ElectroCap Project Proposal

Handheld Digital Emulating Console

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TÉCNICO LISBOA

1. Advisors

- Scientific Advisor: Prof. Fernando Gonçalves
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2. Problem definition

Emulating consoles on-the-go is not viable as it can drain the battery of your other devices quickly. A handheld device whose purpose is only to emulate should solve the issue while offering more functionality.

3. Solution beneficiaries

The ones who benefit from our product would be all people who like relatively older games.

This product could also be appealing to younger people who might be slightly interested in LEE/LEEC courses but aren’t quite sure yet.

4. Technological solution

The solution is a handheld console which runs natively on an FPGA, wasting less battery while still allowing a portable experience.

The technologies used for this project are:

- FPGAs;
- 3D Modeling and Printing;
- Potentiometer/Hall-effect sensors;
- Data transfer protocols.

5. Competitors and previous work

As competitors we have the analogue pocket (https://www.analogue.co/pocket). They offer a pocket console as well, but it only runs certain consoles with physical cartridges and are sold out on their website.

6. Solution requirements

Must run at least one console and one game, have a reasonable amount of battery life (3+ hours) and, at least, semi-portable (considering an MVP).

7. Technical challenges

The technical challenges we might face are:

- Programming each console;
- Programming a user-friendly software to load the consoles;
- Entangling every hardware component (screen, joysticks, etc. into the FPGA);
- Reading and loading each game;
- Be a totally portable design.

8. Testing and validation metrics

The testing and validation metrics are the following:

- Portability;
- Battery usage;
- Ease of installation;
- Ease of use;
- Ergonomics.

9. Division of labor (I)

João Duarte	Bernardo Penela	Miguel Fernandes
Setup following and controller handling	**Setup following and controller handling**	**Battery and cooling**
Audio-Visual handling	**Audio-Visual handling**	

10. Division of labor (II)

João Pequeno	Gonçalo Antunes	Lucas Leiradella
3D Modeling and Design	**Battery and cooling**	**Setup following and controller handling**
		Audio-visual handling

11. Division of labor (III)

The division above presented is subject to change as the labor is completed.

12. Schedule

The schedule is the following:

- Phase 1 (until P3-W2):
  - Run MiSTer software on the FPGA;
  - Run a game on the FPGA.
- Phase 2 (until P4-W2):
  - Wire the controller buttons to the FPGA;
  - Wire a portable display to the FPGA;
  - Make a game run with the controller buttons and the portable display.
  - Start of battery implementation;
- Phase 3 (until P4-W6):
  - Have a CAD model printed to store the FPGA and the rest of the components;
  - Attach a battery and cooling to the housing and hook it up to the FPGA;
  - Run a game on the final portable console!
- Extras:
  - Have the FPGA store many games at the same time;
  - Have the FPGA store many consoles at the same time;
  - Create a user-friendly software:
    - To hook up the SD Card with the starting OS;
    - To upload consoles and games as desired.

The schedule will be updated on the website (https://joaoffduarte.github.io/Handheld_Emulating_Project/planning.html) as the project advances.