"EMPLOYEE TRACKING"

A PROJECT REPORT

Submitted By

PATEL MALAY (130670107065)

TILWANI MASHOOK (130670107119)

Under Guidance Of

In partial fulfillment for the award of the degree

Of

BACHELOR OF ENGINEERING

In

COMPUTER ENGINEERING

SAL Institute of Technology & Engineering Research

Gujarat Technological University, Ahmedabad

Computer Engineering

2016-2017

SAL TECHNICAL CAMPUS

Engineering
Management
Pharmacy

CERTIFICATE

Date: 12/10/2016

This is to certify that the project entitled "**EMPLOYEE TRACKING**" has been carried out by **Patel Malay (130670107065)** & **Tilwani Mashook(130670107119)** under my guidance in partial fulfillment of the degree of Bachelor of Engineering in Computer(7th Semester) of Gujarat Technical University, Ahmedabad during the academic year 2016-17.

Internal Guide	Project coordinator	Head Of Department
Pooja Mehta	Biren Patel	Dr S.G. Desai
Assistant Professor	Assistant Professor	

GUJARAT TECHNOLOGICAL UNIVERSITY

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Name of Guide : Mrs. Pooja Mayur Mehta

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PLAGIARISMA

90% Unique

Total 28466 chars (2000 limit exceeded) , 400 words, 16 unique sentence(s).

Results	Query	Domains (original links)
Unique	There are challenges in getting optimal performance out of their workforce	-
Unique	to have real-time tracking information to help manage field teams	-
10,300 results	Pooja Mehta	poojamehta.us facebook.com bmc.org wellspan.org dnaindia.com dnaindia.com makiaj.com linkedin.com yelp.com huffingtonpost.com
15 results	They have been a constant source of motivation	navy.mil digitalcommons.unl.edu scholarworks.umass.edu groups.csail.mit.edu semanticscholar.org issuu.com qspace.library.queensu.ca esextherapy.com sportskeeda.com cms.unipune.ac.in
Unique	They have shown a way to pursue excellence	-
Unique	1 ETS LOGIN 5	-
1,410,065,408 results	2	starfall.com 2plus2.admissions.uiowa.edu mail2web.com d2.com rwk2.racewarkingdoms.com youtube.com getreadytoread.org i2net.com youtube.com classzone.com
Unique	[i] ABSTRACT There is a need to build an application platform for organizations	-
Unique	for organizations to have a look into their activities and be able to monitor their	-
Unique	The proposed platform will be designed to help organizations optimize their mobile workforce	-
Unique	The solution is based on using employee’s phones to manage and communicate all	-

Unique	Employee locations are automatically tracked thereby enabling field managers, supervisors, office managers, HR	-
Unique	I am pleased to present this project titled “EMPLOYEE TRACKING” before Sal Institute of	-
Unique	I earnestly hope that this project report will provide all necessary information required	-
Unique	I take this opportunity to express my immense gratitude to our internal project	-
Unique	By their uncompromising demand for quality and insistence for meeting the deadlines	-
Unique	I am thank full to all the staff and faculty member of Computer	-
Unique	This project is an outcome stimulated by the cumulative efforts of all of	-
Unique	Lastly, my family, they do deserve more than anything I can ever give,	-
136,000 results	[iii] List of Tables	citeseerx.ist.psu.edu nist.gov citeseerx.ist.psu.edu cga.ct.gov econstor.eu shodhganga.inflibnet.ac.in civilrightsproject.ucla.edu nces.ed.gov ntl.bts.gov
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[i] ABSTRACT There is a need to build an application platform for organizations that have to manage a mobile workforce consisting of field and contract employees. There are challenges in getting optimal performance out of their workforce. While employees are out in the field performing their duties, it is necessary for organizations to have a look into their activities and be able to monitor their progress. The proposed platform will be designed to help organizations optimize their mobile workforce and improve their field operations. The solution is based on using employee's phones to manage and communicate all their activities in the field. Employee locations are automatically tracked thereby enabling field managers, supervisors, office managers, HR Managers, etc. to have real-time tracking information to help manage field teams. [ii] ACKNOWLEDGEMENT I am pleased to present this project titled "EMPLOYEE TRACKING" before Sal Institute of Technology & Engineering Research. I earnestly hope that this project report will provide all necessary information required to readers to fulfill their aspiration. I take this opportunity to express my immense gratitude to our internal project guide, Prof. Pooja Mehta. They have been a constant source of motivation. By their uncompromising demand for quality and insistence for meeting the deadlines I could do such work. They have shown a way to pursue excellence. I am thank full to all the staff and faculty member of Computer Engineering Department for their cooperation and friendly treatment given during my project. This project is an outcome stimulated by the cumulative efforts of all of these. Lastly, my family, they do deserve more than anything I can ever give, I would not have been anything of whatever I am today without them. [iii] List of Tables Table No. Table Name Page No. 2.1 ETS LOGIN 5 2.2

ABSTRACT

There is a need to design an application platform for organizations that have to manage a mobile workforce consisting of field and contract employees. There are challenges in getting optimal performance out of their workforce. While employees are out in the field performing their duties, it is necessary for organizations to have visibility into their activities and be able to monitor their progress.

The proposed platform will be designed to help organizations optimize their mobile workforce and improve their field operations. The solution is based on using employee's phones to manage and communicate all their activities in the field. Employee locations are automatically tracked thereby enabling field managers, supervisors, office managers, HR Managers, etc. to have real-time information to help manage field teams.

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CHAPTER 1

INTRODUCTION

Purpose:

The purpose of “EMPLOYEE TRACKING” is mainly to track down the field employees and their activities for high and efficient productivity of the organization. Also to monitor the location of the field employees through GPS.It will send the notification if the employee goes outside the approved geographical zone.

Intended Audience:

The intended audience of this document includes the HR managers, and other field employees of the developing and developed organization to provide and maintain accurate working atmosphere.

Scope:

- ✓ Login panel
- ✓ Dashboard Screen
- ✓ Overview Screen
- ✓ Manage Employees
- ✓ Manage Tasks for Employees
- ✓ Feedback
- ✓ Settings
- ✓ View on Map
- ✓ Reports

Product Perspective:

Employee tracking system, which assists the field employees and allows to control the activities of the field employees by the HR manager at the ease of touching Android device screen. This system will provide the monitoring facilities such as controlling, messaging, locating employees, calling, notifying etc.

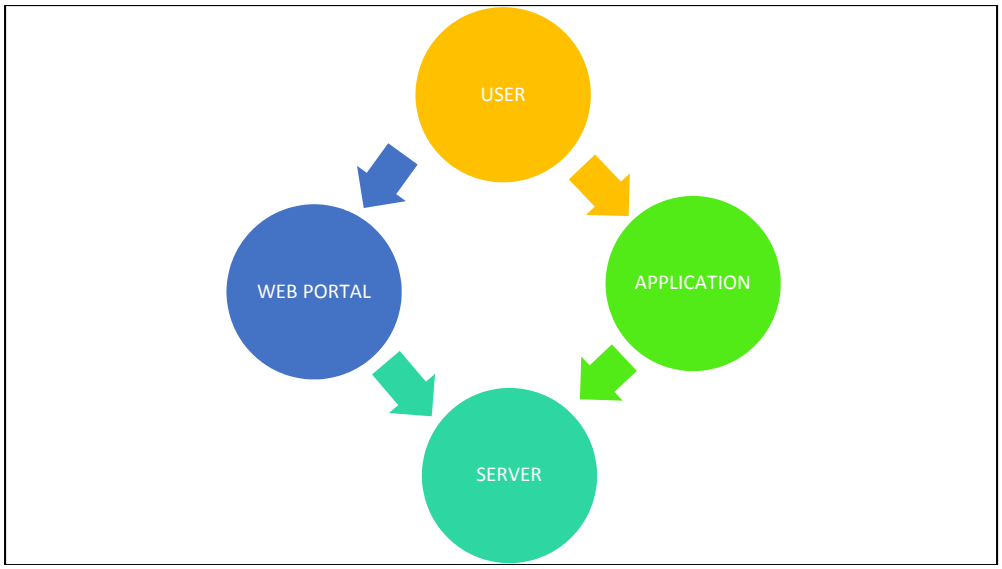

Fig: 1 Overview of Employee Tracking System

Benefits:

- The administrator can see where all workers are, if they are on schedule and can dispatch the closest worker to a certain job.
- Businesses can give clients accurate and complete information about their product delivery or when a technician will arrive at their location.
- Employees can receive turn-by-turn driving directions to find the best way to the client or to locate nearest restaurant or gas station.
- The apps can serve as a communication channel saving companies a lot on phone bills
- Employees have to fill less papers as they can use the app to clock in or clock out for time-card purposes or give customers forms and other papers to sign digitally. There is also the possibility to track time automatically depending on location, making it easier for the employee to see the time spent at each client.
- Businesses can setup certain alerts when employees are entering or leaving an area using geofencing.
- Businesses that can benefit from personnel tracking apps include construction, delivery, field services, fleet leasing, utilities, food and beverage, oil, mining companies and many more.

Objective:

The objective of Employee Tracking System is to maximize the return on investment from the organization's human capital and minimize financial risk. Employee tracking system serves these key functions:

- ✓ Performance evaluation and management (Help to calculating Actual Productive Timing)
- ✓ Selection
- ✓ Industrial and employee relations
- ✓ Record keeping of all personal data
- ✓ Tracking real time activity of an Employee
- ✓ Region/Plant specific Employee Grouping

CHAPTER 2

ANALYSIS

A) STUDY OF EXISTING SYSTEM:

These are the some of the names of the already existing systems for the employee tracking similar to our project idea.

- Bornix
- Vayak
- T-Sheets
- Claudit Ltd

B) DEFINIING REQUIERMENT:

HARDWARE REQUIREMENTS:

Some of the hardware that would be used for developing and maintaining the employee tracking are defined as follows:

- ✓ Mobile Phones/GPS device
- ✓ Computer/Laptops with following requirements for developer
- ✓ Windows(Operating System)
- ✓ Microsoft® Windows® 7/8/10 (32- or 64-bit)
- ✓ 2 GB RAM minimum, 8 GB RAM recommended
- ✓ 2GB of available disk space minimum, 4 GB Recommended (500 MB for IDE + 1.5 GB for Android SDK and emulator system image)
- ✓ 1280 x 800 minimum screen resolution
- ✓ Java Development Kit (JDK) 8
- ✓ For accelerated emulator: 64-bit operating system and Intel® processor with support for Intel® VT-x, Intel® EM64T (Intel® 64), and Execute Disable (XD) Bit functionality.

SOFTWARE REQUIREMENTS:

Some of the software's that would be used for developing and maintaining the employee tracking are defined as below:

For developing team:

- ✓ Android studio
- ✓ Android SDK
- ✓ Eclipse/Net beans
- ✓ Apache Tomcat Server/Glass fish
- ✓ My Sql

- ✓ Tortoise SVN

Other Requirements:

- ✓ Continuous Internet Connection with a high bandwidth

Functional Requirement:

- ❖ Login(Manager/Employee)
- ❖ User Profile Management(Employee)
- ❖ View on Map
- ❖ Define Task Categories
- ❖ Define Task and its Schedules
- ❖ Assigned/Unassigned Task to Employee
- ❖ Create Task Route
- ❖ Evaluate actual time spent on Task
- ❖ Change Task status
- ❖ Generate Reports
- ❖ Feedback

1 Login:

Term	Description
REQ ID	RQ01
Purpose	To have Login functionality of different categories of user (Managers, Employees, Admin).
Access Restrictions	Admin/Manager, Employees
Input(s)	User id and password of users.
Output(s)	User will be logged in.
Process	1. Enter user_id 2. Enter Password of the particular id. 3. If Password is correct user will be logged in 4. If Password is incorrect password incorrect error will be generated.
Mandatory Fields	User's id and Password.
External Events	Registration of new employees or change password.
Validation Rules	User id and password of user must be correct

Table 2.1 ETS Login

2 User Profile Management:

Term	Description
REQ ID	RQ02
Purpose	To manage and add profile of user with picture.
Access Restrictions	Employee, Admin/Manager
Input(s)	User id and password of users.
Output(s)	Profile Will be updated.
Process	1.User needs to login primarily 2. User needs to open his/her profile from settings. 3.User will be updating or managing his information from profile menu
Mandatory Fields	User's id.
External Events	Registration of new employee details or Update Employee details.
Validation Rules	User id of user must be valid.

Table 2.2 ETS User Profile Management

3 View on Map:

Term	Description
REQ ID	RQ03
Purpose	It helps in finding Employee previous and current location and viewing path of employee during office hour. It is used for tracing location of employee with use of particular date. It helps to manager/admin to locate employee between specific time and date.
Access Restrictions	Admin/Manager
Input(s)	User id of Employee.
Output(s)	Manager/Admin are able to track Employee.
Process	1. Admin/manager needs to login. 2. They need to select View employee from provided menus. 3. They need to select particular employee to which they want to track or see.
Mandatory Fields	User's id.
External Events	To use this function admin/manager can restrict the area to employee and helps in providing fence to particular area to employee.
Validation Rules	User id of user must be correct.

Table 2.3 ETS View On Map

4 Define Task Category:

Term	Description
REQ ID	RQ04
Purpose	To define the type of task.
Access Restrictions	Admin/manager.
Input(s)	Name and category of the task.
Output(s)	Organized list of the task.
Process	1.Employee or admin/manager needs to login 2. They need to allocate or select the type of task they want to be categorized.
Mandatory Fields	User's id.
External Events	NA
Validation Rules	Employee id and password must be correct. Only Admin/managers can finalize the defined tasked.

Table 2.4 ETS Define Task Category

5 Define Task and its Schedule:

Term	Description
REQ ID	RQ05
Purpose	This Function is used to add task and also It is used to edit, delete and view all of task assigned to particular employee.
Access Restrictions	Admin/manager
Input(s)	User id of Admin/Manager
Output(s)	Proper predefined task and a properly built schedule for the tasks to be done.
Process	1. Admin/Manager needs to log in. 2. Select Particular employee for whom task is to be defined. 3. Define or select the task for the employee. 4. Provide a start and end date for the task.
Mandatory Fields	Admin/employee id.
External Events	Task schedule provide data in real time like (Expired task details, Today's task details, upcoming Task Details).
Validation Rules	Admin/manager id and password must be correct. Only Admin/managers can define and schedule the tasks.

Table 2.5 ETS Define Task and Its Schedule

6 Assigned / Unassigned Task to Employee:

Term	Description
REQ ID	RQ06
Purpose	Major purpose is to manage the tasks efficiently and effectively so tasks will be divided into sub categories due to which it can be managed properly.
Access Restrictions	Admin/Manager
Input(s)	1. Category of the tasks to be assigned. 2. Category of the tasks to be unassigned.
Output(s)	View on map with for Unassigned Task and same for Assigned Task.
Process	1. Admin/manager needs to log in. 2. Admin/manager needs to assign the tasks to the employee. 3. If required Admin/manager needs to unassigned the tasks to the employee.
Mandatory Fields	Admin/manager id.
External Events	For assigned task a unique feature add in which **swapping of task** is done by assign same task to another. In Assigned Task if Employee is leaving task then he needs to provide a reason for leaving the task.
Validation Rules	Admin/manager id and password must be correct. Only Admin/managers can assign/unassigned the tasks.

Table 2.6 ETS Assign / Unassigned Task to Employee

7 Create Task Route:

Term	Description
REQ ID	RQ07
Purpose	It helps Admin/Manager to assign specific route for getting task done.
Access Restrictions	Admin/Manager
Input(s)	Assign the route for the task to be done
Output(s)	Assigned route for the employees to get the work done.
Process	1. Admin/Manager needs to login. 2. Admin/Manager needs to select employee. 3. Admin/Manager needs to route the task for particular employee.
Mandatory Fields	Admin/manager id
External Events	To restrict Employee within specific area for doing task on map.
Validation Rules	Admin/manager id and password must be correct. Only Admin/managers can route the tasks.

Table 2.7 ETS Create Task Route

8 Evaluate actual time spent on Task:

Term	Description
REQ ID	RQ07
Purpose	To check the overall performance of an Employee and Admin can generate Reports and evaluate performance as per no. of task given to an employee.
Access Restrictions	Admin/manager, Employee
Input(s)	Start and Finish Time
Output(s)	Generate a task report (chart) as per performance.
Process	1.Log in by employee or Admin/manager 2. Starting time of task. 3. Ending time of task.
Mandatory Fields	Start and end time of the task.
External Events	Update time.
Validation Rules	Admin/manager, employee id and password must be correct. Employees needs to enter the start and finish time.

Table 2.8 ETS Evaluate actual time spent on Task

9 Change Task status:

Term	Description
REQ ID	RQ09
Purpose	To update schedule for an Employee.
Access Restrictions	Employee
Input(s)	Schedule to be changed
Output(s)	Updated Schedule
Process	1. Log in by employee 2. Changed Status of task.
Mandatory Fields	Updated status of the task.
External Events	Also ask for reason to select to change the status.
Validation Rules	Employee id and password must be correct. Employees needs to enter updated status of the task.

