Interdisciplinary Project (IDP)

Web Application Development for an office vending machine supply service to provide an optimized logistics network

Are you interested in IOT technology and logistics & you want to discover the Munich start-up scene?
Then your IDP with oazo is the place to be!

Background

oazo is Munich based start-up that combines software and hardware solutions to optimize logistic networks. Currently, oazo is focusing on logistic networks for coffee machine operators. The machine operators are responsible for maintaining and refilling the machines. In Germany only, Dallmayr for example has over 50,000 coffee machines that could run with oazo technology. Thus, generating efficient refill schedules (including vehicle routes for the refillers) and deciding on the amount of replenishment is a very difficult task. Since there is no real-time information about the status of the machines, the planning is currently done manually and mainly based on the experience of the dispatchers.

Two main problems arise here: (1) many delivery tours include unnecessary driving since consumption is less than expected and more efficient routes could be built without that customer, and (2) there might be more demand than expected and not enough supply is provided which leads to unsatisfied customers.

The idea of oazo is to make conventional coffee machines smart. Therefore, a retrofit kit is connected to the vending machines allowing to gather real-time information of the machines' status, e.g. the amount and type of consumed coffee. This information is sent via WLAN to a platform processing the data. Thus, oazo identifies in real-time how much stock is available at every machine and if maintenance has to be done. This information is used to create better routes by only delivering to customers who need replenishment and providing them with right amount of goods.

Project Description

The goal of this IDP is to develop a decision support tool, which can process the real-time information gathered by oazo's retrofit kits. The project can be broken down into three main tasks:

- Developing and implementing an efficient routing algorithm
- Tracking the drivers and storing the geospatial data
- Creating an Admin UI

Developing an efficient routing algorithm

The collected data is only useful if it can be processed in real-time. Thus, the data should be used to create near-optimal routes in short computation time. The underlying problem is well-investigated and the Operations Management group of TUM School of Management has profound expertise in this area. For this part you will work closely with Alexander Döge, your supervisor from TUM.
Tracking the drivers and storing the geospatial data
Accurate tracking of the arrival and departure times of the refillers at the different locations is needed. With this information, tours can be re-optimized. It is also important to store all information in a database. This will provide the basis for oazo to learn more about customer behavior.

Creating an Admin UI
A web view should be created, showing details of the stock levels, the delivery routes and the current position of the refiller’s vehicle – i.e. a GPS track of the refiller. All this should be displayed in a compelling overview, e.g. a map showing the driver’s current location.

Grading
You will be awarded 7 ECTS for the above-mentioned development. Further, the development and results shall be documented in a written report and presented to the supervisors. The report will account for 2 ECTS and the final presentation for 1 ECTS.

In accordance with the practical assignment, you participate in the course “Project Management” (WI000264, 6 ECTS), offered by the Operations Management group. This course covers aspects such as Project Stakeholder and Project Organization, Planning Project Deliverables and Cost, Project Scheduling with Resource Constraints, Project Controlling, Project Valuation, Project Portfolio Planning and Project Planning Considering Risk. These academic insights will be needed in order to successfully work on this IDP. You must pass an oral exam on the course’s topics at the end of the interdisciplinary project.

Project timeline
The following timeline is meant to provide a guideline for keeping track of the progress of the project:

Phase 1 (mid/end of August):
- Assembling the team and project kick off

Phase 2 (beginning of September):
- Research about routing algorithms
- GPS tracking and delivery logistics

Phase 3 (end of September):
- Define conceptual design of the decision support tool that includes features for a better management of the fleet – e.g. tracking, visualization on a map

Phase 4 (beginning of October):
- Start developing web view with basic requirements
- Setting up the database to store machine data and routing information.
- Implementation of the routing algorithm (proof of concept)

Phase 5 (end of October):
- Test of decision support tool on real-life data

Phase 6 (end of November):
- Documentation of the development and the results

Phase 7 (mid/end of December):
- Oral exam on course “Project Management”
Your chance

You will be part of an early-stage start-up. You will directly work together with the founders in the TUM Incubator. We offer you MakerSpace access including free courses, free coffee, your own desk and an awesome team! You will experience all the ups and downs of start-up life!

Requirements

- **Programming Language**: We are open to discuss every suggestion! (e.g. C#, Java, Web Development (Django, JavaScript, Html, Css)
- Experience with frontend and backend development
- **Start-up mind set** (flexible, creative, up for a challenge)
- Team or individual application possible

Application

Send your CV or LinkedIn-profile to contact@drink-oazo.com
In case you have any question contact us +49 176 23866921 (Michael Götz)
The project should start as soon as possible and the timeline can be adapted.

Mentors (**oazo**)

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Advisor (**TUM**)

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