

# Guide 1. APT Project Definition Capstone Subject

## A. PART I

### 1. Personal Background

Below is a table in which you must complete the requested information.

Names	Angelo Curin, Gerard Jiménez y Anaelí Neira
Rut	20.709.152-9, 19.235.806-K, 21.472.634-3
Career	Engineering of informatic
Headquarters	Antonio Varas

### 2. APT Project Description

In the description, you should briefly describe the name of your APT project and the graduate profile competencies you will implement. If your program defines performance areas, also mention which performance areas the project is linked to.

Project name	Vigilia
Area(s) of performance(s)	<p>In this project, several areas of expertise will be addressed, including development, evaluation, and project management. These three dimensions will serve as the foundation for creating the work plan, identifying risks, costs, and benefits, as well as monitoring progress, correcting deviations, and ensuring compliance with project objectives.</p> <p>Furthermore, the project will incorporate machine learning and deep learning techniques, enabling the system to process complex data, detect critical events, and continuously enhance its performance.</p> <p>Finally, emphasis will be placed on mobile development, software engineering, and business intelligence. These areas will support the creation of a mobile</p>

	application, the development and maintenance of system quality, and the transformation of data into strategic decision-making insights.
Competencies	<p><b>Competencies to Be Addressed</b></p> <ul style="list-style-type: none"> <li>• To provide proposals for IT solutions by comprehensively analyzing processes in accordance with organizational requirements.</li> <li>• To develop software solutions using methodologies that systematize the development and maintenance process, ensuring the achievement of objectives.</li> <li>• To program queries or routines for manipulating database information according to organizational needs.</li> <li>• To conduct certification testing of both products and processes, applying industry-defined best practices.</li> <li>• To implement comprehensive systemic solutions to automate and optimize business processes in line with organizational requirements.</li> <li>• To address systemic vulnerabilities to ensure that the developed software complies with industry security standards.</li> <li>• To manage IT projects by offering alternatives to support decision-making according to organizational requirements.</li> <li>• To solve real-world, scientific, and workplace problems using elements of descriptive statistics.</li> <li>• To demonstrate the ability to generate innovative ideas, solutions, or processes that respond to opportunities, needs, and productive or social demands, in collaboration with others and assuming calculated risks.</li> <li>• To develop entrepreneurial projects based on the identification of opportunities within one's area of expertise, applying relevant techniques with a focus on adding value to the environment.</li> </ul>

### 3. APT Project Foundation

Below are various fields that you must complete with the requested information. This section aims to help you describe your project in detail and justify its relevance and suitability.

<p>Relevance of the APT project</p>	<p>Chile faces a growing challenge due to its aging population, as there is a severe shortage of specialized facilities for older adults. As a result, most of them live with their families, creating a double burden: older adults may experience a loss of autonomy and face health risks from chronic diseases, while their families bear a significant emotional and physical load, often sacrificing their personal and professional lives due to the lack of support and effective tools.</p> <p>We chose this issue because it currently lacks a widely adopted solution in our country. Moreover, we believe it is a relevant challenge to address using the knowledge acquired in our field of study, as it offers a convenient and user-friendly solution.</p>
<p>APT Project Description</p>	<p>We present an intelligent support and alert system that respects the privacy and dignity of older adults. Instead of constant human monitoring, our technology uses algorithms and pattern analysis to notify family members only when an event requires their attention.</p> <p>Our solution is based on a mobile application and the integration with smart cameras that the user already has at home. The system operates under a subscription model with different plans:</p> <ol style="list-style-type: none"> <li><b>Basic Plan (Minimum Viable Product)</b></li> </ol> <p>Image Recognition: Fall detection through video.</p> <p>Reminders: Notifies about medication schedules, meals, and other activities.</p> <p>Alerts: Notifies family members of any activity that is not completed.</p> <hr/> <ol style="list-style-type: none"> <li><b>Plus Plan +</b></li> </ol> <p>Includes all features of the Basic Plan, plus:</p> <p>Accelerometer: Fall detection based on movement.</p> <p>Gyroscope: Fall detection based on rotation speed.</p> <p>Reporting: Weekly or monthly compilation of alerts.</p> <hr/> <ol style="list-style-type: none"> <li><b>Premium Plan (Future Versions)</b></li> </ol> <p>Includes all features of the Plus Plan, plus:</p> <p>Monitoring: Routine analysis based on predefined rules and schedules; the system analyzes patterns.</p>

	<p>Motion Sensor: Monitors the older adult's physical activity and notifies of unusual movements such as unannounced visitors.</p> <p>Temperature Sensor: Can monitor bathroom conditions to detect possible falls.</p> <p>Step Counter: Verifies movement patterns to promote an active lifestyle.</p>
Relevance of the project to the graduate profile	<p>This project is related to the previously mentioned competencies, as they are essential to deliver a comprehensive and functional solution.</p> <p>Working with these competencies provides and ensures high-quality outcomes.</p>
Relationship with professional interests	<p>We have three professional interests that complement each other. The first is software development, which allows us to offer diverse solutions tailored to the needs of stakeholders. The second is project management, which is essential as it serves as the foundation for initiating development. Finally, our third interest is data analysis, which is crucial for decision-making, as it enables us to extract valuable information and identify patterns that guide strategy and development.</p> <p>These skills are essential for carrying out the project and also contribute to our personal and professional growth.</p>
Feasibility of developing the APT Project	<p>This project is feasible to develop because we have a clear understanding of the necessary tools to begin building it, how each of them is used, and the time dedicated to the project.</p> <p>One potential challenge could be the training of stumble-related data for falls, since there are no existing datasets with that information and we would need to generate it ourselves. On the other hand, factors that could facilitate the process include the integration of system alerts and the availability of fall-related datasets.</p>

## B. PART II

### 4. Objectives

In this section, you must define the general and specific objectives of the APT Project. It is important to clarify that the objectives should be stated clearly, concisely, and without further explanation; that is, they should be self-explanatory. It is suggested that they be written using an infinitive verb, as this requires specifying specific actions.

