# Problem Statement Worksheet & Development Challenges – Axela: AI Control Agent

## Problem Statement Worksheet

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| Section | Answer |
| Original problem or focusing question | * Users lack a free and personalized AI assistant that can integrate across laptops and mobile devices while performing system-level tasks and daily automation. |
| Stakeholders who are most affected by the problem | * Everyday users who want to explore AI. Students and professionals who need efficiency and productivity. Individuals who rely on multiple devices daily. |
| Type of problem | * Resource and accessibility issue: Current AI assistants are limited, often paid, fragmented by platform, and not designed for full personalization or deep system integration. |
| Suspected cause of the problem | * Current AI assistants are restricted by platform ecosystems, preventing deep integration with laptops and mobiles. Most provide only basic functions such as reminders or web searches, while lacking system-level control and daily personalization. Many advanced features are locked behind paid versions, making them less accessible to all users. |
| Goal for improvement and long-term impact | * To design and implement a cross-platform AI assistant that is free, efficient, and customizable. The prototype will focus on core features such as system commands, file management, voice recognition, and mobile connectivity. Long-term, the goal is to make AI a universal everyday tool, used and useful for everyone in this AI-driven generation. |
| Proposal for addressing the problem | * Our team proposes developing Axela – AI Control Agent, a cross-platform assistant that: Runs on both laptops and mobile devices. - Performs system tasks (shutdown, file handling, task management). - Supports voice recognition, text-to-speech, and web search. - Offers customization (freedom levels, memory size, scripts). - Is built as a free, easy-to-use, and scalable prototype that can later expand into contextual awareness, automation, and integrated communication. |
| Final problem statement | * Current AI assistants are limited by platform restrictions, paid models, and lack of deep integration or personalization. This leaves users without a free, accessible way to automate tasks, control devices, and manage workflows across laptops and mobiles. Our team proposes Axela – an AI Control Agent, a free, easy-to-use assistant that supports system commands, file management, voice recognition, web search, and mobile connectivity. Designed to handle everyday tasks and adapt to user activity, Axela will be immediately useful while creating a foundation for future features like contextual awareness, advanced automation, and communication. |

Developing Axela – AI Control Agent involves several technical and practical challenges. **Platform restrictions** may limit system-level commands, while achieving smooth **cross-platform integration** across laptops and mobiles adds complexity. Ensuring strong **privacy and security** is essential when handling personal data and voice inputs, and careful **resource management** is needed to prevent performance issues on weaker devices. **Voice recognition accuracy** across accents and noisy environments, along with effective **personalization** that adapts to daily activity, are also difficult to implement. The **cost of external AI/ML services** presents another hurdle, requiring open-source solutions to keep Axela free. Finally, **time and scope constraints** mean the prototype will focus on core features first, with advanced automation and contextual awareness left for future development.

## Development Challenges Worksheet

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| Section | Answer |
| Original problem or focusing question | * How can we design an AI assistant that executes system-level commands and integrates across devices when operating systems and APIs impose restrictions? |
| Stakeholders who are most affected by the problem | * The development team building Axela, as well as end-users who expect smooth cross-platform functionality without technical failures or security risks. |
| Type of problem | * Technical and implementation challenge: restrictions on system-level access, platform inconsistencies, and reliance on external AI/ML services. |
| Suspected cause of the problem | * Operating systems limit direct access to sensitive functions like shutdown or file control for security reasons. * Mobile APIs often require permissions or paid access. High processing demands of AI features can strain weaker devices and slow responsiveness. |
| Goal for improvement and long-term impact | * To deliver a working prototype that demonstrates system commands, voice recognition, and file management while ensuring security and efficiency. In the long run, the aim is to build a stable, scalable assistant that overcomes platform restrictions and adapts to user needs. |
| Proposal for addressing the problem | * Use secure APIs and platform-specific permissions to enable critical features. Employ open-source AI frameworks to reduce cost and dependence on paid services. * Design lightweight modules to manage resource consumption and avoid overloading weaker devices.  Develop a privacy-first approach with strict safeguards for personal data. * Deliver a phased prototype: core features first, advanced automation in future iterations. |
| Final problem statement | * Developing Axela will face hurdles such as system restrictions, cross-platform integration issues, and the heavy resource demands of AI services. Additional challenges include ensuring privacy, managing costs of external APIs, and working within the time limits of a senior project. Our team will address these by leveraging open-source tools, optimizing performance, and adopting a phased development strategy that prioritizes security, efficiency, and scalability. |

Developing Axela AI Control Agent faces several technical hurdles. **System-level restrictions** and **API limitations** make it difficult to implement commands like shutdown or file handling, while **cross-platform integration** across Windows, macOS, Linux, Android, and iOS adds complexity. Resource-heavy AI features such as speech recognition raise **performance concerns**, especially on weaker devices, and strong **privacy safeguards** are needed to protect user data. The reliance on **paid AI/ML services** also poses cost challenges, making open-source alternatives more practical. Finally, **time constraints** mean the prototype will focus on core functions first, with advanced automation and contextual awareness planned for future development.