



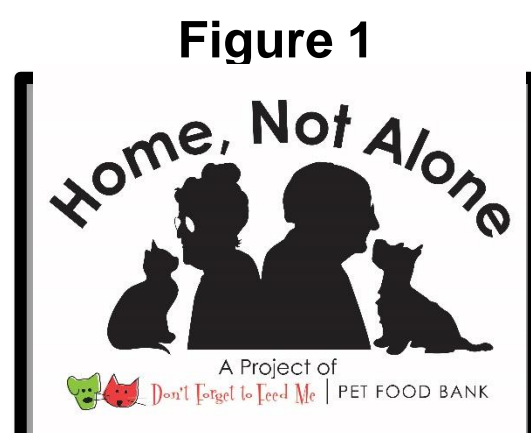
Smart Pet Cage

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BACKGROUND

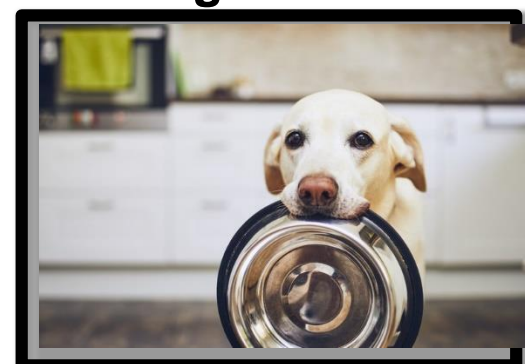
It's a lot more difficult to give your pet a raw diet than it is to open a package of meat and throw it into a bowl. Each meal must be balanced with the necessary micronutrients for proper pet nutrition and failing to include essential components in the diet can be harmful to health in the long term.



Credit: Don't forget to feed me

The smart pet cage is an innovative concept that consists of an automated process for feeding pets and monitoring the temperature conditions inside their abode. The idea arises from the need of pet owners to be able to focus on other activities while still having a pet at home. We aim to make the right use of technology to relieve pet owners from their daily pet chores and simultaneously promote the well-being of the animal

