Tender Proposal

CSIR - Mobile Augmented Reality Number Plate Recognition

1 General

1.1 Purpose of Document

This document provides a description of the proposed solution submitted by BiTwise Developers in response to the invitation for bids on tender for the Mobile Augmented Reality Number Plate Recognition from CSIR.

1.2 Introduction

The aim of this document is to provide a detailed proposal for Mobile Augmented Reality Number Plate Recognition project that offers users the ability to utilize the smartphone using a mobile live video source to simply do object detection and feature extraction. This application also extends in assisting law enforcement agencies to use this application as a tool to detect motor number plates relating to motor crimes.

Our mission is to provide an application of mobile augmented reality number plate recognition for use in military and police domains in getting additional details of a specific vehicle using a smartphone.

2 Executive Summary

Bitwise Developers are a unique collection of aspiring IT professionals, each with ambition and sound judgement. We are all in our final year of study at the University of Pretoria.

The current stakeholders in this project proposal are as follows:

- Company Name : Council of Scientific and Industrial Research (CSIR)

- Project Owner : Smart Systems Research Group of the CSIR

    1. Priaash Ramadeen - Email: pramadeen@csir.co.za
    2. Shazia Vawda - Email: svawda@csir.co.za
    3. Pieter Botha - Email : pbotha@csir.co.za

- Team: BiTwise Developers

2.1 Team Portfolio

- Team name: BiTwise Developers

- Team members:

    1. Priscilla Hammond(Team leader) - Email : u11025477@tuks.co.za
    2. Jacques Lewis - Email : u28183488@tuks.co.za
    3. Francois Oberholzer - Email : u12039803@tuks.co.za

2.2 Unique Differentiators

BiTwise Developers is a group formed by 3 students from the Department of Computer Science, University of Pretoria. It is a necessary requirement to COS 301: Software Engineering, a third year module, that we are to accomplish a project which is industry related, which resulted to the formation of this group.

This group is composed of self-motivated and intellectual persons driven by hard work and fortitude to deliver IT solutions of excellence and exceptional quality.

This group consists of three different persons with three slightly similar degrees in the Information Technology field, two BSc IT Software developer students both with apparent understanding of system development and the strategies used in software development and a BSc IT Psychology (with Artificial Intelligence) student who in apart from knowing computer programming will be assisting with how to develop a solution with consideration of the users psychological needs. All three students are well accustomed to C++, Java, Linux and have moderate knowledge in Android.

This group will use open-source tools for both the documentation and solutions implementation.

3 Technical Proposal

3.1 Project Description

3.1.1 Problem Statement

The project request as submitted by Smart Systems Research Group of the CSIR.

An application to complement the real world live view is permitted by Mobile Augmented Reality, with locally processed information and/or information from other bases. This is all performed in real time.

This application is for extending the well-known augmented reality technology, which is a location based place search used in locating for landmarks when the smartphone is held up and the application picks up landmarks around and displays them onto the mobile device. This project proposes an extended application of this technology into law enforcement domains, namely for military and police.

This applications extension of mobile augmented reality view into real time number plate recognition can be a beneficial tool to benefit mobile units gets supplementary information of a specific automobile using a smartphone.

Employing that the smartphone do real time detection and feature extraction from a mobile live video source is the projects core vision. In addition to the function of this application, the information captured on the used smartphone can also then be distributed via web services to all other mobiles units.

3.2 Proposed Solution

Bitwise Developers believe that we can solve the problem by using our knowledge and resources, and by applying our skills as software developers. We propose a possible solution as follows:

3.2.1 Solution Overview

- Mobile Application : The mobile application will be designed with the following functional requirements

1. It should be able to detect South African automobile number plate and their contained text
2. The user interface should be prove easy and flexible for the users thus making the interface user-friendly
3. It should post the number plate information to the web service after capturing it on the smartphone
4. The mobile should be able to detect features through the camera live video
5. It should receive and extract information to be visualized onto camera view based on the number plate.

In the implementation of the mobile application, we will design and construct the Android application using Android SDK and Java combined with Qualcomm Vuforia augmented reality framework. In addition, it should be able to detect the motor description of the scanned number plate.

- Web application

  1. It should retrieve information from the android application and perform database querying based on the received number plate.
  2. It should post the information in the database back to the android application. It should display a user friendly client-side application to view all the number plate data saved on the local database.

4 Implementation Plan

This section aims to outline the development of the system of the proposed solution of the project. The project team will be submitting the subsequent documents (additional documentation to be provided at a later stage):

- An original tender document: This document will provide a comprehensive description of the Mobile Augmented Reality Number Plate Recognition and set out terms under which the tender will be accepted for evaluation.

- A high level requirements document: This document will provide a detailed description of what the proposed application will do as in, the purpose of the system, system features and interfaces and strictly specifying the systems functional and non-functional requirements, its quality and data requirements and the limitations under which the system should operate.

- An architecture proposal document: This document will provide a comprehensive description of CSIR Mobile Augmented Reality Number Plate Recognition. This architectural specification will give a detailed view of the purpose of the system with respect to its overall architecture and architectural features. This will then formally stipulate the subsystem views, policies, its data requirements, as well as the limitations under which the system operates.

- A user manual: This document will provide all the necessary information giving assistance to specified users on how to use this application for motor number plate recognition.

- Test plans: This document will provide the strategy in confirming and certifying that this application met its design specifications and other necessary and specified requirements

The project team will also be submitting software deliverables, namely

- The designed Android application(.apk file)

- The complete source code for both the web and mobile application

- Any hardware purchased with CSIR funds, will be delivered to CSIR by the team

5 Communication Channels

- Email: This is the top prioritized way of communicating with clients via email to explain concepts, confirm teams progress and set up meetings.

- Face-to-face: Have meetings at clients convenience to explain concepts and confirm teams progress.

- Telephonic: Telephonic consultations to explain concepts and confirm teams progress.