Table 2.9 ETS Change Task status

10 General Report:

Term	Description
REQ ID	RQ010
Purpose	To generate the report of the actual tasks done for the particular time duration.
Access Restrictions	Employee
Input(s)	Task details
Output(s)	General Report
Process	NA
Mandatory Fields	NA
External Events	NA
Validation Rules	NA

Table 2.10 ETS General Report

11 Feedback:

Term	Description
REQ ID	RQ011
Purpose	It provides whole details of employee feedback send through android app during task implementation. It also display images send by employee as feedback during task progress of task. It also Helps Admin/Manager to track location from where Feedback is sent by employee on task location.
Access Restrictions	Employee,Admin/Manager
Input(s)	Details of the feedback task.
Output(s)	Feedback generated by employees and admin/managers.
Process	NA
Mandatory Fields	NA
External Events	NA
Validation Rules	NA

Table 2.11 ETS Feedback

C) FEASIBILITY STUDY OF REQUIREMENTS:

CHALLENGES:

- Social issues:
  Assuring the employees that the app has stopped after work time, letting them know who can see what and when, explaining all the benefits of the system for them and for the company.

ADVANTAGES:

- The administrator can see where all workers are, if they are on schedule and can dispatch the closest worker to a certain job
- Businesses can give clients accurate and complete information about their product delivery or when a technician will arrive at their location
- Employees can receive turn-by-turn driving directions to find the best way to the client or to locate nearest restaurant or gas station
- The apps can serve as a communication channel saving companies a lot on phone bills
- Employees have to fill less papers as they can use the app to clock in or clock out for time-card purposes or give customers forms and other papers to sign digitally. There is also the possibility to track time automatically depending on location, making it easier for the employee to see the time spent at each client.
- Businesses can setup certain alerts when employees are entering or leaving an area using geofencing.
- Businesses that can benefit from personnel tracking apps include construction, delivery, field services, fleet leasing, utilities, food and beverage, oil, mining companies and many more.

DISADVANTAGES:

- GPS has its certain limitations.
- It might result into high stress and highly conscious as nobody likes to be monitored. Due to this it might affect the performance.

CHAPTER 3

DATA DICTIONARY

Table Name: ETS EMPLOYEE

Table Description: This table is used to store information about Registration of Employee.

Field Names	Data Type	Constraint	Description
Name	varchar(40)	Not Null	"Employee's Name"
Email	varchar(40)	Primary Key	"Employee's Email"
Phone Number	int	Not Null	"Employee's Phone Number"
Date Of Birth	Date	Not Null	"Employee's DOB"
Gender	Boolean	Not Null	"Employee's Gender"
Department	Integer	Not Null	"Employee's Department"
Dept_ID	varchar(20)	Foreign Key(Department)	"Department of the employee"
City_ID	varchar(40)	Foreign Key(City)	"Employee's city"
Company_ID	varchar(30)	Foreign Key(Company)	Unique ID given by Company
Employee_ID	varchar(30)	Foreign Key(Employee)	Unique ID given by Company

Table 3.1 ETS Employee

Table Name: ETS Admin/Manager

Table Description: This table is used to store information about Registration of Admin.

Field Names	Data Type	Constraint	Description
Name	varchar(40)	Not Null	"Admin's Name"
Email	varchar(40)	Primary Key	"Admin's Email"
Phone Number	Int	Not Null	"Admin's Phone Number"
Date Of Birth	Date	Not Null	"Admin's DOB"
Gender	Boolean	Not Null	"Admin's Gender"
Admin_ID	varchar(20)	Foreign Key(Department)	Unique ID given by Employee Tracking System
City_ID	varchar(40)	Foreign Key(City)	Company's city
Company_ID	varchar(30)	Foreign Key(Company)	Unique ID given by Employee Tracking System

Table 3.2 ETS Admin/Manager

Table Name: ETS Employee Login

Table Description: This table is used to store information about login of employee.

Field Names	Data Type	Constraint	Description
Company Name	varchar(40)	Not Null	Company's Name
Company_ID	Varchar(40)	Not Null	Unique ID given by Employee Tracking System
Employee Name	varchar(40)	Not Null	Employee's Name
Employee_ID	varchar(20)	Primary Key, Autoincrement	Unique ID given by Employee Tracking System
Email	varchar(20)	Unique	Email used for Login
Password	varchar(20)	Not Null	Password for login

Table 3.3 ETS Employee Login

Table Name: ETS Admin/Manager Login

Table Description: This table is used to store information about Login of Admin.

Field Names	Data Type	Constraint	Description
Company Name	varchar(40)	Not Null	Company's Name
Company_ID	Varchar(40)	Not Null	Unique ID given by Employee Tracking System
Admin Name	varchar(40)	Not Null	Admin's Name
Admin_ID	varchar(20)	Primary Key, Autoincrement	Unique ID given by Employee Tracking System
Email	varchar(20)	Unique	Email used for Login
Password	varchar(20)	Not Null	Password for login

Table 3.4 ETS Admin/Manager Login

Table Name: ETS Task Manager

Table Description: This table is used to store information about Task Management.

Field Names	Data Type	Constraint	Description
Task Name	varchar(40)	Not Null	Task's Name
Task_ID	varchar(20)	Primary Key, Autoincrement	Unique ID given by Employee Tracking System
Task Code	varchar(20)	Unique	Task's code if any
Schedule	varchar(20)	Not Null	Schedule Area of the Task.
Employee_ID	varchar(20)	Unique	To whom task is to be allocated.

Table 3.5 ETS Task Manager

Table Name: ETS Task Status

Table Description: This table is used to store information about status of the task.

Field Names	Data Type	Constraint	Description
Task Name	varchar(40)	Not Null	Task's Name
Task_ID	varchar(20)	Primary Key, Autoincrement	Unique ID given by Employee Tracking System
Task Code	varchar(20)	Unique	Task's code if any
Status	varchar(20)	Not Null	Status of the Task.
Changed Status	varchar(20)	Not Null	Changed Status of the Task.
Employee_ID	varchar(20)	Unique	To whom task is to be allocated.

Table 3.6 ETS Task Status

Table Name: ETS Location management

Table Description: This table is used to store information about Location Management.

Field Names	Data Type	Constraint	Description
Employee_ID	varchar(40)	Not Null	Task's Name
Task_ID	varchar(20)	Primary Key, Autoincrement	Unique ID given by Employee Tracking System
Start Time	Date & Time	Not Null	Starting Time of the task
End Time	Date & Time	Not Null	Ending Time of the task
Start Location	varchar(40)	Not Null	Starting location of the task
End Location	varchar(40)	Not Null	Ending location of the task

