SWE1014- Enterprise Resource Planning

Report for Review-III of Project-based Component

Project Title: Automotive Manufacturing Systems with Accident Protection System

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Project Synopsis / Abstract (not more than 150 words):

The automobile industry is a pillar of the global economy, a main driver of macroeconomic growth and stability and technological advancement in both developed and developing countries, spanning many adjacent industries. For developing countries such as India, understanding the auto industry's evolution in other countries offers a roadmap forward.

The automobile manufacturing industry is nothing but an importing and exporting of

The automobile manufacturing industry is nothing but an importing and exporting of automobile parts. We can see automobiles play a major role in our society. Nowadays without an automobile people are unable to travel for long distances. So there is a huge demand for automobiles in the industry. This also means the safety aspect of these vehicles as these are prone to accidents. For this aspect we plan to construct a system that can easily integrate with vehicles that can directly communicate with radio systems and variants of which shall be even able to communicate with satellites when the crash detection happens. This resource planning and acquisition and main line implementation shall be main aspects along with the system building for this project. This shall enable the industry to easily modify and adapt a technique that shall increase the safety features of the vehicles to a great extent.

Motivation

The number of vehicle collisions in India is among the highest in the world. One major factor that leads to these accidents becoming fatal is the response of the emergency services which in most cases are not notified sufficiently within time as the passengers of the vehicle may not be in a state to make calls or raise alarms. The proposed system will detect the occurrence of the accident using various sensors present in the system, detect the location of the vehicle using the GPS module along with the use of Google Maps data and send the emergency messages and distress signals automatically in case of an accident where the passengers are not in a state to respond/raise an alarm. The messages will be sent using a GSM module present in our system. The system will always provide a small window of time for the user to cancel the distress call in case of a rare occurrence of a false detection by our system so as to not disturb the emergency services and also to not cause panic amongst the family and friends of the user. If the user does not respond within the time delay, the system is activated and the necessary

processes are carried out. This time window is to stop the system from activating, and can only be done manually by the user with the help of a button.

Overview of existing systems and their limitations (please be specific, enumerating the existing systems and giving the necessary details in maximum 150 words):

Overview of existing system -

- **Generating revenue:** The automotive sector contributes significant tax revenues from vehicle sales, usage-related levies, personal income taxes, and business taxes.
- **Economic development:** The automotive industry is important to global economic development. Globally, automotive contributes roughly 3 percent of all GDP output.
- **Industrial development:** Across the world, auto is a spark for regional development. Industrial clusters formed as original equipment manufacturer (OEM) plants are surrounded by component manufacturing facilities, including steel plants, glass manufacturers, used car dealerships, aftermarket shops, and transportation service providers.
- **Mobility:** Automobiles have revolutionized the concept of mobility, with goods and people now easier than ever to move across geographic regions.

Limitations of the existing system -

- **Manufacturing shutdowns**: Manufacturing shutdowns accentuated the automotive industry challenges of excess production and resource shortage. They also lead to massive financial losses, directly impacting GDP.
- Less vehicle sales: Reduced car sales emerged as one of critical challenges facing the automotive industry
- Massive layoffs:Loss of labor is an overt impact of manufacturing shutdowns. As the coronavirus spread, many companies had to resort to massive layoffs, which emerged as one of the crucial challenges of the automotive market.
- Liquidity: Liquidity was the biggest challenge facing the automotive industry Production shutdowns and slumping sales gradually led to heavy financial losses, with OEMs operating on minimal liquidity. Lack of funds is likely to result in many small-time automotive companies going out of business.

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Odoo ERP Functionality Overview

There is something to help handle all of your business demands in a simple, affordable, and modular solution between the Odoo apps and the tens of thousands of Community apps: no more work to get various technologies to cooperate.

Because Odoo apps are flawlessly linked, you can fully automate your business activities and enjoy the savings and advantages that come with it.

ERP Modules:

Accounting & Invoicing

Accounts payable and receivable, bank reconciliations and cash management, taxes and reporting, and other general financial processes required within an organisation are all covered by the Odoo Accounting & Invoicing modules.

Project Management

The Project Management module offers a variety of views, including Gantt charts, calendars, graphs, Kanban boards, and pivot table analysis, to manage multiple projects and resources.

Inventory Management

Whether you have a single inventory or a complex warehouse map across geographies, the Inventory Management module offers complete traceability from supplier to customer for all of your organization's products.

Manufacturing module

Other essential Odoo applications like Quality, Maintenance, and PLM are integrated with the Manufacturing module. A work centre control panel is provided by the manufacturing module and shows, among other things, work orders, progress, production quantities, work instructions, and time tracking.

eCommerce

The eCommerce module gives your company the ability to create an online shopping experience by selecting one of the template websites that is offered and customising it to highlight your company and product line.

Timesheets

Employees can use the time tracking app to record activities on the go through the timesheet module, which also gives managers access to team timesheets for viewing, reporting, and connecting to sales orders.

How IOT can be integrated into all modules of the ERP platform. DEFINITION: (IOT)

- The Internet of Things (IOT) is a term used to refer to a network of physical items that are equipped with sensors, software, and other technologies in order to connect and exchange data with other systems and devices over the internet.
- IOT-enhanced semi-autonomous vehicles make judgments on the fly while partially directing the vehicle's operations to prevent collisions and lighten the strain on the driver.
- To reduce errors and improve comfort and safety while driving, cars now include a variety of proximity sensors and cameras, as well as IOT systems.

IOT in task management modules:

• The workflow in IOT applications is typically represented as a DAG, in which the edges of the graphs reflect the connections between tasks and data transfer, and the vertices of the graphs represent tasks. Additionally, workflow scheduling can be broken down into two phases: Assignment of tasks and resources

IOT in modules for sales and marketing:

• As a marketing and sales leader, you must be driven to foresee client demands, quickly spot sales opportunities, develop ongoing relationships with customers, and spot more

potential to boost the company's revenue. In the opposite direction, the use of the Internet of Things in marketing allows businesses to communicate with customers in a more contextual and personalised fashion, for example, through digital signage in real-world settings like stores or through the use of mobile or other digital devices.

