

UNIVERSITY PARTNER



## Project and Professionalism (6CS007)

### A1: Project Report

## Computerized Worker Management System

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# 1. Literature Review

## 1.1. End User

Maintenance workers and other use this system to keep accurate track of their facilities, property and inventories. It can be found in a wide range of industries; essentially, any company that has used a repair division, no matter how big or tiny the maintenance team is. The system is designed to help the workers do their job more efficiently and build a better network with work provider. Large maintenance enterprise and work management offices could be potential client of this system. Workers and work provider are main targeted end user of this system. The chart shown below describes potential user percentage which is shown in green color. (staff & , 2020) (Duranceau, 2020)

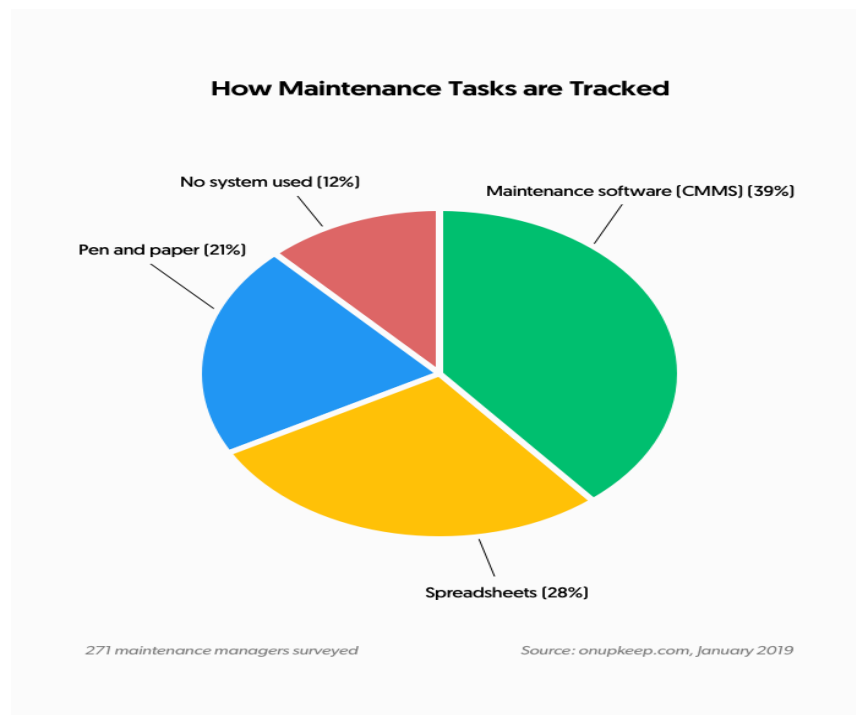


Fig 3.1: Potential user percentage from survey result of upkeep (Team, 2019)

## 1.2. Similar system

### 1.2.1. Rigo human resource management

Rigo human resource management system, based on more than 10 years of experience and expertise, is a comprehensive and easy-to-use software developed by financial professionals and engineers. This system is Nepal's most common and commonly deployed handling human resources and payroll applications. Many reputable organizations in Nepal have used it, including

the biggest government and private sector banks, the largest ISP's, reputed software industries, national and international NGO's.

This system offers employee onboarding services, employee document and HR processing, leave and attendance, payroll and taxation, control of priorities and assignments, talk and communication, performance evaluation, etc. Rigo human resource management is bit different from other similar system. Rigo is more based on human resource management but other are based on asset management. CWMS is human resource management and asset management also. There are many similarities which are human resource management, task management where Rigo get task order from other customer and complete that task by diving between employees and performance appraisal for evaluation of the employee performance.

(team, 2010)