Table 3.7 ETS Employee's Location Management

CHAPTER 4

DIAGRAMS

4.1 Use case Diagram:

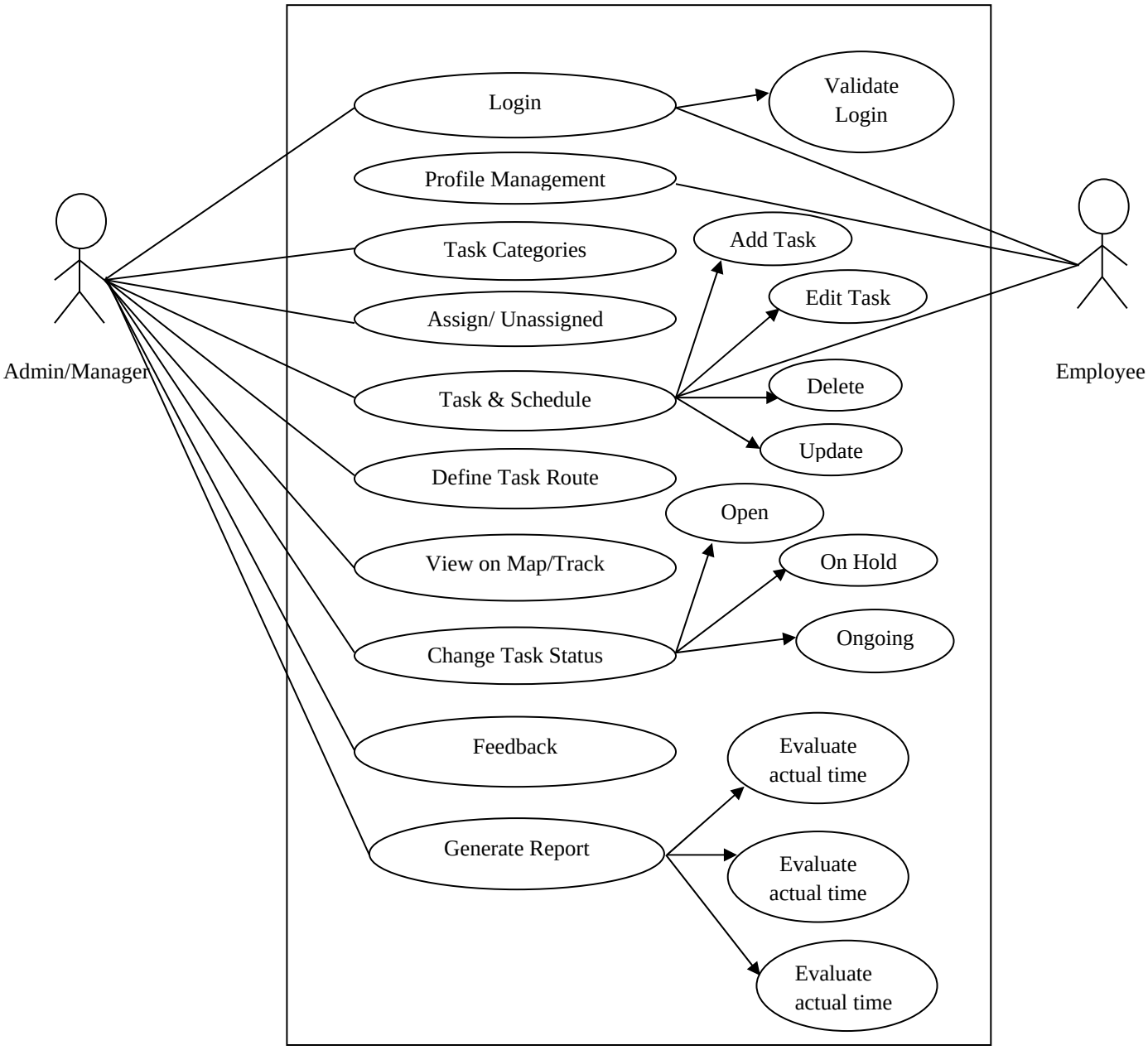

Fig 4.1 ETS Use case Diagram

4.2 Sequence Diagram:

4.2.1 User Login:

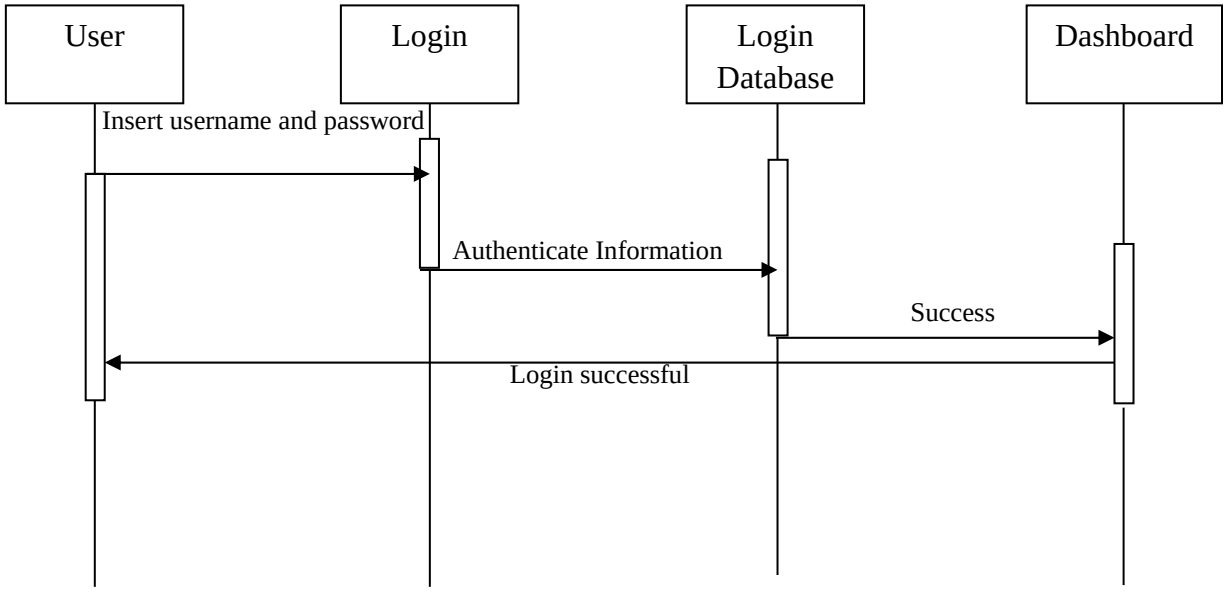

Fig 4.2.1 ETS User Login

4.2.2 User Registration:

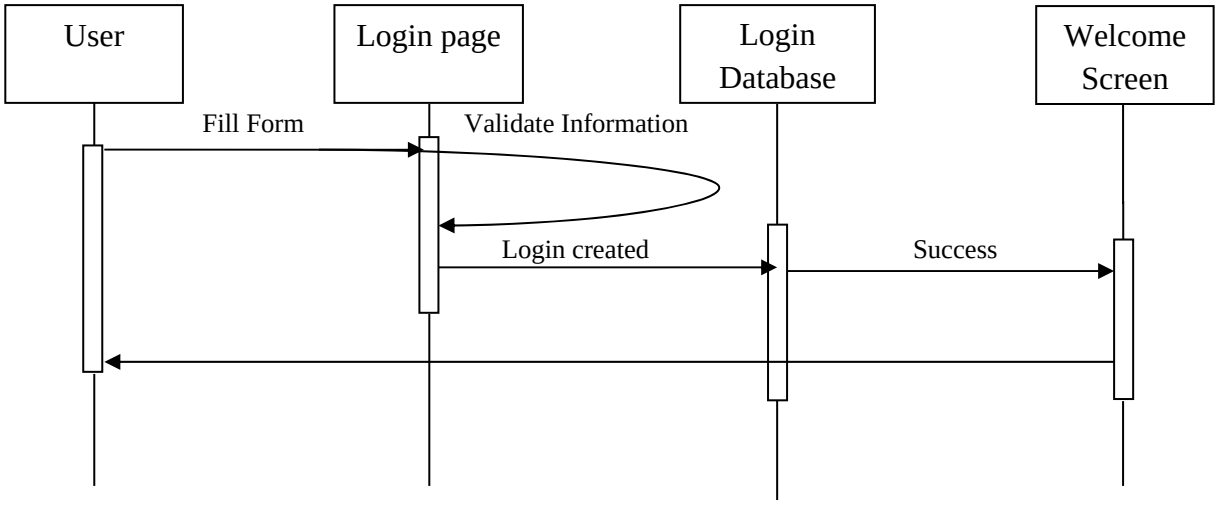

Fig 4.2.2 User Registration

4.2.3 Add/Update Task:

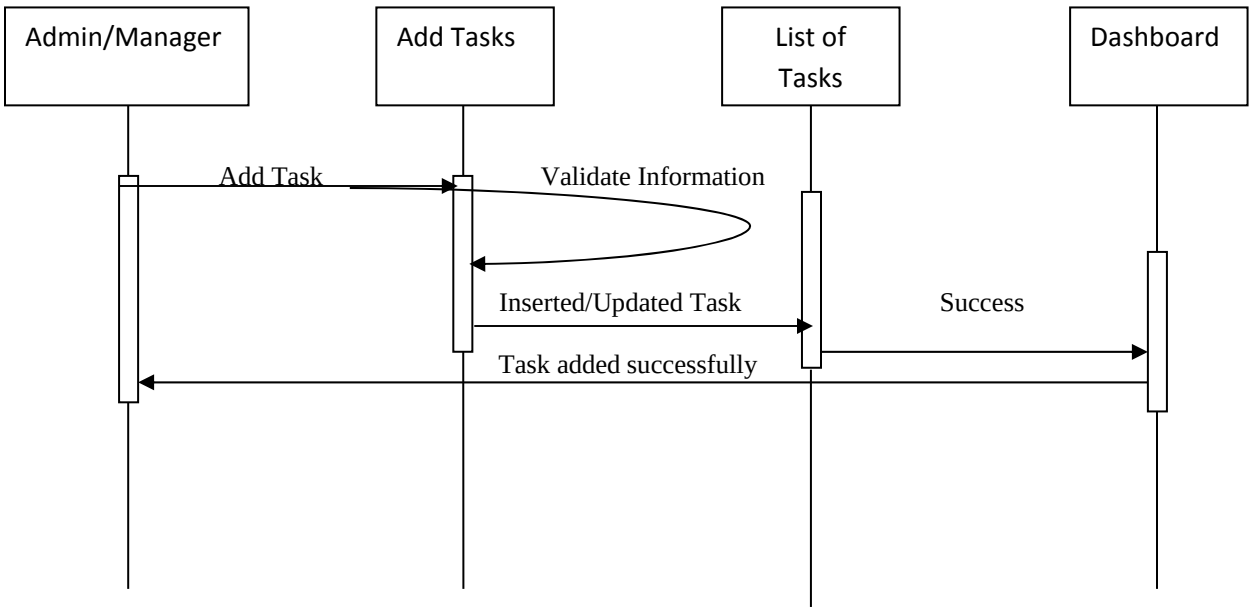

Fig 4.2.3 Add/ Update Task

4.2.4 Profile Management:

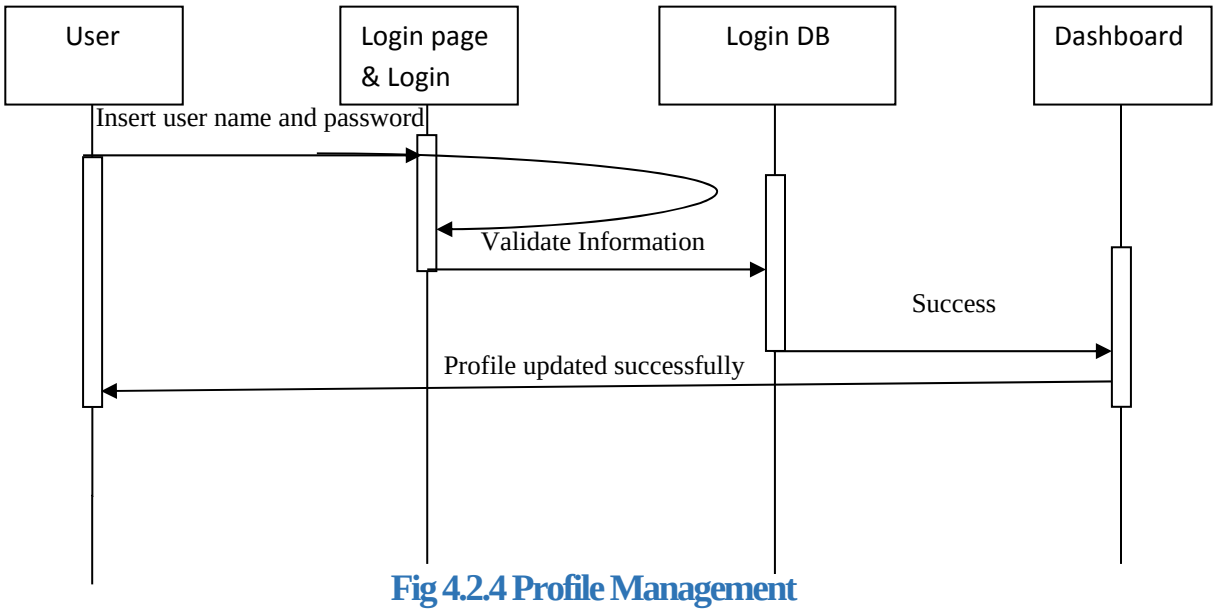

Fig 4.2.4 Profile Management

4.2.5 View on Map:

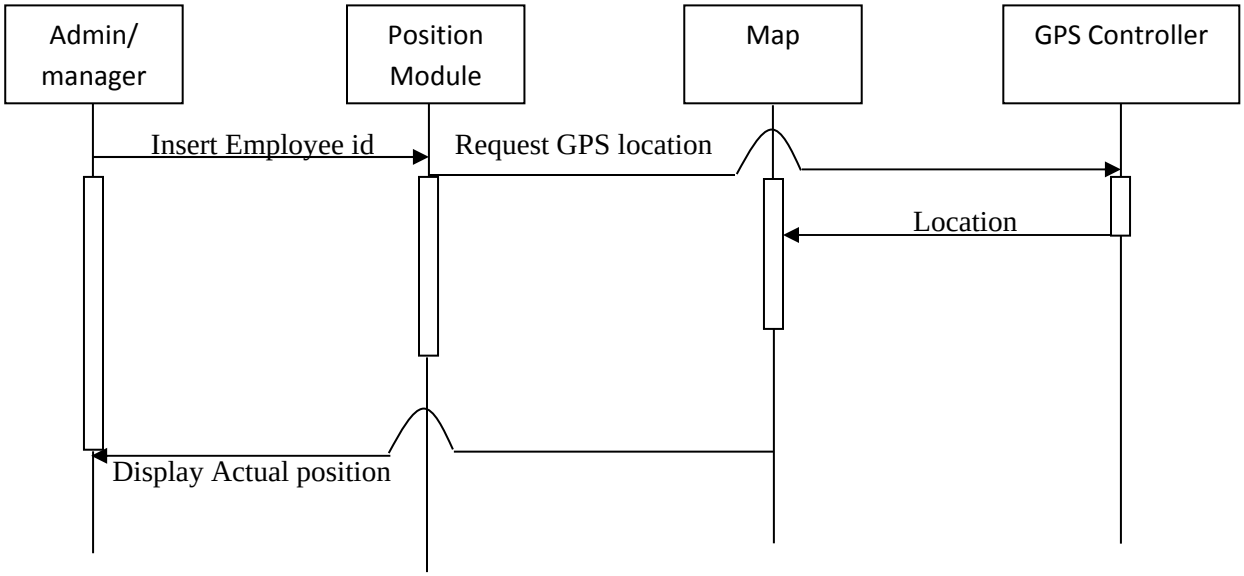

Fig 4.2.5 View on Map

4.2.6 Generate Report:

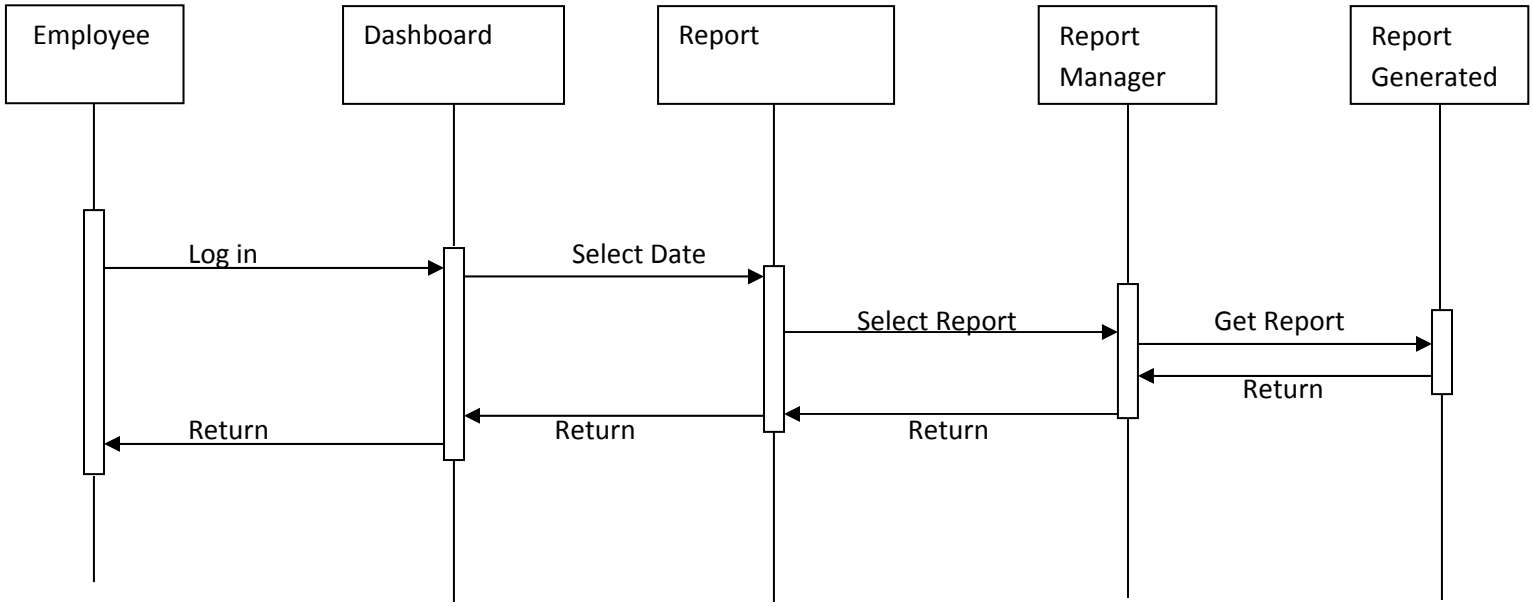

Fig 4.2.6 Generate Report

4.2.7 Feedback:

4.2.7.1 Post Feedback:

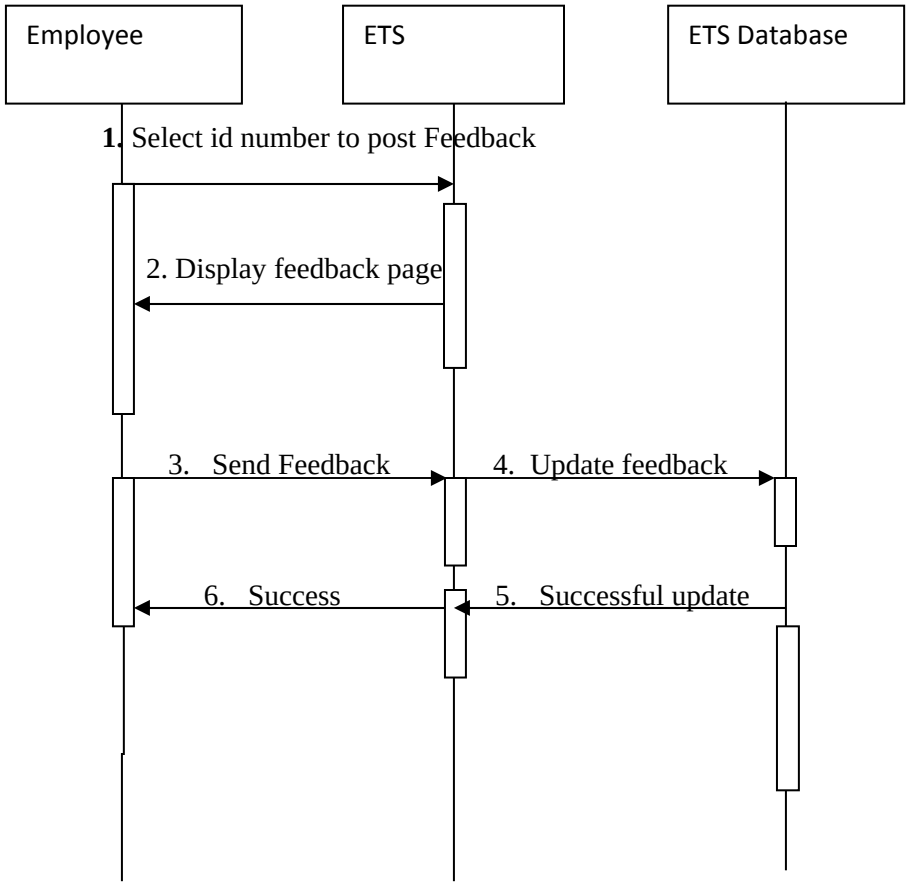

Fig 4.2.7.1 Post Feedback

4.2.7.2 View Feedback:

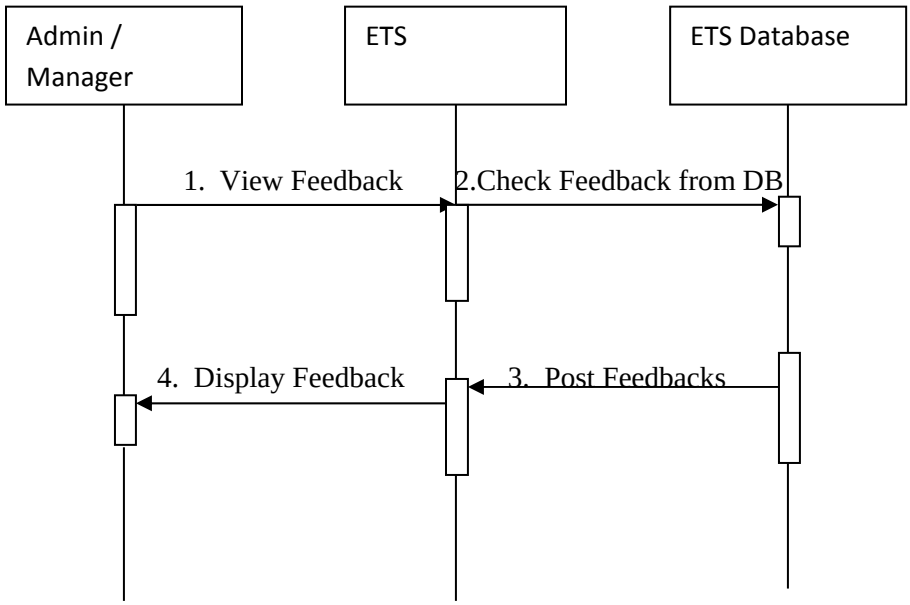

Fig 4.2.7.2 View Feedback

4.2.8 Create Task Route:

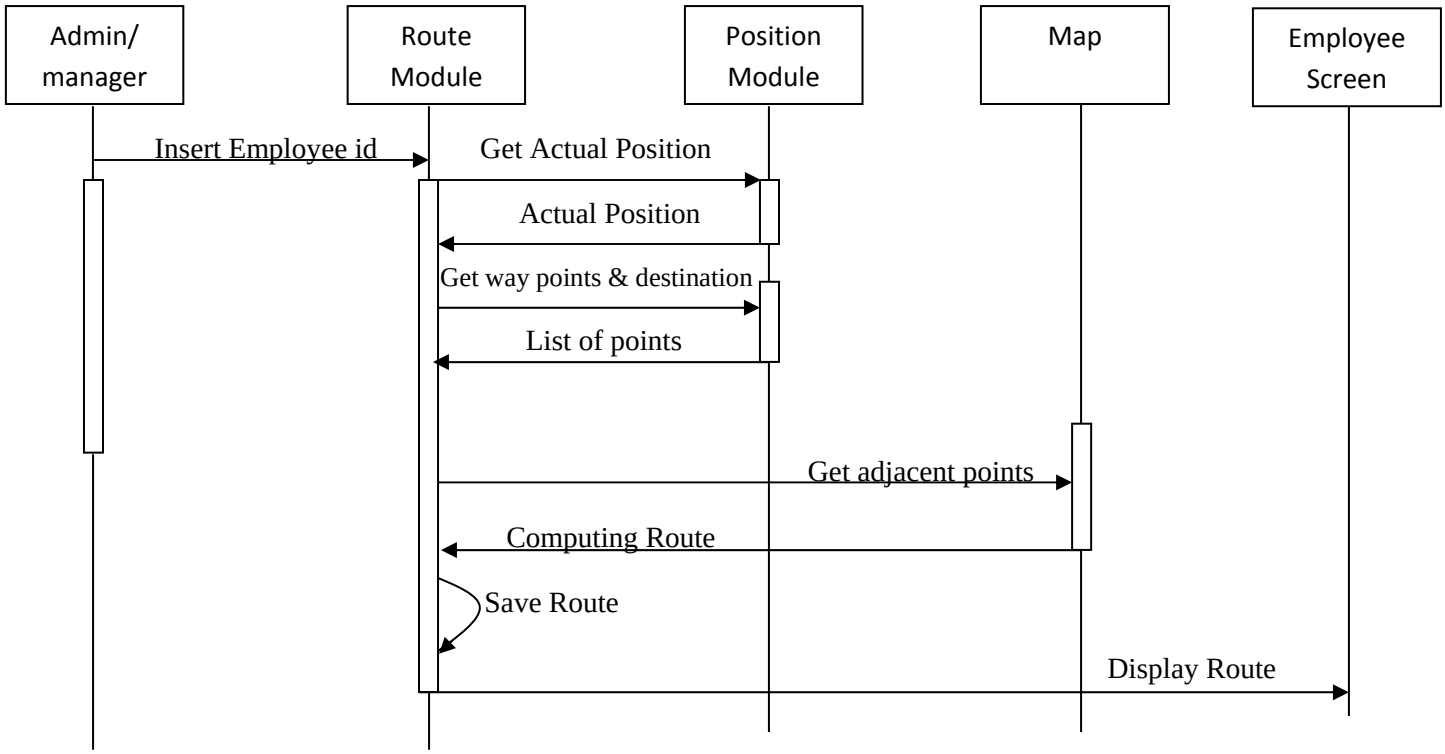

Fig 4.2.8 Create Task Route

4.3 ER Diagram:

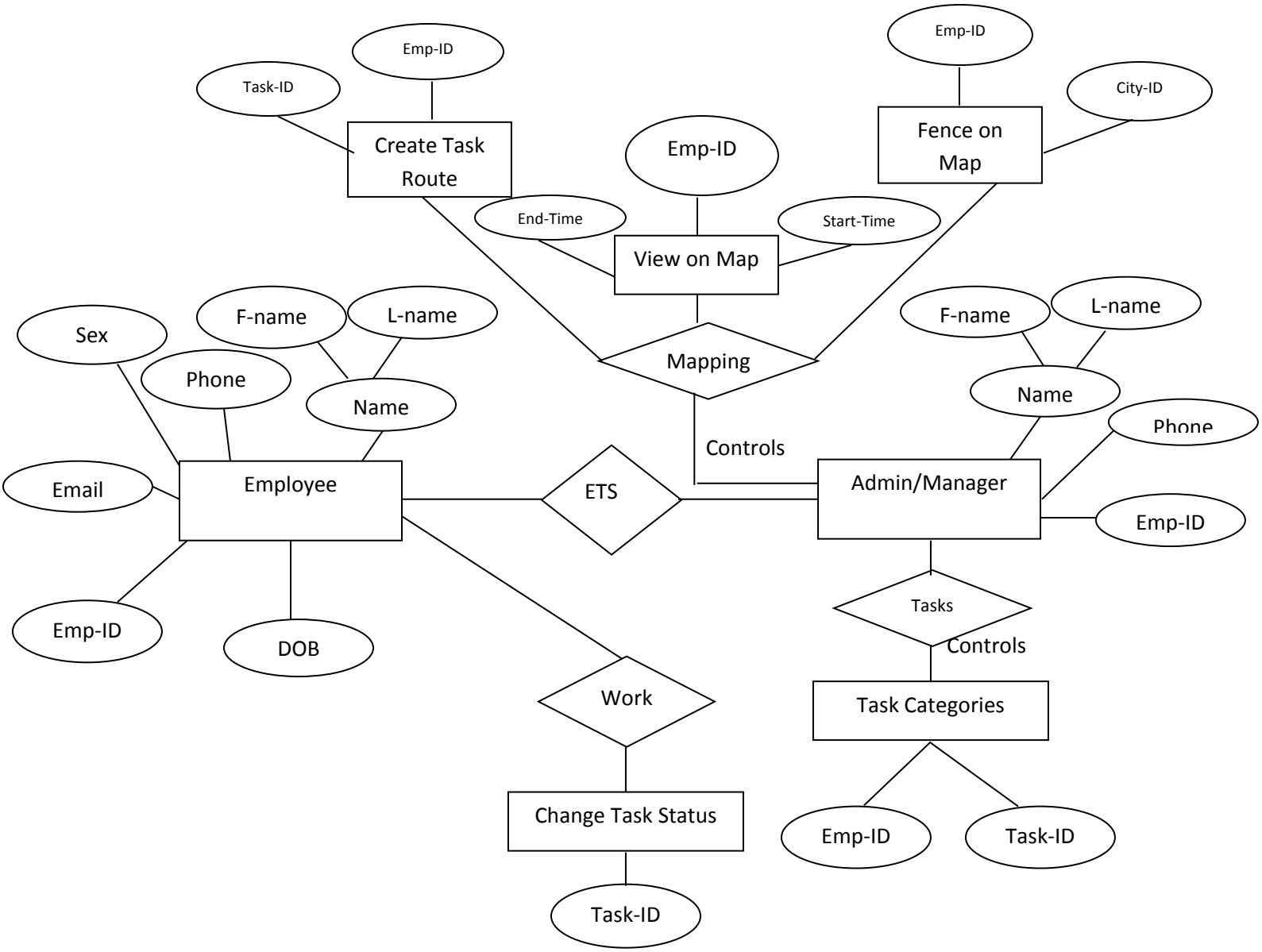

Fig 4.3 Entity Relationship Diagram

4.4 Activity Diagram:

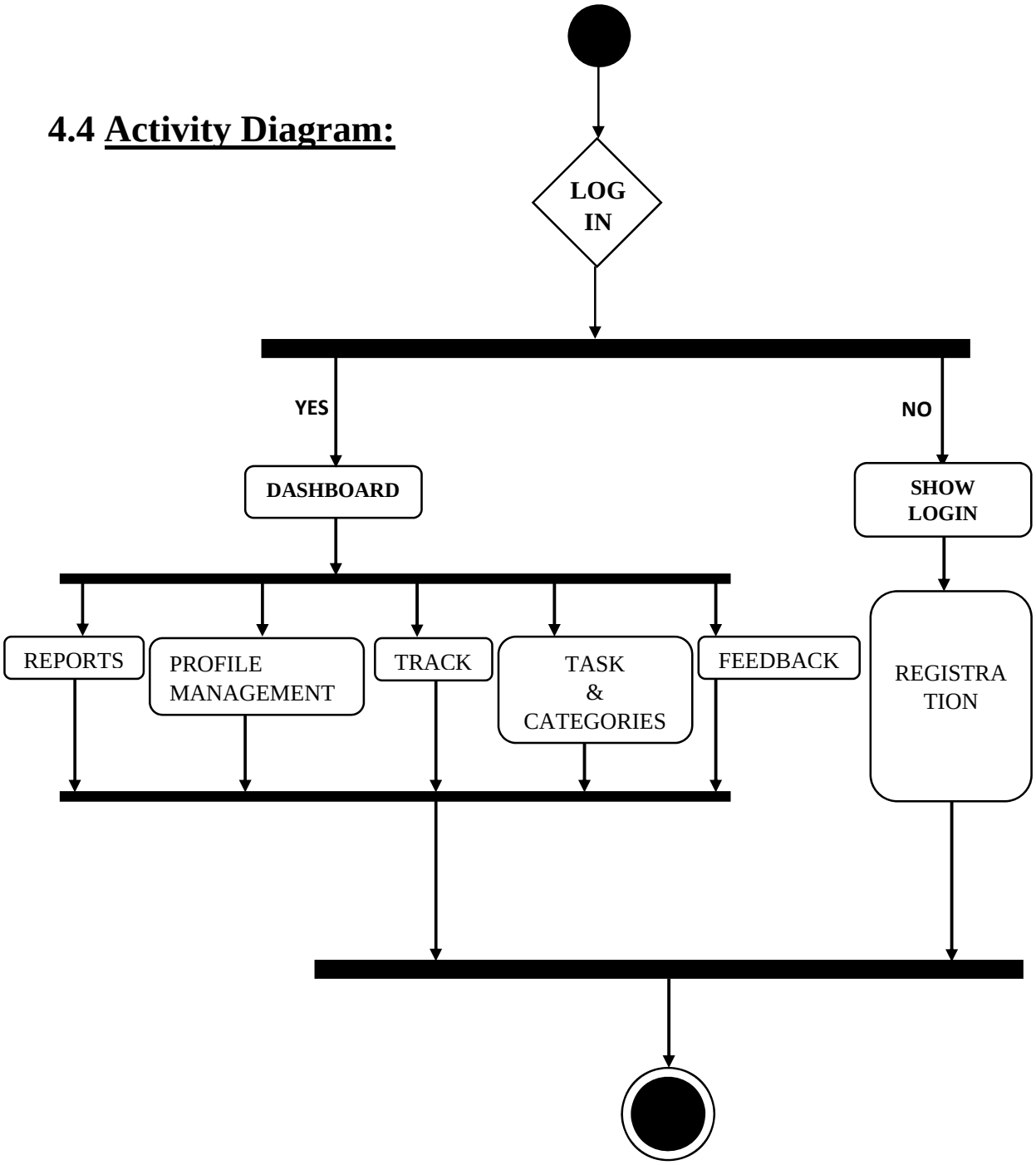

Fig 4.4.1 Activity Diagram for Login

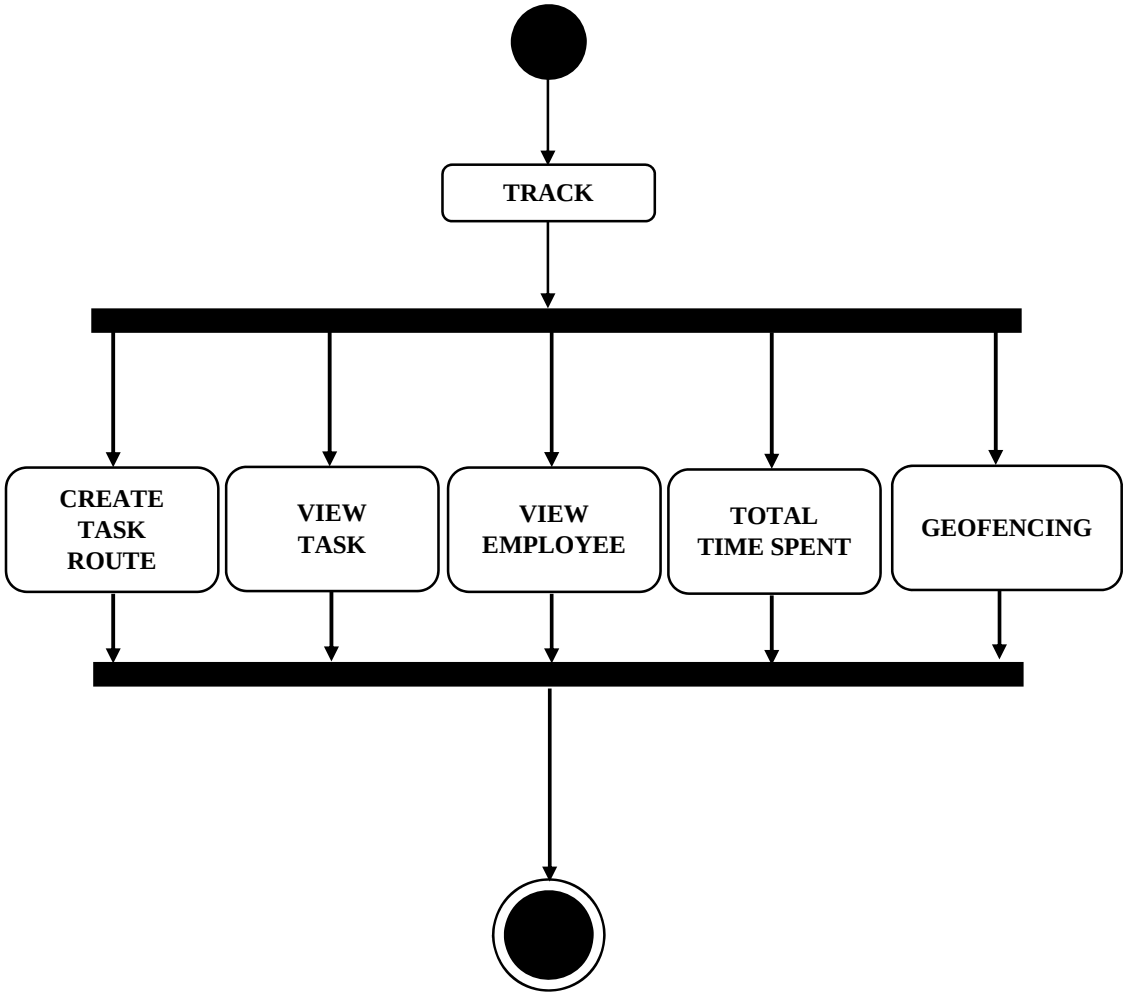

Fig 4.4.1 Activity Diagram for Track

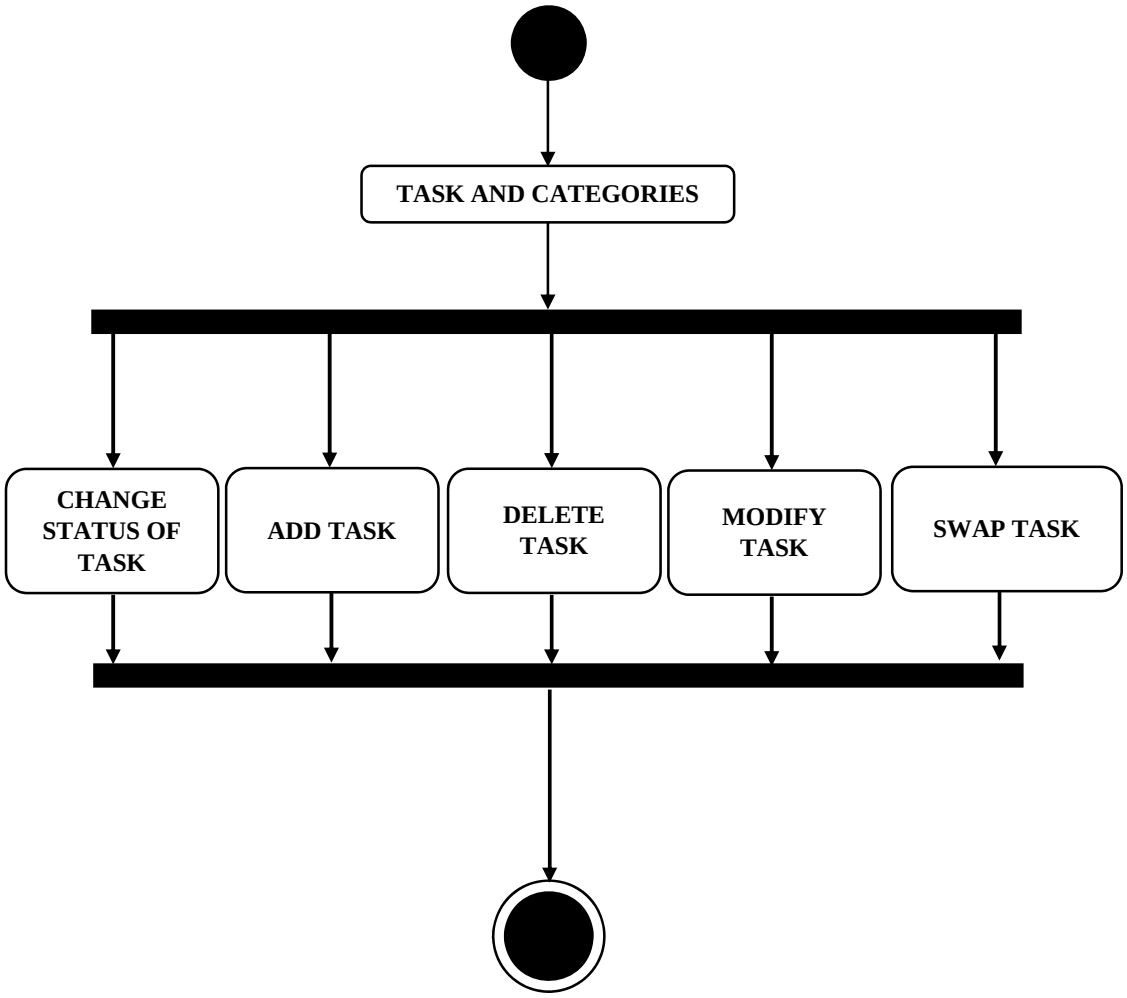

Fig 4.4.1 Activity Diagram for Task and Categories

4.5 Data Flow Diagram:

4.5.1 DFD Level 0:

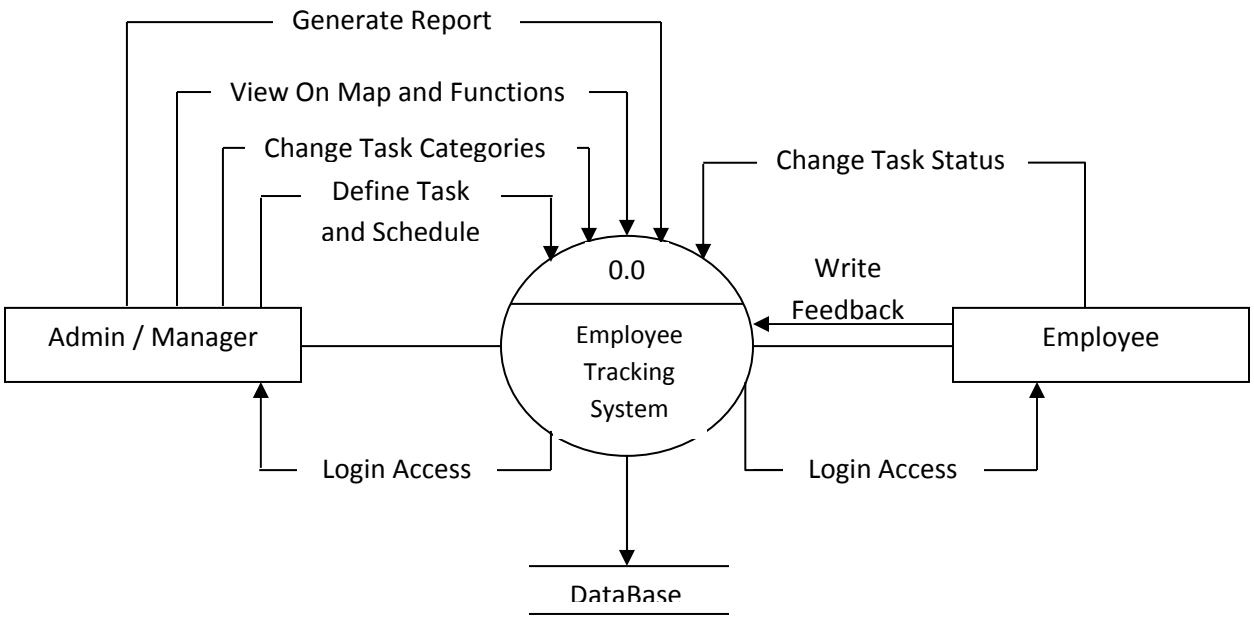

Fig 4.5.1 Data Flow Diagram Level 0

4.5.2 DFD Level 1 for Admin/Manager:

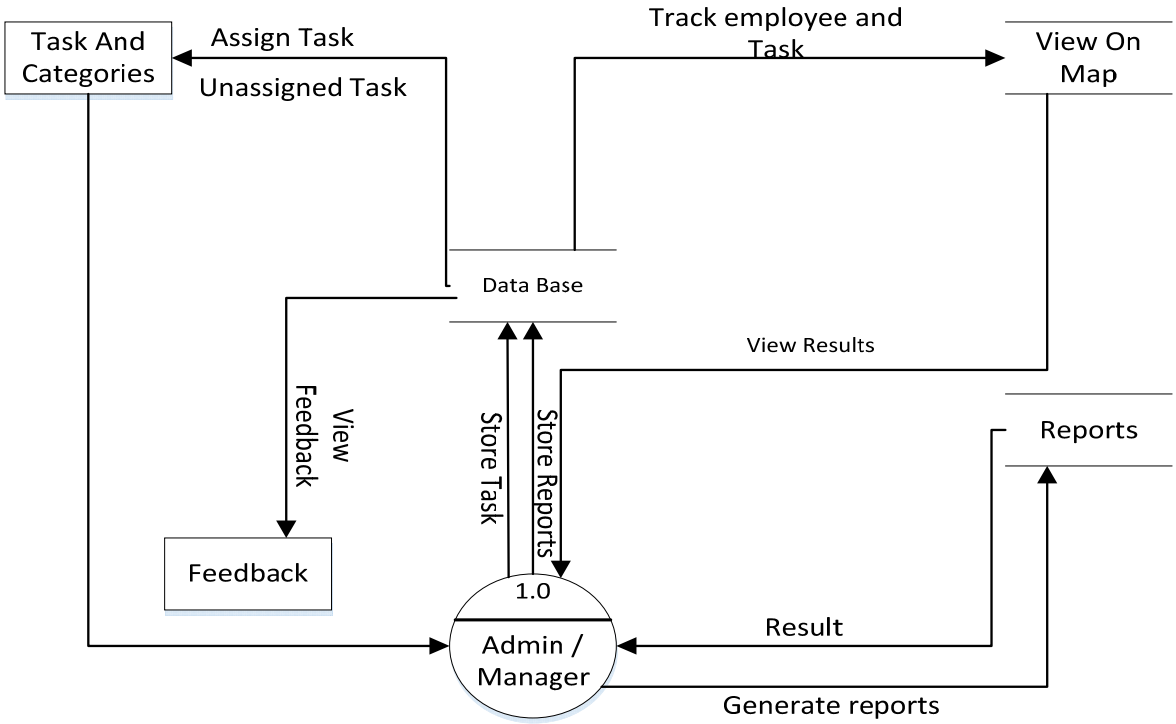

Fig 4.5.2 Data Flow Diagram Level 1 for Admin/Manager

4.5.3 DFD Level 1 for Employee:

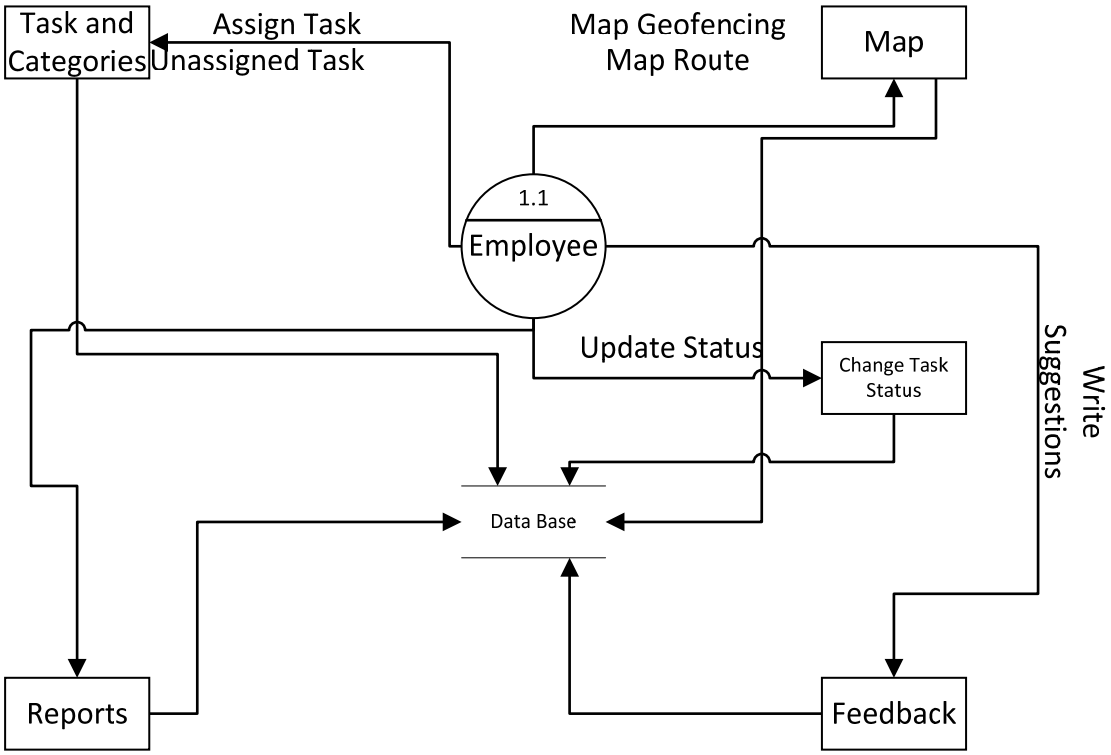

Fig 4.5.3 Data Flow Diagram Level 1 for Employee

CHAPTER 5

CONCLUSION&FUTURE ENHANCEMENT

Although advantages and disadvantages seems to be balanced out, the disadvantages can easily be ironed out through the right balance of technology and personal engagement. Thus the employee tracking and workplace privacy can go hand in hand such that employees don't feel pressured but get motivated to achieve their outright best. This can only be achieved through creation of clear work policies and guidelines backed by proper training and communication and maintaining the business ethics.

In future the tasks planned will be implemented and further after the implementation it would be tested accordingly. And the things mentioned above in the report will be also implemented accordingly.

CHAPTER 6

REFRENCES

http://keyloggers.mobi/employee-monitoring/

https://www.tsheets.com/

https://prezi.com/nnbizrs56or3/employee-tracking-record-for-coefficients-company-in-lucena-city/

http://blog.mobiversal.com/employee-location-tracking-apps.html

www.statista.com

www.wikipedia.com

http://www.trinetraiway.com/

http://gpsemployeetracking.in/howtowork.html

http://gpsemployeetracking.in/download/Employee%20Tracking%20System.pdf

CHAPTER 7

APPENDIX

PRINT BACK

Enrollment No :	130670107119	**College :**	Sal Institute Of Technology & Engineering Research, Ahmedabad
Student Name :	Tilwani Mashook Tarachand	**Department :**	Computer Engineering
Mobile No :	8141513534	**Discipline :**	BE
Email :	mashookt7@gmail.com	**Semester :**	Semester 7

PPR Details

Time Interval : -

Periodic Progess Report : First PPR

Project : Employee Tracking System

Status : Reviewed (Freeze)

1. What Progress you have made in the Project ?

Initially when i came to know about the final year project i started researching on various project ideas which i would be implementing in the final year of my B.E Computer engineering.After the project concept was finalized i started researching on idp/udp moving further in the project i ended up finalizing to complete my project in IDP.

2. What challenge you have faced ?

Challenges that were faced majorly were as follows: 1.Lack of resources 2.Lack of information 3.Lack of project exposures or project concepts

3. What support you need ?

Support expected is as follows: 1. Preinformed about the task to be done. 2. A proper scheduled information for the tasks to be completed in following semester.

4. Which literature you have referred ?

Literature referred were mostly online and were majorly websites like Tech crunch, Wikipedia,etc. Also enough information gathering from google for deciding project idea and finalizing an organization for performing my IDP project and enhancing my knowledge in proper manner with proper guidance.

Comments

Comment by Internal Guide :

None

Comment by External Guide :

None

Comment by HOD :

None

Comment by Principal :

None

Comment by University Admin :

None

PRINT BACK

Enrollment No :	130670107119	**College :**	Sal Institute Of Technology & Engineering Research, Ahmedabad
Student Name :	Tilwani Mashook Tarachand	**Department :**	Computer Engineering
Mobile No :	8141513534	**Discipline :**	BE
Email :	mashookt7@gmail.com	**Semester :**	Semester 7

PPR Details

Time Interval : 12 days, 11 hours

Periodic Progess Report : Second PPR

Project : Employee Tracking System

Status : Reviewed (Freeze)

1. What Progress you have made in the Project ?

After finalizing to do the project in the IDP the next major objective was to decide a competitive definition for the particular project.So our project definition was defined and the term for the project was named as EMPLOYEE TRACKING SYSTEM.

2. What challenge you have faced ?

The challenges that were faced are as follow: 1. lack of resources. 2. Availability of project idea. 3. Lack of practical knowledge.

3. What support you need ?

Proper guidance regarding the project idea.Also appreciable support is received already from your side.

4. Which literature you have referred ?

The literature that was referred was multiple websites like tech crunch,Wikipedia ,YouTube ,etc.Also research paper on project idea and definition that is finalized.

Comments

Comments

Comment by Internal Guide :

None

Comment by External Guide :

None

Comment by HOD :

None