Figure 2

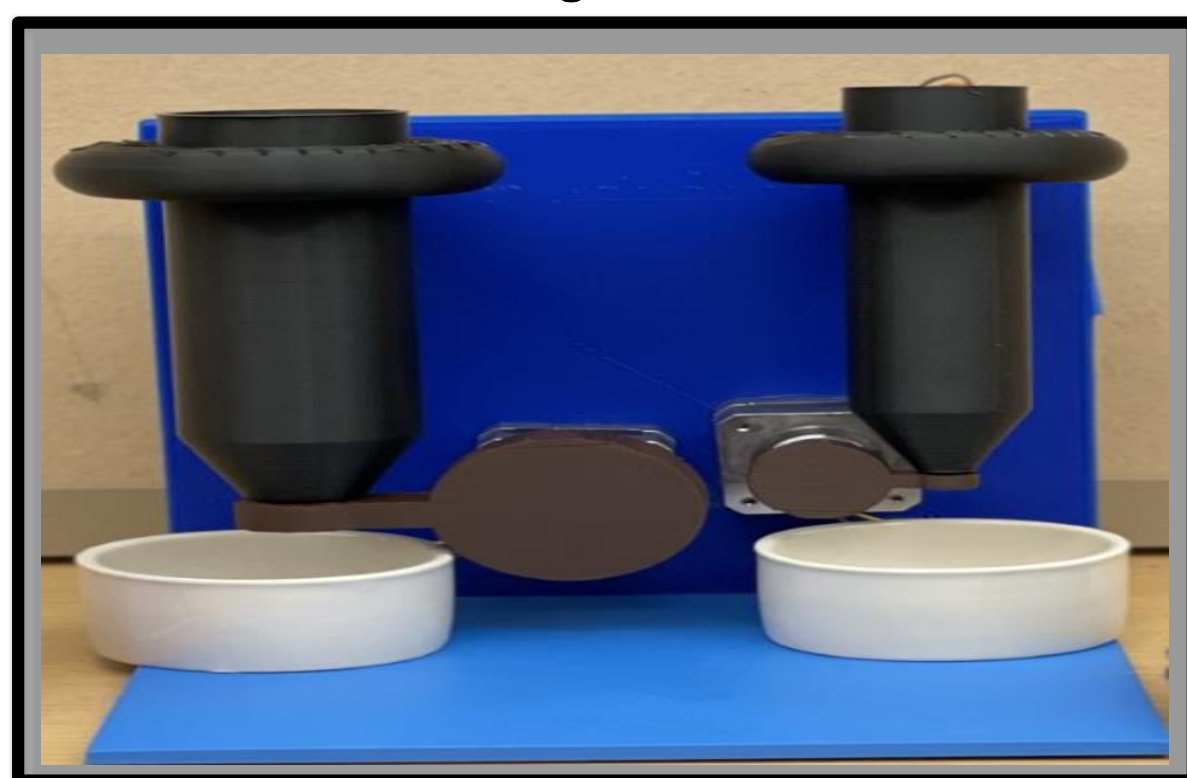


Credit: pittsburgh

PROPOSED SOLUTION

Our proposed solution is an automation pet cage include components such as feeders, water dispenser and temperature regulator. In this project we have automated each component so that manual input calibration is not required. This feature helps provide ease to pet owners by fulfilling the daily necessities of a pet in ways such as providing food, water, and monitoring temperature automatically. The smart pet cage provides a solution to that using remote access. Web based applications to trigger features like the food/water systems and to control lights etc. The application will also display updated temperature readings and report any anomalies.

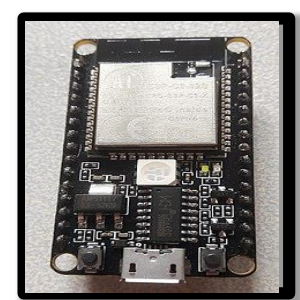
Figure 3



SYSTEM DESIGN

Esp-32 Microcontroller

The ESP32 is a low-cost, low-power microcontroller with Wi-Fi and Bluetooth built in. It succeeds the ESP8266, which is a low-cost Wi-Fi microprocessor with limited features.



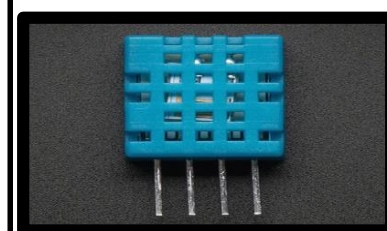
Power Supply

The Power Supply consists Battery holder pack with 8 x AA batteries totaling up to a 12 V output. The holder dimensions are 5" x 2.8" x 0.8"



Temperature Sensor

The DHT11 is a basic digital temperature and humidity sensor with a modest price tag. It measures the ambient air with a capacitive humidity sensor and a thermistor and outputs a digital signal on the data pin.



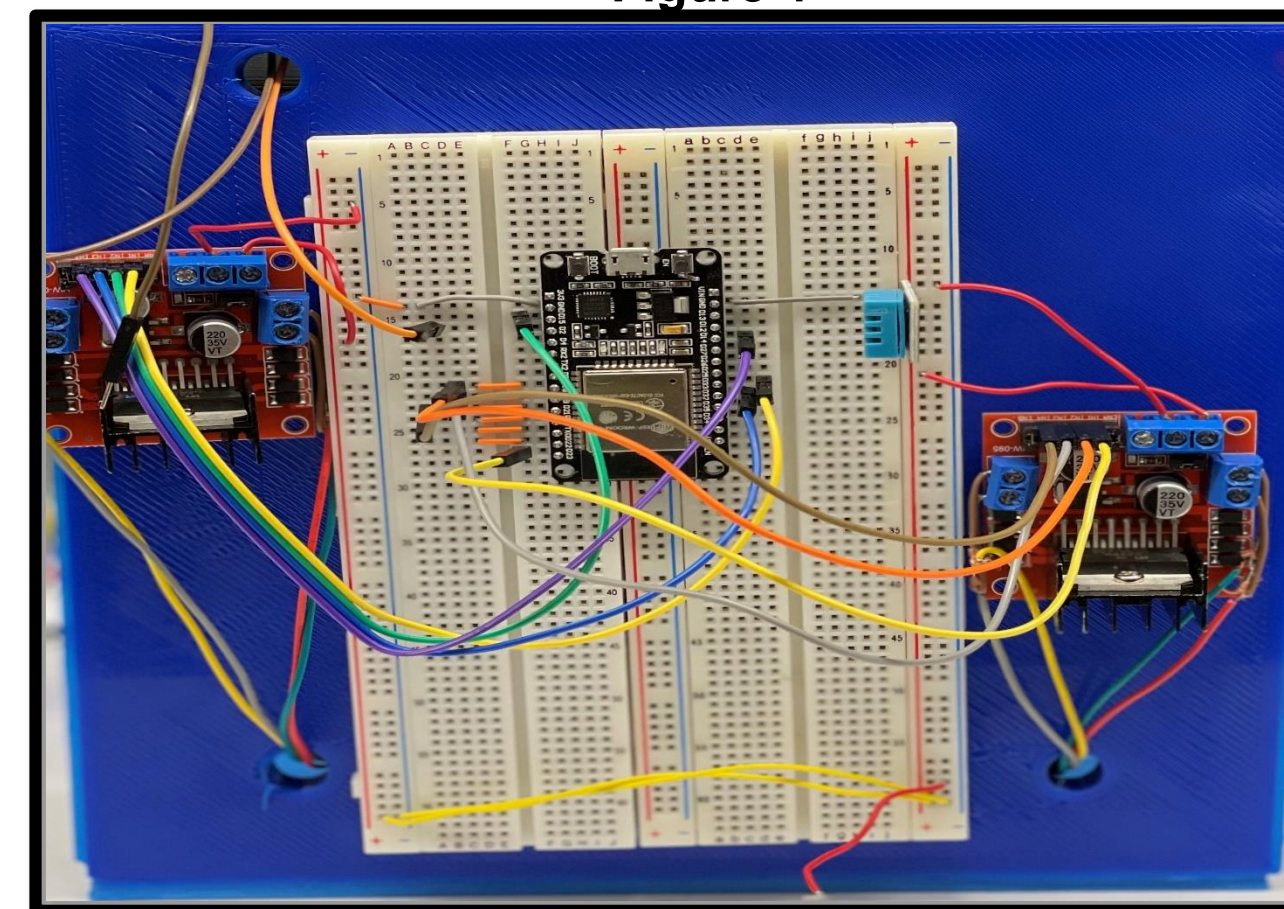
Timer

Timer based on Network Time Protocol (NTP) that adjusted from UTC to CDT. It implements a looping function to dispense food/water when feed time becomes active

UI

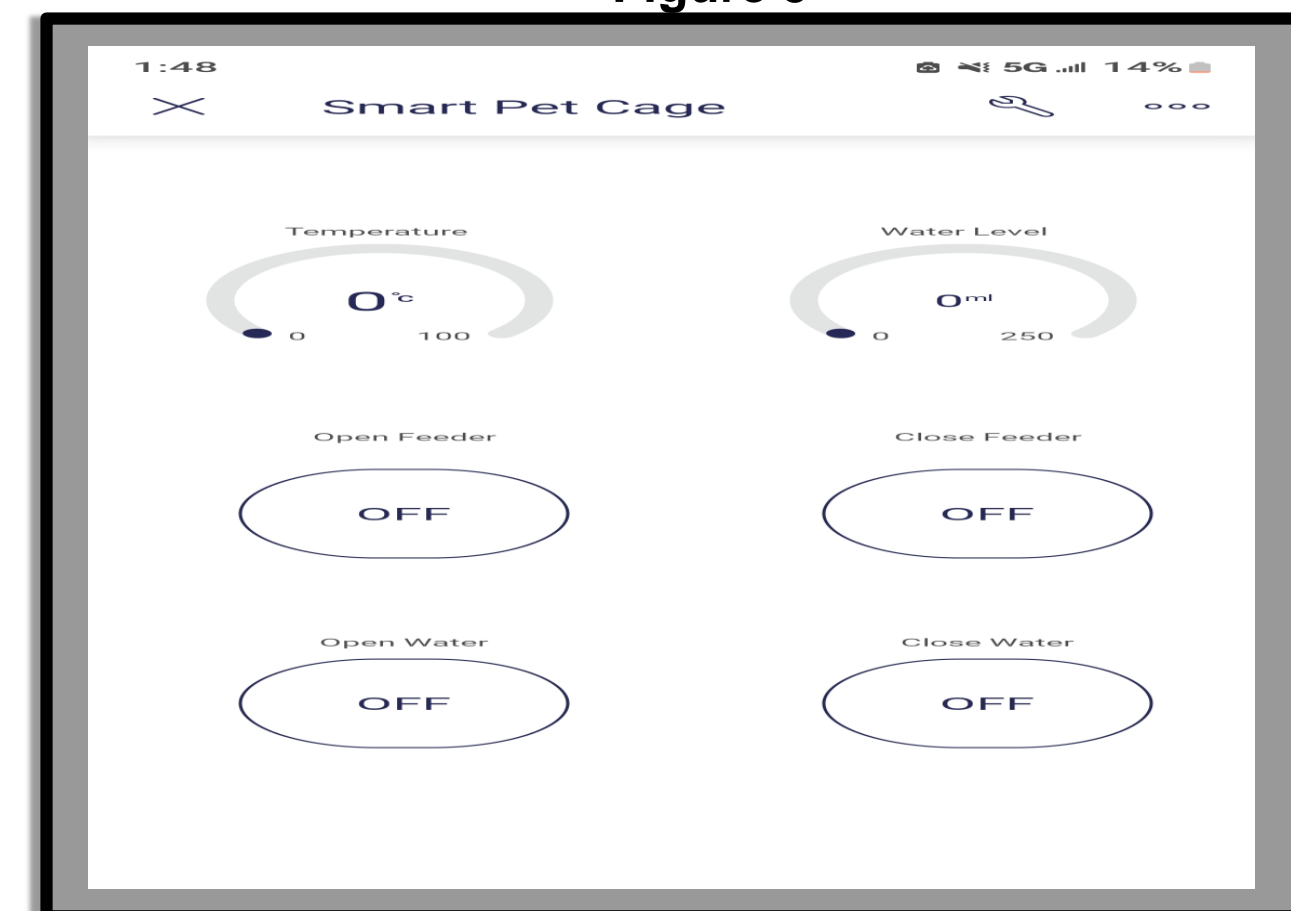
Simple UI to promote the ease of usability across all end-users. There are four push buttons and two gage display widgets. Each button controls the open/close functionality of the dispensers and the gages output temperature and water level conditions.

Figure 4



Device

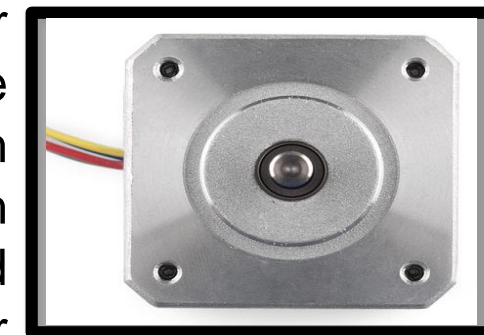
Figure 5



Client Application

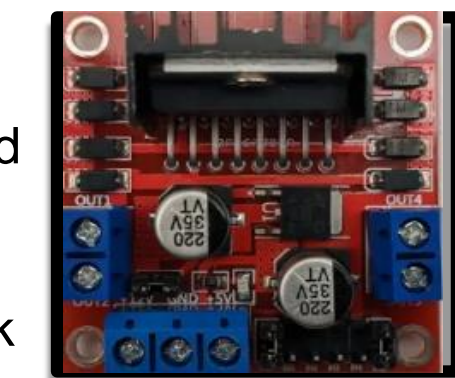
Adafruit 12V Stepper motor

A stepper motor to meet all of your robotics requirements! This 4-wire bipolar stepper features a smooth action and a nice holding torque with 1.8° per step. The motor was designed to be driven with an Adafruit motor shield for Arduino (or other motor driver) and a wall adapter or lead-acid battery with a maximum current of 350mA.



L298n Motor driver.

The L298N is a dual H-Bridge motor driver that allows for simultaneous speed and direction control of two DC motors. The module can power DC motors with voltages ranging from 5 to 35V and peak currents of up to 2A.

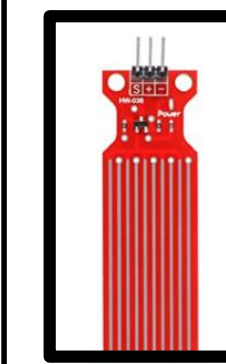


PLA Plastic Casing

The 3D printed objects (Figure 3) in the cage is all made from PLA filament material. It is waterproof and electrically insulated.

Water Level sensor

Operating voltage: DC3-5V
Operating current: less than 20mA
Sensor Type: Analog
Detection area: 40mmx16mm
Production process: FR4 double-sided HASL
Operating temperature: 10-30 degree centigrade
Humidity: 10% -90% non-condensing



FUTURE DIRECTION

- Explore integrated circuit options to reduce size of Device
- Introduce Voice Assistant Feature for an enhanced user experience
- Reprinting the cage but with the same colors.
- Prevent leakage from the water dispenser.
- Provide access to application for IOS users.
- Recreate the cage but with different pets
- Generate power for the cage using the hamster wheel.

REFERENCES

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CONTACT INFORMATION

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