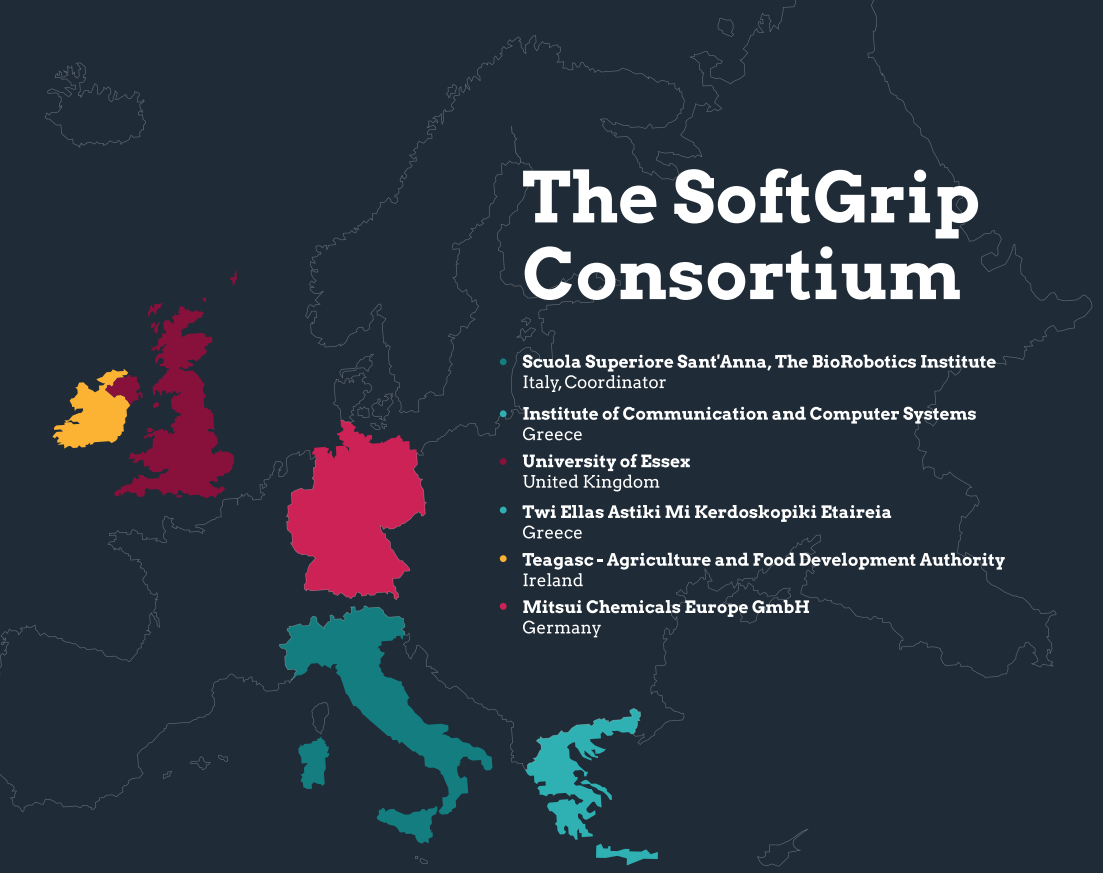

The SoftGrip Consortium

- **Scuola Superiore Sant'Anna, The BioRobotics Institute**
  Italy, Coordinator
- **Institute of Communication and Computer Systems**
  Greece
- **University of Essex**
  United Kingdom
- **Twi Ellas Astiki Mi Kerdoskopiki Etaireia**
  Greece
- **Teagasc - Agriculture and Food Development Authority**
  Ireland
- **Mitsui Chemicals Europe GmbH**
  Germany

Project Info

Starting date: **January 2021**
Duration: **36 months**
Funding: **~ 3 M€**
Coordinator: **Scuola Superiore Sant'Anna, The BioRobotics Institute**
Partners: **6 from 5 EU countries**

SoftGrip

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SoftGrip

SoftGrip

Functionalized Soft robotic gripper for delicate produce harvesting powered by imitation learning-based control

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 101017054.

Summary

Labour costs often represent up to 50% of total production costs in the fresh food industry. **The EU-funded SoftGrip project will introduce a self-actuating soft gripper for the autonomous picking of delicate white button mushrooms**.

SoftGrip Project came into existence to bring about a technological shift to the fresh food industry. The implementation of Artificial Intelligence innovation and robotic automation can facilitate delicate harvesting, boost production, and decrease labour costs for European SMEs in the mushroom farming sector. The intelligent soft gripper, having embedded sensing and actuation while equipped with skill-transfer capabilities by imitation, aims to become an economically viable, easily scalable, and environmentally friendly solution that will revolutionise the world of fungiculture and the soft fruit market at large.

Objectives

01 Research and develop **low-cost**, **soft robotic grippers** having **built-in actuation, sensing and embodied intelligence that enable safe-grasping, adaptability** to object shape, and grasping **versatility** for reliable and efficient picking of mushrooms.

02 Research and develop the engineering and blending of **novel materials** that offer **precise tuning of important material properties**, safe interaction with the food elements, have minimum impact on the environment and provide robust and maintenance-free production over a many cycles of operation.

03 Research and develop a set of **accelerated continuum mechanics modelling algorithms** that will facilitate sophisticated **model-based control schemes**.

04 Research and develop **advanced cognition capabilities** of the soft gripper through a **learning by demonstration** framework.

Features of the Soft Robotic Gripper

Soft
To perform inherently safe grasping of fragile and pressure sensitive objects

Food-safe
All materials used for the soft gripper will be food safe according to the EU food-safe directives

Intrinsic Sensing
SoftGrip will employ new manufacturing techniques to embed deep into the soft material sensing elements

Imitation Learning-based
Advanced robotic control and machine learning algorithms for learning by demonstration will be implemented

Self-repair
The challenge is to design the self-healing material without compromising the mechanical properties such as strength and stiffness

Recyclable
All materials used for the soft robotic gripper will be recyclable based on chemical recycling processes

Embodied Intelligence
The functionalities of the soft gripper will be translated into physical intelligence

Low Cost
The soft gripper mechanism will be a practical, low-cost, and scalable solution