Design, Implementation and Simulation of a Cloud Computing System for Enhancing Real-time Video Services by using VANET and Onboard Navigation Systems

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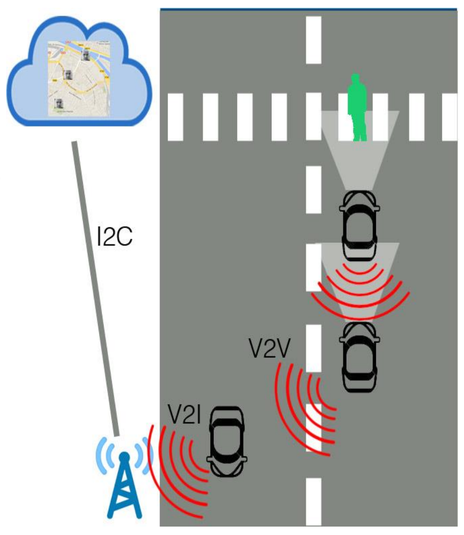
I. ABSTRACT

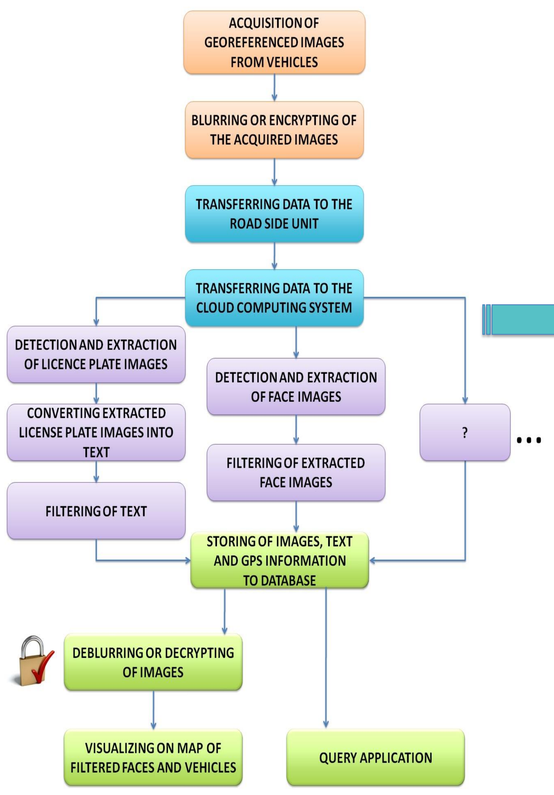
In this poster, we propose a design for novel and experimental cloud computing systems. The proposed system aims at enhancing computational, communicational and annalistic capabilities of road navigation services by merging several independent technologies, namely vision-based embedded navigation systems, prominent cloud computing systems and Vehicular Ad-hoc NETwork (VANET). This work presents our initial investigations by describing the design of the proposed system. The designed system has been simulated with various scenarios of video-based road services. Moreover, the associated architecture has been implemented on a small scale car prototype. The implemented architecture has been experimented in the case of a simulated road service to aid the police agency. The goal of this service is to recognize and track searched individuals and vehicles in a real-time monitoring system remotely connected to moving cars. The presented work demonstrates the potential of our system for efficiently enhancing and diversifying real-time video services in road environments.

II. INTRODUCTION AND MOTIVATION

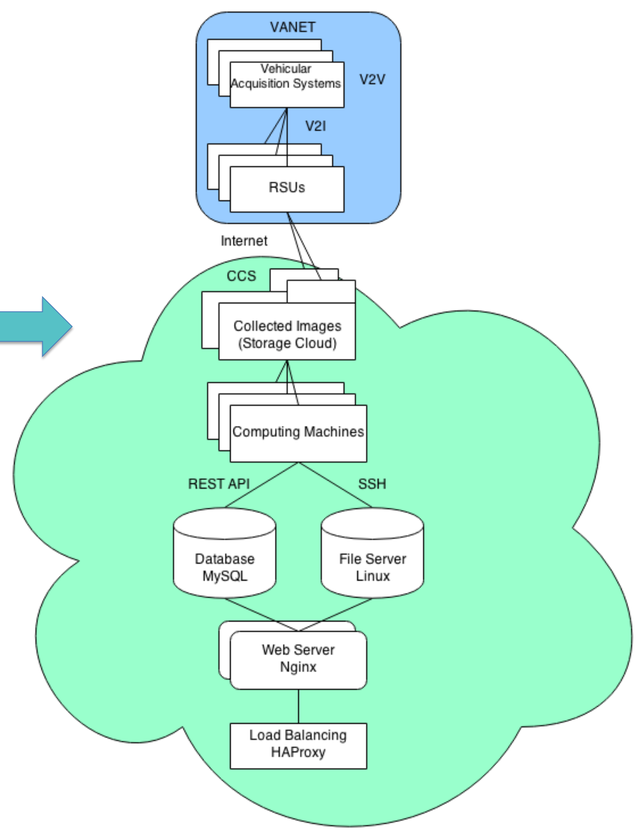
- To exploit the cameras integrated on vehicles for proposing new road services (e.g. police or parking services)
- To extend the computational capabilities of embedded systems by using cloud computing systems
- To mutualize the collected road information for enriching monitoring systems
- To process acquired road images on-the-fly for real-time video services



III. PROPOSED CLOUD COMPUTING SYSTEM



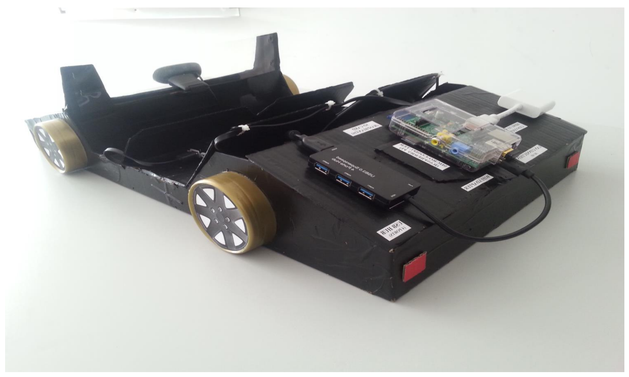
Global dataflow diagram



Cloud-based generic computing architecture

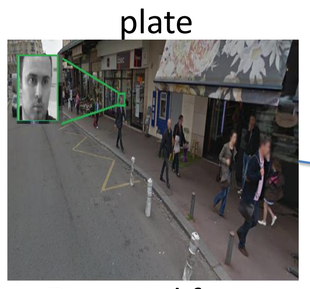
IV. SIMULATION AND EXPERIMENTAL RESULTS

Produced car prototype with associated embedded system

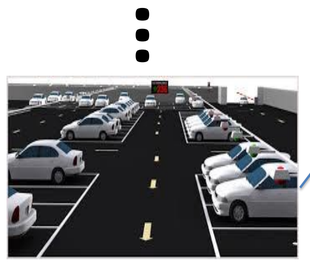


[1-3]

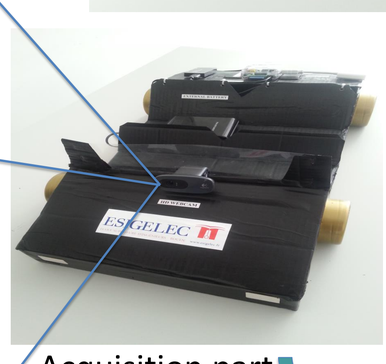
Detected license plate



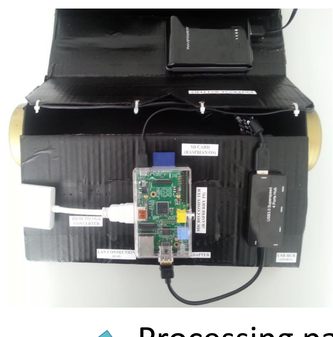
Detected face



Detecting available parking places?

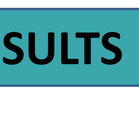


Acquisition part



Processing part

Road Images



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CCS

V. CONTRIBUTIONS

- Design a hybrid computing system based on VANET and CCS for enhancing the road monitoring coverage
- Development of an indoor vehicular monitoring simulator for experimenting real-time video services
- Simulation of new service ideas for smart cities and Intelligent Transportation Systems

VI. FUTURE WORKS

- To improve the performance of the proposed architecture
- To simulate our architecture by using ns2 or ns3 Network Simulators
- To improve the efficiency of the recognition methods
- To transfer this embedded monitoring technology onto real vehicles
- To detect available parking places in collected road images
- To regulate the road traffic
- To study meteorological conditions for avoiding bad weather itineraries

VII. BIBLIOGRAPHY

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