Smartphone Geotagging App

THE DESIGNLAB at Rensselaer

CREAT(E) — Component Recognition and Entry Application for wind Turbines

Problem

- GE Power & Water maintains tens of thousands of wind turbines world wide.

- Wind turbine configuration data is used to improve system designs and provide better services to customers.

- GE wants to maintain the data more accurately allowing for an easy use in the event of maintenance or upgrade by field technicians.

Purpose

- Our goal is to create a phone application that will allow field technicians to accurately record wind turbine configuration information; by taking a photo that captures this information which is then processed and stored in a database.

- The application is being created to increase productivity and reduce costs.
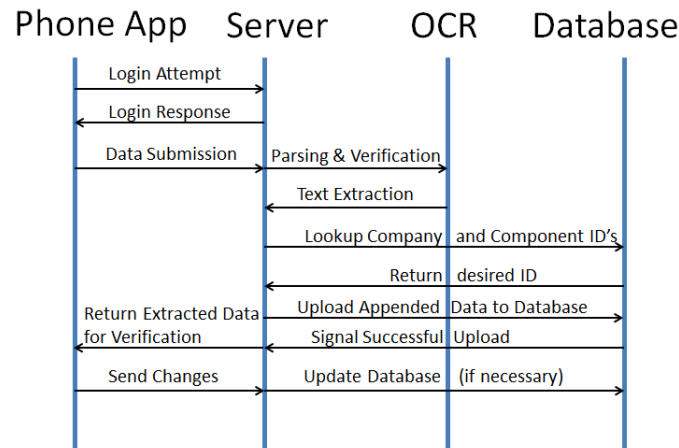
Software

- OCR – Tesseract (C++ Based)

- Image Processing – OpenCV (C++ Based)

- Front End App – Phone Gap (HTML & Java Script Based)

- Back End App – Django (Python Based)

- Database – SQLite 3 (SQL Based)

Semester Objectives

1. Collect user stories and create use cases

2. Develop a field testable system for capturing:
   a. Make, Model, & Serial Number
   b. Time Stamp
   c. Latitude, Longitude, & Elevation

Technical Approach

Phone App | Server | OCR | Database

- Login Attempt
- Login Response
- Data Submission — Parsing & Verification
- Text Extraction
- Lookup Company and Component ID's
- Return desired ID
- Return Extracted Data for Verification — Upload Appended Data to Database
- Signal Successful Upload
- Send Changes — Update Database (if necessary)

Accomplishments

- Image Enhancement can increase OCR accuracy
- OCR reliably information from image
- Smartphone App transfers photo and geolocation data, allow for manual correction, and auto-caches photo data in local database
- Server seamlessly integrates subsystems, handles client requests, executes OCR, and interfaces with database
- Stores work orders and turbine configuration data in database satisfying 3rd normal form
- Performed Cost Benefit Analysis of project

Future Recommendations

- Image Processing & OCR: Separate fields on plates, Logo recognition support, check results against values in database, Indicate confidence of accurate data to user

- Phone App: Use GPS at all times to capture data, Camera overlay to focus data on nameplate, Barometer plugin for accurate elevation data, User authentication tokens to allow continuous login

- Database: Use ODBC to connect multiple databases to show integration.

- Future Benefits: Scanning of ID tags, Identification for smaller components