

Mini Project Report

Embedded-type Implementation-of-smart-home-gateway-for-movement-monitoring



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Introduction

The main aim is to recognize the fall detection of elder people. The system is build making use of the motion detector accelerometer sensor. Human activity recognition is one of the major concern in health care environment as they are more prone to unexpected and unpredictable activities. Such activities often lead to injury and death in elderly. 3-axis accelerometer sensor is placed on the hands or chest of an elder person. In case if the person is alone in the home and he suddenly falls down, then immediately the accelerometer sensor gets an alert and can be informed to near by hospitals as an emergency via alarm. The proposed work done activity recognition for high level activities (i.e sitting, standing, walking, climbing up and climbing down).

Research

The problem of human activity recognition can be approached using spatiotemporal variations in successive video frames. In this paper, a new human activity recognition technique is proposed using multi-view videos. Initially, a naive background subtraction using frame differencing between adjacent frames of a video is performed. Then, the motion information of each pixel is recorded in binary indicating existence/nonexistence of motion in the frame. A pixel wise sum over all the difference images in a view gives the frequency of motion in each pixel throughout the clip. The classification performances are evaluated using these motion frequency features. Our analysis shows that increasing number of views used for feature extraction improves the performance as different views of an activity provide complementary information. Experiments on the i3DPost and the INRIA Xmas Motion Acquisition Sequences (IXMAS) multi-view human action datasets provide significant classification accuracies.

Cost And Features

costs

The Cost for the IMPLEMENTATION OF SMART HOME GATEWAY FOR MOVEMENT MONITORING OF ELDER PEOPLE The running cost needs an working system with an the battery backups.and we required some NodeMCU ESP8266 WiFi development board MPU6050 Accelerometer and Gyroscope Sensor And it well cost more

Features

802.11 b/g/n Integrated low power 32-bit MCU Integrated 10-bit ADC Integrated TCP/IP protocol stack Integrated TR switch, balun, LNA, power amplifier and matching network Integrated PLL, regulators, and power management units Supports antenna diversity Wi-Fi 2.4 GHz, support WPA/WPA2 Support STA/AP/STA+AP operation modes Support Smart Link

Function for bA, PWM, GPIO STBC, MIMO, 2x1 MIMO A-MPDU & _A-MSDU aggregation and 0.4s guard interval Deep sleep power < 5uA Wake up and transmit packets in < 2ms Standby power consumption of < 1.0mW (DTIM3) +20dBm output power in 802.11b mode

Hardware Requirements

- NodeMCU ESP8266 WiFi development board
- MPU6050 Accelerometer and Gyroscope Sensor
- Jumper Wires
- Bread Board

software requirements

- C
- Arduino IDE

Defining our System

The system has been implemented using NodeMCU ESP8266 WiFi. The system has employed accelerometer of a human to find the fall detection status of elder people. According to the command given by microcontroller will send the message to authorized person. 3-axis accelerometer sensor is placed on the hands or chest of an elder person. In case if the person is alone in the home and he suddenly fall down, then immediately the accelerometer sensor gets an alert and can be informed to nearby hospitals as an emergency via SMS.

- To use the IFTTT, sign in to your IFTTT account if you already have one or create an account.
- Now, click on the documentation to get the key which will be used in our programming part
- After that click on create
- Next, search for webhooks and select it
- After clicking the webhooks now you want to select Receive a web request and give an event name as per your wish. In my case I have given fall detect

SWOT Analysis

- this project is use full for elder people in emergency alert.
- The system detects the abnormal activity and sends immediately an emergency alert
- The main aim to recognize the human fall detection and their movements like walking, standing, sitting, lying down, falling, and the transitions between them.

