PRESIDENT'S SCIENCE & TECHNOLOGY AWARDS

YOUNG SCIENTIST AWARD 2023

Dr Soujanya Poria
Assistant Professor of Computer Science
Singapore University of Technology and Design (SUTD)

"For his significant contributions in multimodal conversational AI that has gained widespread adoption, and for his outstanding work in affective computing which has been instrumental in multiple practical applications."

A large share of the data posted on social media is multimodal. This wealth of information is highly valued by businesses for use in a variety of ways including enhancing user engagement for better recommender systems and AdSense. However, effectively utilising such data requires aggregating information from constituent modalities, posing significant technical challenges to AI agent development. Dr. Soujanya Poria's research is dedicated to advancing AI by devising state-of-the-art techniques to tackle intricate multimodal tasks, including emotion recognition.

Dr. Poria's primary focus has been on overcoming the challenge of fusing multimodal information, achieved through multimodal representation learning and information-theoretic methods like mutual-information maximisation. Dr. Poria's work shows that amalgamating data from complementary modalities yields superior performance as compared to single-modal systems. The open-source code developed by Dr. Poria's team has gained widespread adoption in both academic and industrial spheres.

In addition to working on multimodal AI techniques, Dr. Poria is actively addressing the challenge of commonsense reasoning in natural language processing. Language models often struggle in this area, prompting Dr. Poria and the team to develop AI models and tasks tailored for context-aware commonsense reasoning. They endowed deep learning models with commonsense knowledge, improving performance on commonsense-oriented tasks like emotion recognition, dialogue understanding, and sentence ordering. The research also introduced a unique commonsense reasoning task where AI models answer causal questions using in-context speculation and creative thinking, with the goal of creating human-like AI assistants.

In recent years, Dr. Poria and his team have played a significant role in advancing dialogue understanding. They have focused on important issues within this field, including the extraction of implicit knowledge triplets from conversations and emotion recognition in conversations (ERC). These tasks hold particular significance for businesses that employ chatbots for customer interactions, as they enhance comprehension of conversations, leading to better customer engagement. To address these challenges, Dr. Poria's team

has created a range of open-source algorithms for modelling dialogue context, utilising advanced techniques like transformers and graph neural networks. Additionally, Dr. Poria has curated extensive datasets, which have been instrumental in establishing this research area as a crucial subset of dialogue system studies. Importantly, this research bears practical implications in areas such as mental health assessment, grasping student behaviours, and enhancing engagement in online education.

Currently, Dr. Poria is actively working on Large Language Models (LLM) to make them explainable, accessible, trustworthy, responsible, multimodal, and resource-efficient by design. His research efforts have led to the creation of holistic evaluation benchmarks of LLMs, safety checking of LLMs, and parameter-efficient adaptation of LLMs in diverse Natural Language Processing (NLP) tasks.

Dr. Poria nurtures the future generation by advising a number of postdoctoral fellows, researchers, and students. Some of his students have won significant research awards or established their careers at top AI companies. Dr. Poria also encourages young researchers to join AI research by participating in different mentorship programs. He motivates them to research AI techniques that can directly benefit societal issues.