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1. Introduction

Team 1 of the Spring 2026 semester at the Instituto Superior de Engenharia do Porto (ISEP) embarked on a project that connects food production with modern mental health challenges. The team, composed of six students from various cultural and academic backgrounds, chose to develop an automated basil-growing system designed to act as a physical mirror for the user's digital habits. By linking the physiological health of a living plant to a person's screen time, the project aims to make Smart Pot, an automatic watering system connected to screen time statistics from the user's phone. This first chapter focuses on introducing the team, the motivation behind the chosen topic, and the problem description.

Presentation of the team

Team consists of six students gathered from across the world, coming from different fields of studies. Students data is presented in the table below.

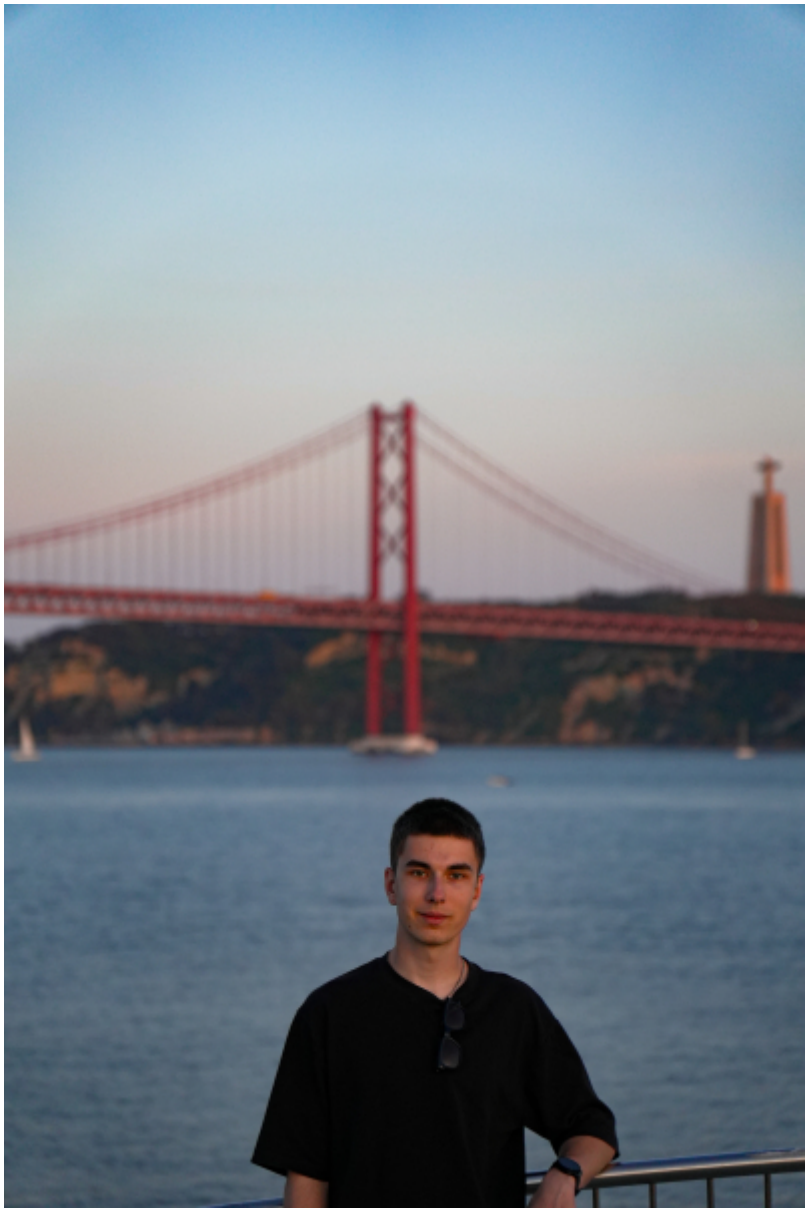
Name	Field of study	Country
Kacper Furczyński	Mechanical Engineering	Poland
Sunwoo Choi	Convergence Security Engineering	Korea
Hanna Linnea Østern	Applied computer technology	Norway
Avkaran Sarminder Singh Dhillon	Electronics/ICT	Belgium
Sophie Tanzer	Media Technology	Austria
Ymke Roelfien Adema	Industrial Product Design	Netherlands

Avkaran Sarminder Singh Dhillon

I am a 22 year old bachelor student from Belgium who studies full-stack web & app development at Odisee, a college under KU Leuven. I am fascinated by the world of tech, but also the human mind and art. I am prominent in Javascript, Vue, PHP, Laravel, Ionic Capacitor, Java, .NET and Python. I like to spend my time creating. Whether it's making a full-stack application, a dish, music or a story, I dive into the task and I make it flourish.

I have experience working as IT support in several banks in Belgium, working as full-stack web developer for a non-profit organization in Belgium named BSYA and I have experience in team work, reporting and representing a large group of people as representing student of my study program and secretary in the student council of my college.

Kacper Furczynski



I am 6th semester Mechanical Engineering student at the Technical University of Lodz, Poland. Most of the projects I have completed were in collaboration with the Institute of Turbomachinery and concerned wind turbines with both vertical and horizontal axis of rotation. I have work experience in manufacturing environment, chocolate plant located in Lodz.

Hanna Linnea Østern

I'm an Applied Computer Technology student from Oslo Metropolitan University in Norway. I've previously worked on projects focusing on user experience, digital solutions, and system development. Through this work, I have gained experience with technologies such as HTML, CSS, JavaScript, while also developing an understanding of innovation and business within the technology field.