4W's and 1'H

- What-This project is very use full for human fall activity for use of elder people.
- When-The system detects the abnormal activity and sends immediately an emergency alert
- Why-The tools organise this information in a way that makes it easy for you to find the entires again the data may also be searchable.
- How-it works simple and easily using Gyroscope Sensor

Detail Requirements

HIGH LEVEL REQUIREMENTS

ID	Description	Status
HLR1	DATA ACCESS	user need to access
HLR2	sim activation	filter by princes abd product

LOW LEVEL REQUIREMENTS

ID	Description	status
---	-----	-----
LLR1	User Inputs	to check the option they choose
LLR2	Basic operation	to generate message
LLR3	Multifile Approach	To reduce the code structure

Architecture :

Structural and behavioral

IFTTT is a web-based service by which we can create chains of conditional statements, called applets. Using these applets, we can send Emails, posts to Twitter, posts to Facebook, play music, SMS, notifications, etc. Here in this project, we are using IFTTT to send SMS notifications to the mobile phone when the system detects a fall.

STEPS TO IFTTT

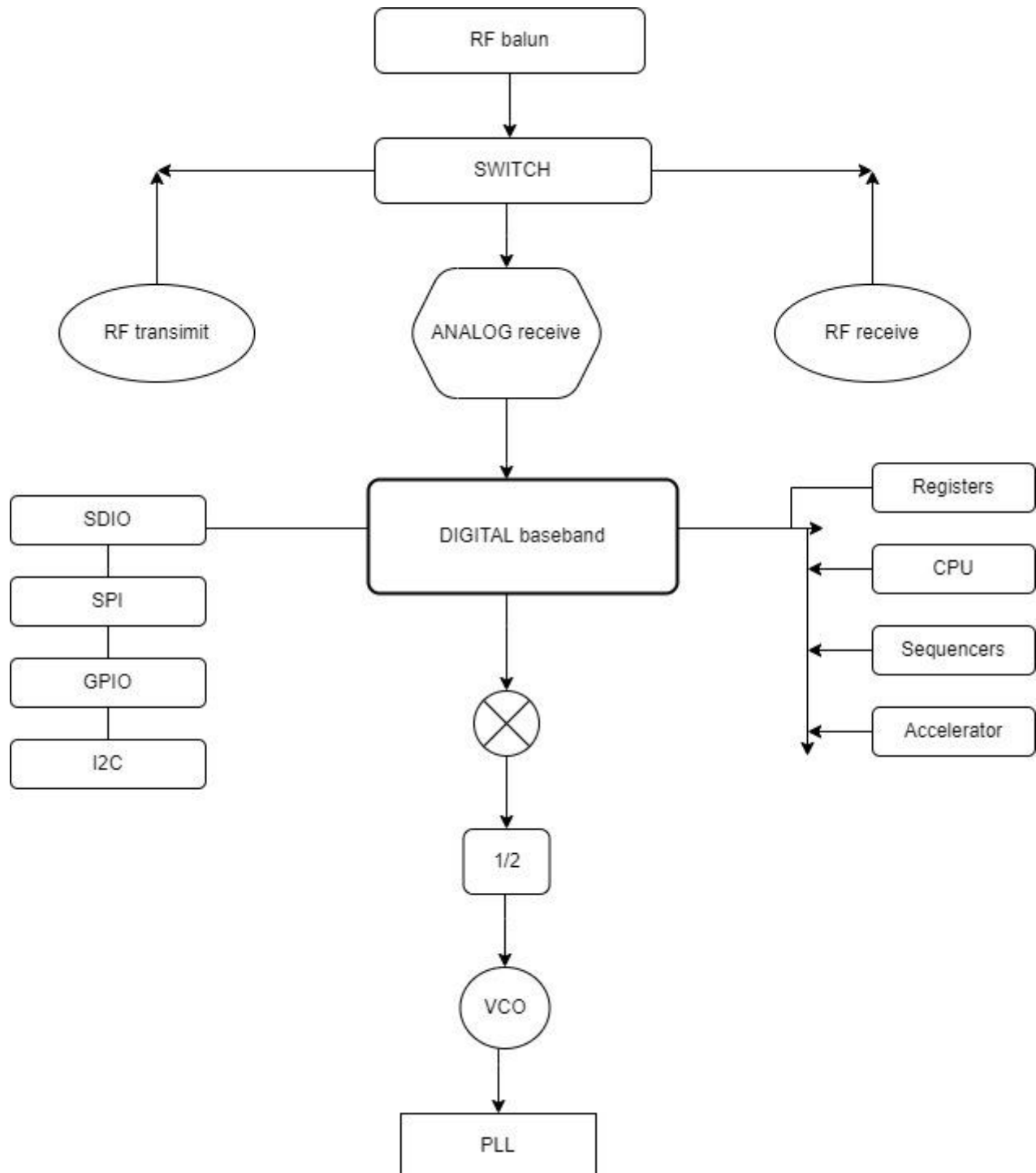
- To use the IFTTT sign in to your IFTTT account if you already have one or creating an account
- Now click on the documentation to get the key which will be used in our programming part.
- After that click on create
- Next, search for webhooks and select it
- After clicking the webhooks, now you want to select "Receive a web request" and give an event name as per your wish. In my case, I have given fall detect
- if you want to play any song when the magnitude exceeds the thresh hold value, you can set any song to play by repeating these all step from the creating part but instead clicking Android SMS, you want to select Android Service, then you want to select play a specific song to play anysong as per your wish.
- After that click on Create Action

Architecture Level

- ESP8266EX also integrates an enhanced version of Tensilica's L106 Diamond series 32-bit processor, with on-chip SRAM, besides the Wi-Fi functionalities.ESP8266EX is often integrated with external sensors and other application specific devices through its GPIOs; codes for such applications are provided in examples in the SDK. Espressif Systems Smart Connectivity Platform (ESCP) demonstrates sophisticated systemlevel features include fast sleep/wake context switching for energyefficient VoIP,adaptive radio biasing.For low-power operation, advance signal processing, and spur cancellation and radio co-existence features for common cellular, Bluetooth,DDR,LVDS,LCD interference mitigation.

Flowchart-1:

Structural :



Flow chart -2 :

Behaviourl :

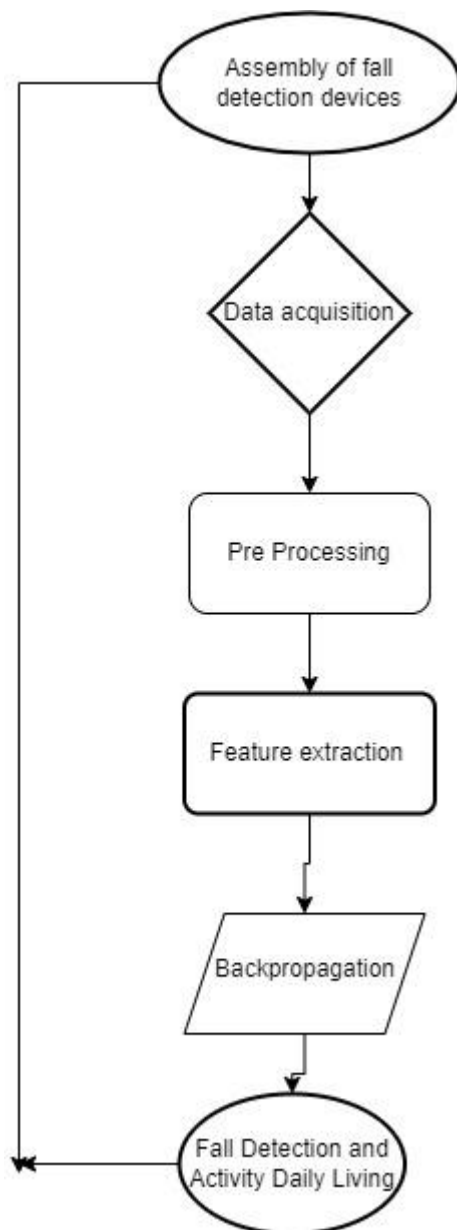


Table no: High level test plan

ID	Test scenario	Test Data
1	Main men	IFTTT is a web-based service by which we can create chains of conditional statements, called applets. Using these applets, we can send Emails, posts to Twitter, posts to Facebook, play music, SMS, notifications, etc.
2	STEPS TO IFTTT	To use the IFTTT, sign in to your IFTTT account if you already have one or create an account
3	Documentation Program	Now, click on the documentation to get the key which will be used in our programming part
4	Create a list	After that click on create,then click on "this"
5	search for webhooks	After clicking the webhooks, now you want to select "Receive a web request" and give an event name as per your wish. In my case, I have given fall detect
6	Add to contact	Now, you want to enter your phone number with country code,then click on create action
7	Final step	if you want to play any song when the magnitude exceeds the thresh hold value, you can set any song to play by repeating these all step from the creating part but instead of clicking Android SMS, you want to select Android Service, then you want to select play a specific song to play any song as per your wish
8	Exit	After that click on Create Action

Expected Output

- FALL DETECTED TAKE ACTION IMMEDIATELY
- FALL DETECTED TAKE ACTION IMMEDIATELY

Output image -1



Fig.6.5.Output

Fall detected take action
immediately

Fall detected take action
immediately

Output image-2

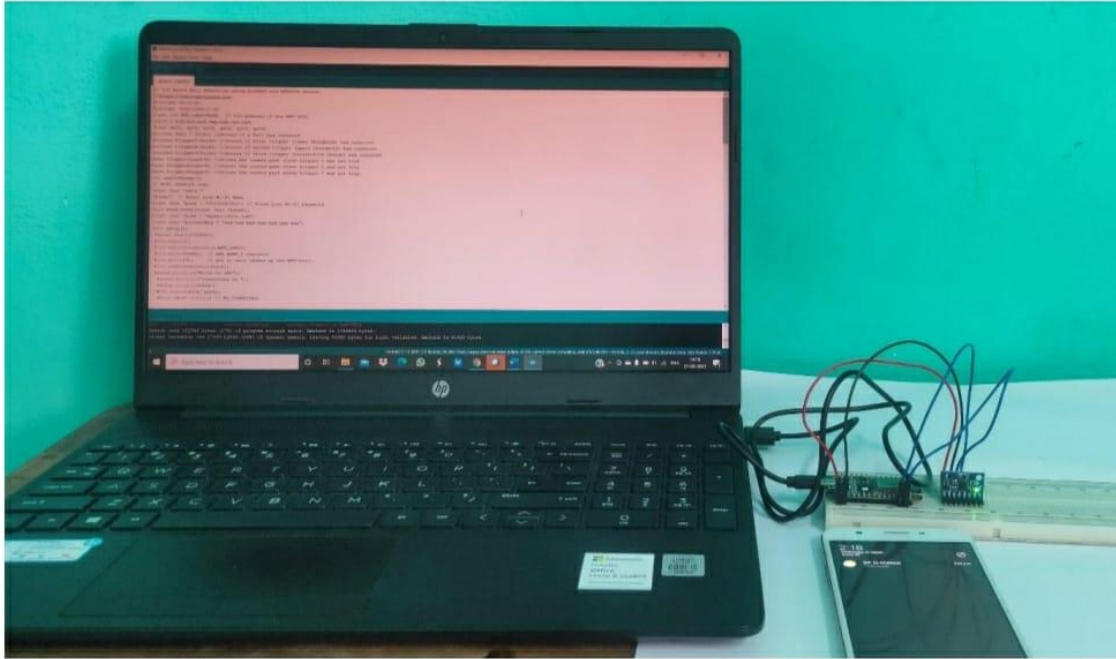


Fig.6.3.Interfacing code to the NodeMCU

