**UCPLA Dream Team Abstract Concepts - Hackaday Prize 2020**

## **Our Mission: Develop an affordable open-source platform to democratize assistive technology for interacting with the digital world.**

### Design Goals

* Universal Control
* Low cost / Affordable (without insurance)
* Durable / Easily repairable
* Portable / Mountable
* Scalable / Expandable
* Adaptable to each user
* Require minimal user effort
* Long Battery Life and/or easily chargeable
* Control Common Devices

### Target User

* Cannot use existing devices for extended periods without lots of effort
* Use devices in a seated position (wheelchair)
* Able to use their hands and/or feet to interact with the device
* Want to operate and access this device independently

### Limitations

* May require initial setup, configuration and customization from another person
* Some parts will be hard to come by and may take too long to design and test
* Limited understanding of all the different users capabilities, wants, and needs
* Less than 2 months to build a working prototype

### Target Devices

**Entertainment:** TV, Smart TV, Media Player, Streaming Box, RC Cars, Robots, Toys, etc

**Computers:** Web, Email, Chat, Photoshop, Games, Banking, Work, etc

**Tablets / Smartphones:** Call, Chat, Email, Web, Game, Banking, etc

**Mobility (Future Targets):** Motorized wheelchairs, Motor vehicles

# **Supplementary Information for Concepts/Other Concepts**

## **Proposal 1: Smart Remote** (Iteration of a [previous concept in use today](https://zukle.in/cp-remote))

* A versatile low power device usable out of the box.
  + No additional devices or supporting platforms required.
  + Initially setup like a typical universal TV remote
* Easiest and most intuitive for users with limited mobility
  + Users that have difficulty using existing interfaces like touch screens, keyboard, mouse, should be able to use this with ease
* A display will show users what functions are currently assigned to each button.
  + Additional functions can be added and accessed by turning “pages”
  + The home page can be a list of categories
  + Each category is like a chapter in a book, with as many pages as desired
  + Each button can have unlimited functions
* Integratable with existing connected devices and systems
  + Like smart home hubs, switches, lights, appliances, etc.
* An speaker could be added for additional feedback and options
  + Users could use the remote as an assistive communications device  
    This would require quite an extensive amount of time to initially develop

## Proposal 2: Low-cost Joysticks

**Approach 1: Open source, low-cost joystick**

* Deliver a few generic functioning joystick prototypes to UCPLA at the end of August
* Develop a digital parts library of 3D printed parts for customization for different hand grips, hand sizes, and other preferences
* Develop a DIY joystick parts kit
* Develop an instruction manual for easy assembly and user customization

**Approach 2: Wearable, motion-sensing joystick**

* Links for initial testing of drawing on Paint using “floating” joysticks
  + [Video 1(using two hands)](https://www.youtube.com/watch?v=xaj4_o-qeq4)
  + [Video 2 (using head and hand)](https://www.youtube.com/watch?v=7OEtlaxxQfM)

## Proposal 3: Platform App

**Motivations**

* The **cheapest solution** for the production once developed
* The **easiest to distribute** (no shipping costs, no 3D printing errors, no electronic components backordered, out of stock)
* The **easiest to adapt and to test** with the existing devices our users own
* The **availability of these devices** is possibly the highest as they are ubiquitous

Based on the similar concept of the survey we currently work on and have distributed version one on July 14, 2020, the app will be able to access the actual needs, desires and the existing tools of the user, thus suggesting him upgrades (open source or not), tutorials, and other resources.

App platform can be centralized to facilitate the onboarding of new and existing users of the centers like UCPLA. Please check the slides for the full list of features, pros, cons and challenges.

## Other Proposals

Two other proposals are mainly about using voice as the modality of control as well as focusing on smart home control (using voice and/or other modalities). Pros for these two options include the fact that based on the observations and input from UCPLA, voice is a powerful modality available to some extent to more than 50% of their users and other 50% being able to generate some sounds. As for the smart home, several excellent pre-existent resources are already available.

## Project Timeline

