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Iot For Beginners

EMBEDDED DEVELOPMENT IN AUTOMOTIVES

Emerging Trends in IT

Digital Marketing Trend In 2023

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ABOUT US

In 2008, we started our journey by launching the company's first office in Kochi with an operation team executing industrial automation projects and within one year we opened our first training centre in Kozhikode. By providing the finest service, in a short span we got students from various parts of India and Africa too. As a next step, we expanded our training centres to diverse locations in India, Nigeria, Qatar, UAE, Kenya, and the KSA and now in 2022, we have altogether 18+ branches. IPCS Global, one of the most renowned Core Technical Instruction Providers in the World, has been offering training on numerous programmes that are focused on the future.

The programmes that we choose for training segments are influenced by a variety of factors, including the stream's potential growth, the employability of our trainees, the accessibility of various employment markets, and many other aspects. Our current stream list includes Industrial Automation, Building Management and CCTV Systems, Embedded and Robotics, Internet of Things, Digital Marketing and IT and Software Development. 100% live and interactive classes, global certifications and placements are our major highlights.

Our next step is to expand IPCS to every single continent and to build a career oriented generation that stands with the future. We IPCS always focus on the upcoming trends and updates on every stream to make our students best and hold professional ethics and moral values tightly and never turns our clients un-satisfied. We firmly believe in the virtue of team spirit. All throughout, a culture of professionalism and mutual respect is upheld. Technology is the engine of business success and innovation. We believe that in the current digital world, it is important to understand how they affect our lives. As a part of our Corporate Social Responsibility, Team IPCS gave birth to "Iziar", a magazine that reflects technology trends and current trends in the market related to the same. The main goal is to raise awareness of available technologies and make them accessible wherever you are. It's about technology, inventions, startups, cyberpunk life & much more. Iziar was developed to give you insight into the latest innovations and keep you on top of the latest trends.

Technology is like air, You can't live without it. So we welcome you to the technological world of Iziar.

DJANGO

OBJECT RELATIONAL MAPPER

Gopika Raji S
Python Trainer

DJANGO is a framework (high-level python framework), which is used to create applications on the web server i.e., on the backend side, which is used to manipulate the data that are stored in the webserver. It is free and open source with a great documentation for creating the application over the web server.

The main features of Django are scalability, simplicity, reliability, flexibility, versatile, secure, maintainable and portable. The code was evolved into a web development framework in July 2005. The first release of Django was in September 2008.

Django is the top 3 python web- frameworks, which allows us to create any type of framework and so it is said to be a versatile framework.

SOFTWARE DESIGN PATTERN

Django uses the software design pattern, and is a collection of components called MVT.

Control flow in MVT Architecture

1. M- Model : DATABASE
2. V- View : TO CARRY OUT DATA AND RENDERS A TEMPLATE
3. T- Template: PRESENTATION LAYER

WHAT IS MVC ?

MVC is a software design pattern that is used to implement the data representation according to the user interface.

MODEL:

The main function of the model is to interact with the database, which consists of all the information that can be shared with the end user.

VIEW:

It is used to display the data to the user, which can be represented in various data formats.

CONTROLLER:

It acts like a bridge between the view and the template, which will manipulate the Model and render the view according to the user request and responses.

WHAT IS MVT?

MVT is also a software design pattern similar to MVC. The main difference is that the controller part is taken care of by the framework itself.

MODEL:

Model is used to define the main structure of the data in django. -The entire application is maintained by the model, in which some of these functions can be done, like adding, updating, reading and deleting the data in the database. We can use the **ORM api**, which is nothing but the object relational mapping in which these operations can be done.

VIEW :

It is used to render the HTTP Request and Response in the server side.
To get the request from the server, a Model is used and to give the correct response to the user Templates are used.

TEMPLATE:

which is used to define the layout of the user interface, in the text file format. For example, the text file can be HTML, XML, etc.

WHAT IS ORM ?

ORM is the abbreviation of Object Relational Mapper. The main advantage is that we do not need to write the SQL code. The main function of the ORM is to transfer data, which acts as a bridge between the database and the model. So, ORM maps the objects in the fields of the table.

DJANGO allows us to make changes in the database using these steps, they are adding new data, to modify it and we are able to delete the data and also query the objects as required.
The main advantage of ORM is that it provides an object-oriented layer between the relational databases and OOPS languages without writing the SQL query comments.

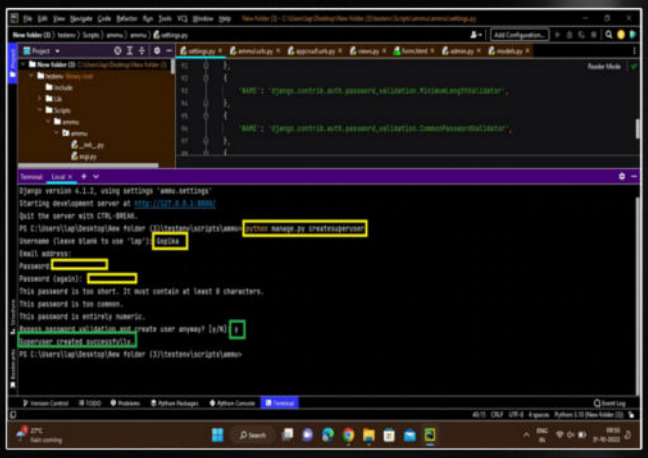
In default DJANGO provides an admin interface, which is used to create, read, update and delete on the database so that we are able to modify the database without the SQL commands.
Let us now learn how to create a login to the admin page and not only can the admin access the admin interface, but we can also allow users to access the interface by creating login using the create a new superuser command.