IOT in Material Management module:

- The material management module of the IOT module makes it simple to offer materials to consumers in an online fashion.
- The group management examines the pertinent concerns. Financial statements have been given independent assurance.
- Centralized information and record storage aids the industry in reducing paper trails and stacks by managing inventory, number of goods, raw materials, manufactured goods, and material needs.
- The IOT module in ERP for material management streamlines all industrial activities.

IOT in Production Planning module:

- As a result, an IoT application to enhance the Production Planning process should take
 into account these variations by tailoring the behavior of things to the kinds of process
 phases with which they are to interact. The use of the IOT is then examined for PPP
 phases or activities, such as developing plans and carrying them out and controlling
 them.
- The IoT's ability to gather and process enormous amounts of data will be essential for making lists and calculating forecasts based on the number of articles that need to be managed. Depending on the quantity of divisions, the number of employees, the availability of equipment, and the complexity of the production process, it will also be crucial for processing data on the company's capacities.

IOT in Quality Management module:

- Quality control is essential in every sector of the economy, but it is especially crucial in manufacturing. The mission-critical nature of finished products, volatile market demand, and high material and production costs force OEM and manufacturers to pursue nothing less than first-rate quality and a low rejection rate. Quality management is seen as a field with transformational opportunities as the Internet of Things IOT slowly gains traction in manufacturing.
- Constant monitoring is essential to effective quality management, and regulate a variety of machinery and process variables that have an impact product excellence.

IOT in Budgeting module:

• Using IOT in software comes with a number of risks, including the potential for budget overruns and schedule delays.

IOT in Import/Export module:

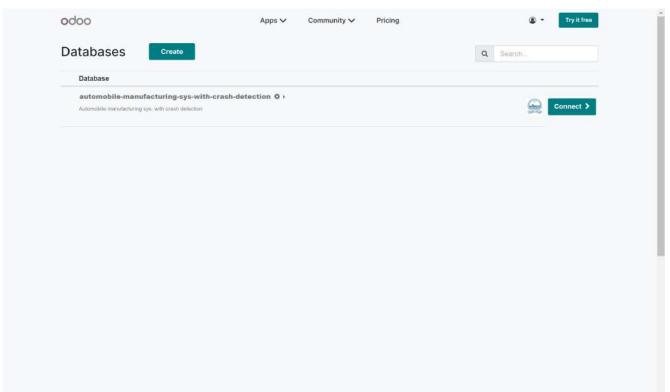
- The graph's grid view is visible. This is employed in numerous industries. It is used in stocks, specifically.
- We can see in the graph how many parts are imported, either as a percentage or as a number.
- As a result, we can determine the number of imported and exported parts. How many parts are imported and exported in a month or a year can be determined.

Finance and accounting module IOT:

- By collecting and exchanging data, IOT helps financial companies save a significant amount of time and money. IOT also assists financial companies in enhancing customer service and detecting fraud.
- Banks can automate crucial business activities via a network of IOT devices that are connected to one another. Banking and financial institutions benefit from specialised IOT apps for asset and other procedures.

Share the screenshots of the demo of the tool and explore all the features of all the functional areas.

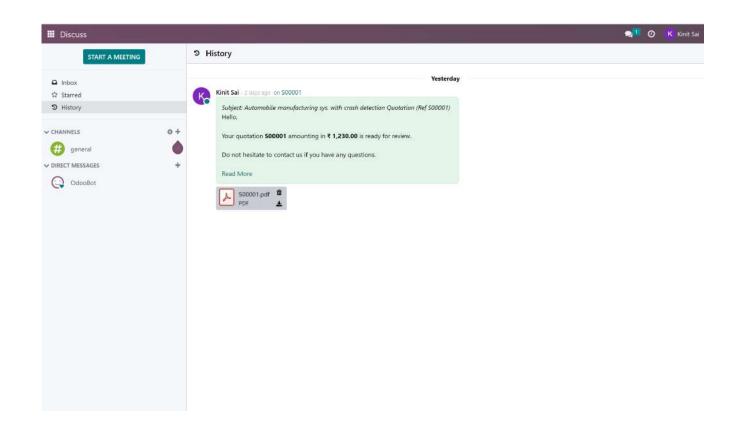
Creation of database

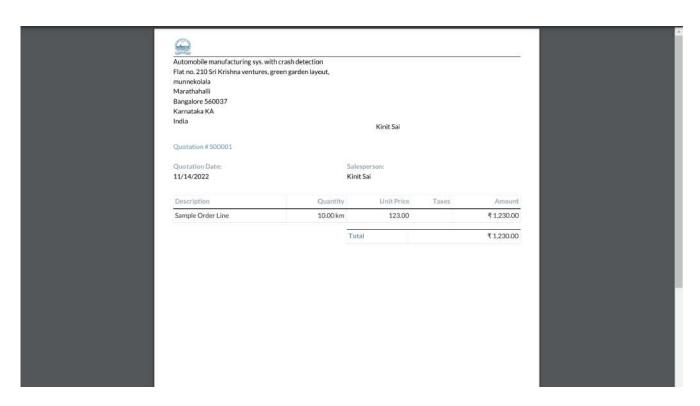


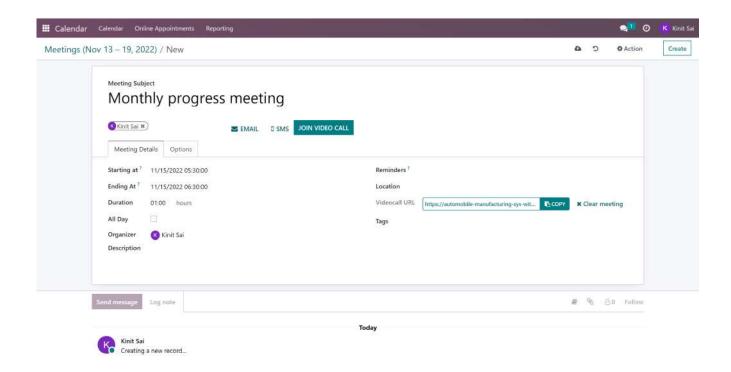
Modules:



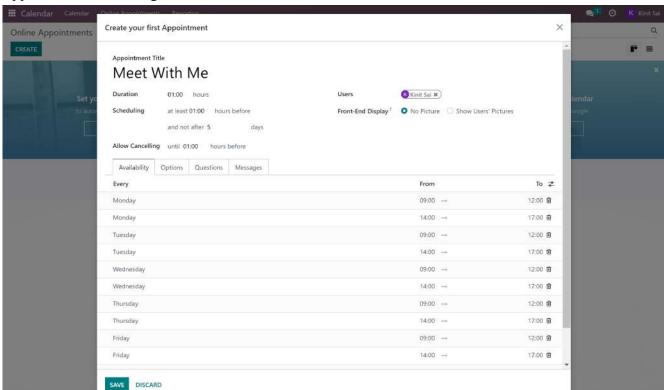
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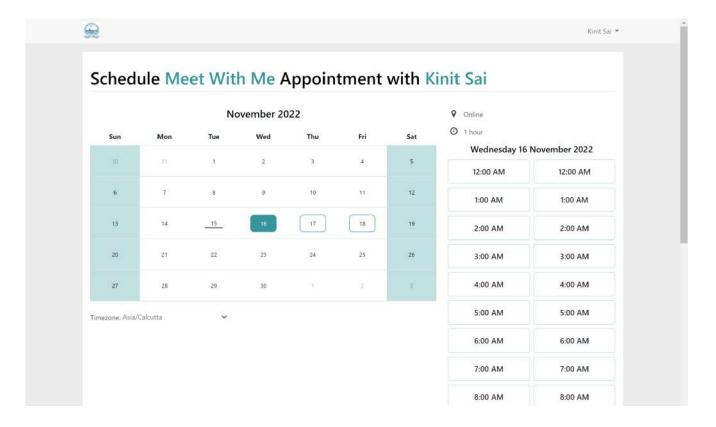