Sophie Tanzer

I am Sophie, 22 years old and currently studying Media Technology in my sixth semester at the University of Applied Sciences in St. Pölten, Austria. My expertise lies in the creative field, especially in photography, audio and video production and their technical workflows.

Sunwoo Choi

I am studying Convergence Security Engineering at Sungshin Women's University in Korea. My major is related to cybersecurity, but I have not had many chances to do projects or team activities yet. Through this project, I have learned things like marketing analysis and basic knowledge from other majors.

Ymke Roelfien Adema

Hi, I’m Ymke, a 21-year-old Industrial Product Design and Engineering student from the Netherlands. I’m passionate about developing products that combine functionality, technology, and user experience. Through my studies, I’ve developed both creative and technical skills, and I’m especially interested in working on projects where different disciplines come together. In the future, I aim to move into the field of project management, where I can coordinate teams and guide ideas from concept to final product.

Motivation

The motivation for this project stems from increasing concerns regarding the psychological effects of excessive smartphone usage, which has become a growing issue in contemporary society. Numerous studies have highlighted the negative consequences of prolonged screen time on attention, stress levels, and overall well-being. While indoor gardening has been widely recognized as a beneficial activity for stress reduction and mental health, the project explores the potential of transforming the act of growing basil from a passive activity into an interactive mechanism that encourages self-regulation.

The central objective is to use the visual condition of the basil plant as a form of feedback that reflects the user’s digital behavior. By linking the plant’s state to smartphone usage, the system aims to make users more aware of the relationship between their digital habits and their physical environment. In this way, the basil plant functions as a tangible and living reminder that encourages users to reduce excessive phone use and engage more consciously with their surroundings.

Problem

Indoor plants are known to contribute positively to mental health and stress reduction. However, maintaining plants requires time, attention, and consistency; resources that many individuals with busy schedules often lack. As a result, plants are frequently neglected or abandoned.

Another challenge is that digital addiction is largely invisible. Unlike physical exhaustion, the negative consequences of excessive screen time develop gradually and are easy to ignore. Existing solutions, such as smartphone screen-time notifications or app usage limits, are often ineffective because users can easily dismiss or bypass them.

This project addresses this problem by exploring how digital behavior can be translated into a physical and biological feedback system. The proposed concept is a Smart Pot designed for growing herbs such as basil. The system connects smartphone screen-time data with an automated watering mechanism. When the user exceeds a predefined screen-time limit, the watering system shifts to a suboptimal mode, causing the plant to deteriorate. Conversely, responsible phone usage maintains optimal conditions for plant growth.

By linking digital habits to the health of a living plant, the system introduces a tangible and emotional feedback loop intended to increase awareness of smartphone overuse and encourage healthier digital behavior.

Objectives

General Objectives

The primary objective of this project is to develop a prototype of an interactive Smart Pot system for indoor herb cultivation that integrates smartphone usage data with automated plant care mechanisms. The goal is to promote awareness of excessive screen time and encourage healthier digital habits.

Specific Objectives

To achieve this goal, the project will pursue the following objectives: Design and develop a functional prototype of a smart plant pot capable of supporting the indoor cultivation of basil in small residential environments. Integrate smartphone screen-time monitoring with the physical system in order to establish a connection between digital behavior and plant care. Develop and implement an automated irrigation system whose operation is influenced by the user’s smartphone usage patterns. Create a biological feedback mechanism in which the condition of the plant reflects the user’s level of smartphone use. Assess the feasibility of using plant-based feedback as a tool to increase awareness of excessive smartphone usage. Ensure the prototype is suitable for compact indoor environments, where access to outdoor gardening and natural spaces is limited.

Expected Outcome

The final outcome of the project will be a working prototype of a Smart Pot system that demonstrates

the feasibility of translating digital behavior into a physical and biological feedback mechanism, encouraging users to develop more conscious and balanced smartphone usage habits.

Requirements

Functional Requirements

Monitor smartphone usage for selected applications. Compare user screen-time with predefined daily limits. Adjust water supply to the plant based on smartphone usage. Maintain suitable conditions for indoor basil growth. Communicate plant status and usage feedback with the mobile app. Operate autonomously with minimal manual intervention.

Technical Requirements

Include a microcontroller (ESP32 or equivalent) for processing and control. Use Wireless Fidelity (Wi-Fi) or Bluetooth for communication with the mobile app. Implement a water control system for adjusting irrigation (hydroponic or soil-based). Optionally include sensors for water level, plant health, or environmental conditions. Provide a safe and reliable power supply. Ensure compact design suitable for small indoor environments.

User and Design Requirements

Be easy to set up and maintain for non-technical users. Provide clear behavioral feedback via the plant and mobile app. Be aesthetically suitable for indoor spaces (apartments, offices). Encourage responsible smartphone usage without causing stress. Constraints Operate within budget limitations (Yet to be defined)(affordable and accessible components). Be feasible to develop within the project timeline. Allow future upgrades or expansions (e.g., sensors or hydroponics refinements). Ensure electrical and water safety in the design.

Tests

Report Structure

Add the missing descriptions to the table

Chapter	Description
1 Introduction	…
2 Background and related work	…
3 Project management	…
4 Marketing plan	…
5 Eco-efficiency measures for sustainability	…
6 Ethical and deontological concerns	…
7 Project development	…

Chapter	Description
8	...