

Child Tracking using Wireless Technology

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Introduction

This project aims to develop a Child Tracking System. The system is based on the new ZigBee technology for exchanging information between mother and child. The GPS is used for monitoring the child location. The innovation of this project is the development of a model using statistical power to determine child location with respect to the parent. Further, the system operates both indoor and outdoor.

Proposed project

In this system, the GPS device is used only at the child side. It sends the first coordinates as an initial position value for both child and the parent. As the child moves, the microcontroller at mother side compares the child location with the reference location to determine the direction and the distance. Also the Xbee at parent side passes RSSI values to PIC microcontroller to analyze the RSSI value and detect if the child is close to his parent or not. An alarm is used as indicator. The RSSI values provide the project some features like working indoor.

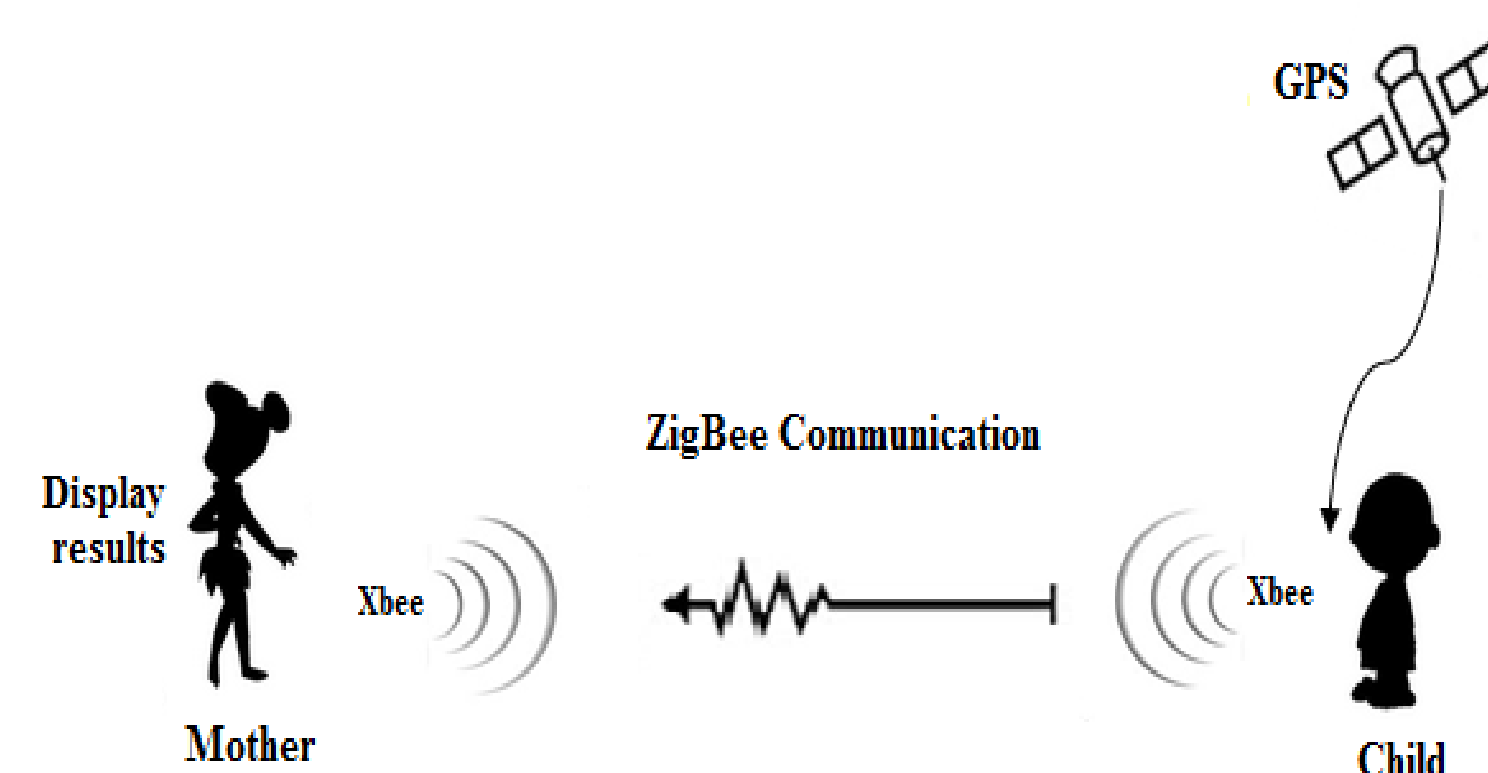


Figure 1: General Block Diagram

System Design and Implementation:

A PIC microcontroller is used. It is connected to Xbee. This configuration can be assumed as a receiver which has the entire component including processing unit and Xbee that have the ability to communicate with child via ZigBee technology. Figures 3 show the block diagrams for this design options:

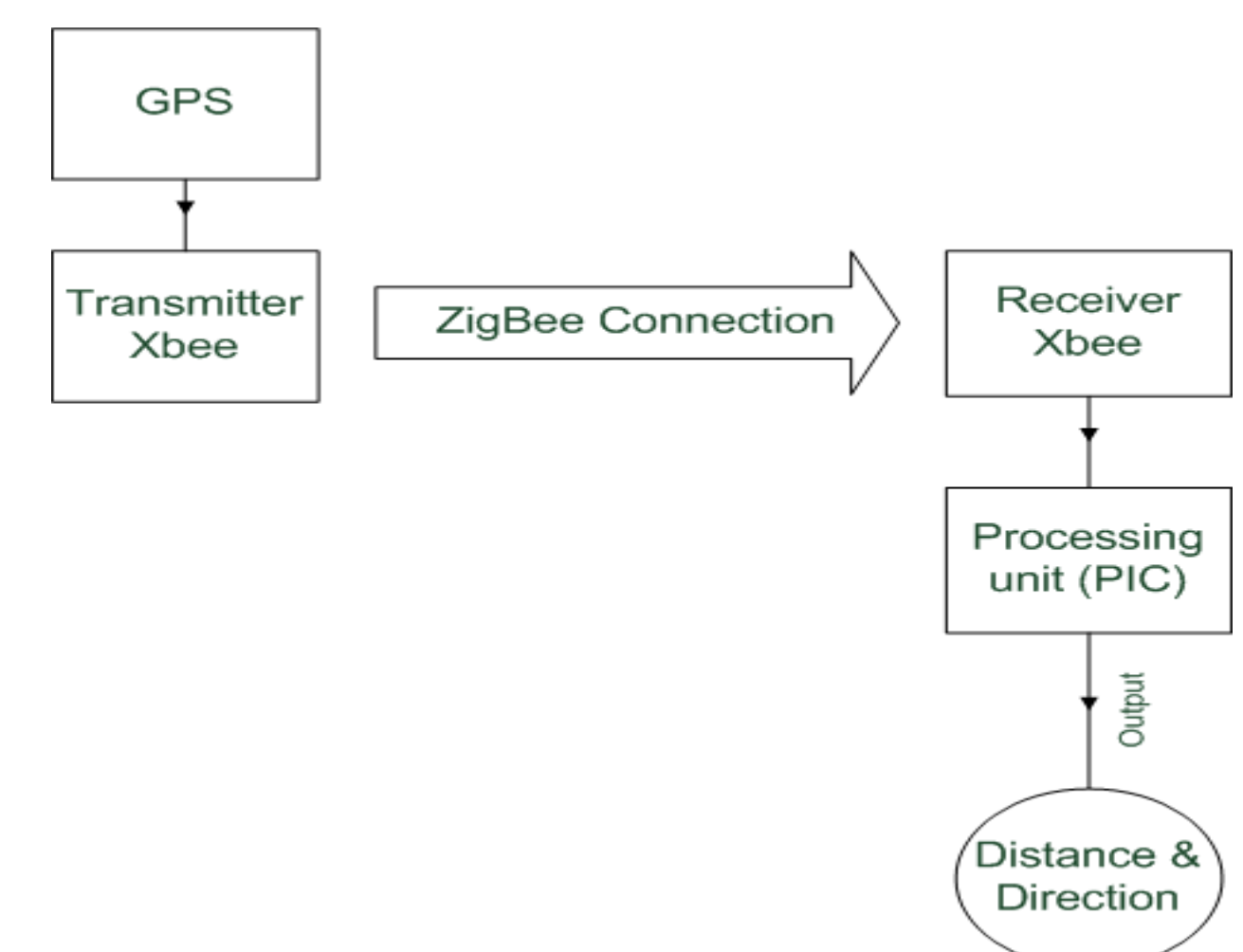


Figure 3: System Design Option

The general flowchart diagram that controls the flow of information between system components is shown in Figure 4.

Project Objectives:

The project has the following objectives :

1. Alleviating the problems faced by children to express themselves, especially children whom suffer from autism.
2. To understand and use the new technology (ZigBee), that is mainly designed for monitoring applications.
3. To study the possibility of using RSSI from Zigbee in localization applications.
4. To design a cost competitive system.