Comment by Principal :

None

Comment by University Admin :

None

PRINT BACK

Enrollment No :	130670107119	**College :**	Sal Institute Of Technology & Engineering Research, Ahmedabad
Student Name :	Tilwani Mashook Tarachand	**Department :**	Computer Engineering
Mobile No :	8141513534	**Discipline :**	BE
Email :	mashookt7@gmail.com	**Semester :**	Semester 7

PPR Details

Time Interval : 0 days, 0 hours

Periodic Progess Report : Third PPR

Project : Employee Tracking System

Status : Reviewed (Freeze)

1. What Progress you have made in the Project ?

The progress that was made this time was working on the analysis and requirement gathering of the EMPLOYEE TRACKING SYSTEM.Also the Software requirement specification were completed for the employee tracking system.

2. What challenge you have faced ?

No major challenges were faced while working on the analysis and requirement of the project.The challenge were faced while developing the software requirement specification for the Employee Tracking System.Lack of structure of the Software requirement specification.

3. What support you need ?

The support provided from the internal and external guide is sufficient.

4. Which literature you have referred ?

The Literature that was referred was mainly the major documents from different websites and research paper as well were referred.

Comments

Comment by Internal Guide :

None

Comment by External Guide :

None

Comment by HOD :

None

Comment by Principal :

None

Comment by University Admin :

None

PRINT BACK

Enrollment No :	130670107119	**College :**	Sal Institute Of Technology & Engineering Research, Ahmedabad
Student Name :	Tilwani Mashook Tarachand	**Department :**	Computer Engineering
Mobile No :	8141513534	**Discipline :**	BE
Email :	mashookt7@gmail.com	**Semester :**	Semester 7

PPR Details

Time Interval : 0 days, 0 hours

Periodic Progess Report : Forth PPR

Project : Employee Tracking System

Status : Reviewed (Freeze)

1. What Progress you have made in the Project ?

The process that was made this time was working and making data dictionary and UML Diagrams for the Employee Tracking System.

2. What challenge you have faced ?

No major challenges were faced.

3. What support you need ?

The support till now from the university and the external and internal guide is more then sufficient.

4. Which literature you have referred ?

The previously referred were again referred and different Uml diagram examples and examples of data dictionary were refereed.

Comments

Comment by Internal Guide :

None

Comment by External Guide :

None

Comment by HOD :

None

Comment by Principal :

None

Comment by University Admin :

None

GUJARAT TECHNOLOGICAL UNIVERSITY

(GTU)

INNOVATION COUNCIL (GIC)

Patent Search & Analysis Report

(PSAR)

Date of Submission : 23/09/2016

Dear **Tilwani Mashook Tarachand,**

Studied Patent Number for generation of PSAR	:	**16BE7_130670107119_1**

PART 1: PATENT SEARCH DATABASE USED

1. Patent Search Database used	:	Google Patents
Web link of database	:	https://patents.google.com/
2. Keywords Used for Search	:	Employee ,Tracking,System
3. Search String Used	:	AND
4. Number of Results/Hits getting	:	1000

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

5. Category/ Field of Invention	:	Computer/IT Engineering
6. Invention is Related to/Class of Invention	:	Tracking the employees of Giant Companies
6 (a) : IPC class of the studied patent	:	H04Q7/20
7. Title of Invention	:	Employee Tracking System with Verification
8. Patent No.	:	
9. Application Number	:	US2006281469 (A1)
9 (a) : Web link of the studied patent	:	https://www.google.com/patents/US20060281469
10. Date of Filing/Application (DD/MM/YYYY)	:	14/06/2005
11. Priority Date (DD/MM/YYYY)	:	14/06/2005
12. Publication/Journal Number	:	US20060281469 A1
13. Publication Date (DD/MM/YYYY)	:	14/12/2006
14. First Filled Country : Albania	:	United States

15. Also Published as

Sr.No	Country Where Filled	Application No./Patent No.
1	United States	US20060281469 A1

16. Inventor/s Details.

Sr.No	Name of Inventor	Address/City/Country of Inventor
1	STOLLER GARY	UNITED STATES
2	SILVERSTEIN STEPHEN	UNITED STATES

17. Applicant/Assignee Details.

Sr.No	Name of Applicant/Assignee	Address/City/Country of Applicant
1	STOLLER GARY	UNITED STATES
2	SILVERSTEIN STEPHEN	UNITED STATES

18. Applicant for Patent is : Company

PART 3: TECHNICAL PART OF PATENTED INVENTION

19. Limitation of Prior Technology / Art

Global Positioning System has its certain limitations. And sensitivity is comparatively less accurate.

20. Specific Problem Solved / Objective of Invention

Systems are known for tracking persons, such as employees, by using computer-based telephone tracking and reporting systems. For this purpose, a computer-based tracking and reporting service may have a number of customers, each of which is a company with employees that provide services to a client. For example, the customer may be a nurses association, the employees of which are nurses who provide nursing services to a patient at the patient's home. In the parlance of the computer-based tracking service, the nurses association is the customer, the nurse is the "employee" or "caller", and the person receiving the service from the employee-caller is the "client." Tracking services are also useful for non-commercial applications. For instance, it can be used by prison systems to determine if a parolee has met with a parole officer.

21. Brief about Invention

A method and system for verifying that an employee and a client are present at a single location. A telephonic communications channel is established between the single location and a location verification system provider. Data is received at the system provider, from the employee over the telephonic communication channel. Data is received, at the system provider, from the client over the telephonic communication channel. The client data is separate from the employee data. The identity of the employee and the client are verified through a comparison of the employee data and the client data to preexisting data located in a database. A determination is made whether or not the employee and the client are present at the single location in response to the step of identifying.

