HackerBay

“ Smart Cities ”

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Problem Statement

1. 30% of the traffic congestion on the roads is because of the drivers looking here and there for the parking lot available.

2. Due to inefficient mechanism to handle emergency vehicles, many lives are lost per year.

3. Due to fixed timing system of traffic lights, people face congestion problems on the streets.

4. Accidents on streets can cause loss of life and congestion, if an emergency response is not given.

5. Real time monitoring of vehicles is not there for irresponsible(like Over speeding) driven vehicles.

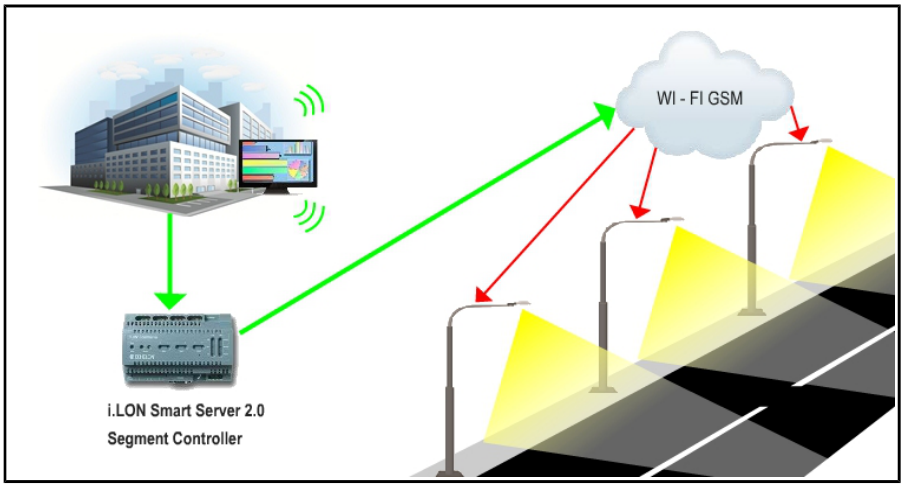
6. Energy consumption due to the street lights where it is not put into use ,which can be saved but it is not.

7. The use of renewable energy is not put to use to the maximum.

Solutions

Smart street lights:

- The street lights get illuminated only when the intensity of the light on the roads is less because of nights, weather changes etc.
- Most the street lights are not used during 12 am - 6 am.
- So between that time it will not be illuminated but if the sensor senses some activity ,it will automatically illuminate the lights,
- It will learn the behaviour and update accordingly the illuminating timings.



Accident Detection:

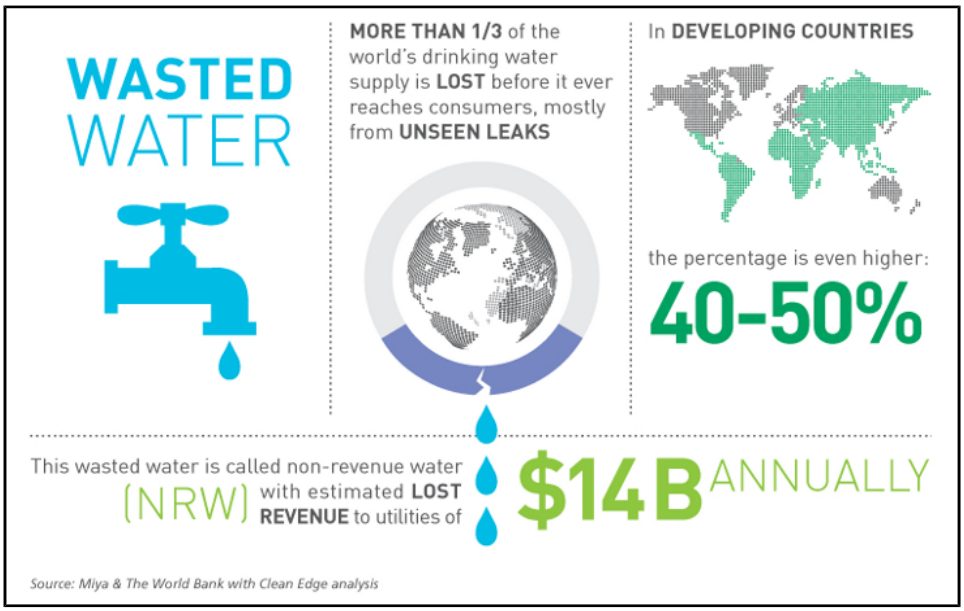
- Sound detection sensors of high frequency which catches particular sound patterns which happens during accidents.
- Smoke and burning detection is also monitored for the accidents.
- If a vehicles gets down the lane where it is not supposed to, it is considered as accident.
- If overlapping between the vehicles is there it is considered as accident.