General objective	To implement a technological intelligent support system that improves the quality of life and safety of older adults in their homes, while providing peace of mind and support to their family caregivers.
-------------------	--

Specific objectives	<ol style="list-style-type: none"> <li>1. To develop a mobile application for Android that uses the device's accelerometer to detect high-impact falls and send alerts to family members.</li> <li>2. To implement a video analysis system based on predefined routines to monitor patterns of eating, medication, and physical activity.</li> <li>3. To create a platform that provides family members with relevant information and alerts, offering peace of mind and reducing the burden of care.</li> </ol>
---------------------	--

## 5. Methodology

In the following section, you must describe the methodology, specific to your discipline, that you will use to complete the APT project described above, including the stages and working methods.

### Description of the Methodology

For this 15-week project, the Scrum methodology will be used. This agile approach is ideal as it enables iterative development and continuous product improvement, while adapting to technical and market insights that may arise during the process.

## 6. Evidence

Next, describe what evidence will be assessed in the progress report and the final report for your APT project. This evidence should be agreed upon with your instructor. Evidence refers to the products developed during the project and whose purpose is to visualize or document how the work was implemented.

Type of evidence (advance or final)	Evidence name	Description	Justification
Advance	Model training for fall detections <a href="https://github.com/RedSilentTides/Capstone">https://github.com/RedSilentTides/Capstone</a>	GitHub link where the entire system development will be hosted	Evidence of all developments carried out during the semester
Advance	<a href="https://drive.google.com/drive/u/0/folders/1P8_IRNyAOJufTZ852i_nuLEEMBpryua2">https://drive.google.com/drive/u/0/folders/1P8_IRNyAOJufTZ852i_nuLEEMBpryua2</a>	Google Drive repository where all finalized documentation is hosted.	Supporting evidence of all documentation required for the project.

## 7. Work Plan

## Student Guide - APT Project Definition Phase 1



In the following table, define your APT Project planning according to the requirements.

APT Project Work Plan						
Competence or units of competences	Name of Activities/Tasks	Description Activities/Tasks	Resources	Duration of the activity	Responsible <sup>1</sup>	Observations
To develop a software solution using techniques that systematize the development and maintenance process, ensuring the achievement of objectives.	Web/Mobile Development	<ol style="list-style-type: none"> <li>Find datasets that can be used.</li> <li>Train the model.</li> <li>Explore tools that can be used.</li> </ol>	<ol style="list-style-type: none"> <li>Visual Studio</li> <li>Node JS</li> <li>React Native</li> </ol>	8 Weeks	Gerard Jiménez.	It is difficult to begin training the model because it yields an accuracy of 1, indicating overfitting.
Resolve systematic vulnerabilities to ensure that the software built meets industry-required security standards.	Set up cameras	<ol style="list-style-type: none"> <li>Search for cameras</li> <li>Configure cameras</li> <li>Review security protocols</li> </ol>	<ol style="list-style-type: none"> <li>Cameras</li> <li>ARM Board (SBC)</li> </ol>	2 Weeks	Angelo Curin	It is difficult to choose the most optimal ARM board for the project.
Ability to generate innovative ideas, solutions or processes that respond to productive or social opportunities, needs and demands, in	Develop MVP	<ol style="list-style-type: none"> <li>Determine prototype plans</li> <li>Generate cash flow to validate values</li> <li>Develop MVP</li> </ol>	<ol style="list-style-type: none"> <li>Canva</li> <li>Excel</li> </ol>	3 Weeks	Anaelí Neira	The cash flow analysis was hindered in determining the product's values because we did not know how the

<sup>1</sup> If the APT Project is a group project, the names of those responsible for each task or activity should be indicated in this column. This will later allow for different evaluations for each member.

collaboration with others and assuming calculated risks.						project would be financed..
--	--	--	--	--	--	-----------------------------

## 8. Gantt Chart

Find a Gantt chart format that suits you and organize the activities planned in the previous point, taking into account the period assigned for the development of your APT Project. You must maintain the academic period in the development of the three phases of the Degree Portfolio Course.

Activity	Phase 1				Phase 2											Phase 3		
	S 1	S 2	S 3	S 4	S 5	S 6	S 7	S 8	S 9	S 10	S 11	S 12	S 13	S 14	S 15	S 16	S 17	S 18
Requirements Survey	X																	
Definition of MVP functionalities (Basic Plan)		X																
System design (App + Cameras)			X	X														
Camera protocol validation					X	X												
Web/Mobile Development					X	X	X	X	X	X	X	X						
Fall recognition module (computer vision)						X	X											
Reminder module (medication, nutrition, routines)							X	X	X									
Monitoring and pattern analysis module									X	X	X							
Family alerts and notifications module										X	X	X						
Internal testing and bug fixes												X	X	X				
Launch of the MVP (Basic Plan)															X	X		