22. Key learning Points

Ordinarily the employee-caller is scheduled to provide services at the client's address at a specified date for a specified amount of time. The nurses association (i.e., the customer) may want to track the nurse's time of arrival, time of departure, etc. at the client's location in order to have a record of the nurse's activity and amount to be paid to the nurse for the nursing services and/or to the nurses association by a medical insurance company.

In one prior system, the employee calls a telephone number when the employee arrives at the client's location. When the call is received, the Dialed Number Identification Service (DNIS) is detected and the Automatic Number Identification (ANI) is also detected. The DNIS is compared with a customer database and the employee is requested to enter the appropriate data. The entered data, the DNIS, the ANI, and other information such as the time and date of the call is recorded and saved. However, on occasion the employee, caller, may enter the wrong caller identification, and the system will record an incorrect caller identification code and will be unable to determine the correct identification of the caller.

In another system, a computer-based system is provided for collecting data from callers, including a customer's database corresponding to a customer's Dialed Number Identification Service (DNIS) and in which system the caller has an identification code. When a call is received, the DNIS is detected and is compared with the customer's database to determine the data to collect during the call. If a caller identification code is required, then the caller identification code is obtained and the caller identification code is compared, via the computer, with a check digit algorithm without referencing a caller identification code database. After the call is terminated, a call record is created for the received call.

Now that cellular, or mobile phones are in wide use, however, it is difficult to determine the location of the employee through utilization of the previous methods. Accordingly, what is needed is a method and system, which can verify, regardless of the technology used, that the employee is at the proper location, i.e. with the patient. To this end, applicant has discovered a system for verification of two or more people during a single phone call.

Other objects and advantages of the present invention will become apparent as the description proceeds. It is to be understood, however, that although the terms "telephone" or "telephonic" are used for convenience herein to refer to the medium upon which communication is achieved, these terms are intended to include cable transmission, satellite transmission, and any other type of transmission upon which communication can be achieved.

23. Summary of Invention

In one example, a method for verifying that an employee and a client are present at a single location is provided. A telephonic communications channel is established between the single location and a location verification system provider. Data is received, at the system provider, from the employee over the telephonic communication channel. Data is received, at the system provider, from the client over the telephonic communication channel. The client data is separate from the employee data. The identities of the employee and the client are verified through a comparison of the employee data and the client data to preexisting data located in a database. Finally, it is determined whether or not the employee and the client are present at the single location in response to the step of identifying the employee and client.

In another example, an article for verifying that an employee and a client are present at a single location is provided. The article includes a computer-readable signal-bearing medium. There is logic in the medium that includes hardware logic, software logic, logic embedded in a communications signal, or some combination thereof that perform various activities. There is logic to establish a telephonic communication channel between the single location and a location verification system provider. There is logic in the medium for receiving data, at the system provider, from the employee over the telephonic communication channel. There is logic in the medium for receiving data, at the system provider, from the client over the telephonic communication channel, wherein the client data is separate from the employee data. There is logic in the medium for verifying the identity of the employee and the client through a comparison of the employee data and client data to preexisting data located in a database. Finally, there is logic in the medium for determining whether or not the employee and the client are present at the single location in response to an indication from the logic in the medium for verifying.In a further example, a method for verifying that an employee and a client are present at a single location is provided. A telephonic communication channel is established between the single location and a location verification system provider. The employee sends data over the communication channel that includes information that can be used by the location verification system provider to identify the employee. The client sends data over the communication channel that includes information, which is different from the information sent by the employee, that can be used by the location verification system provider to identify the client.

24. Number of Claims : 20

25. Patent Status : Other (Assignment)

26. How much this invention is related with your IDP/UDP?

71 to 90%

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

By adding the functionality related to generating different reports and geofencing as well and some other data analytic methods.