Sustainable Development:

- The sensors do not need that much energy and it can run for more than 5 years with just one small lithium battery.
- A separate ***solar panel*** will be planted on all the street lights to save the energy consumption by it.

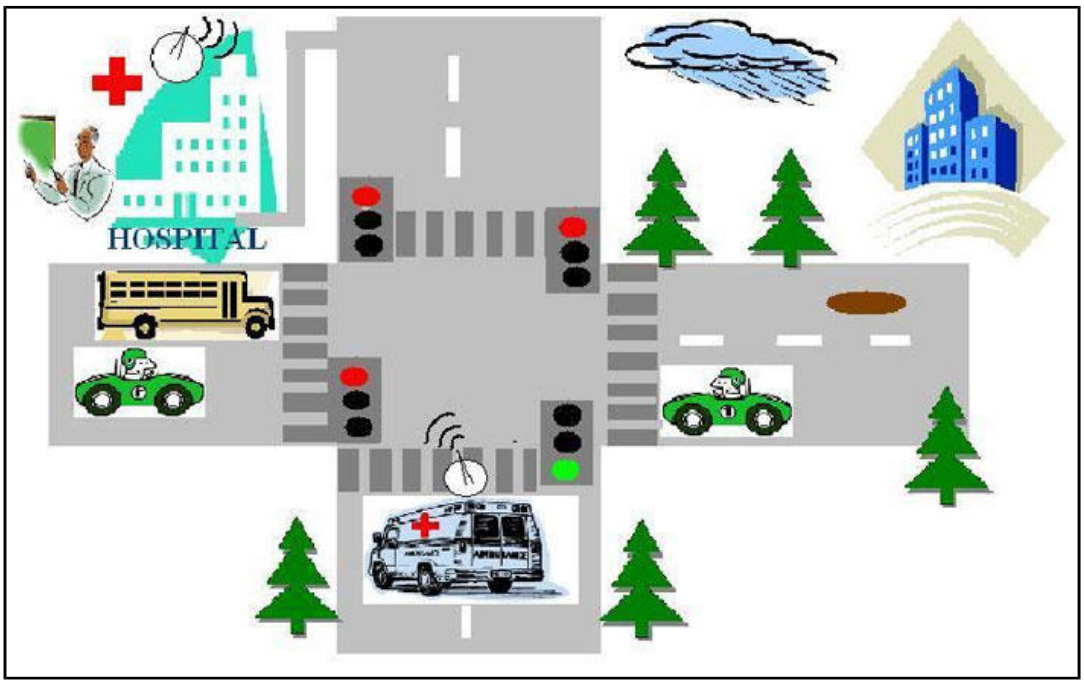
Water Management:

- Trees and irrigation fields needs water to be provided on daily basis.
- Whenever a need is there by reading the environmental factors like soil moisture, day temperature, air moisture, rain expectations.



Traffic management:

- Emergency vehicles are given priority over other vehicles and given a right to way.
- When the emergency vehicle is 100 metres away from the traffic lights, the traffic flow is stopped for all others and former is allowed to pass.
- It is most likely that a congestion will occur which will be handled by ***RESCHEDULING ALGORITHM.***



Real Time Behaviour Monitoring:

- A vehicle moving in opposite direction is monitored and a warning is passed to Traffic Department wiht location of the car.
- A vehicle which is over speeding is monitored and a warning is passed to to Traffic Department with location of the car.