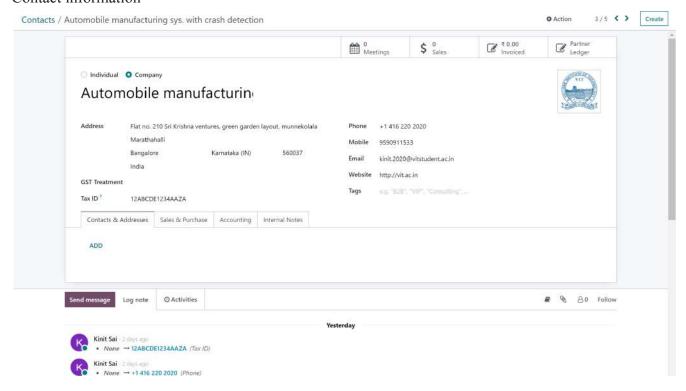


Appointment scheduling

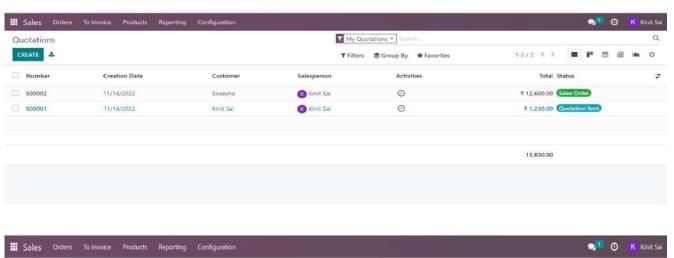


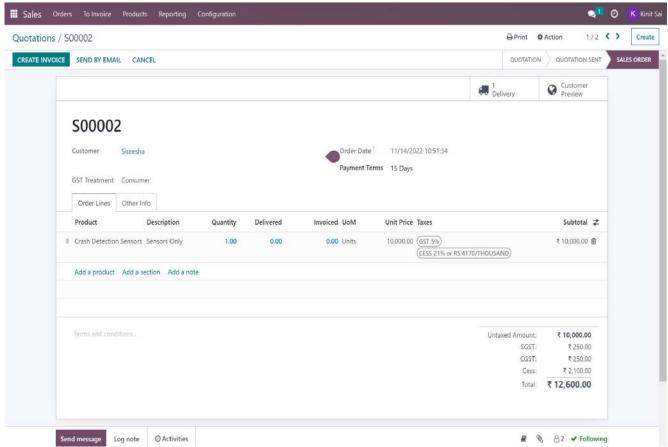


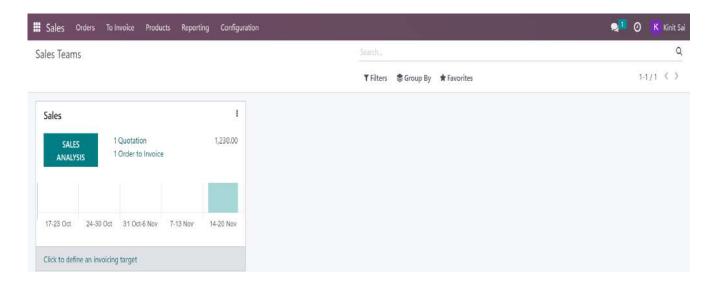
Contact information

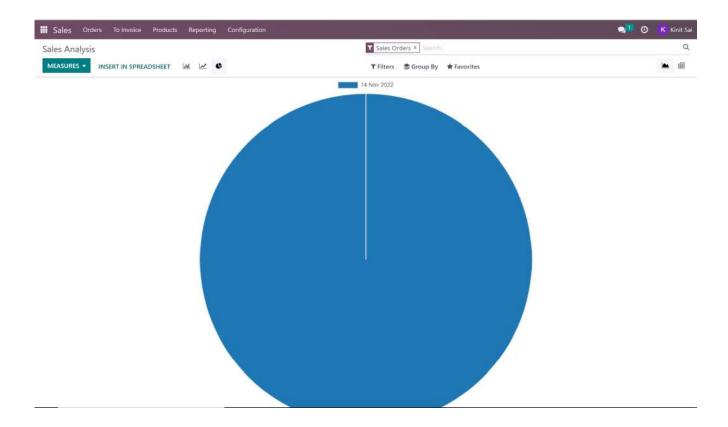


Sales

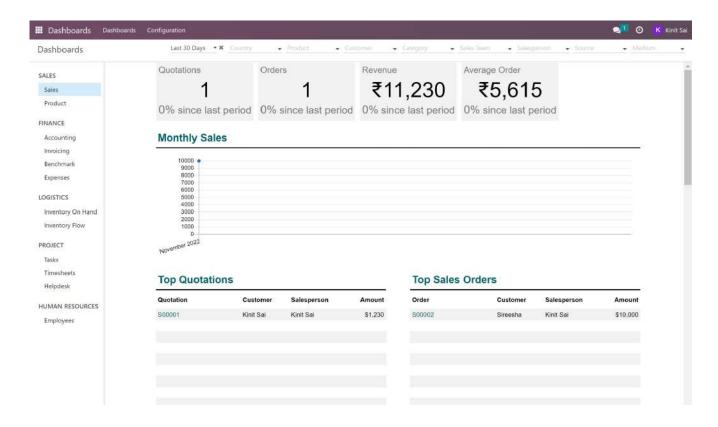


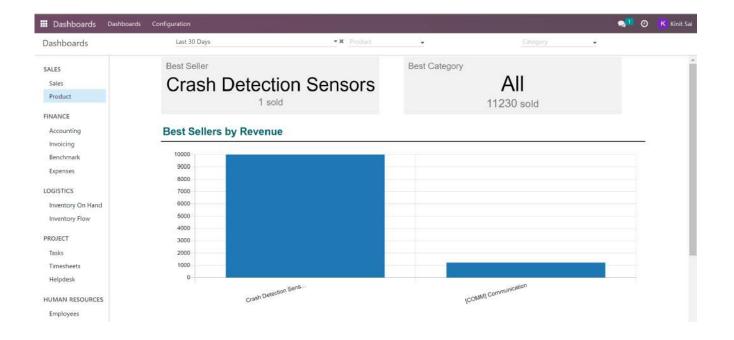




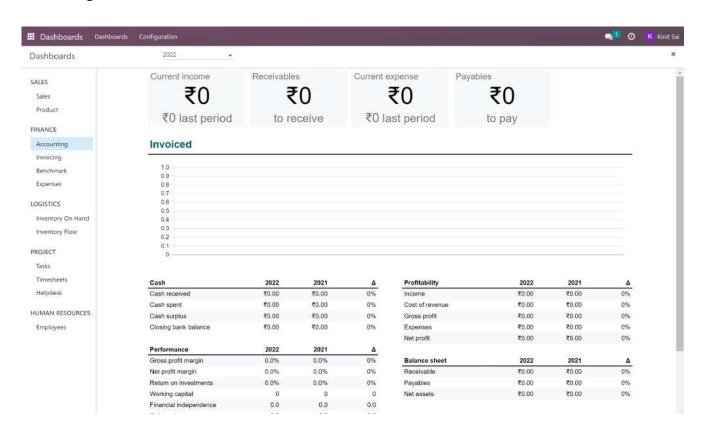


Dashboard

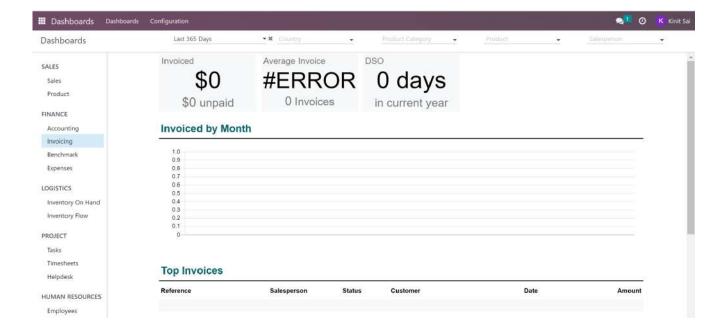




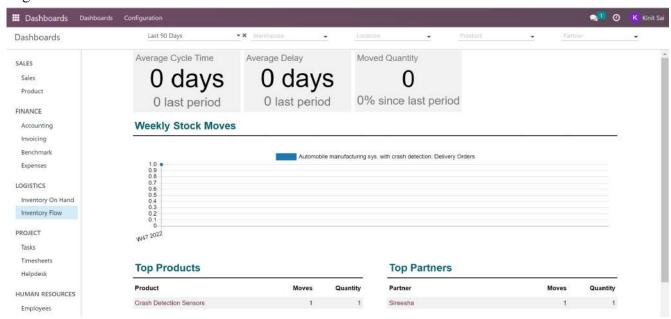
Accounting



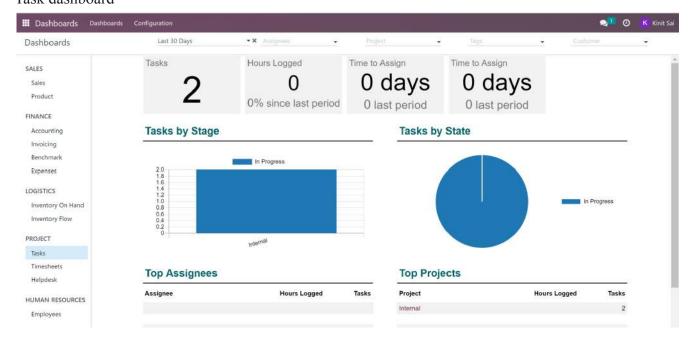
Invoicing



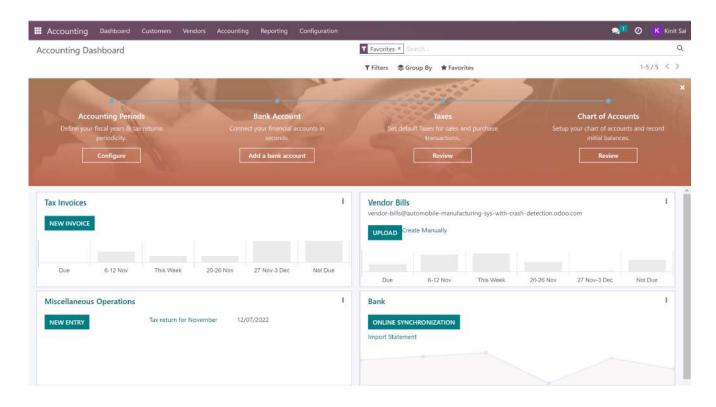
Logistics -

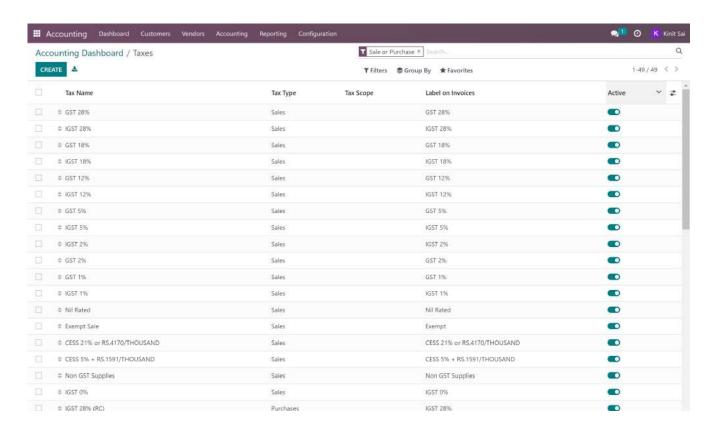


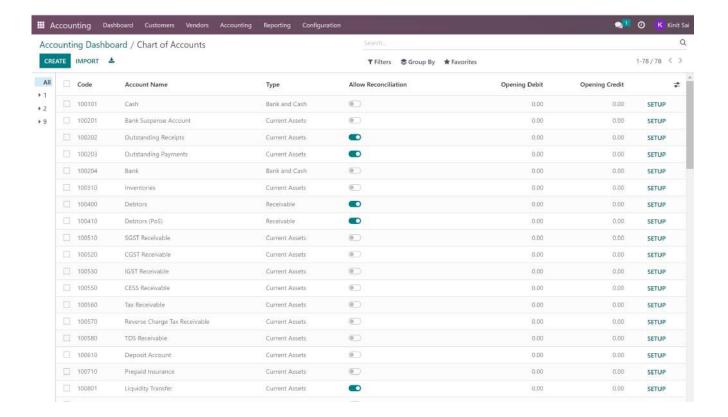
Task dashboard



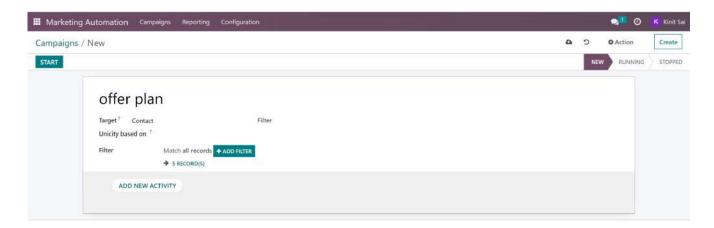