GUJARAT TECHNOLOGICAL UNIVERSITY

(GTU)

INNOVATION COUNCIL (GIC)

Patent Search & Analysis Report

(PSAR)

Date of Submission : 23/09/2016

Dear **Tilwani Mashook Tarachand,**

Studied Patent Number for generation of PSAR	:	**16BE7_130670107119_2**

PART 1: PATENT SEARCH DATABASE USED

1. Patent Search Database used	:	Google Patents
Web link of database	:	https://patents.google.com/
2. Keywords Used for Search	:	Employee ,Tracking,System
3. Search String Used	:	And
4. Number of Results/Hits getting	:	1000

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

5. Category/ Field of Invention	:	Computer/IT Engineering
6. Invention is Related to/Class of Invention	:	Tracking the employees of Giant Companies
6 (a) : IPC class of the studied patent	:	G06Q10/00
7. Title of Invention	:	Employee Tracking System
8. Patent No.	:	
9. Application Number	:	EP2081139 (A1)
9 (a) : Web link of the studied patent	:	https://patents.google.com/
10. Date of Filing/Application (DD/MM/YYYY)	:	08/01/2009
11. Priority Date (DD/MM/YYYY)	:	
12. Publication/Journal Number	:	EP2081139 A1
13. Publication Date (DD/MM/YYYY)	:	22/07/2009
14. First Filled Country : Albania	:	

15. Also Published as

Sr.No	Country Where Filled	Application No./Patent No.
1		

16. Inventor/s Details.

Sr.No	Name of Inventor	Address/City/Country of Inventor
1	RONNINGEN BAARD FRODE	UNITED STATES
2	KARLSEN GEIR CHRISTIAN	NORWAY

17. Applicant/Assignee Details.

Sr.No	Name of Applicant/Assignee	Address/City/Country of Applicant
1	KARLSEN GEIR CHRISTIAN	UNITED STATES
2	RONNINGEN BAARD FRODE	UNITED STATES

18. Applicant for Patent is : Company

PART 3: TECHNICAL PART OF PATENTED INVENTION

19. Limitation of Prior Technology / Art

GPS has its certain limitations. And some of the psychological barriers for employees

20. Specific Problem Solved / Objective of Invention

Various embodiments provide methods and systems for tracking employees. Employee statistics may be obtained from the employees themselves as they interface with an embodiment system and may also be obtained from other resource management systems. In certain embodiments, the following steps may be performed: a) creating an employee profile; b) identifying organizational and dynamic structure based upon data obtained from other management systems; c) defining performance management rules; d) defining a coded calendar overview; e) providing both employee assessment tools and employee management tools; f) automatically modifying the organizational structure, employee data or both according to predefined rules, previous scheduling and scheduling approval iterations; g) determining a ranking value of generated or modified employee-related data that is based upon adherence to the predefined performance management rules or interpretations of the rules; h) repeating elements f) and g) and determining if there are any improvements in ranking values via the employee management tools; and i) publishing organizational performance goals at selected levels of the organizational structure, such as via the coded calendar overview. The calendar may be color-coded, for example, to present report results in a format that can be quickly grasped. Other coding methods, however, may also be employed, such as using certain symbols, text or the like.

21. Brief about Invention

An employee tracking system is disclosed, in which processing, accessing or both within the system is determined according to the hierarchical structure of the underlying organization. Each employee is associated with a node in the organization, and access to employee-related data is based upon the node associated with the requestor and the node of the employee being checked, as well as the type of data being requested. Employees may clock into and out of work using mobile devices that interface with the employee tracking system host computer.

22. Key learning Points

Many organizations today employ various types of systems, such as time management systems, personnel management systems, accounting systems and the like to maintain and track resources within the organization. Of particular concern is the tracking of employee performance statistics, such as absenteeism. In some companies, absenteeism can be as high as 10%, and hence may present a significant financial drain. Adequate monitoring and, when necessary, following up, of employees may be critical to maintaining corporate efficiency.

Additionally, presenting such statistics in a dynamic and user-friendly manner in the context of the underlying organizational structure is also important to assist management in both tracking and following up with employees. Because different systems may assume different organizational structures, such presentations may be quite challenging.

It would therefore be desirable to provide a system that is capable of interfacing with other systems to both track employees and present results in a manner that is easy to understand and consistent with the organizational structure.

23. Summary of Invention

Various aspects of an employee tracking system are disclosed. In one embodiment, an employee tracking system is disclosed that includes a computer system with program code that causes the computer system perform various steps. These steps include, for each of a plurality of employees, storing corresponding employee-related data in an employee statistics database. Each employee is associated with at least one node in a hierarchical tree that represents the organizational structure for which the employee works, in which the organization structure may be represented by a hierarchical tree comprising a plurality of nodes. Each employee may thus be associated with a node in this tree. The hierarchical tree is used to access, or determine access rights of, the corresponding employee-related data of one or more employees. The employee-related data of an employee is then compared against performance management rules stored in the computer system. Finally, the program code causes the computer to generate a report comprising information of employees not in conformance with the performance management rules.

In certain embodiments, utilizing the hierarchical tree to access corresponding employee-related data includes the steps of determining a hierarchical position in the hierarchical tree of a node corresponding to a user requesting the data; utilizing the hierarchical position of the node corresponding to the requesting user to determine access rights to employee-related data, and using or analyzing employees for which the access rights to the corresponding employee-related data is permitted.

In other embodiments, each node in the hierarchical tree may have a corresponding set of performance management rules, and each employee is compared against the corresponding performance management rules for the node with which the employee is associated.

In preferred embodiments, an employee tracking system further comprises one or more mobile devices in communications with the computer system. Each mobile device includes input/output circuitry, a clock-in circuit for generating a clock-in signal according to data received from the input/output circuitry, a clock-out circuit for generating a clock-out signal according to data received from the input/output circuitry, and a radio frequency circuit for transmitting data related to the clock-in signal and the clock-out signal to the computer system unit via a wireless network. Employees may thus use respective mobile devices to clock into and out of work, work-related tasks, or both.

A system and related method for managing a relational database that stores hierarchical information is disclosed. The system comprises a central processing unit, and memory in communications with the central processing unit. The memory includes a database storing hierarchical information in a plurality of records, each record comprising at least a first field and a second field. The memory also includes program code to cause the central processing unit to perform the following steps:

(a) Selecting as a processing record a record in the database corresponding to a root node of the hierarchical information.

(b) Setting the first field in the processing record to a value corresponding to a sequence variable and then incrementing the sequence variable.

(c) Determining if a node in the hierarchical information corresponding to the processing record has any children nodes, and if so, selecting as the processing record a record in the database corresponding to one of the children nodes and then jumping to step (b).

(d) Setting the second field of the processing record to a value corresponding to the sequence variable and then incrementing the sequence variable.

(e) Determining if a node in the hierarchical information corresponding to the processing record has any unprocessed sibling nodes, and if so, selecting as the processing record a record in the database corresponding to one of the unprocessed sibling nodes and jumping to step (b). And,

(f) Determining if a node in the hierarchical information corresponding to the processing record has a parent node, and if so, selecting as the processing record a record in the database corresponding to the parent node and jumping to step (d).

24. Number of Claims : 5

25. Patent Status : Other (Assignment)

26. How much this invention is related with your IDP/UDP?

71 to 90%

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

The functionalities like developing multiple reports and geofencing, and some of the other can be added to overcome the lack of functionalities.

GUJARAT TECHNOLOGICAL UNIVERSITY

(GTU)

INNOVATION COUNCIL (GIC)

Patent Search & Analysis Report

(PSAR)

Date of Submission : 23/09/2016

Dear **Tilwani Mashook Tarachand,**

Studied Patent Number for generation of PSAR	:	**16BE7_130670107119_3**

PART 1: PATENT SEARCH DATABASE USED

1. Patent Search Database used	:	Google Patents
Web link of database	:	https://patents.google.com/
2. Keywords Used for Search	:	GPS,Tracking,System
3. Search String Used	:	AND
4. Number of Results/Hits getting	:	100

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

5. Category/ Field of Invention	:	Computer/IT Engineering
6. Invention is Related to/Class of Invention	:	Tracking of employee using mobile phone GPS
6 (a) : IPC class of the studied patent	:	G01S19/02
7. Title of Invention	:	GPS Tracking System
8. Patent No.	:	
9. Application Number	:	US 07/800,850
9 (a) : Web link of the studied patent	:	http://www.google.co.in/patents/US5379224
10. Date of Filing/Application (DD/MM/YYYY)	:	29/11/1995
11. Priority Date (DD/MM/YYYY)	:	
12. Publication/Journal Number	:	
13. Publication Date (DD/MM/YYYY)	:	
14. First Filled Country : Albania	:	

15. Also Published as

Sr.No	Country Where Filled	Application No./Patent No.
1		

16. Inventor/s Details.

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17. Applicant/Assignee Details.

Sr.No	Name of Applicant/Assignee	Address/City/Country of Applicant
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18. Applicant for Patent is : Company

PART 3: TECHNICAL PART OF PATENTED INVENTION

19. Limitation of Prior Technology / Art

GPS has its certain limitations

20. Specific Problem Solved / Objective of Invention

This invention relates generally to navigation systems and more specifically to a system for positioning radiosondes, sonobuoys, aircraft, ships, land vehicles, and other objects on or near the earth's surface using satellites of the Global Positioning System (GPS). The GPS is a multiple-satellite based radio positioning system in which each GPS satellite transmits data that allows a user to precisely measure the distance from selected ones of the GPS satellites to his antenna and to thereafter compute position, velocity, and time parameters to a high degree of accuracy, using known triangulation techniques. The signals provided by the GPS can be received both globally and continuously. The GPS comprises three major segments, known as the space, control, and user segments.

21. Brief about Invention

A low cost tracking system employing satellites of the global positioning system (GPS) is suitable for applications involving radiosondes, sonobuoys, and other objects. The tracking system includes a sensor mounted on each object which digitally samples the GPS satellite signals and records them in a data buffer. The digital samples are then transmitted, at a rate lower than that at which the GPS satellite signals were sampled, over a data telemetry link, interleaved with other telemetry data from the object. The GPS data is processed in a data processing workstation where the position and velocity of the sensor, at the time the data was sampled, is computed. The data buffer in the sensor is periodically refreshed, and the workstation periodically computes the new position and velocity of the sensor. Differential corrections are also provided at the workstation to aid in signal acquisition and to increase the precision of the position fix.

22. Key learning Points

The space segment, when fully operational, will consist of twenty-one operational satellites and three spares. These satellites will be positioned in a constellation such that typically seven, but a minimum of four, satellites will be observable by a user anywhere on or near the earth's surface. Each satellite transmits signals on two frequencies known as L1 (1575.42 MHz) and L2 (1227.6 MHz), using spread spectrum techniques that employ two types of spreading functions. C/A and P pseudo random noise (PRN) codes are transmitted on frequency L1, and P code only is tranmitted on frequency L2. The C/A or coarse/acquisition code, is available to any user, military or civilian, but the P code is only available to authorized military and civilian users. Both P and C/A codes contain data that enable a receiver to determine the range between a satellite and the user. Superimposed on both the P and C/A codes is the navigation (Nav) message. The Nav message contains 1) GPS system time; 2) a handover word used in connection with the transition from C/A code to P code tracking; 3) ephemeris data for the particular satellites being tracked; 4) almanac data for all of the satellites in the constellation, including information regarding satellite health, coefficients for the ionospheric delay model for C/A code users, and coefficients used to calculate universal coordinated time (UTC).

The control segment comprises a master control station (MCS) and a number of monitor stations. The monitor stations passively track all GPS satellites in view, collecting ranging data and satellite clock data from each satellite. This information is passed on to the MCS where the satellites' future ephemeris and clock drift are predicted. Updated ephemeris and clock data are uploaded to each satellite for re-transmission in each satellite's navigation message. The purpose of the control segment is to ensure that the information transmitted from the satellites is as accurate as possible.

GPS is intended to be used in a wide variety of applications, including space, air, sea, and land object navigation, precise positioning, time transfer, attitude reference, surveying, etc. GPS will be used by a variety of civilian and military organizations all over the world. A number of prior art GPS receivers have been developed to meet the needs of the diverse group of users. These prior art GPS receivers are of a number of different types, including sequential tracking, continuous reception, multiplex, all in view, time transfer, and surveying receivers.

A GPS receiver comprises a number of subsystems, including an antenna assembly, an RF assembly, and a GPS processor assembly. The antenna assembly receives the L-band GPS signal and amplifies it prior to insertion into the RF assembly.

The RF assembly mixes the L-band GPS signal down to a convenient IF frequency. Using various known techniques, the PRN code modulating the L-band signal is tracked through code-correlation to measure the time of transmission of the signals from the saellite. The doppler shift of the received L-band signal is also measured through a carrier tracking loop. The code correlation and carrier tracking function can be performed using either analog or digital processing.

The control of the code and carrier tracking loops is provided by the GPS processor assembly. By differencing this measurement with the time of reception, as determined by the receiver's clock, the pseudo range between the receiver and the satellite being tracked may be determined. This pseudo range includes both the range to the satellite and the offset of the receiver's clock from the GPS master time reference. The pseudo range measurements and navigation data from four satellites are used to compute a three dimensional position and velocity fix, to calibrate the receiver's clock offset, and to provide an indication of GPS time.

The receiver processor controller (RPC) processing and memory functions performed by a typical GPS receiver include monitoring channel status arid control, signal acquisition and reacquisition, code and carrier tracking loops, computing pseudo range (PR) and delta range (DR) measurements, determining data edge timing, acquisition and storage of almanac and ephemeris data broadcast by the satellites, processor control and timing, address and command decoding, timed interrupt generation, interrupt acknowledgment control, and GPS timing, for example. These functions are fixed point operations and do not require a floating point coprocessor.

The navigation processing and memory functions performed by a typical GPS receiver include satellite orbit calculations and satellite selection, atmospheric delay correction calculations, navigation solution computation, clock bias and rate estimates, computation of output information, and preprocessing and coordinate conversion of aiding information, for example. These functions require significant amounts of processing and memory and are generally performed using a floating point coprocessor.

The GPS standard positioning service provides a navigation accuracy of 100 m 2 dRMS. A number of applications of the GPS require higher levels of accuracy. Accuracy can be improved using a technique known as differential GPS (DGPS). This technique involves operating a GPS receiver in a known location. The receiver is used to compute satellite pseudo range correction data using prior knowledge of the correct satellite pseudo ranges, which are then broadcast to users in the same geographic area. The pseudo range corrections are incorporated into the navigation solution of another GPS receiver to correct the observed satellite pseudo range measurements, thereby improving the accuracy of the position determination. Correlation of the errors experienced at the reference station and at the user location is dependent on the distance between them, but they are normally highly correlated for a user within 350 kilometers of the reference station.

An alternative to the GPS receiver known in the prior art is the GPS translator or transdigitizer, as described in U.S. Pat. No. 4,622,557, for example. These translators or transdigitizers typically include only the antenna assembly and RF assembly portions of a GPS receiver. Translators are typically employed in missile tracking applications where small, lightweight, expendable sensors are required. The GPS C/A code spread spectrum signals received by the translator are combined with a pilot carrier and transmitted at S-band frequencies (2200 to 2400 MHz). A GPS translator processor located at the telemetry tracking site receives these translated GPS C/A code signals and estimates the position and velocity of the object. The transdigitizer retransmits the digitally sampled GPS signal at 2 Msps using quadraphase modulation at 149 to 170 MHz.

Known variants of the GPS translator are the digital translator and the transdigitizer. An object-borne GPS digital translator or transdigitizer operates to convert the GPS C/A code spread spectrum signals to base band and perform in-phase and quadrature phase sampling at a rate of about 2 MHz. Transdigitized or translated GPS signals are processed in a ground based translator processing system in a similar manner to GPS signals.

A third variant of the GPS translator is the codeless GPS receiver, as typified by the teachings of U.S. Pat. No. 4,754,283. This receiver ignores the bi-phase code and recovers the carrier frequency of all satellites in view of the receiving antenna. A telemetry transmitter transmits a signal that contains the GPS carrier frequency information to a ground-based telemetry receiver. This data is used to derive the speed of the sonde. Since the GPS code is not tracked, the position of the sonde cannot be computed using this method. This system uses a telemetry link at 403 MHz with a bandwidth of 20 KHz and has the advantage of requiring less bandwidth than the transdigitizer but the disadvantage of only providing velocity data instead of both position and velocity data.

23. Summary of Invention

In summary, prior art GPS receivers may be one of three types. In the first type, all navigation processing activities occur at the receiver, which outputs the position and velocity of the tracked object using either a single computer or an RPC and navigation computer, in which there is substantial interconnection between the RPC functions and the navigation functions for satellite selection and acquisition. In the second type of GPS receiver, the GPS signal is remoted by translation or variations thereof and the signal is tracked at a ground processing facility where the object position and velocity are derived. In accordance with this latter approach, significant bandwidth is required to transmit the translated signal. In the third type, the carrier frequency of the GPS signals is measured and retransmitted to the ground processing facility where only the

velocity of the object can be derived.

It is therefore the principal object of the present invention to provide a low cost tracking system for radiosondes, sonobuoys, aircraft, ships, land vehicles, and other objects, using GPS satellites, that is capable of providing the position and velocity of multiple objects without requiring a 2 MHz bandwidth data link.