PROPOSED ALGORITHM

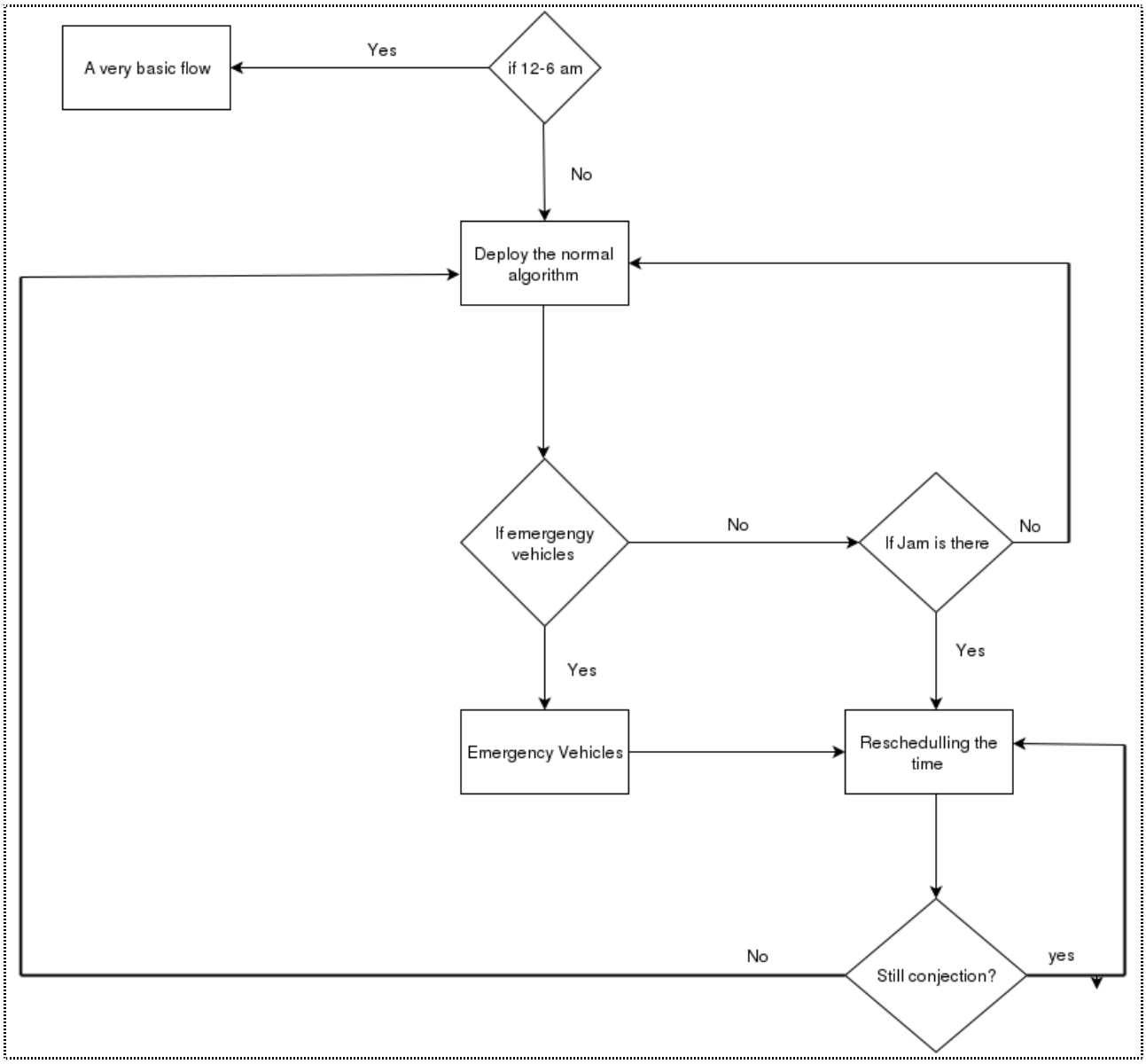
Street Light Detection Algorithm:

```
void streetLightDetect()
{

    currentTime=hour;
        if(detect)
        {
            Time=hour;
            priority[Time]++;
        }

        if((Time-currentTime)<0)
        priority[Time]--;

    if(currentTime==23)
        repeatedTime();
}
```

- Here, it will detect in a whole day which street lights are used mostly in which particular time and which are not used usually. And, according to that important street light and in which time they are used daily will get on automatically.

Refer: StreetLight.txt

Traffic Light Detection Algorithm:



Flow Chart for Smart Traffic control

- Here, their will be two situation i.e. traffic between 12am – 6am and the rest time.

- And during 12am-6am traffic stay very low so we can use the basic algorithm i.e. in every interval it will switched to each traffic light.
- And rest of the time it will implement advance algorithm where it will check for emergency and jams and if any

emergency will occurred, it will stop all the junction so that ambulance can pass and till that time will get pause.

- And then after that it will call rescheduling algorithm where it will check number of cars in queue and according to that it will pass that junction.

```
void emergency()
{
   green-> off // for all traffic signal
   red-> on //full restriction for others
   passTheCar;
   delay(10000);
        reSheduling();
}

void resheduling()
{

   delay(10000);
        if(jam)
        reSheduling();
        green->on
        red->off
}
```

refer: TrafficManagement.txt

Water Management Algorithm :

- Here, first it will detect moisture using sensor attached in street light and if plants beside street light needs water it will make artificial rain accordingly.