Accounting -



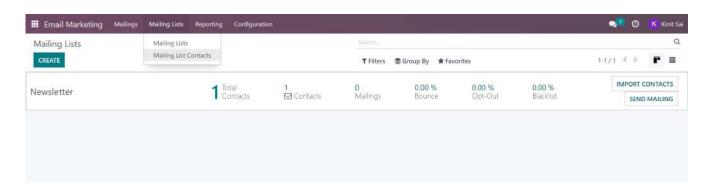




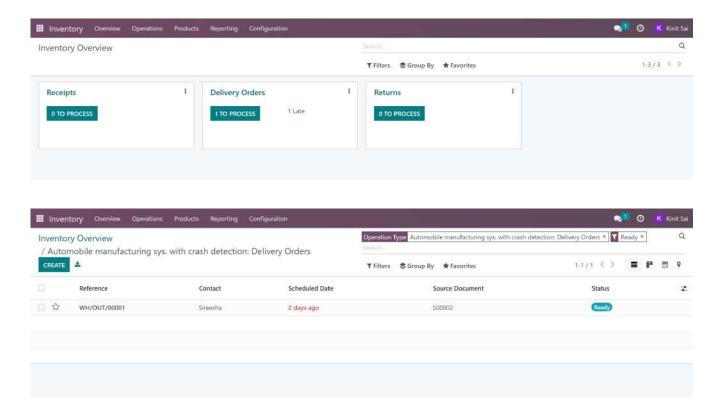
Marketing



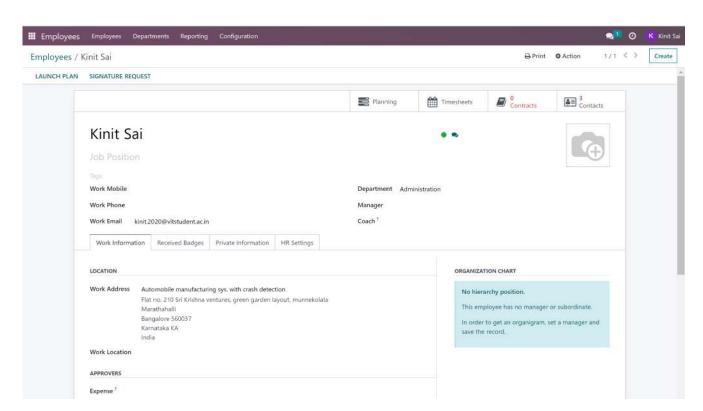
E-mail marketing

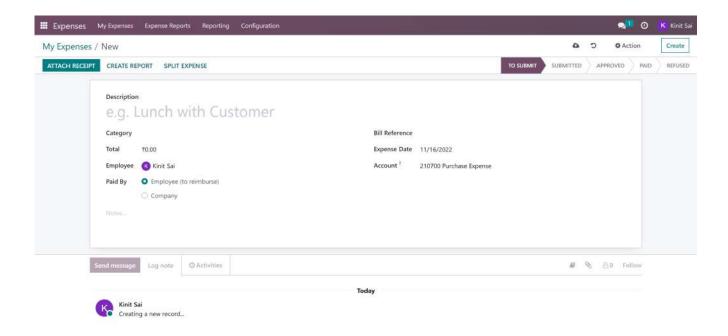


Inventory

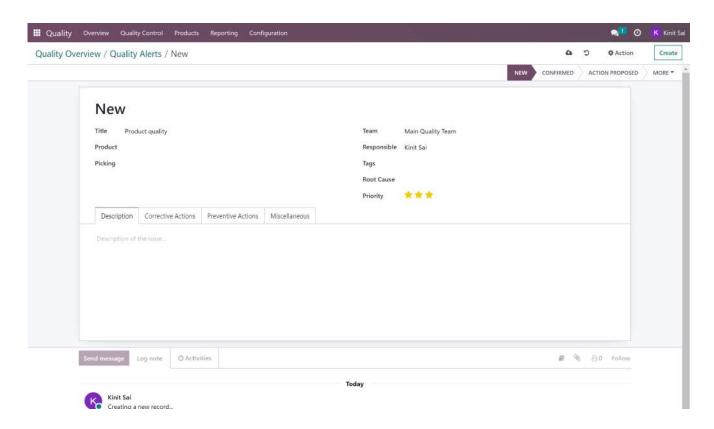


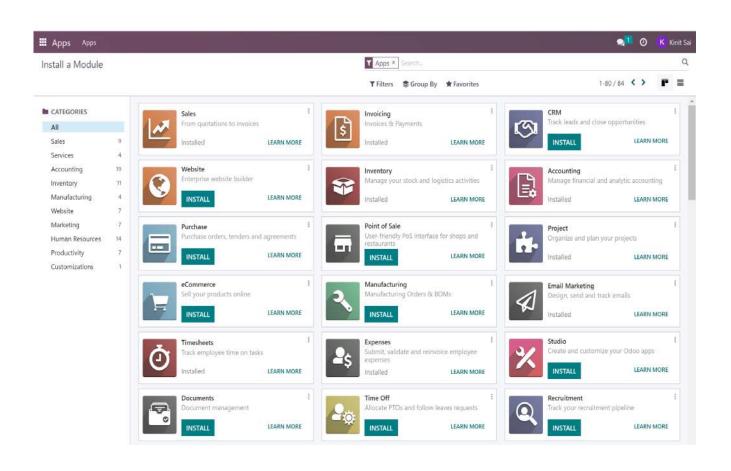
Employee information

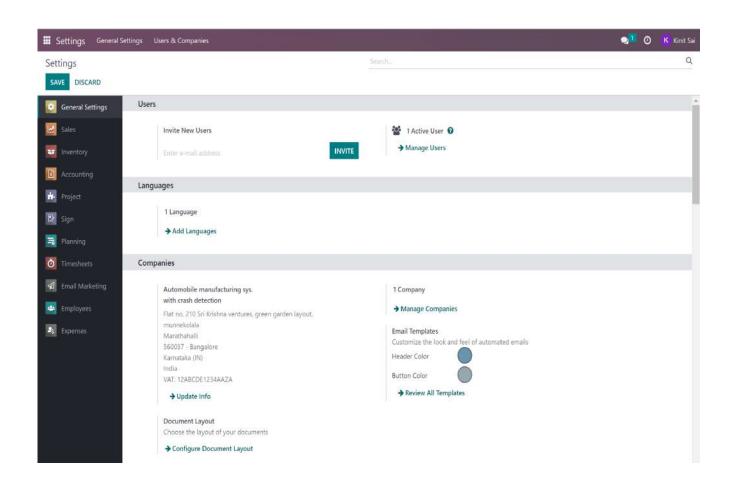


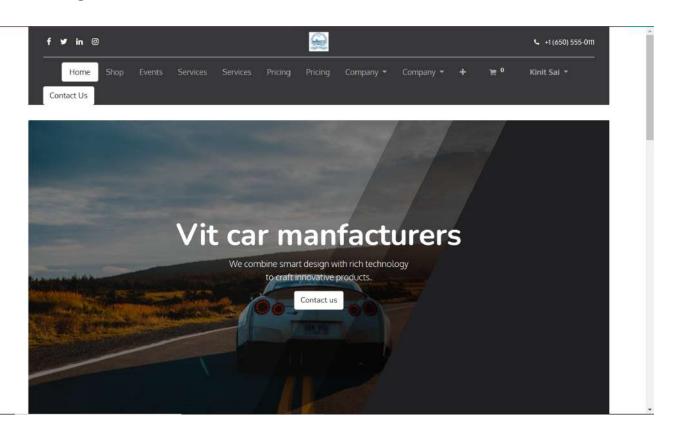


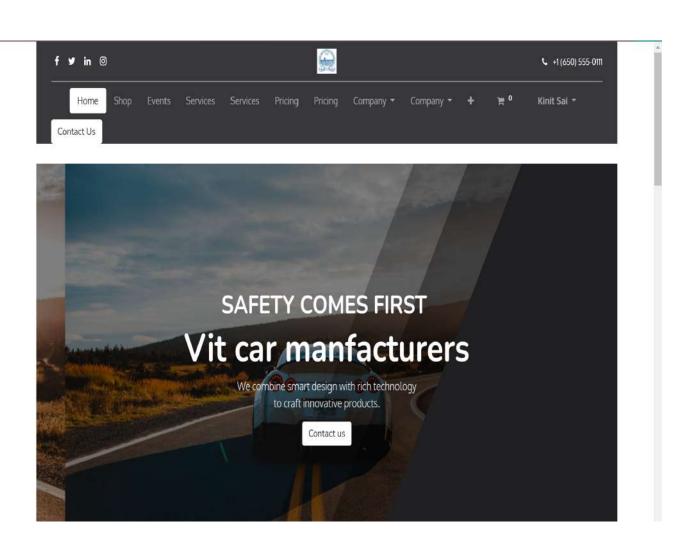
Quality maintenance

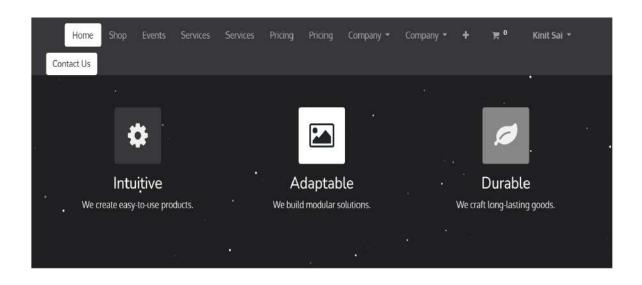






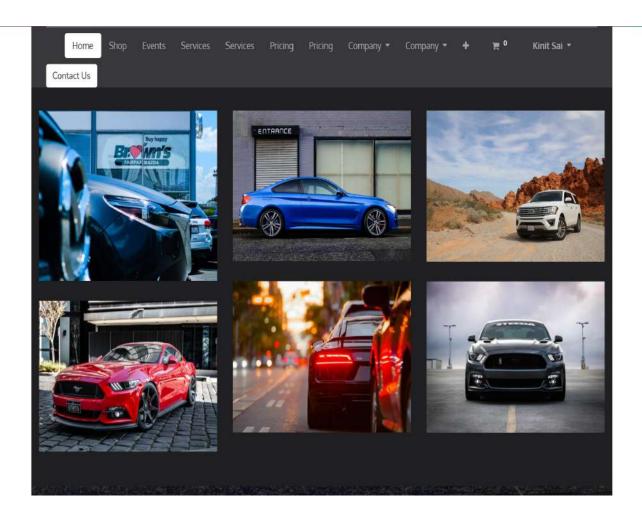




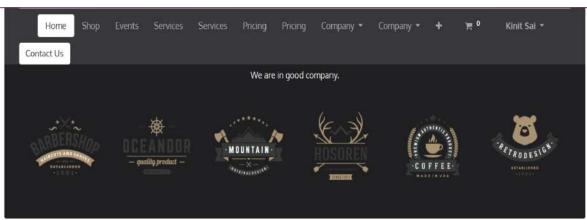


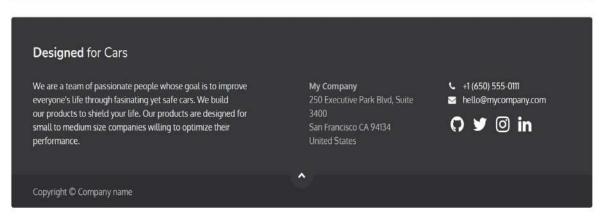