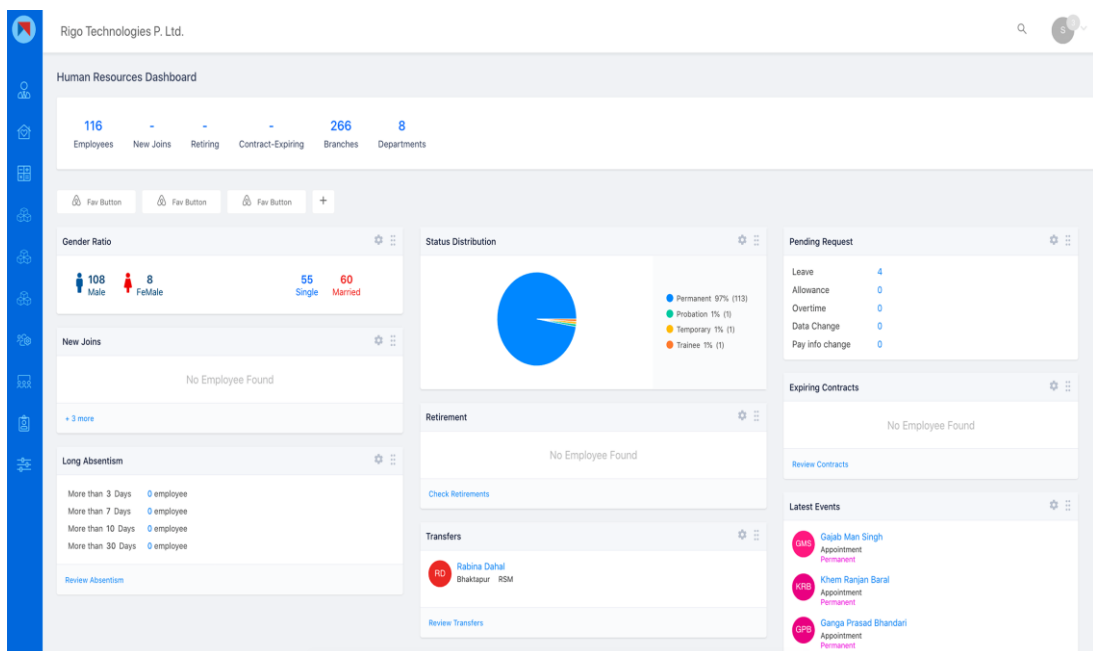


Fig 4.3.1: Rigo human resources management dashboard

### 1.2.2. MaintainX

MaintainX, a popular smartphone-first workflow management app for deskless workers based in San Francisco, is simple enough for pick-up and use by anybody on the squad. The user can create boundless work orders, invite unlimited users and create unlimited properties and locations even on the MaintainX free plan. For clarification on issues that come up in the area, users can upload images and annotate them. As evidence of accomplishment, the workers could also post images of the equipment whenever they mark successful job orders. Barcode scanning, resource management, reporting,

and team support offer comprehensive capabilities that help established enterprises to drive the technology with much greater benefit. (Turlica, 2019) (Anderson, 2019)