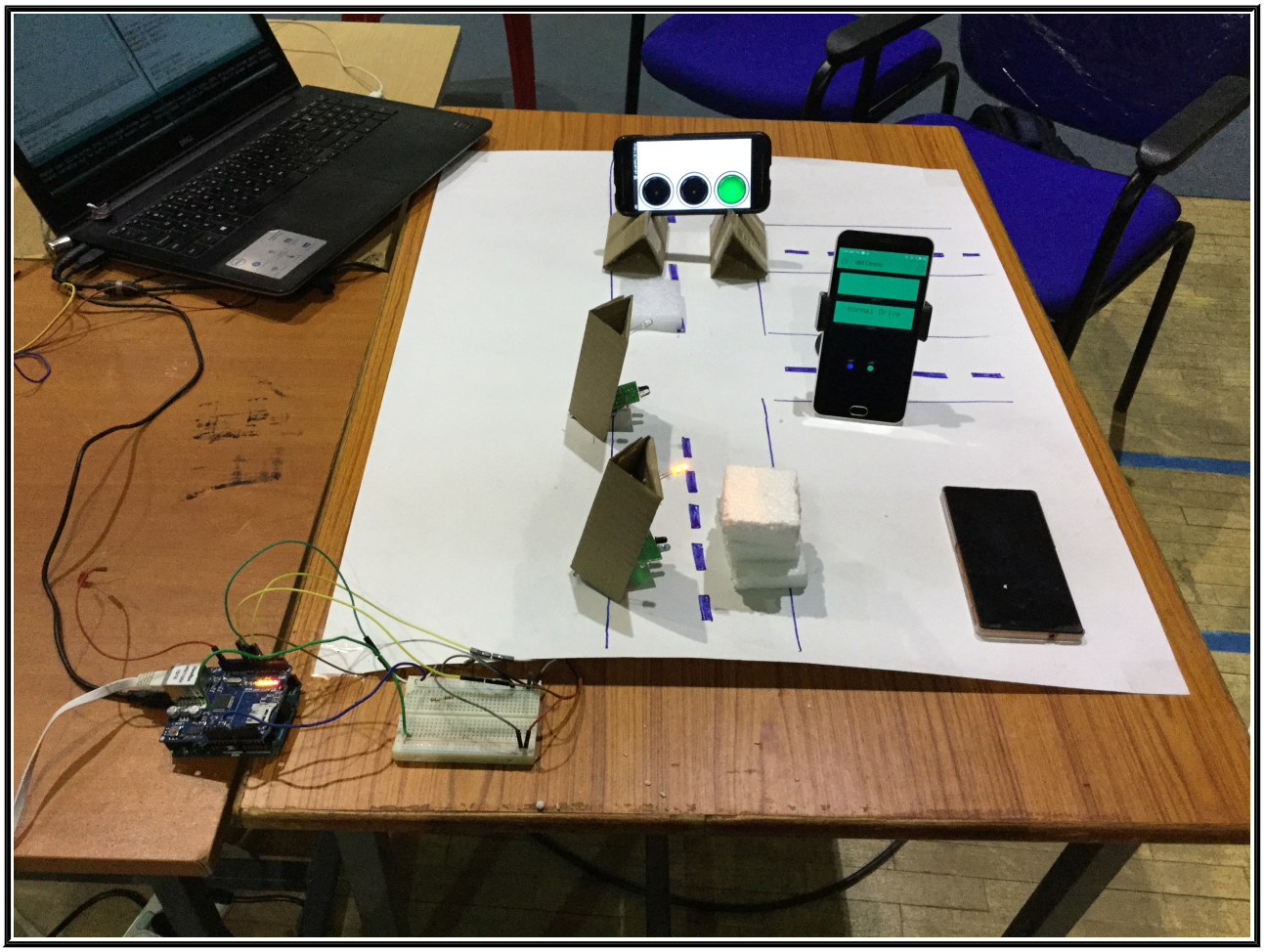
- Suppose, its a rainy season then it will never make artificial rain until it is emergency. And during summer season duration will get increased according to the analyzed.

```
void plant()
{

        if(rainySeason)
        noArtificialRain();
        else if(summerSeason)
        ArtificialRain();
        else if(detectMoisture<Required)
        ArtificialRain();
}
```