This and other objects are accomplished in accordance with the illustrated preferred embodiment of the present invention by providing a GPS sensor module that supplies the data required to locate a particular object, a one-way telemetry link, and a data processing workstation to process the data and display the object position and velocity. The GPS sensor module comprises an antenna and a sensor. The sensor operates autonomously following application of operating power. The sensor digitally samples the signals from visible GPS satellites and stores this data in a digital buffer. No processing functions are performed by the sensor, thereby permitting significant reductions in the cost thereof. The raw satellite data stored in the buffer, interleaved with other telemetry data from the sonde or other object, are transmitted back to the data processing workstation. Using this set of raw satellite data, the position and velocity of the sensor can be determined at the time the data was recorded by the sensor to a precision of 100 meters. If differential corrections are also provided at the data processing workstation, the accuracy of the position fix can be improved to better than 10 meters. If a 20 kHz data link is used and the GPS signals are sampled at 2 Mbps, a 1-second set of GPS data can be provided every 100 seconds, or a 0.5-second set of GPS data every 50 seconds, or a 0.1-second set of data every 10 seconds. The principal advantage afforded by the present invention is its ability to provide extremely accurate position, velocity, and time information for radiosondes, sonobuoys, and other objects using a low cost sensor and a conventional data telemetry link. By eliminating all processing functions performed in prior art GPS sensors, significant cost reductions are achieved over existing GPS receiver designs. By reducing the data link bandwidth from the 2 MHz required of prior art transdigitizers, conventional telemetry links may be employed to retransmit the data. For low cost data applications, such as sonobuoys or radiosondes, a position and velocity fix is only required at a low rate (e.g. every 10 seconds), a requirement that is accomodated by the present invention.

24. Number of Claims : 5

25. Patent Status : Other (Assignment)

26. How much this invention is related with your IDP/UDP?

71 to 90%

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

More functionalities should be added.Like Reports,geofencing,daily alerts,dashboard,etc.It should be made more user friendly.

GUJARAT TECHNOLOGICAL UNIVERSITY

(GTU)

INNOVATION COUNCIL (GIC)

Patent Search & Analysis Report

(PSAR)

Date of Submission : 25/09/2016

Dear **Tilwani Mashook Tarachand,**

Studied Patent Number for generation of PSAR	:	**16BE7_130670107119_4**

PART 1: PATENT SEARCH DATABASE USED

1. Patent Search Database used	:	Google Patents
Web link of database	:	https://patents.google.com/
2. Keywords Used for Search	:	GPS ,TRACKING,SYSTEM
3. Search String Used	:	AND
4. Number of Results/Hits getting	:	100

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

5. Category/ Field of Invention	:	Computer/IT Engineering
6. Invention is Related to/Class of Invention	:	TRACKING OF EMPOYEES
6 (a) : IPC class of the studied patent	:	G01S19/02
7. Title of Invention	:	GPS TRACKING SYSTEM
8. Patent No.	:	
9. Application Number	:	US5379224 A
9 (a) : Web link of the studied patent	:	http://www.google.co.in/patents/US5379224
10. Date of Filing/Application (DD/MM/YYYY)	:	29/11/1991
11. Priority Date (DD/MM/YYYY)	:	
12. Publication/Journal Number	:	
13. Publication Date (DD/MM/YYYY)	:	
14. First Filled Country : Albania	:	

15. Also Published as

Sr.No	Country Where Filled	Application No./Patent No.
1		

16. Inventor/s Details.

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17. Applicant/Assignee Details.

Sr.No	Name of Applicant/Assignee	Address/City/Country of Applicant
1	NAVSYS CORP	UNITED STATES

18. Applicant for Patent is : Company

PART 3: TECHNICAL PART OF PATENTED INVENTION

19. Limitation of Prior Technology / Art

GPS has its certain limitations.

20. Specific Problem Solved / Objective of Invention

This invention relates generally to navigation systems and more specifically to a system for positioning radiosondes, sonobuoys, aircraft, ships, land vehicles, and other objects on or near the earth's surface using satellites of the Global Positioning System (GPS). The GPS is a multiple-satellite based radio positioning system in which each GPS satellite transmits data that allows a user to precisely measure the distance from selected ones of the GPS satellites to his antenna and to thereafter compute position, velocity, and time parameters to a high degree of accuracy, using known triangulation techniques. The signals provided by the GPS can be received both globally and continuously. The GPS comprises three major segments, known as the space, control,

21. Brief about Invention

The present invention is directed to an apparatus and method for computing the position and velocity of multiple objects equipped with low cost sensors using a data processing workstation. The GPS satellite signals are digitally sampled in accordance with techniques employed in conventional digital GPS receivers, and the data is periodically recorded in a digital data buffer. This data is then interleaved with other telemetry data from the object being tracked and transmitted using a conventional telemetry data link having a typical bandwidth of 20 KHz. The GPS data block is recorded and processed by the data processing workstation to compute the position and velocity of the sensor, at the time the data was sampled. Differential GPS corrections are also provided at the data processing workstation to improve the accuracy of the position computation.

22. Key learning Points

A key feature of the present invention is the high speed code correlation and complex multiplication algorithm illustrated in FIG. 6. To perform a high speed search, it is necessary to perform multiple code correlations at different code phases to detect the GPS signal. The algorithm illustrated performs these functions in parallel in software. Using a TMS320C40 chip, nine correlators can be operated in parallel in real time. Using a 10-millisecond dwell period, the full 2046 possible half-chip C/A code phases can be searched in 2.27 seconds. Once the signal has been initially acquired at start-up, reacquisition requires significantly smaller search windows and can be performed in a fraction of a second on each new data block.

23. Summary of Invention

In summary, prior art GPS receivers may be one of three types. In the first type, all navigation processing activities occur at the receiver, which outputs the position and velocity of the tracked object using either a single computer or an RPC and navigation computer, in which there is substantial interconnection between the RPC functions and the navigation functions for satellite selection and acquisition. In the second type of GPS receiver, the GPS signal is remoted by translation or variations thereof and the signal is tracked at a ground processing facility where the object position and velocity are derived. In accordance with this latter approach, significant bandwidth is required to transmit the translated signal. In the third type, the carrier frequency of the GPS signals is measured and retransmitted to the ground processing facility where only the velocity of the object can be derived.

It is therefore the principal object of the present invention to provide a low cost tracking system for radiosondes, sonobuoys, aircraft, ships, land vehicles, and other objects, using GPS satellites, that is capable of providing the position and velocity of multiple objects without requiring a 2 MHz bandwidth data link.

This and other objects are accomplished in accordance with the illustrated preferred embodiment of the present invention by providing a GPS sensor module that supplies the data required to locate a particular object, a one-way telemetry link, and a data processing workstation to process the data and display the object position and velocity. The GPS sensor module comprises an antenna and a sensor. The sensor operates autonomously following application of operating power. The sensor digitally samples the signals from visible GPS satellites and stores this data in a digital buffer. No processing functions are performed by the sensor, thereby permitting significant reductions in the cost thereof. The raw satellite data stored in the buffer, interleaved with other telemetry data from the sonde or other object, are transmitted back to the data processing workstation. Using this set of raw satellite data, the position and velocity of the sensor can be determined at the time the data was recorded by the sensor to a precision of 100 meters. If differential corrections are also provided at the data processing workstation, the accuracy of the position fix can be improved to better than 10 meters. If a 20 kHz data link is used and the GPS signals are sampled at 2 Mbps, a 1-second set of GPS data can be provided every 100 seconds, or a 0.5-second set of GPS data every 50 seconds, or a 0.1-second set of data every 10 seconds. The principal advantage afforded by the present invention is its ability to provide extremely accurate position, velocity, and time information for radiosondes, sonobuoys, and other objects using a low cost sensor and a conventional data telemetry link. By eliminating all processing functions performed in prior art GPS sensors, significant cost reductions are achieved over existing GPS receiver designs. By reducing the data link bandwidth from the 2 MHz required of prior art transdigitizers, conventional telemetry links may be employed to retransmit the data. For low cost data applications, such as sonobuoys or radiosondes, a position and velocity fix is only required at a low rate (e.g. every 10 seconds), a requirement that is accomodated by the present invention.

24. Number of Claims : 5

25. Patent Status : Other (Assignment)

26. How much this invention is related with your IDP/UDP?

< 70 %

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

By increasing some of the functionalities and also by using better GPS for the project.

GUJARAT TECHNOLOGICAL UNIVERSITY

(GTU)

INNOVATION COUNCIL (GIC)

Patent Search & Analysis Report

(PSAR)

Date of Submission : 25/09/2016

Dear **Tilwani Mashook Tarachand,**

Studied Patent Number for generation of PSAR	:	**16BE7_130670107119_5**

PART 1: PATENT SEARCH DATABASE USED

1. Patent Search Database used	:	Google Patents
Web link of database	:	https://patents.google.com/
2. Keywords Used for Search	:	GPS ,TRACKING,SYSTEM
3. Search String Used	:	AND
4. Number of Results/Hits getting	:	100

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

5. Category/ Field of Invention	:	Computer/IT Engineering
6. Invention is Related to/Class of Invention	:	EMPLOYEE TRACKING
6 (a) : IPC class of the studied patent	:	G01C21/20
7. Title of Invention	:	Compact GPS tracker and customized mapping system
8. Patent No.	:	
9. Application Number	:	US 09/384
9 (a) : Web link of the studied patent	:	http://www.google.co.in/patents/US6198431
10. Date of Filing/Application (DD/MM/YYYY)	:	27/08/1999
11. Priority Date (DD/MM/YYYY)	:	
12. Publication/Journal Number	:	
13. Publication Date (DD/MM/YYYY)	:	
14. First Filled Country : Albania	:	

15. Also Published as

Sr.No	Country Where Filled	Application No./Patent No.
1		

16. Inventor/s Details.

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17. Applicant/Assignee Details.

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18. Applicant for Patent is : Company

PART 3: TECHNICAL PART OF PATENTED INVENTION

19. Limitation of Prior Technology / Art

GPS has its certain limitations.And lack of some the functionalities.

20. Specific Problem Solved / Objective of Invention

It is, therefore, an object of the invention to provide a device, apparatus and method for tracking people in their travels or movements outdoors, record said movements and accurately display these movements onto customized 3-D projection maps or computer displayed maps. The printed maps may be purchased by the person tracked in the event of sports activity as a souvenir as with a daily rental of the tracker, or computer analyzed by a central monitoring station as in search and rescue operations or the like; or used by an individual to determine the location of a person wearing the device at a given point in time or over time. The advantages are as numerous as the mind can imagine. In its skiing application skiers can view their travels for the first time on an accurate display of the mountain terrain skied discovering their total vertical feet skied and speeds obtained. For the outdoor sporting world the sport enthusiast can have a tool to accurately remember their travels whether hiking, biking, skiing or hunting. For the amateur or professional athlete this can be an analytical tool for accessing performance by viewing their travels over terrain in a 3-D model.

With the addition of real time tracking any lost skier wearing a tracker can be located on the tracked mountain or a parent can watch the skiing progress of their family, friends or children while sitting in the comfort of a ski lodge. In other applications, the movement and travels of employees or persons under surveillance can be viewed for monthly reviews of compliance standards or to reveal and prove the tracked person's exact location at a given time and date. Further, in search and rescue operations the movements of rescuers can be directed to better utilize the present “grid” technique in verifying that a particular geographic area has been thoroughly searched. Also, similarly in a military application troops can be observed from a central monitoring location for fast and efficient evaluation of the troops locations and relationship to each other and relationship to the operation objective and hindering terrain. The list is endless.

21. Brief about Invention

A light weight compact portable GPS receiver and transmitter for use on the person during outdoor activity, data logging receiver, data logging software supported by battery pack and modified active GPS patch antenna with chips, download connector, download docking station, charging units, mapping software to transfer the GPS data onto various maps including ortho-rectified, flat topographical maps, 3-D projection view topographical maps and street maps.

22. Key learning Points

Modern technology has brought us the ability to monitor and track movements of persons over geographic areas by use of monitoring devices that utilize the Globally Positioned Satellite System or ("GPS"). GPS is a position/navigation system that consists of a constellation of 28 satellites. A GPS receiver is an electronic device that receives signals from the satellites to determine its location on earth, in any weather. GPS has been around since the early 1980s and has been fully operational for many years now.

In any GPS device used by the civilian population corrections are made to adjust the vertical error inherent in the GPS signal. The US government adds a variable to the mix of data transmitted from the satellites so that no one can download immediate precise accurate information. Typically this technology is used by the civilian population in motorized vehicles to assist in determining where that vehicle is located geographically.

23. Summary of Invention

This inventions unique mapping system and customized software addresses the issues and heretofore unsolved problems of GPS elevation drift in nonobvious ways that is totally surprising and fascinating to all persons skilled in the art of GPS and the field of mapping. For example, prior to my invention, the GPS world has not been able to control the third dimension factor of elevation drift, which can fluctuate from 10 feet to 400 feet. Therefore, this invention, for the first time, permits the accurate display of three-dimensional and four dimensional (including display of time) data onto a two-dimensional map producing what is termed a 3-D enhanced projection map. This invention with its integrated tracking and mapping system now makes it possible to display true geochron data for 3-D viewing.

The problem of elevation drift has been corrected in the mapping system software to anchor the elevation of the person wearing the tracker to the digital elevation model of a mountain or variable terrain model at the user's X-Y location. This method assumes that the user is always on the mountain or terrain surface. In addition, in the skiing application where a skier ascends the mountain via a ski lift he or she is above the ground while on the lift. The software "senses" when the skier is traveling uphill along the trace of a lift line and the software either fails to draw the lift or anchors the skier to the lift line at the chair elevation. This is accomplished by supplying software with a digitized line representing the lift line and its average height, which the software uses to perform a proximity analysis on the skier's position. If the skier is within a certain distance of a known (preprogrammed) lift line and their direction is indicating a sustained upward motion, then the skier is assumed to be riding the lift and their location is snapped to the lift line while their elevation is set to the height of the lift above the surface.

Next the mapping system software takes the GPS raw data recorded as the users location by latitude, longitude and elevation and converts if from what would be a floating way point when attempted to be placed onto a 3-D topographical model or picture map to an accurate display of location.

Further, the inventions unique technique and application addresses the problem of "traveling" waypoints by Z-buffering. The visual representation of a skier's track can be suppressed when he or she is out of sight behind a ridgeline in certain views. Z-buffering is a computer graphics process whereby all objects in a view are sorted by distance to the viewers eye, and the image is built up by rendering the furthest objects (like distant GPS tracks or terrain ridges) first. In this way, since the nearer objects are drawn last, they cover up the farther ones where they should. Because this process uses just simple occlusion, the processing effort to calculate positions of objects is minimized, resulting in faster rendering. The final result is a picture map with accurate GPS waypoints displayed.

By this invention, this unique mapping feature, used to enhance the map product produced through GPS technology, will be available to the consumer either as a daily rental or as a purchased apparatus with mapping software as further described herein. It appears that GPS "techies" are just now using existing GPS trackers such as Garmin, Magellan, Trimble and Lowrance with off the shelf mapping software such as street maps to transfer the GPS data collected by the receiver onto a map displayed either on the hand held unit or a later printed. There does not appear to be specialized or customized mapping system software offered for purchase and use with the "prior art" products.

Even more exciting with this invention, in the very near future by the addition of a transmitter all map views including the 3-D view can be used by a base monitoring station to watch the progress and movements of one or more persons wearing a tracker.

OBJECTS AND ADVANTAGES

It is, therefore, an object of the invention to provide a device, apparatus and method for tracking people in their travels or movements outdoors, record said movements and accurately display these movements onto customized 3-D projection maps or computer displayed maps. The printed maps may be purchased by the person tracked in the event of sports activity as a souvenir as with a daily rental of the tracker, or computer analyzed by a central monitoring station as in search and rescue operations or the like; or used by an individual to determine the location of a person wearing the device at a given point in time or over time. The advantages are as numerous as the mind can imagine. In its skiing application skiers can view their travels for the first time on an accurate display of the mountain terrain skied discovering their total vertical feet skied and speeds obtained. For the outdoor sporting world the sport enthusiast can have a tool to accurately remember their travels whether hiking, biking, skiing or hunting. For the amateur or professional athlete this can be an analytical tool for accessing performance by viewing their travels over terrain in a 3-D model.

With the addition of real time tracking any lost skier wearing a tracker can be located on the tracked mountain or a parent can watch the skiing progress of their family, friends or children while sitting in the comfort of a ski lodge. In other applications, the movement and travels of employees or persons under surveillance can be viewed for monthly reviews of compliance standards or to reveal and prove the tracked person's exact location at a given time and date. Further, in search and rescue operations the movements of rescuers can be directed to better utilize the present "grid" technique in verifying that a particular geographic area has been thoroughly searched. Also, similarly in a military application troops can be observed from a central monitoring location for fast and efficient evaluation of the troops locations and relationship to each other and relationship to the operation objective and hindering terrain. The list is endless.