Results:

1. A power based algorithm for location determination was developed.
2. The GPS has been used to enhance the system accuracy.
3. The developed system achieved the desired objectives, in terms of false alarm analysis.

Project Block Diagram:

Figure 2 is the general system block diagram. As illustrated below, the ZigBee communication connects child (transmitter side) with parent (receiver side). Transmitter Xbee is connected directly to the GPS which sends the NMEA messages from GPS to receiver side when upon request. Receiver Xbee receives these messages and passes it to PIC microcontroller at parent side.

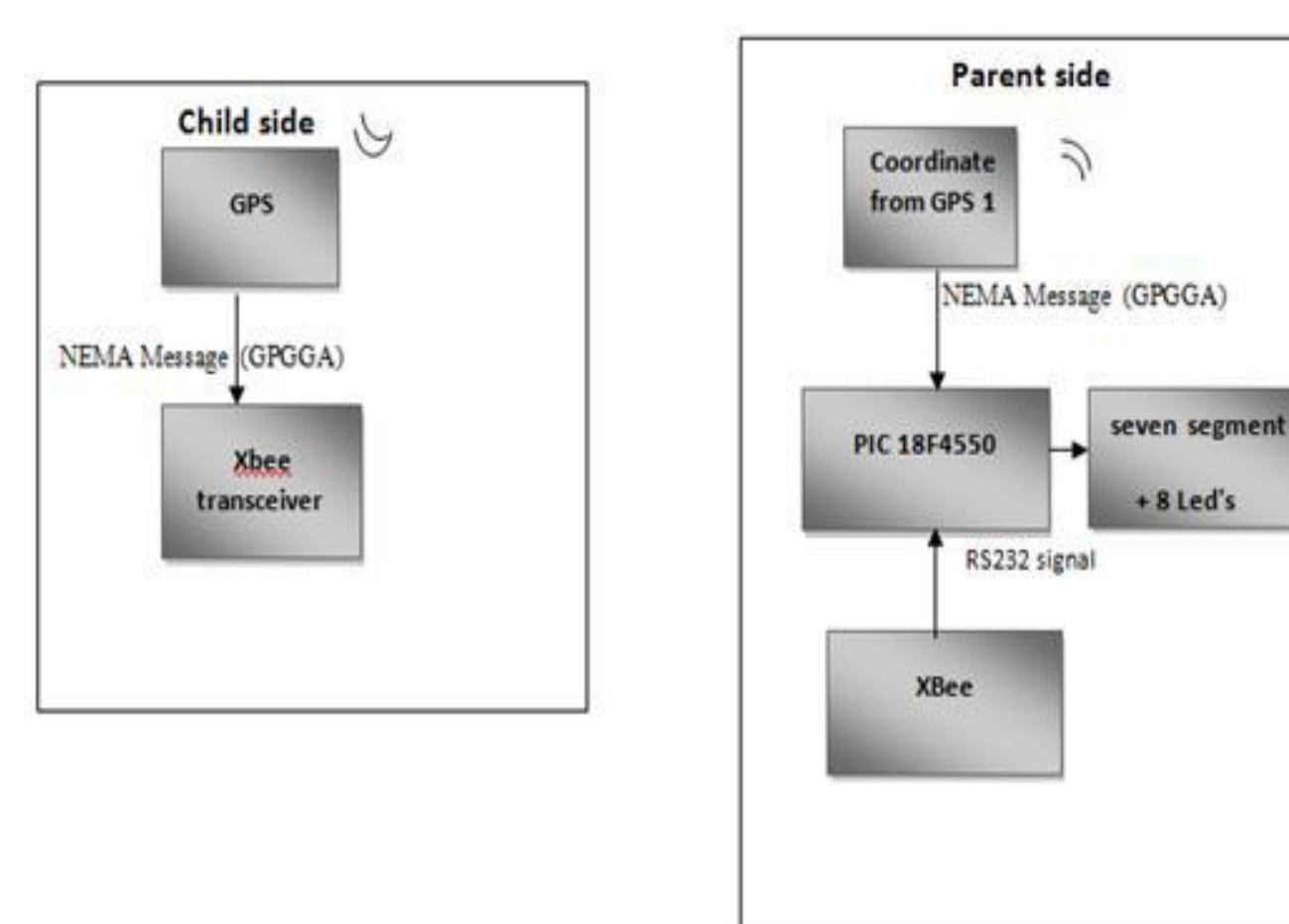


Figure 2 : System General Block Diagram.

The PIC microcontroller is responsible to extract and manipulate the GPS reading and convert it to specific location that compared with the reference location using UTM equations and power models, combines them to determine the child distance and direction.