Our cars are the first ever four-door, four-seater car in history, but models with two rear seats have played a significant role in the company's strategy since the very beginning. Now, in the culmination of 75 years of leading-edge research, It has created a unique car and the encapsulation of the Prancing Horse's DNA, where performance, driving pleasure and comfort coexist in perfect harmony.

Great stories are for everyone even when only written for just one person. If you try to write with a wide, general audience in mind, your story will sound fake and lack emotion. No one will be interested. Write for one person. If it's genuine for the one, it's genuine for the rest.

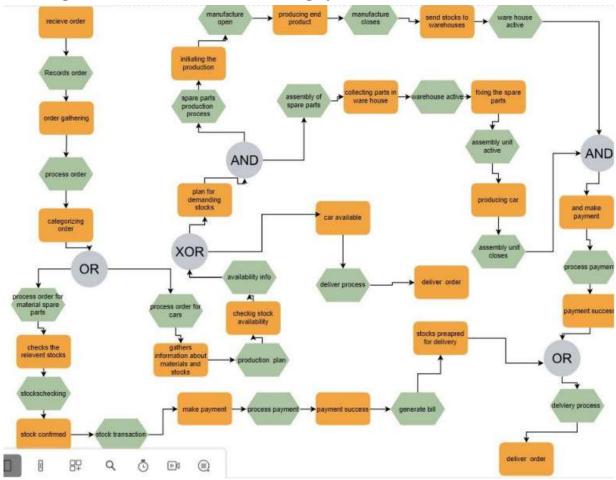








EPC Diagram for Automotive Manufacturing System:



Pros of Odoo

Multiple Modules Integration

Odoo has more than 35 modules, which are the fundamental parts of a company. The list of Odoo modules that benefit the business in various ways is provided below. Odoo ERP integrates all the modules, including Accounting, Human Resources, Inventory, Manufacturing, and Logistics, so that users can easily track products from their manufacture until delivery.

Customer Support

Good and bad customer support merely differ in how approachable they are. Odoo provides customer support through a variety of accessible and simple channels. Typically, there are only a few resources accessible for software, but for Odoo, there are many resources and discussion threads online, making it an excellent place for beginners to start.

