Development of Camera Based Low-Cost Real-Time Internet Controlled Vehicle for Smart Factories

C1-009

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Introduction

Facts of Smart Factory Vision

- **Self-Monitored**
- **Automation**
- **Remote-Operation**
- **M2M**
- **Working 24x7**

S.M.A.R.T = Self-Monitored Analysis and Reporting Technology

Motivation - Problem

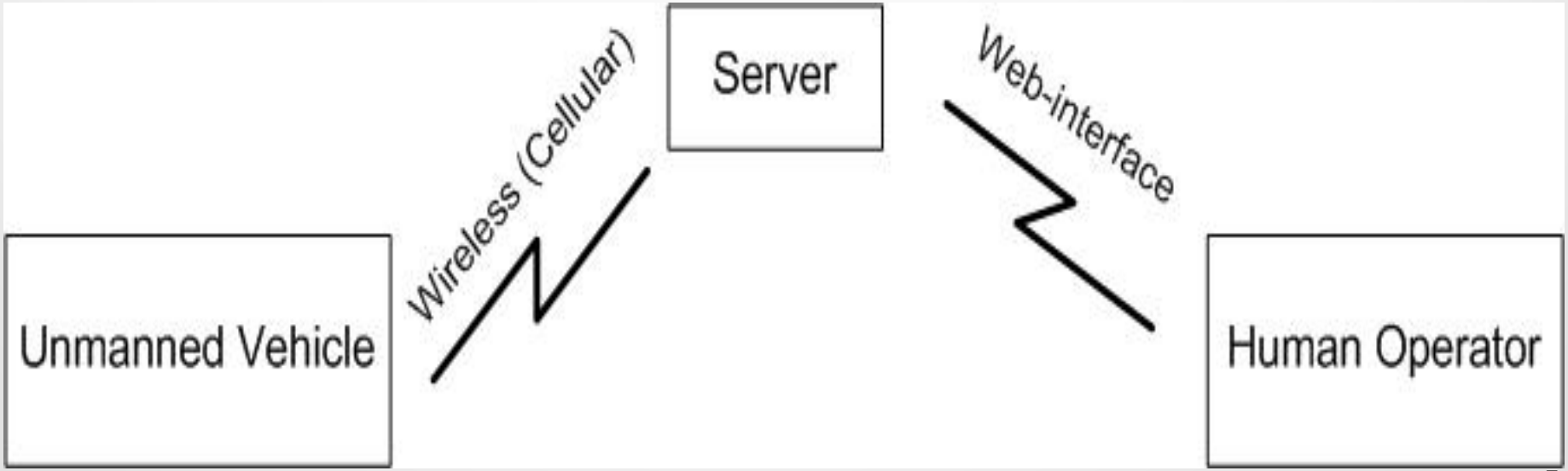
- Automation in Industries
  - **Transportation of goods from one point to another**
  - **Remote Monitoring/ Inspect Machine Safety**
  - **Unmanned vehicle in unstructured environment**
  - **Need of Remote Control**

Motivation - Solution

- Automation In Industries
  - ✓ **Pre-Defined Path**
  - ✓ **Capturing the Vicinity**
  - ✓ **Detection of obstacles and change of path**
  - ✓ **GSM / Web Based Connectivity**

Major Parts of Prototype

- Three Components
  - **Human Operator**
  - **Web Interface(Server)**
  - **Unmanned Vehicle**



Major Parts of Prototype

Unmanned Vehicle

- Inbuilt GSM Module
- High Resolution Camera
- Sensor Fusion
- Micro-Controller

Human Operator

- Accessing the Unmanned Vehicle
- Watching the Real-Time Video
- Instructs the Unmanned Vehicle

Technical Features

I. Hardware

- **Arduino Uno**
- **GSM Modem(SIM 900) with SIM card**
- **Ultra-Sonic Sensors**
- **L239D IC (Motor Driver IC)**

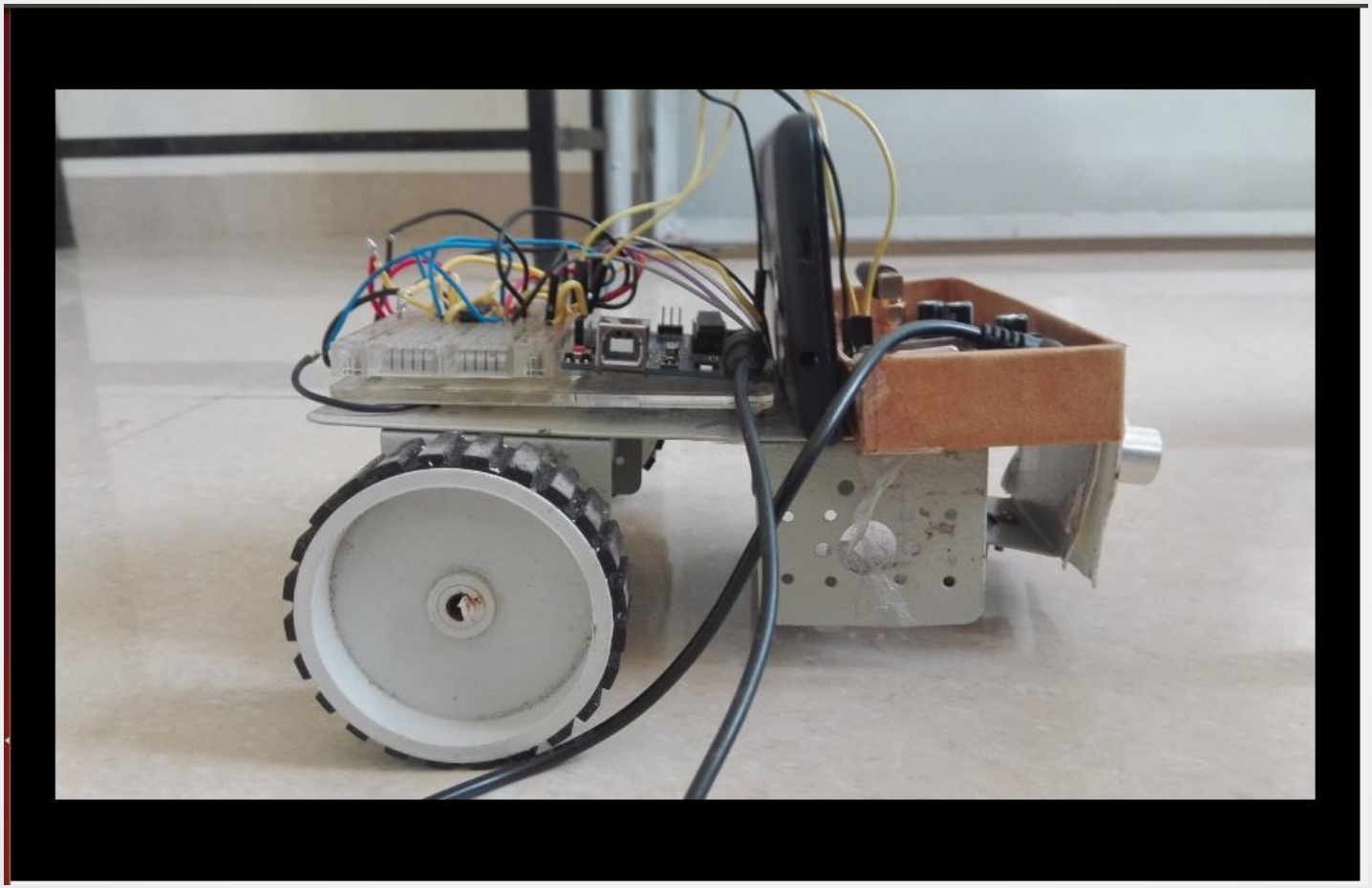
II. Software

Arduino 1.6.0 Programming Software(Embedded C)

HTTP Secured (HTTPS) Apache 2.4.9 Server support for PHP script

GRUVEO Video API

Indigeneous Unmanned Vehicle



Developed Web Interface

Developed Prototype(Video)

Conclusion

- Multi-functional remote-monitored vehicle for smart factory environment
- 3 Novel Aspects
  - **Remote connectivity through wireless/web based interface**
  - **Automatic detection of obstacles and change of path**
  - **Capturing the vicinity and send it to the server wirelessly**

Future Work

- **Analysis and Reporting Technology (A.R.T)**

  Vehicular Data Analytics

  Analyse the information in real-time for motion detection

  Image and Video Processing Tecnhiques

  Recommending the Operator

  Distance between Vehicle and Obstacle

  What Path has to be Taken?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