**Digital Smart Bus System**

**Introduction**

* This is all about the GPS technology in detail, and to make this concept more Programatic.
* The Bus Passenger Count Sensor is designed to solve such problems and performs highly accurate and reliable counting of Passengers getting in to the Bus.
* These both will combine to form a Digital Smart Bus System by using Micro controller which leads to avoidance of several problems.

**Objective**

* The project is designed to locate a bus and announce the location with the help of GPS technology, by using which the signals sent by the satellites to a GPS receiver are interfaced with a PC for locating the exact location of the bus.
* Horizontal beam sensor system is generally used to count bus passengers, it often misses overlapping passengers or counts luggage or other such objects.
* Also, the increase of low-floor buses has resulted in many passengers standing beside the door, which in turn increases counting errors.

**Block diagram**

**Automatic Bus Location Announcement Sytem Using GPS and Micro controller**

**16\*2LCD**

**Power supply**

**8051**

**Speaker IC**

**MAX 232**

**GPS Modem**

**Speaker**

**A Compact Passenger Counter**

**Image Pulse count Boaring**

**Speech synthesis system On-board location box ,etc fare sytem**

**Image monitor Drive Recorder**

**Bus Controller Processing**

**Door Operation Switch (back)**

**Door Operation Switch (front)**

**Sensor (back door)**

**Sensor (Front door)**

**Image**

**Open / close signal**

**Sensor Image front**

**Sensor Image back**

**Specifications**

* **8051 Microcontroller** - It controls all the operations of the circuit such as reading data from the GPS modem which is connected serially with a Personal Computer Interfacing.
* **LCD** – There are various displays used in those projects such as seven-segment displays and 5\*7 displays. Selection of display depends on the following factors like power consumption, ambient lighting conditions and cost of displays.
* **MAX 232** - This is for interfacing the system with a GPS module and computer. The MAX 232 converts RS 232 signals to TTL voltage levels and thus makes use of +5v power source, which is same as the source voltage from the 8051 microcontroller.
* **Power Supply -** This block contains step-down transformer a bridge rectifier , a filter capacitor and a voltage regulator.
* **GPS Interface -** The GPS module operates at 9600 or 4800 baud rates.
* **Speaker IC** – It is a single chip voice recording speaker that plays back solution interfaced with microcontroller and announces the data with the help of a speaker.
* **Door Operation Switch (front) and (back) -** Because the front door and back door sensors count people getting on and off respectively, it is possible to count passengers simultaneously when they all get on and off at once.
* **Sensor** - The sensor is resistant to environmental stress such as vibrations and power supply variations .The sensor provides high counting performance based on image processing methods used for our people counting sensors.
* **Image monitor Drive Recorder -** The camera's video output function allows viewing of the conditions near the middle door (back door), which is difficult to see, and also records the images in the video event data recorder.

**Working**

* This entire circuit is placed inside a bus or train.
* The power supply provides the voltage to entire circuit.
* The GPS modem consists of a receiver that receives the signals from the satellites based on latitude, longitude and altitude.
* These coordinate values are stored in the microcontroller. These coordinates represent the bus or train locations.
* These coordinates’ values are compared with the values from the GPS receiver.
* These coordinated values are equal to the latest coordinates coming from the GPS modem and are converted into TTL level with the help of MAX 232.
* If the latest values match with the stored coordinates values in the microcontroller, it displays the location name on the LCD display, and then announces the stop name by using the Speaker IC.
* The sensor is designed to count the number of bus passengers getting on or off.   
  All passengers are counted regardless of their payment method (cash, pass, welfare ticket, or discount ticket).
* The sensor can be used to get information on the usage status and crowding of bus passengers.   
  Take advantage of the sensor's abilities to create an optimum time table by knowing the number of passengers getting on or off at a particular stop, at what times, on which lines, and in which zones.
* The sensor (camera) is installed in the bus ceiling near an entrance and exit.   
  It is compact and easy to install.   
  A single sensor can count people getting both on and off.
* Counting is possible even in crowds of people or during the night. (Highly sensitive CCD camera adopted).
* A single sensor can function properly even if the door is wide.
* Passengers getting on and off are counted respectively even when passing each other at the door.

**Conclusion**

* This project is helpful for the people who are new to a city.
* Also reduces the avoidance of Bus Accidents.
* This configuration is simple with two sensors and one bus controller and all about GPS Technology.
* This project can also be implemented by using Python.