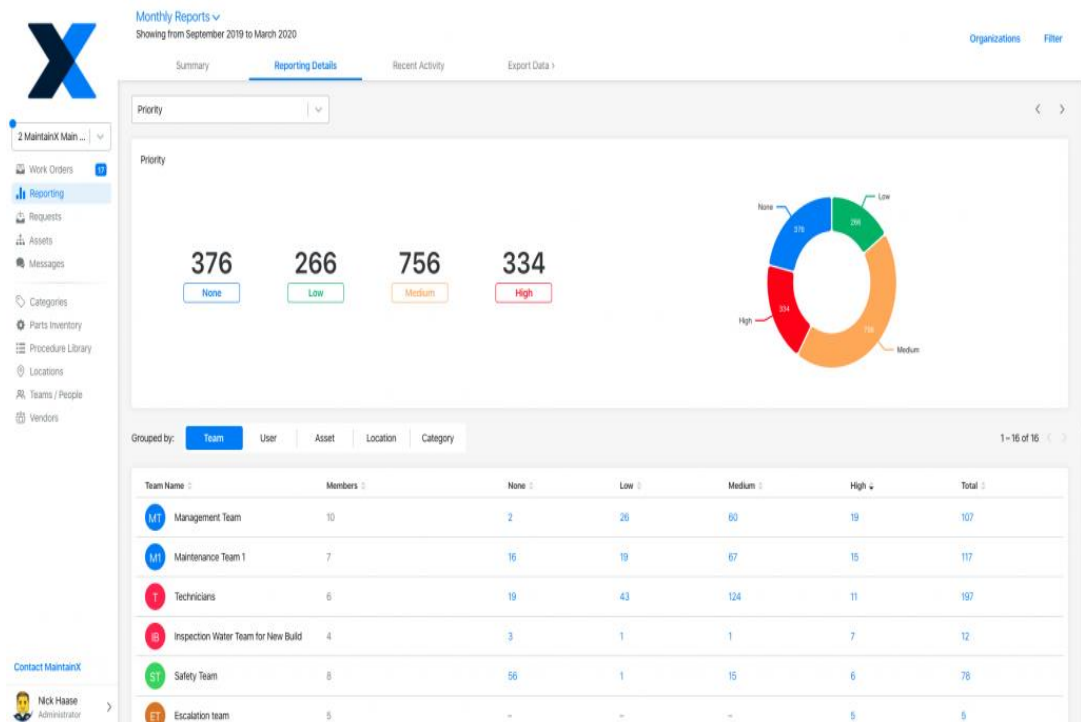


Fig 4.2.2: MaintainX dashboard

### 1.2.3. UpKeep maintenance management

UpKeep provides key maintenance features to build operation plans, such as equipment tracking, inventory and task order scheduling, and proactive maintenance. Users will see a preview page of assignments displaying pending work along with due dates, criticality and equipment or delegated to each worker. Users may have notes, a color-coded priority ranking, photos, objects and users when introducing new activities.

The smartphone app offers users the opportunity to develop projects, delegate work orders, handle funds and more. UpKeep is designed for small and medium-sized enterprises across all verticals of the market.

MaintainX and Upkeep are computerized maintenance management system (CMMS) which are designed for multiple companies work and asset management. That software is international software which are used across the globes and it's also free and this project (CWMS) is also based on similar concept. Mostly CWMS and CMMS are same which have the feature of work order management, plan and schedule, notification and work status etc. The main difference between them are that CWMS is designed for single company

system to connect multiple maintenance companies, individual worker and other blue-collar workers with customers but those CMMS are designed for multiple organization and anyone can create and join the organizations. CWMS have feature of geolocation and customer can easily find the worker in single system. (Upkeep, 2020)