24. Number of Claims : 6

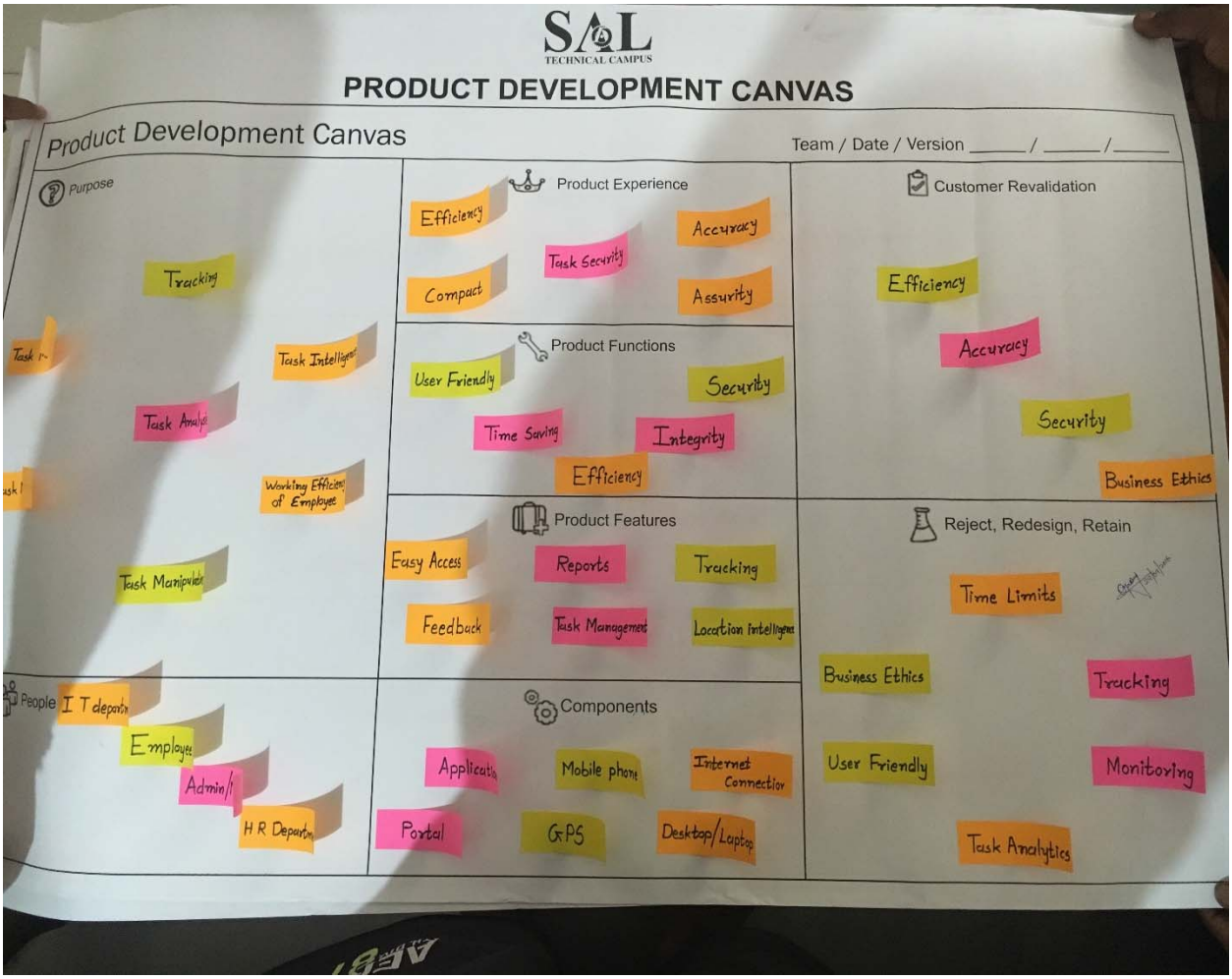
25. Patent Status : Other (ASSIGNMENT)

26. How much this invention is related with your IDP/UDP?

71 to 90%

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

Some of the major functionalities also some of the business intelligence functionalities will be added.


SAL
TECHNICAL CAMPUS
PRODUCT DEVELOPMENT CANVAS
Product Development Canvas
Team / Date / Version _____ / _____ / _____
Purpose
Tracking
Task Intelligent
Working Efficiency of Employee
Task Manipulation
People
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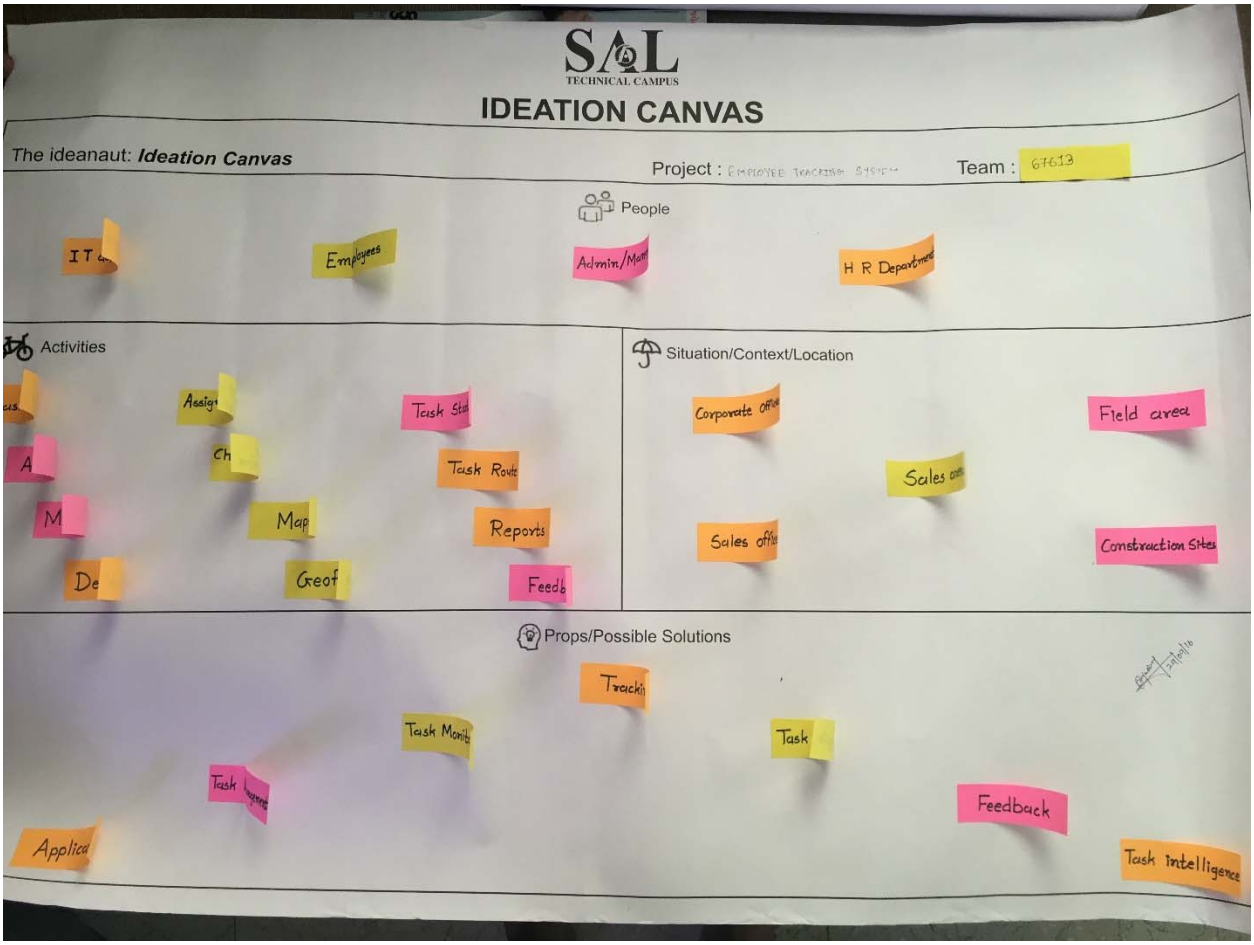
Employee
Admin/I
H R Departm
Product Experience
Efficiency
Accuracy
Task Security
Compact
Assurity
Product Functions
User Friendly
Security
Time Saving
Integrity
Efficiency
Product Features
Easy Access
Reports
Tracking
Feedback
Task Management
Location Intelligence
Components
Applicatio
Mobile phone
Internet Connectior
Portal
GPS
Desktop/Laptop
Customer Revalidation
Efficiency
Accuracy
Security
Business Ethics
Reject, Redesign, Retain
Time Limits
Business Ethics
Tracking
User Friendly
Monitoring
Task Analytics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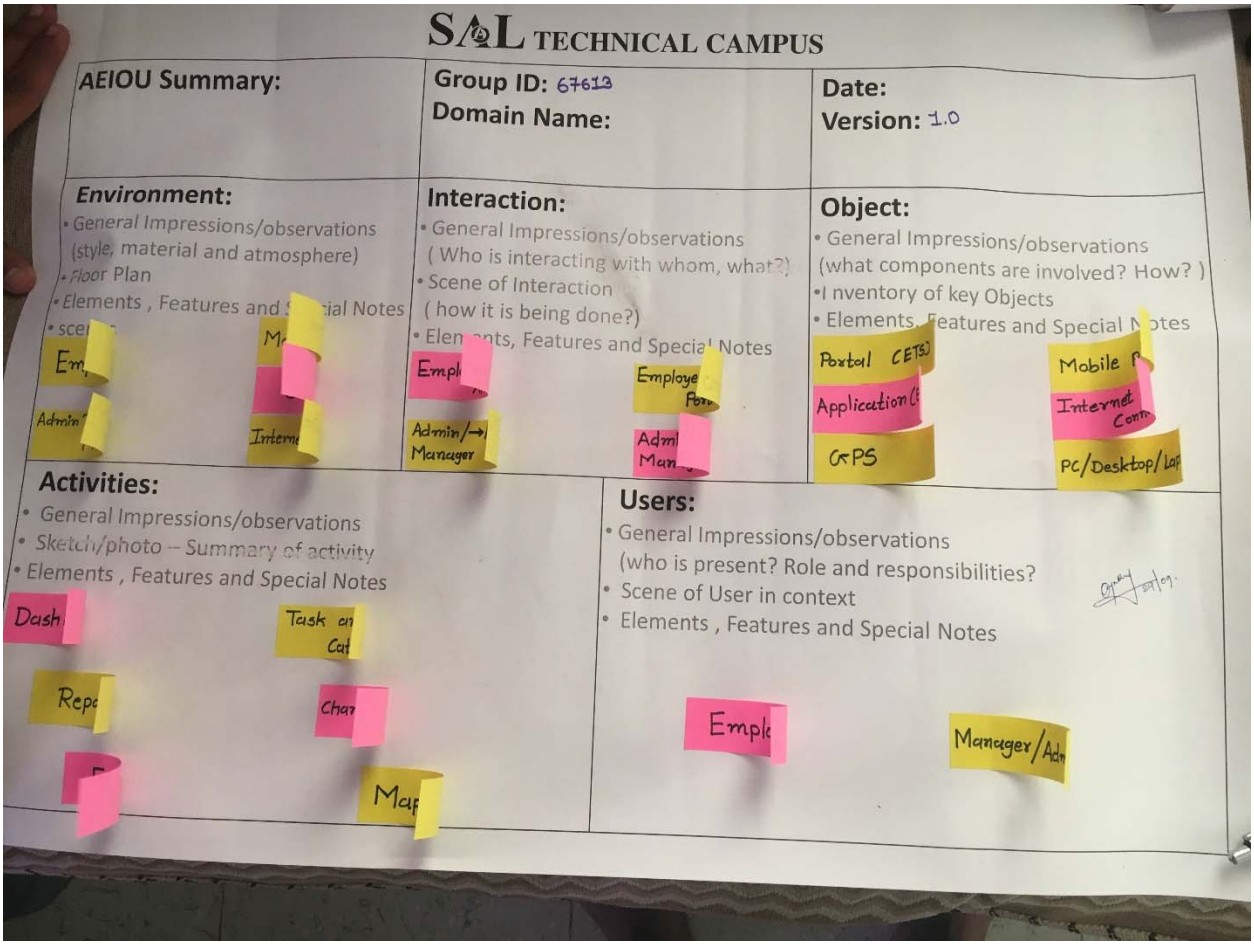
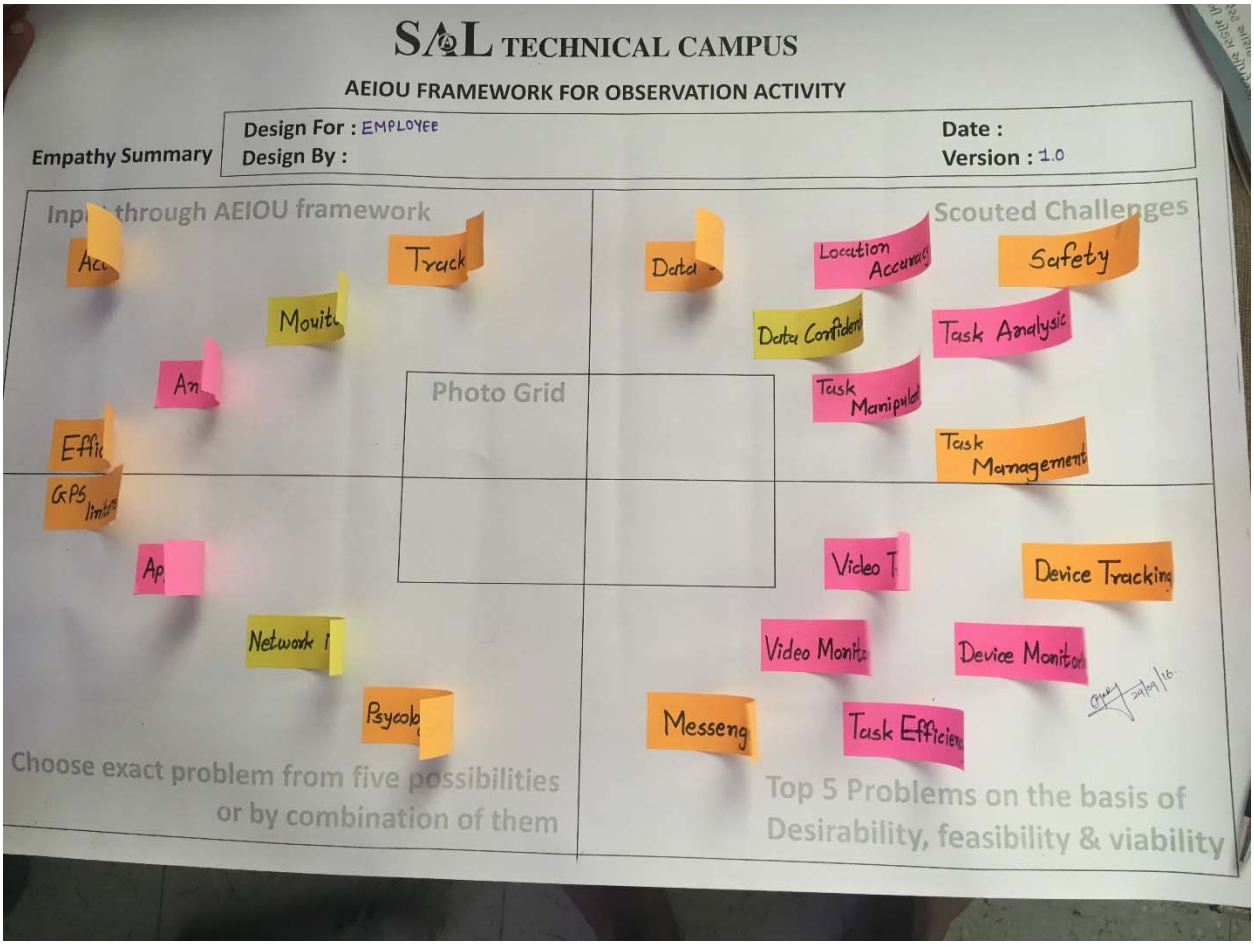
TECHNICAL CAMPUS
IDEATION CANVAS
The ideanaut: Ideation Canvas
Project : EMPLOYEE TRACKING SYSTEM
Team : 67613
People
IT
Employees
Admin/Mgmt
H R Department
Activities
Assign
Task Stat
Ch
Task Route
A
M
Map
Reports
De
Geof
Feedb
Situation/Context/Location
Corporate office
Field area
Sales
Sales offic
Construction Sites
Props/Possible Solutions
Trackin
Task Monit
Task
Task
Feedback
Applica
Task Intelligence


SAL TECHNICAL CAMPUS
AEIOU Summary:
Group ID: 67613
Domain Name:
Date:
Version: 1.0
Environment:
• General Impressions/observations (style, material and atmosphere)
• Floor Plan
• Elements , Features and Special Notes
Interaction:
• General Impressions/observations (Who is interacting with whom, what?)
• Scene of Interaction (how it is being done?)
• Elements, Features and Special Notes
Admin/→ Manager
Object:
• General Impressions/observations (what components are involved? How?)
•I nventory of key Objects
• Elements, Features and Special Notes
Portal CETS
Application
GPS
Mobile
Internet Conn
PC/Desktop/Lap
Activities:
• General Impressions/observations
• Sketch/photo – Summary of activity
• Elements , Features and Special Notes
Dash
Repe
Task on Cat
Map
Users:
• General Impressions/observations (who is present? Role and responsibilities?
• Scene of User in context
• Elements , Features and Special Notes
Manager/Adm


SAL TECHNICAL CAMPUS
AEIOU FRAMEWORK FOR OBSERVATION ACTIVITY
Empathy Summary
Design For : EMPLOYEE
Design By :
Date :
Version : 1.0
Inp through AEIOU framework
Track
Mouit
An
Effi
GPS
Ap
Network
Psycol
Photo Grid
Choose exact problem from five possibilities
or by combination of them
Scouted Challenges
Data
Location Accuracy
Safety
Data Confident
Task Analysic
Task Manipulat
Task Management
Video T
Device Tracking
Video Monit
Device Monitor
Messeng
Task Efficien
Top 5 Problems on the basis of
Desirability, feasibility & viability