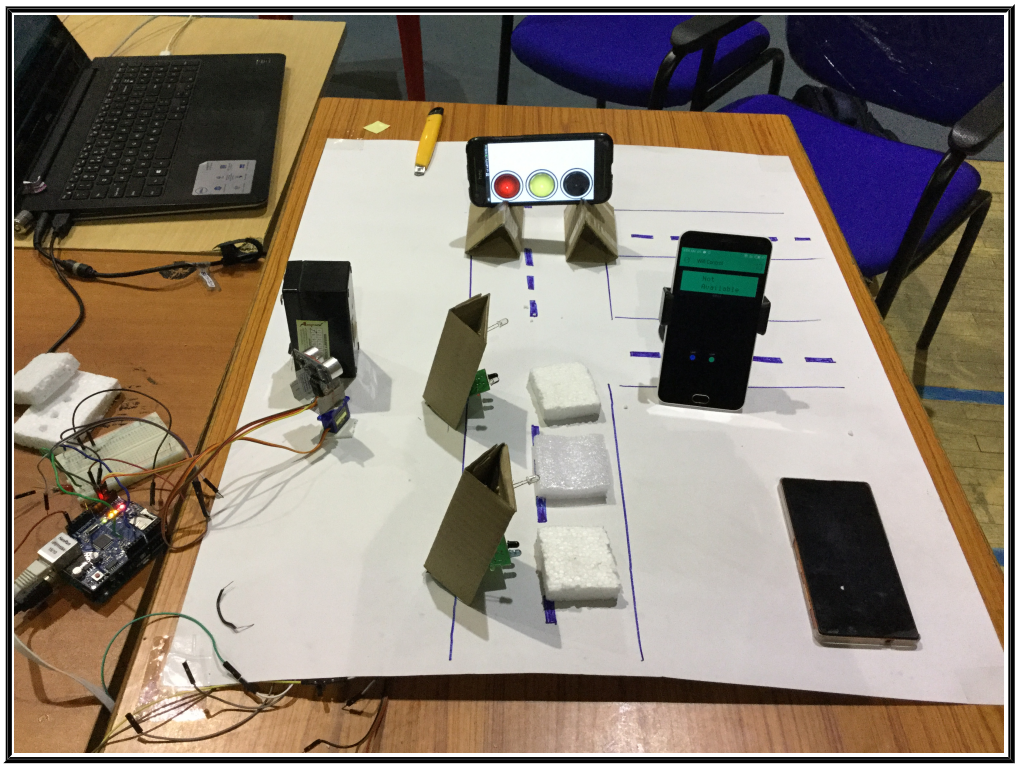
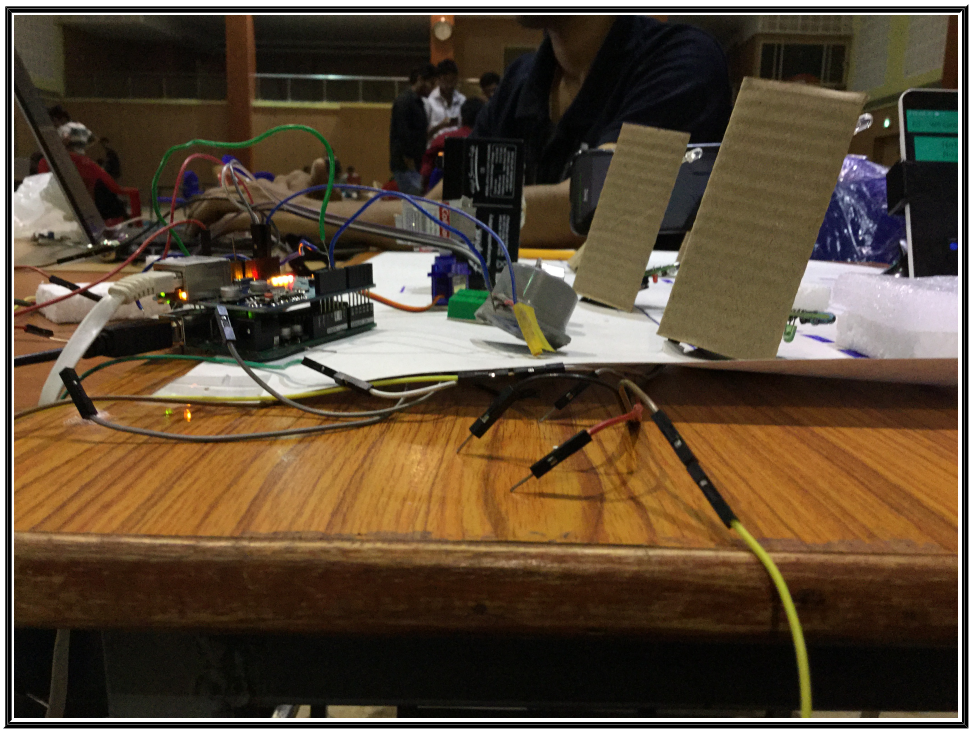
refer: WaterManagement.txt

IMPLEMETED PROTOTYPE DURING HACKATHON

Smart Street Light & Over Speed Vehicle Detection:



Smart Car Parking:



Accident Detection: