Internet of Things Application in Smart Refrigerator

Presented by,

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Outline

Problem Statement

Design and develop an IoT based smart refrigerator for smart food sensing and automatically set the necessary storage conditions and provide food details to help user save money and food spoilage, wastage in order to give a healthier lifestyle.

Objectives

- To automatically detect food contents in a refrigerator.
- To measure quantity of food contents in a refrigerator and provide the best storage conditions using IoT platform.
- To provide healthy food recipes from the available food contents in the refrigerator.
- To give food content details and data along with refrigerator state control to the user through mobile application.
- To help people save money and food wastage.

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- Help revolutionize smart kitchen with IoT smart refrigerator
- Refrigerators are used to prevent the spoilage of food and keep it fresh. It reduces illness and make our lifestyle healthier in the modern world
- This application uses IoT architecture to integrate the idea

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Table: A Brief description of components used and their functionalities

Component	**Functionality**
Raspberry Pi 3 B	Hardware controller
Load Cell, Hx711 weighing sensor	Measure weight of contents
HD Web camera	Capture food picture for detection
DHT11 module	Detect environment temperature
SG90 servo motor	Temp. control dial
YOLO v3 / Google Vision AI	Food detection

System Architecture

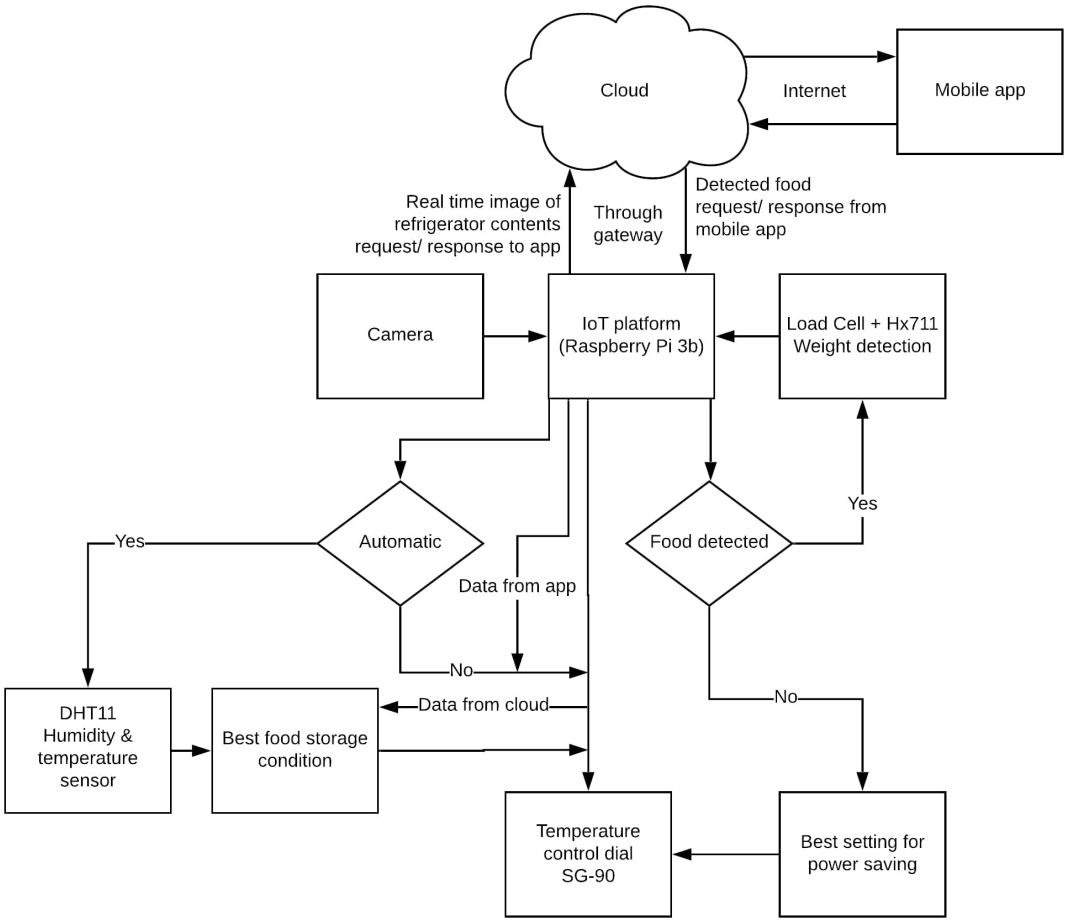

Figure: Flow Diagram of system

API and Cloud

- Food2Fork recipe API: Helps search top socially ranked recipes through ingredients
- Google Vision AI cloud API: Cloud object prediction/ detection
- Adafruit Cloud + API - IoT cloud
- IFTTT - Voice assistant support for controlling status of refrigerator through Google Assistant
- IFTTT - Google calendar integration through Adafruit Cloud
- AllRecipe and Amazon.in, BigBasket in-app search integration.