Customizable Architecture

Without extensive rewriting of codes or modifications to its fundamental structure, Odoo offers end-to-end user customization. There is hardly any room for user customization in other ERP systems. However, users can easily alter the architecture of Odoo with the aid of its sophisticated apps and themes without exerting additional effort.

Comprehensive in Nature

Odoo has a broad range of functionality that assists businesses in meeting their business needs. Odoo is available in two editions: Enterprise and Community Edition. Enterprise is a paid version, while Community is free. If you want to purchase Odoo, you can start with the free version and then upgrade to the paid Enterprise version.

Cons of Odoo

Odoo's obvious drawback is the lengthy installation and setup procedure. Additionally, this implies that the learning curve will be rather steep at first. It's imperative that you get the installation process correct the first time even though it might not seem crucial in the broader scheme of things. We frequently talk to businesses who have lost valuable time and resources as a result of a sluggish and problematic installation phase.

Our consultants were also made aware of the following drawbacks of the solution when interacting with current Odoo clients:

Lack of support

Even though Odoo provides a variety of customer service choices, some users are not totally satisfied with the selection. A few customers complain that the Odoo team frequently takes a long time to repair bugs, and some customers also complain that the cost of the training sessions is too high.

Arduous to sustain

The Community edition of Odoo, which is the free option, can be challenging to manage, and it requires a significant amount of IT expertise to function to its full potential, according to some of our existing clients. You might need to contact an Odoo partner to acquire the assistance you require if you lack the required internal IT expertise.

Complex pricing Plans

The intricacy of the pricing schemes is a typical grievance. You will be charged \$30 per month per user in addition if you require more than one additional application.

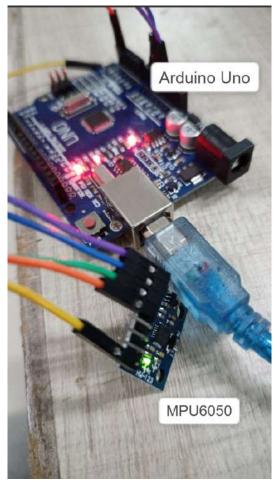
the chosen application's price. Given the wide variations in application costs, this is progressively more difficult.

Odoo includes a feature on their website that may estimate your monthly fees in order to help you avoid this computation fatigue. But take caution: if you need a lot of applications, you can end up paying the same price as many of the high-end enterprise options available.

Real-Time Implementation of the Extra Feature of the Accident Detection System:

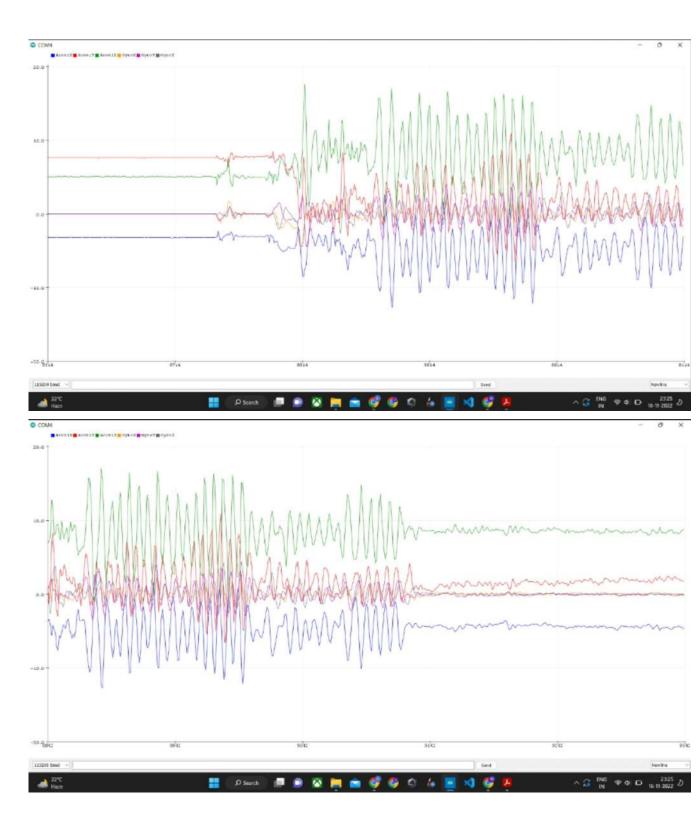
Drive link of implementation video:

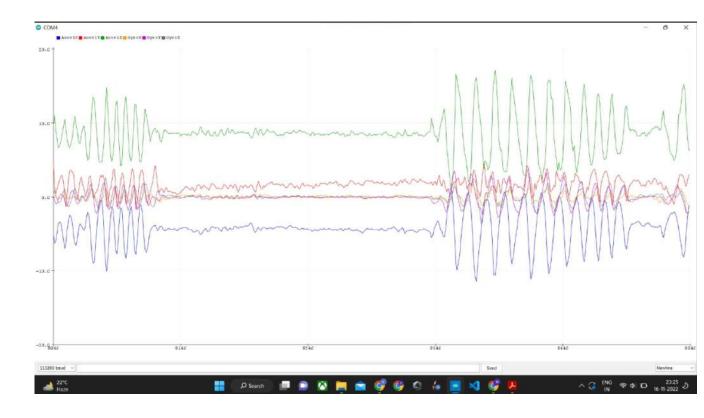
 $\frac{https://drive.google.com/file/d/1w-iKC5bpw9lkGml4md6ZP117Duz0iW27/view?usp=shar}{e_link}$



An MPU 6050 is able to identify the tilting of the car. When tilting reaches a certain level, an Arduino Uno signal is sent to the GSM module. The pre-registered numbers will receive a message from the GSM module stating that an accident has occurred.

Results Obtained:





References (include at least 10 references from Reputed journals, conference proceedings, websites of professional societies and industry associations):

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