IoT-based Baby MonitoringSystem (IoT-BBMS)

Group No. - 13

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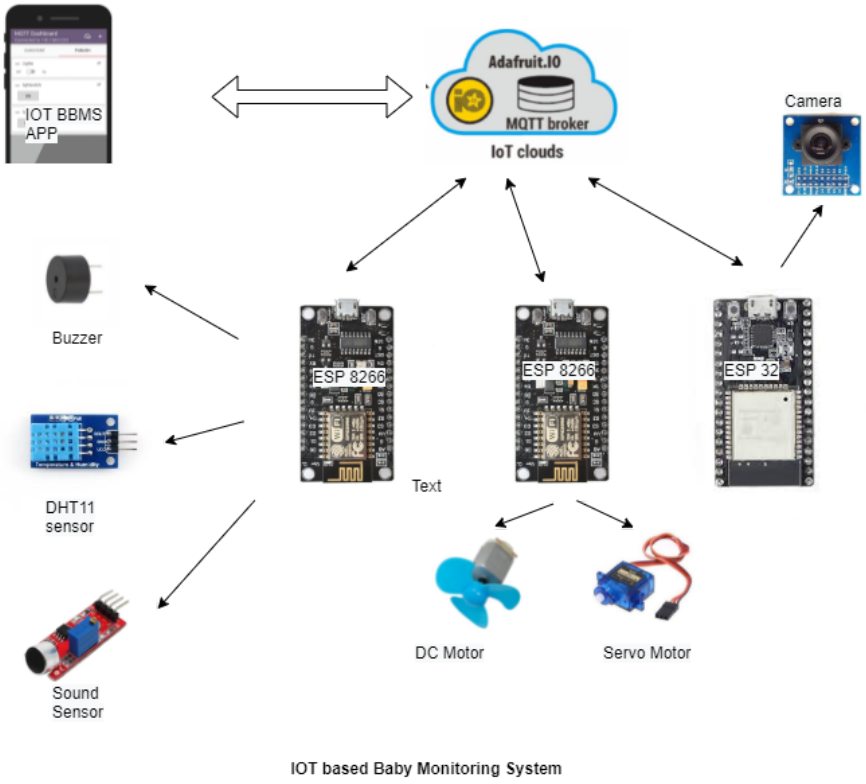
System Architecture -



IOT based Baby Monitoring System

Build Flow Steps -

1. Interfacing Sensors/Actuators - (Write file location and some relevant function)
   - **DHT11 Sensor** - It is used to record temperature and humidity values to maintain ambient conditions around the baby.
   - **Sound Sensor** - The sound sensor used in this project is KY037 sound sensor. It is used to detect if the baby is crying.
   - Camera Module - OV7670 camera module was used. It is interfaced with the ESP32 MCU. It is used to provide live feed of the baby to the parents via the app.

     The code for the sensors mentioned above is written inside **void loop()** because the temperature, humidity and sound values are used to trigger the music and rocking of the cradle, so these values need to be updated continuously.

   - **Servo Motor** - SG90 servo motor has been used. It enables rocking functionality of the cradle. The code for the servo motor is written inside **void rock_cradle()**.
   - **DC Motor** - DC motor is used to rotate the fan when the temperature/humidity value goes above a certain threshold.

- **Buzzer** - Combination of varying frequencies and delay has been used to play music. The code for the buzzer is written inside **void play_song()**.

  The actuators run when the sensor(s) detect crying or when the parents choose to switch it on/off via the app.

The code for all the sensors and actuators is in a single file - **iot_bbms.ino**

2. Connecting all devices to the NodeMCU -

The following pins were used to connect the sensors and actuators to the MCU:

1. Buzzer - D2
2. DHT11 - D5
3. Sound sensor - D8
4. Servo Motor -
5. DC Motor-
6. Camera Module (ESP32) -

3. Building the cradle -

1. The cradle was made using an empty cardboard carton.The legs of the cradle have been cut out in a semi-circular shape which allows us to rock the cradle easily.
2. In the research paper, a fly-wheel mechanism has been suggested. In our project, we have used a much simpler yet effective mechanism. A servo motor with a piece of string attached to it is used to rock the cradle.
3. The sound sensor is placed near the baby's head to reduce interference.
4. The DHT11 sensor can be placed anywhere in the cradle as it only measures the surrounding conditions.

4. Adafruit-MQTT Server Integration -

The MQTT-Dash app has been used to design the front-end for the application. It contains placeholders which display the values detected by various sensors which have been used. The data collected by the sensors is sent to Adafruit-MQTT servers using Wi-Fi (publish) where it is stored as "feeds". On the MQTT-Dash app, Wi-Fi is used to fetch the latest data from these "feeds" (subscribe) and the same is displayed on the app.