Embodied online dancing and partying with the help of digital characters.

The Internet connects individuals to the world and to other people by means of virtual social networks. However, the online experience is mostly passive, disconnected and disembodied. Internet users are patently part of the digital world, but often isolated from real-world sensations and feelings such as the presence of others, their touch, or their movement. We find ourselves isolated, instead of brought together, by the very technologies that are designed to connect us.

CAROUSEL has the vision that, with the support of novel, original and imaginative combinations of Artificial Intelligence and immersive interaction technologies, people will be able to feel each other's presence, touch, and movement, even if they are physically disconnected. These new developments will help overcome isolation and loneliness and bring improvements to our health, work, and wellbeing. Moreover, they will also generate the foundations for an ecosystem of original, as yet unimagined forms of communication and expression.

In CAROUSEL we have chosen dance as vehicle to implement our vision. Because dance is a profoundly human activity; we dance when we are in love, we show we are happy with dance, sharing a dance with someone creates a deep connection. By combining thinking, feeling, sensing with physical movement, Dance generates powerful positive effects on physiological and psychological well-being.

Our studies include modern freeform dance styles in groups and in pairs, folk dances, and partner dances such as tango. Scientifically and technically, we believe dance presents a special challenge due to the complex dependency between the motions, the music, the tactile contact and the dancers' feelings and sensations. The results learned from dance will open up research avenues to many other use cases in the future, from physical training to manual assembly, martial arts, companionship etc., that require close and subtle collaboration and synchronization in groups.

A person may feel lonely or isolated if they find themselves with nobody to contact, temporary confined, in pandemic quarantine or lockdown conditions. This person may open an interaction with a digital character and start dancing together; other real people may decide to join. In live events an icebreaker, for example from a group animator, an inspiring dancer, musician, moderator, trainer, or companion is often needed to kick-start the interaction. We imagine that an autonomous digital character will be able to play this role in the future. This is precisely the technical CAROUSEL breakthrough: to create AI-driven characters who will be able to interact autonomously with a single person or a group of people in a meaningful way and the people can feel and dance with each other even if they are physically not in the same space!

The core of the CAROUSEL research is the experimentation with humans. The project involves partners from technical, scientific, social science, innovation, and artistic backgrounds from the outset. Our research will study the main senses involved in dancing: Audio, Vision, Haptics, to develop technology for human interaction and intelligent simulation and control of physically plausible digital characters.

Artificial General Motion Intelligence
Purely emergent AI agents (non-remote person driven).
Building from these contexts enhancing remote human interaction.
Passing a connected virtual dancing form of the Turing Test

Virtual Crowd Presence
Ability to influence and feel the influence of a crowd in motion physically and tangibly

Physical Avatar Contact
Enables remote physical contact with low latency, heightening the measurement of tangible co-presence

State of the Art
Disconnected individual technical solutions for motion capture, animation retargeting, generative animation, and XR audio, visual, haptic display

Increasing Challenge

The innovation perspective of this new branch of "Real-World Social and Physical AI" is tremendous as it has countless applications, requiring meaningful physical and social interaction. In particular, in the future, digital characters may act as physical trainers, dancers, entertainers, actors, coworkers, health assistants, guides, educators, spectators, physical therapists and companions. Beyond social, entertainment, health and educational applications, CAROUSEL's insights on body language and group dynamics may be deployed in many other areas, including security, peace-making, emergency handling and autonomous driving.

The project is coordinated by Deutsche Forschungszentrum für Künstliche Intelligenz (DFKI)s with the participation of Edinburgh Napier University, Aalto University, Grassroots Arts and Research and VIVITnet.