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Simulation

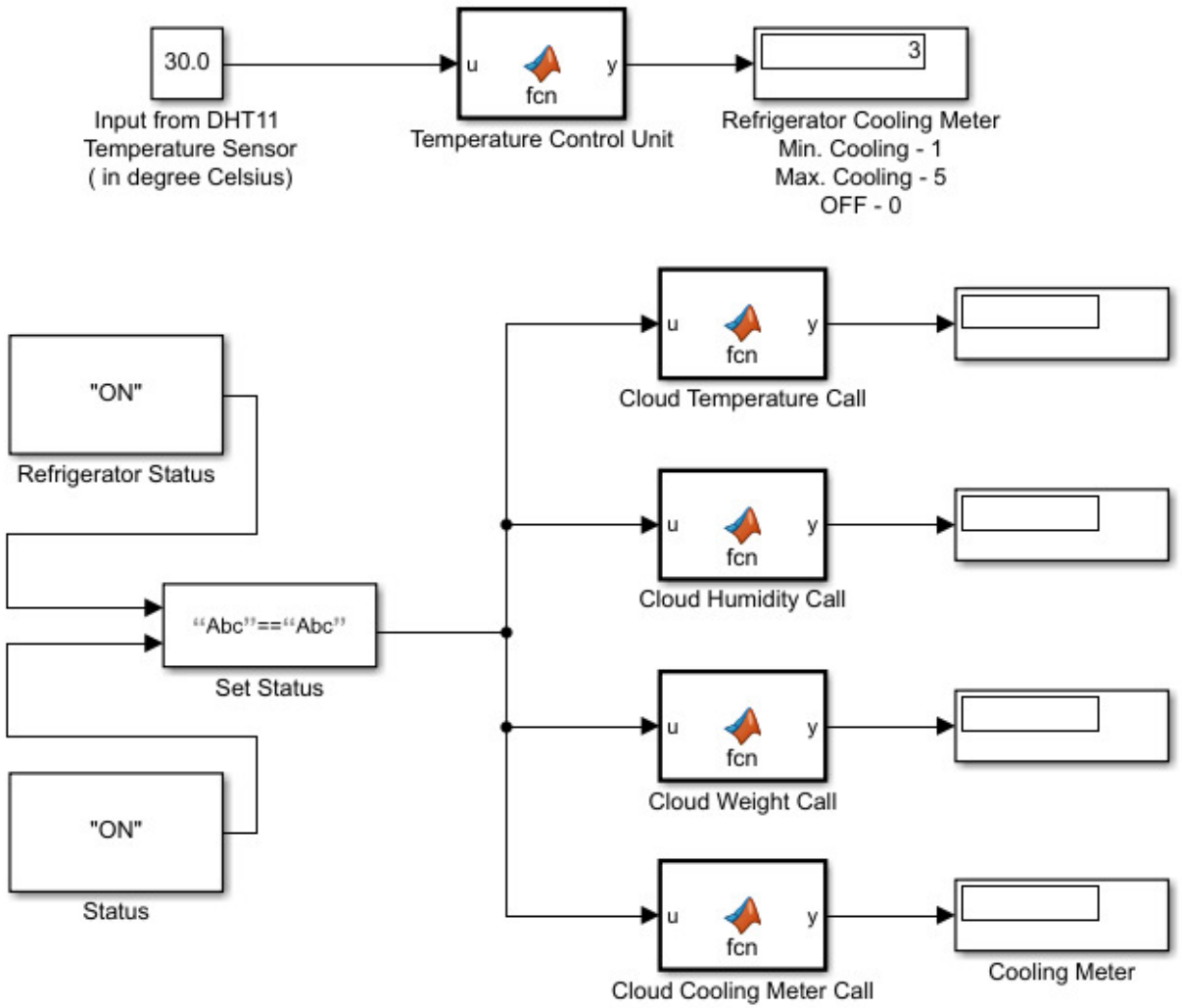

Figure: Matlab Simulation of temperature control and API testing

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Hardware

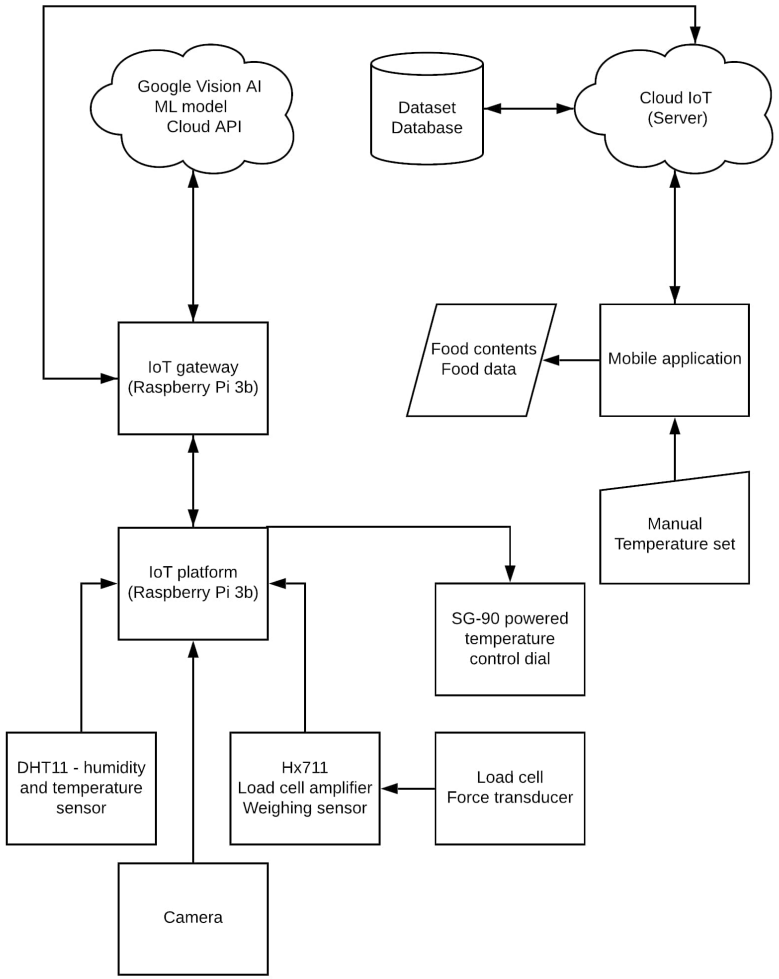

Figure: IoT hardware architecture

Hardware

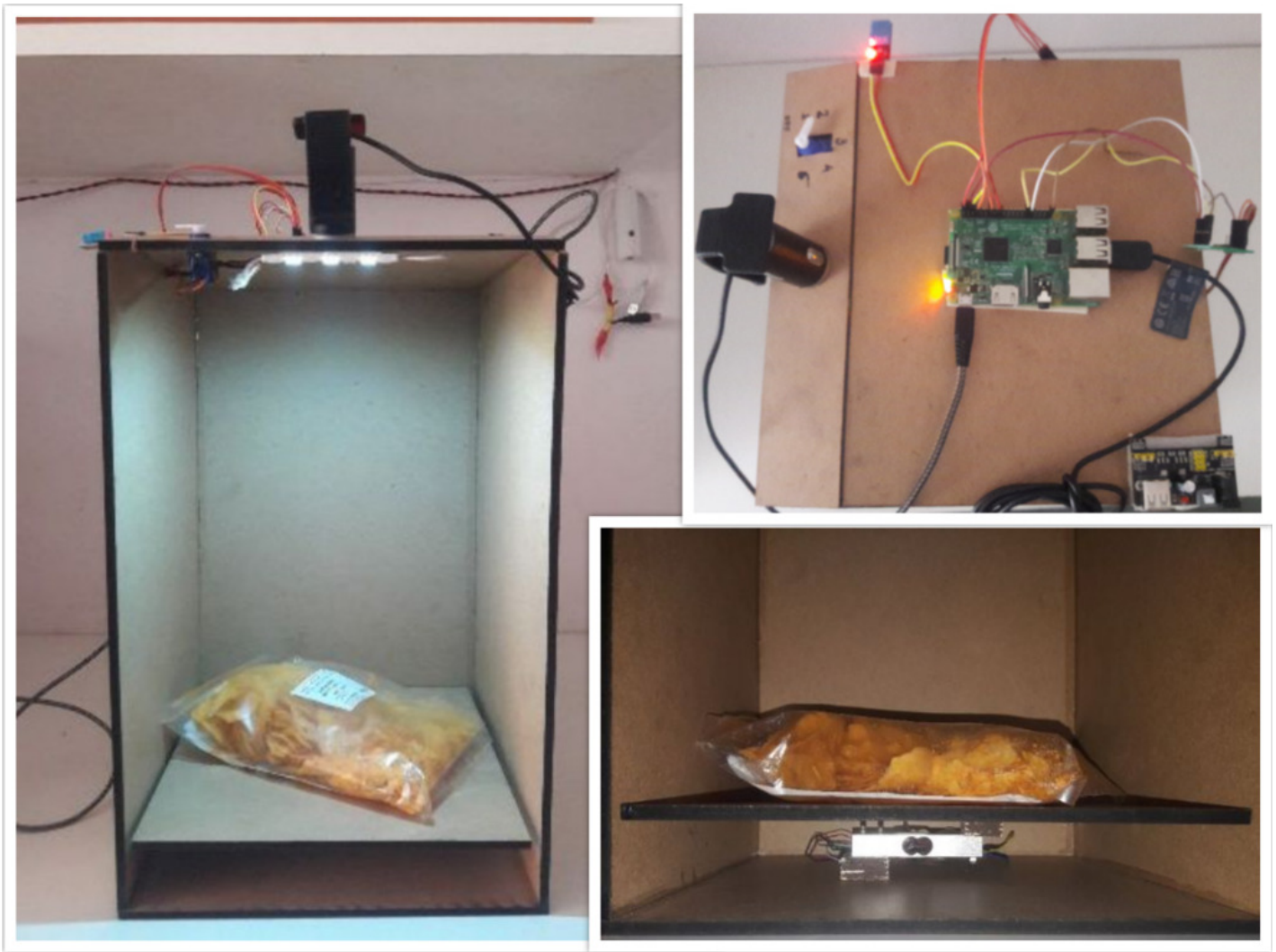

Figure: Smart refrigerator hardware prototype

Conclusion

1. A smart refrigerator has been proposed for automatic sensing of refrigerator contents with the capability of generating necessary data to help user save food spoilage.
2. A Smart refrigerator working hardware prototype and a mobile application has been developed for providing user with the refrigerator status details with assisted voice control support and food contents with possible food recipes, also allowing user to see live refrigerator contents from a remote location and buy from Amazon.in and BigBasket.com app integration.

Major Reference

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2. Deepti Singh, Preet Jain, IoT Based Smart Refrigerator System, International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE), Volume 5, Issue 7, July 2016.
3. Online available hardware, and API references

Thank you