PROBLEM STATEMENT.

AUTOMATING INSTITUTE STAFF TAXI SHARING.

The Institute has hired a few chauffeur driven taxis dedicated for the staff's travel. The problem in hand is to automate efficiently the booking and billing process.

SPECIFICATIONS.

<u>INPUT.</u>

Booking Details as a web request / a mobile text message.

OUTPUT.

Acknowledgement to the client, update to the taxi driver before a journey and ultimately taxi reaching the requested destination.

COMPONENTS REQUIRED.

RFID Reader, Electronic Meter, Storage Device (Current Preference : Micro SD Card), Access to a Server, a registered Mobile number for sending notifications, Embedded board.

All the components are available and yet to be procured. There are some issues on the costing yet to be sorted out.

PROBLEM DETAILS.

EXPLANATORY DIAGRAM.



Storage for Journey Details

BOOKING PROCEDURE.

- Database of booked / available taxis on the central server.
- All the bookings would be Query based. All queries would be directed to the central server followed by Acknowledgement by the server.
- Any Query would be from a web portal.

Query Format.

- Booking/Cancellation.
- If Booking then Client ID; Start Location; Start time followed by End Location; End time. (Simplistic Assumption that these Booking details are correct and one of Start Location / End Location is the Institute).
- If Cancellation then Booking ID.

Acknowledgement Format.

- Unique Booking ID to the Client on Booking and update to database.
- In case of Cancellation delisting of the booking ID and update to database.

Booking Protocol.

- At start of the day Taxis will be stationed at fixed stations.
- Tasks segregated and allotted in an optimal fashion*.
- First come first serve priority.
- If Booking is not available then request can be queued subject to availability in case of cancellation.

*Tasks Segregation will take into account *nearness of end location to start location, good task distribution* and in case of immediate requests *good redistribution*.

Update / Reminder service to the taxi on journey to journey basis.

BILLING PROCEDURE. (Main focus initially).

Charging Details/Charge Structure given by the Institute/Taxi Service Provider should consist of:

- Travelling Charge.
- One Way vs. Two Way Charges.
- Advanced Booking Charge.
- Cancellation Charge.

Assuming each Staff member has a unique RFID, the RFID reader integrated storage capable Taxi Meter will store the details (travel distance, time, and Client ID) of the journey.

Synchronization of the Taxi Meter with the Server through a physical connection on a per day basis. The billing details for the day will be processed during this syncing.

The entire billing details can be obtained from the central server on a monthly basis.

ASSUMPTIONS.

- All Queries would be entertained by the Central Server.
- One of the Start location and End location is the Institute.
- The journey details are correct and there will be no delays / change in location parameters. (If the clients wishes to change booking details then he would have to cancel the existing booking and request a new booking. This new booking would be treated afresh.)
- The Meter readings are indicative of the travelled distance.
- The RFID will contain all the necessary client details(ID Number).

METHODOLOGY.

The problem will be approached from two fronts: **Software** and **Hardware** front.

Software front: (Task in order of Importance)

- Implementation of Tariff Calculator.
- Database management of bookings.
- Query Support for the Server.
 (Incoming query for booking through net and acknowledgement to client. Outgoing notification of journey to allotted driver and client)
- Algorithm development for Booking Allotment.

Hardware front: (All tasks equally important)

 RFID Reader – Electronic Meter – Storage Device Interfacing on an embedded board. The RFID Reader will convey the client details. The Electronic Meter will convey the journey details. Both these details along with start and end time of the journey would be stored on the Storage device.

We plan to begin work on Software and Hardware fronts in a parallel manner with more focus to Hardware.

TIMELINE.

The timeline and the work allotment chart are explained in detail in the additional document sent along with this document.

Study and Search.

- Algorithm for Booking(Taxi Allotment).
- Web based database Management of all bookings.
- Web based query handling.
- Components to be procured: RFID, RFID Reader, Server, Taxi Meter, Storage device, Web portal, Registered Mobile Number.
- Interfacing Issues.

Development Phase.

- Software Front .
- Interfacing the web portal/mobile device with the database on the server.
- Implementation of Algorithm for Efficient Task Allotment.
- Implementation of Tariff Calculator from the Data obtained from the Storage Device on Meter.
- Hardware Front .
- Integrated Module consisting of RFID Reader interfaced with Taxi Meter along with a Micro SD Card.

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