Research Conference key points

Prof. mahesha kapurubandara's speech about AI

Artificial Intelligence (AI) is a highly intelligent and continuously learning system that improves its decision-making abilities through the data it receives. Training AI is often compared to training a dog—it requires feedback, repetition, and reinforcement to improve. AI is already embedded in our daily lives through platforms like Netflix, Siri, and online banking, making it accessible to everyone without needing specialized technical knowledge. However, while AI is powerful, it lacks human qualities such as ethics, sympathy, and creativity. Therefore, humans remain in control, and AI needs our guidance to function responsibly.

With growing global challenges such as climate change and limited resources, there is an urgent need for innovative solutions, and AI provides a path forward. One powerful example is from two university students who developed an AI-based model to help farmers optimize irrigation based on weather and soil moisture data—reducing water waste and increasing agricultural profits. Beyond agriculture, AI is also transforming sectors like healthcare, particularly in rural areas where access to doctors is limited. AI-powered diagnostic tools and telehealth solutions allow patients to connect with doctors remotely. Despite fears of AI replacing jobs, it is actually a tool to enhance human abilities—similar to how a spaceship is useless without an astronaut. Furthermore, AI is being used in environmental conservation, such as detecting illegal logging in forests through satellite image analysis. In Sri Lanka, a rising generation of students is embracing AI, showing that innovation is not limited to global tech giants.

Nonetheless, there are risks associated with AI, including biases in data, high energy consumption, and inequality in access. The system only reflects what it is taught, so it is up to us to shape it responsibly. In the broader economic context, capitalism often focuses on what is profitable rather than what is necessary. This can result in missed opportunities for innovation when profit margins are not strong enough. For example, the U.S. lacks a unified payment system like LankaPay and instead relies on services like Venmo. Additionally, unsustainable profit models pose major risks—such as the case of Beeworks, which collapsed despite once being valued in the billions due to poor financial management. Sustainable capitalism must prioritize purpose and long-term value over short-term profits. Businesses that practice social responsibility—like Dilmah, which donates 15% of its profits to community development—are increasingly favored by consumers. Sustainability now influences 10–20% of brand pricing, indicating that ethical practices are not just moral, but also profitable. The key message is that meaningful, purpose-driven growth is more valuable than rapid, unsustainable expansion.

The final section focuses on unconventional computing, a field that explores non-traditional computing models using biological, chemical, and physical systems. Examples include Physarum machines (based on slime mold), Belousov-Zhabotinsky chemical computers, and memristors, which are physical components that relate magnetic flux and charge. These systems often possess remarkable traits like self-repair, self-assembly, and embedded sensing capabilities, making them efficient and sustainable. Physarum Polycephalum, a type of slime mold, has been used in computing experiments due to its ability to solve complex problems naturally. The concept of multimodal sensing—integrating various sensory inputs for smarter computation—was also covered. Memristors are particularly critical to this form of computing and have been tested in early-stage experiments for tasks like encoding and decoding data. Additionally, the physical implementation of these systems requires specially designed receptacles, showcasing the need for integrated hardware to support unconventional computing models.

Mr. Kalana Muthu Speech

Mr. Kalana Muthu, co-founder of Hypergheds, emphasized the crucial intersection between capitalism and sustainability, particularly for small and medium enterprises. He discussed the importance of **collateral-free credit**, highlighting that many promising businesses lack the traditional guarantees required by banks but still maintain strong revenue and trustworthy payment histories. He warned about the **danger of unsustainable profit models**, using the case of WeWork—a startup once worth billions but ultimately bankrupt due to poorly planned, unaffordable long-term leases. In contrast, companies like Regus (a real estate company) succeeded by **managing their revenue effectively** and evolving their business model, now holding over $8 billion in assets. This contrast shows that **validating business models before scaling** is essential.

He also spoke about **"capitalism with a conscience,"** stressing the need for businesses to align with ethical and sustainable values. Consumers and young professionals increasingly support brands that reflect these values. Examples include **Patagonia**, whose founder gave away ownership to fight climate change, and **Dilmah**, a Sri Lankan tea company that donates 15% of its profits to community development. This trend highlights that **sustainability is no longer optional—it's a necessity.** Unsustainable models, regardless of their scale or speed of growth, will eventually collapse. Kalana pointed out that meaningful growth must include ethics, regeneration, and long-term thinking—not just profits and market domination.

Additionally, he contrasted fintech systems in the U.S. and New Zealand. Despite the U.S. being a larger market, it still lacks real-time bank transfers, unlike smaller but more efficient systems. This reveals that **clear market needs do not always result in profitable innovation**—capitalism tends to solve what's profitable, not always what's necessary. Finally, he highlighted innovative credit models that use **supply chain movements and payment behavior** as alternative metrics for assessing creditworthiness, helping underserved but capable businesses access financial support without traditional collateral.

Dr. Edward Braund's Presentation

Dr. Edward Braund, Head of the School of Computer Science at the University of Bedfordshire, delivered an insightful presentation on *Unconventional Computing: Experiments in Biological Computing*. He explained that unconventional computing explores alternative computing models that go beyond classical systems, focusing on new languages, architectures, and physical mediums. Current experimental prototypes in this field include biological systems such as **Physarum machines**, chemical systems like **Belousov-Zhabotinsky computers**, and physical systems such as **memristors**.

A central focus of his talk was on **Physarum Polycephalum**, a slime mold with remarkable computational capabilities. This organism demonstrates built-in intelligence, the ability to self-repair and self-assemble, and high sustainability—traits that traditional silicon-based systems lack. Dr. Braund highlighted research showing that Physarum can be applied to solve complex problems and that its integration with sensors and actuators significantly enhances processing efficiency. He emphasized the quote, *"Biological systems equipped with sensors and actuators enhance processing efficiency,"* to reflect this core advantage.

In terms of practical experimentation, early findings indicate that biological computing is moving from theory to reality. For example, Physarum-based systems have successfully been used to **map pitches to voltage levels**, enabling **data encoding and decoding**. Furthermore, **memristors**—electronic components that relate magnetic flux and charge—are emerging as vital elements in unconventional computing applications.

Dr. Braund concluded by stating that **multimodal sensing techniques**, which integrate different types of sensory input, show strong potential for enhancing computing performance. Overall, biological computing stands out as a **sustainable, efficient, and innovative** alternative to traditional computing methods, marking a significant shift toward **practical, experimental implementations** in the field.