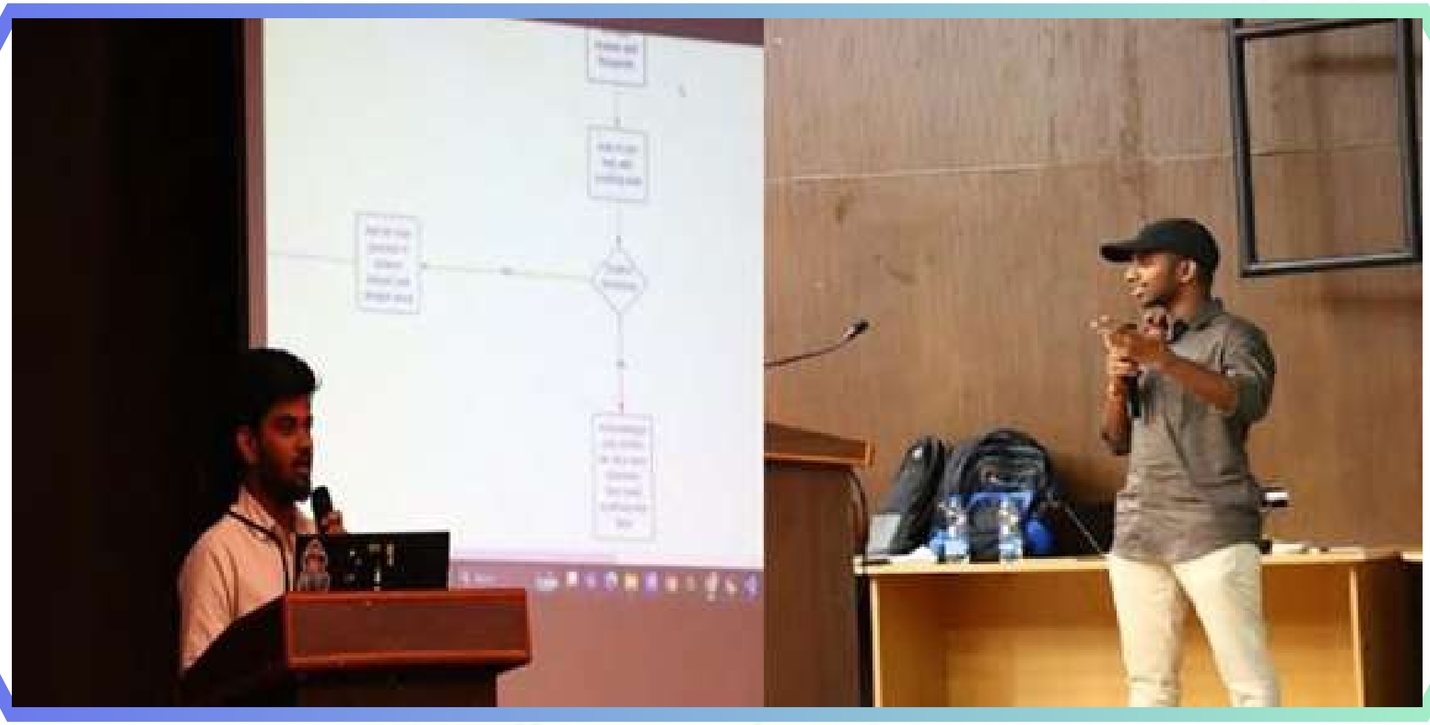
The session also touched on the latest trends in AI, such as the rise of edgeAI, the integration of AI with Internet of Things (IoT), and the growing importance of ethical AI practices. Sai Kiran and Pritam discussed the challenges faced by AI practitioners, including data privacy concerns, the need for explainable AI, and the importance of addressing bias in AI models.

They emphasized the role of ongoingresearch and development in overcoming these challenges and advancing the field of AI.

Sessions Overview contd...

Interactive Q&A:

The session concluded with an interactive Q&A segment, where the audience had the opportunity to ask questions about AI and its applications. Sai Kiran and Pritam provided insightful answers, furtherenriching the participants' understanding of AI and its potential.



Hands-On Session

After the fourth session,participants moved to the LiviaLab and Computer Lab for a hands-on session led by Mr. Nayan Anand Jha. This session provided a practical experience where attendees could apply the concepts discussed earlier, particularly in the areas of speech recognition, text-to-speech systems, and deep learning architectures. The interactive nature of the session allowed participants to engage directly with the technologies, solidifying their understanding through real-world application.

A Closing and Feedback Session

The workshop concludedwith a feedback session where participants sharedtheir thoughts on the e
The feedback was overwhelmingly positive, with many attendees expressing their appreciation for t
insightful sessions and the opportunity to learn from industry experts.

Conclusion

The workshop on "Building the Future: The Synergy of Speech, NLP, and Generative AI" was a resounding success, offering a comprehensive exploration of the latest technological advancements in these fields. Through a series of insightful sessions led by distinguished alumni and industry experts,participants gained valuableknowledge about the intersection of speech technologies, Natural Language Processing (NLP), and Generative AI. The hands-on activities further enhanced their understanding by providing practical experience with cutting-edge tools and techniques. The event not only highlighted the theoretical aspects of these technologies but also demonstratedtheir real-world applications and future potential. Participants left with a deeper appreciation of how these advancements are shaping the future of technology, driving innovation, and opening new possibilities in various industries. The workshop also fostered a collaborative environment where ideas were exchanged, and new connections were made, laying the groundwork for future projects and innovations. The involvement of alumni speakers underscored the ongoing relationship between the institution and its graduates, showcasing the impact of IcfaiTech Hyderabad's education on their successful careers.

Hands-On Session

AIn conclusion, the workshop achieved its objective of bridging the gap between theory and practice, inspiring participants to explore and contribute to the rapidly evolving fields of Speech, NLP, and Generative AI. The knowledge and skills acquiredduring this event will undoubtedly equip them to navigate and influence the future of these transformative technologies.