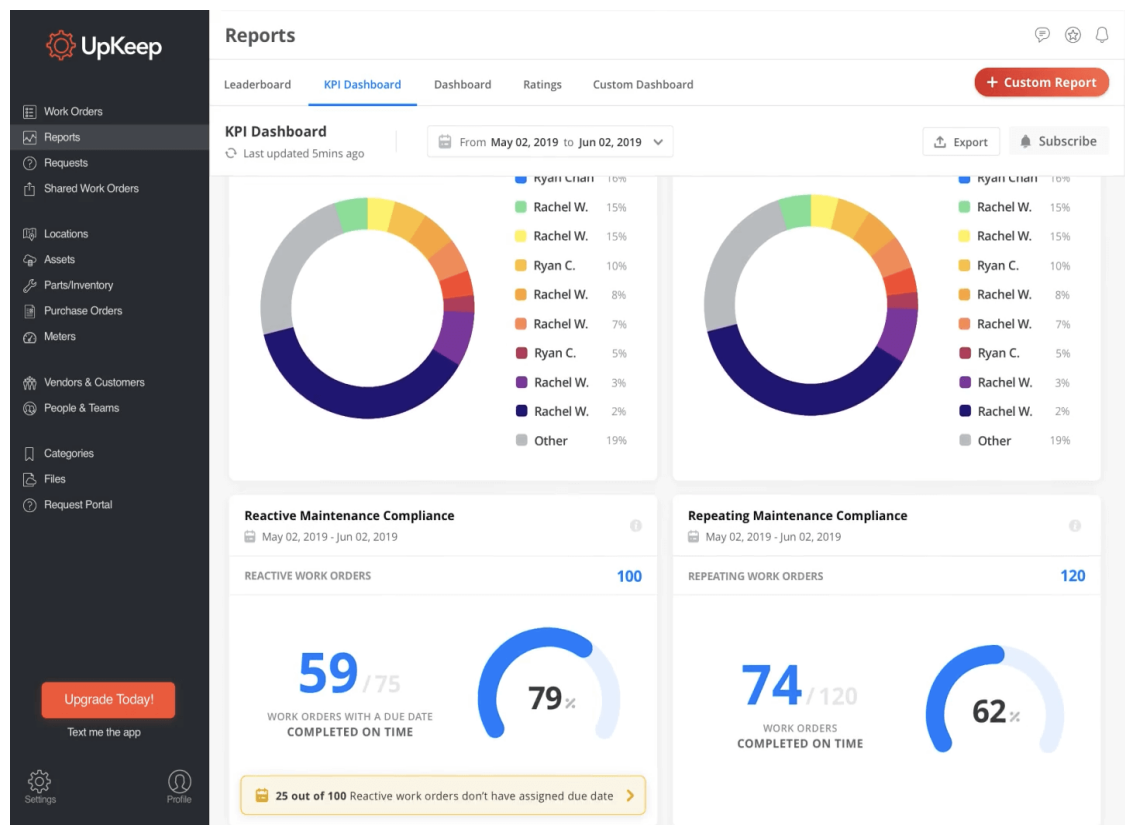


Fig 4.3.3: Upkeep report page

### 1.3. Framework

A system is a compilation of applications that organizes an application's architecture and makes the work of a developer simpler. For various applications, a system may be modified. It also provides practical instruments to make the work of a programmer faster. Thus, certain functions, such as database administration and user management, that are regularly used on a website can be automated. When a programmer handles a system, the efficiency and the consistency of the code are significantly increased. (Dauzon, et al., 2016)

#### 1.3.1. Django Web Framework

Django is a Python high-level web framework that allows for the rapid creation of stable and maintainable websites. Designed by expert developers, Django looks after much of the web development hassle, meaning developers can concentrate on developing the software without having to reinvent the wheel. It is free and open source, has a vibrant and successful culture, decent

documentation. This web framework is complete, versatile, secure, scalable, maintainable and portable (kruschk, 2019) (Ramesh, 2019) Particularly Django uses an MVT pattern which is a software design pattern for developing a web application.

#### 2.3.1.1. Model View Template (MVT)

##### **Model:**

The model would serve as the data interface. It is accountable for managing data. It is the logical structure of the data behind the entire application and a database (usually relational databases such as MySQL, Postgres and SQLite) is represented. (Arora, 2016)

##### **View:**

The View is the user interface and what you see when you render a website in your browser. HTML / CSS / JavaScript and Jinja files represent it. (Arora, 2016)

##### **Template:**

A template consists of static sections of the desired HTML output and some special syntax that defines how to incorporate dynamic content. (Arora, 2016)

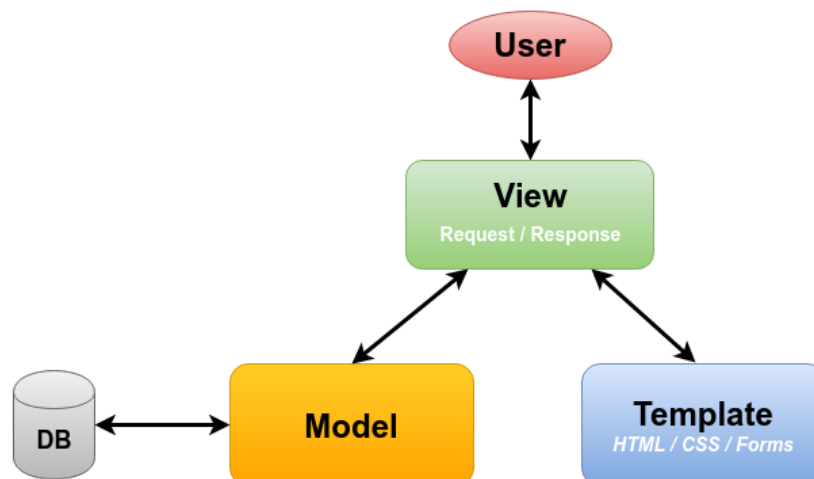


Fig: MVT architecture (Ramesh, 2019)

## 1.4. Libraries

### 1.4.1. Chart.js

Chart.js is a JavaScript library in order to create different charts. In general, when it comes to how they need to consume info, JavaScript libraries are not all the same. Pure JSON, arrays, strings, even single integers may be required by libraries. Chart.js primarily uses the array type to consume the data,

whether it is an array of numeric or string values. This is pretty cool because it is very easy to set up and function with JavaScript arrays. Scatter charts that require x and y coordinates in a JSON format are the only exception to this default behavior. (Englishby, 2018)

#### 1.4.2. Pillow

Pillow is a Python Imaging Library (PIL), which provides support for images to be opened, edited and stored. The current version identifies a large number of formats and reads them. Write support is purposely confined to the most widely used formats for interchange and presentation. Pillow have the function like showing image, providing image information, blurring image, grayscale image, converting image, rotating image, displaying in Tkinter, reading from URL, drawing to pillow image and creating water mark with pillow. (Bodnar, 2020)

