Heating Oil Level Detection and Assistance Using Amazon Alexa

Ajay Menon Muralidhar, Muhammad Bahauddin Khan, Nitish Makam Prashanth, Neha Nomula, Prachi Pathak
Poster Advisor: Dr. Shakour Abuzneid
Department of Computer Science and Engineering
University of Bridgeport, Bridgeport, CT

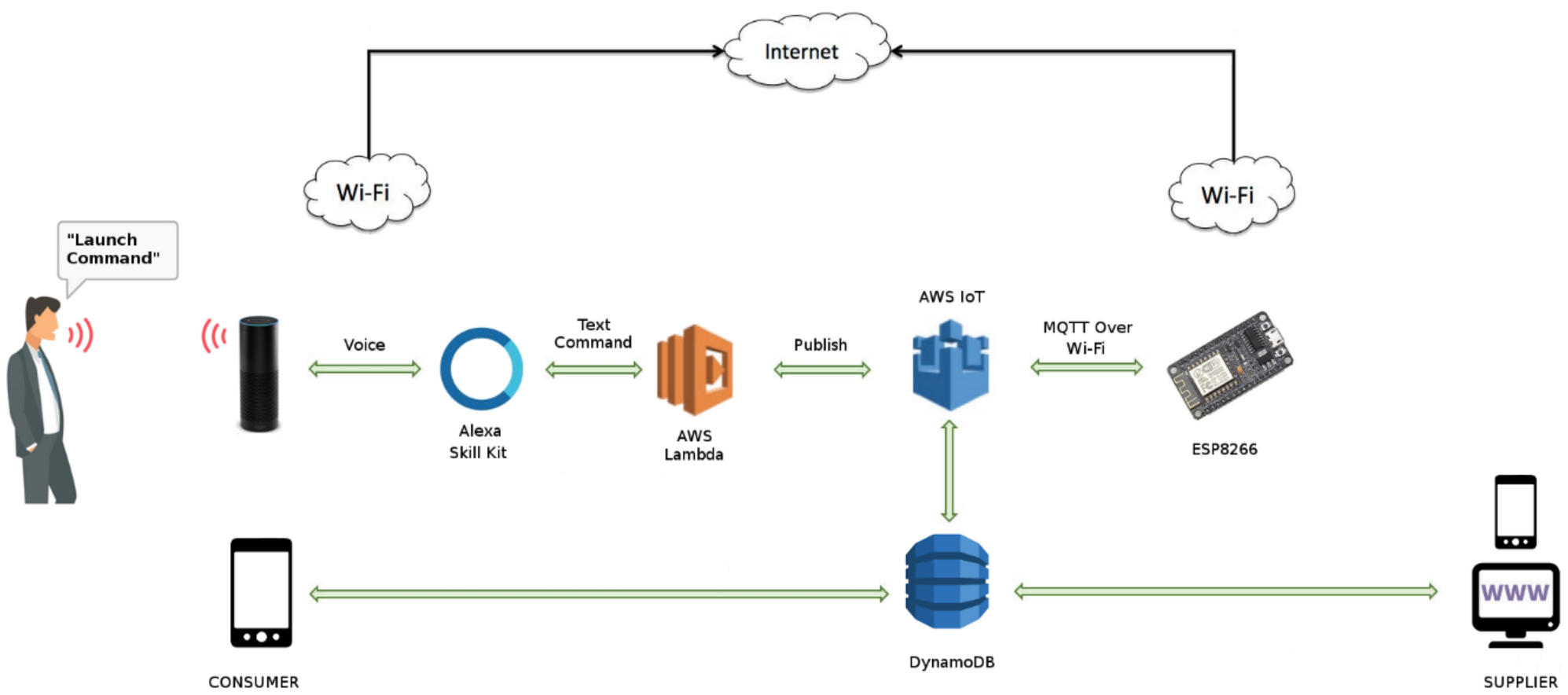
ABSTRACT

This work is used to bridge the gap between consumer and oil supplier by building a smart monitoring system with the help of ESP8266 (Wi-Fi module) and Alexa (Intelligent AI based Virtual Assistant). In the existing system, many oil tanks are inaccessible or buried under the ground. We came up with the solution of having a smart monitoring system where there is no longer need to read the oil level in the heating oil tank manually. It can be done with the help of an ultrasonic sensor. When the consumer requests to check the oil level, ESP8266 retrieves the oil level from the ultrasonic sensor and sends it to Alexa.

INTRODUCTION

The Internet of Things (IOT) is an extensive system which is a mix of different things and various physical gadgets. IOT allows objects to be controlled and accessed with the help of sensors and actuators. The majority of residents are making their homes smart homes by installing several devices which are connected to the Internet. One of the approaches to building a smart home is by installing a smart heating oil monitoring system using Amazon Alexa.

Alexa is a cloud-based intelligent personal assistant provided by Amazon to interact with the user mainly. Users interact with Alexa through their voice. High speech accuracy is achieved through sophisticated natural language processing (NLP) algorithms built into its text-to-speech (TTS) engine.



METHODOLOGY

When the user asks Alexa, "Alexa, please check the oil level in the tank," a request is sent by Alexa to the cloud. From there, through MQTT, a request is sent to the connected device ESP8266. It can easily process this request and retrieve the present oil level in the tank by using the ultrasonic sensor and sends it back to the cloud. Alexa pulls data from cloud and replies back to the user giving the present oil level. If the present oil level is less than 10%, Alexa even requests for a refill from the supplier. A database is used to maintain a record of monthly oil consumption of connected homes, daily oil consumption based on outside temperature, etc., which can be further used by the supplier for research and development.

EXPECTED OUTPUT

The expected output of this research will be in two forms- One, for the consumer as a voice output from the virtual assistant Alexa and a mobile app. Second, will be the supplier as a Web app or Mobile app. Data like oil level, low oil prices available, the amount of oil consumed per day based on various burner temperature can be got by interacting with Alexa. The consumer and the supplier gets these data after interaction with the database. The supplier can access data like oil consumption based on outside temperature and daily oil levels of various connected homes.