#### 1.5. Geolocation

By delay estimation and landmark comparison, standard city-level IP geolocation algorithms currently evaluate the location of the target. Based on the PoP network topology in this report, a city-level geolocation algorithm is suggested. Next, the network nodes belonging to the target city are taken out from the detection route according to the distribution of one-hop delay between network nodes in various cities, and the landmarks are enlarged. Second, typical anonymous route structures are used in the path data to identify and merge anonymous routes. Finally, via the closely linked network nodes, the PoP network topology within the city is extracted, registered into the PoP database, and used for geolocation at the city level. Four process carried for IP geolocation is given below: ( Zu , et al., 2018)

1. **Landmark extension and path division.** Perform route detection on all network nodes in the subnet after receiving the landmark information of the target city, discard the route not to the target city according to the one-hop delay distribution across the routes, divide the remaining routes by one-hop delay into two sections and keep the target city part. ( Zu , et al., 2018)
2. **Anonymous routes search and process.** Search, remove and merge the anonymous route structures in the order of phantom structure, parallel structure, star structure and binary structure that exist in the path information, and then remove repeated routes after completion. ( Zu , et al., 2018)
3. **Extraction of PoP network topology.** Extracting the PoP network through the Bi-fan structure in the path information, determining the location

information according to the landmarks included in the PoP network and logging into the PoP database. (Zu, et al., 2018)

4. **City-level IP geolocation.** Identify the target IP and ask the node in the database path information to get the geolocation on response. (Zu, et al., 2018)

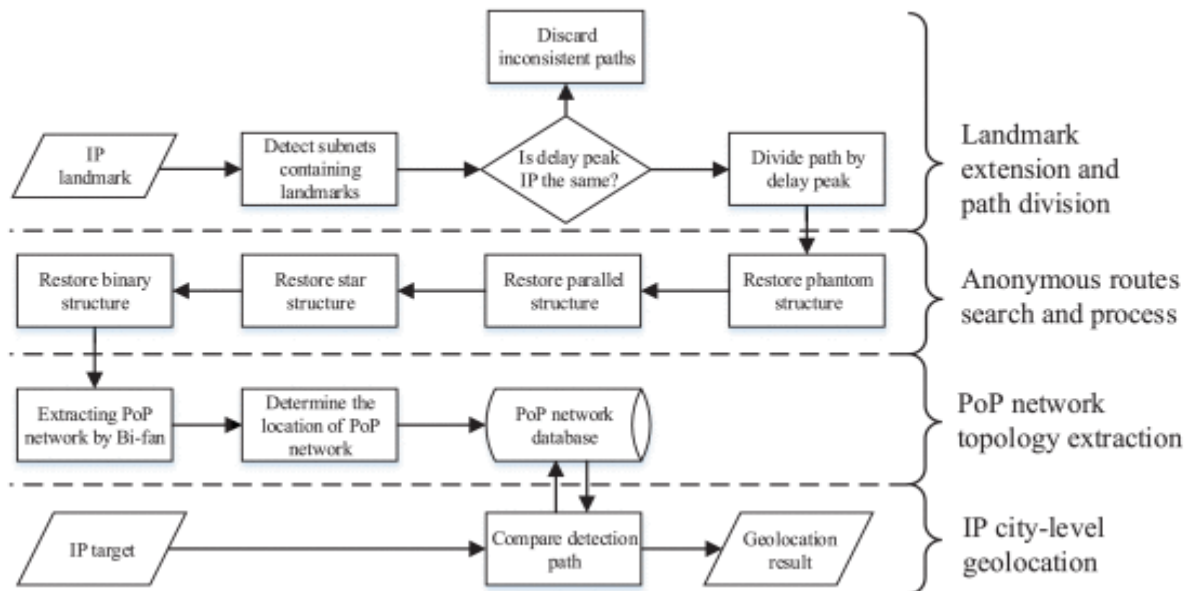


Fig: Schematic diagram of algorithm (Zu, et al., 2018)

### 1.6. Analysis

Above mentioned similar system are more based on worker and company. Those system are not popular in Nepal. Few industries use the CMMS software because of not having proper knowledge of technology. Those are international companies so which gives less priority in developing country like ours. That CMMS software have many features but for the customer (work provider) it is less user friendly. That system has the feature of work order but first customer must know the id of organization and they have to remember or find many ids which is pain point for customer. Due to different organization customer have to visit different organization using their id which is more time consuming and difficult.

This system is solving that pain point of the customer by connecting all the work service company and individual worker in a single platform. This system is more like ecommerce where customer can place work order to different workers and companies as their requirement, they don't have to remember any id which makes it easier. This system has the feature of geolocation which helps to show the worker around the customer place.





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