-python manage.py createsuperuser

You will be prompted to enter a username, email address (optional), and password for the new superuser. Follow the prompts and enter the required information.

Once you have entered the required information, Django will create a new superuser and you should see a success message like the following:

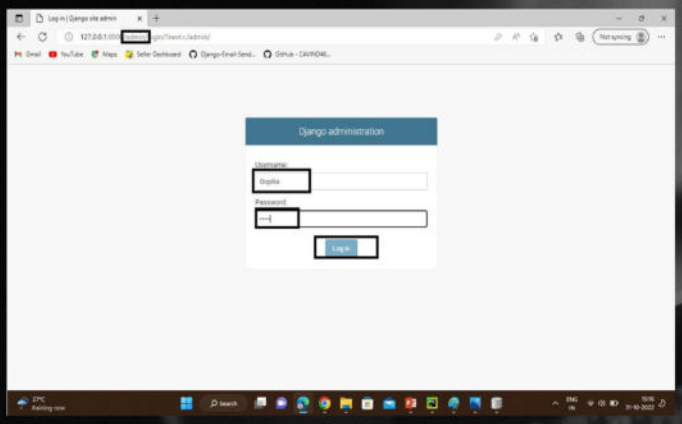
-Superuser created successfully



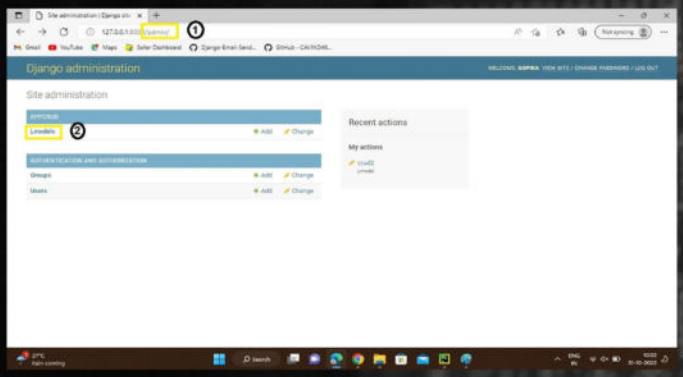
Try to login through the admin panel....
On the url's area you can able to see the url **http://127.0.0.1:8000/**, next to the url type admin,

http://127.0.0.1:8000/admin

Then you are able to view the admin login page, now we can login through the user's name and password that we have created using the **Create superuser** command.



After entering into the admin interface we are able to view the DJANGO administration page.



Now we are able to see the admin page authentications and authorization, and also, we are able to see the app creation. For creation of the application, we need to create models, views and respective templates to render them on the Django administration panel.
After rendering models into the panel, we are able to add data through the ORM, that is we are able to create data, edit that data, retrieve the data and delete the data if required.

HOW TO CREATE PROJECT DIRECTORY AND APPLICATION

- Goto start>type "cmd", then click enter button, command prompt will be opened

- Mkdir pythonProject

- cd pythonProject

To create virtual environment to isolate our package dependencies locally:

-C:\Users\MICRO\PycharmProjects\pythonProject>**py -3 -m venv venv**
-C:\Users\MICRO\PycharmProjects\pythonProject>**cd venv\scripts**
-C:\Users\MICRO\PycharmProjects\pythonProject\venv\Scripts>**activate**
-(venv) C:\Users\MICRO\PycharmProjects\pythonProject\venv\Scripts>
-(venv) C:\Users\MICRO\PycharmProjects\pythonProject\venv\Scripts>**pip install Django**

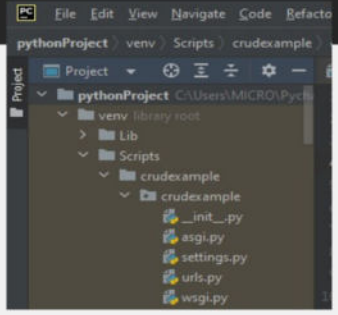
Set up new project with a single application

1) Project creation:

-(venv) C:\Users\MICRO\PycharmProjects\pythonProject\venv\Scripts> **django-admin startproject crudexample**

(venv) C:\Users\MICRO\PycharmProjects\pythonProject\venv\Scripts>**cd crudexample**

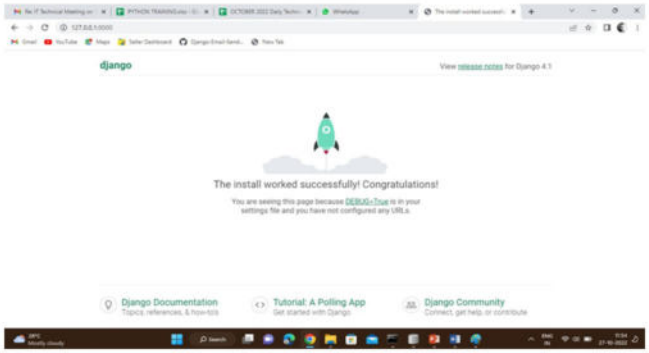
Now open pycharm and search the file we created and open it, you can able to see this creation on the left side of the ide.



crudexample /
__init__.py
settings.py
urls.py
wsgi.py

- __init__.py – Just for python, treat this folder as a package.
- settings.py – As the name indicates, your project settings.
- urls.py – All links of your project and the function to call. A kind of ToC of your project.
- wsgi.py – If you need to deploy your project over WSGI.

-Now type on terminal **"python manage.py runserver"**, a link will be generated **http://127.0.0.1:8000/**, click on to the link and you will be able to see this page.

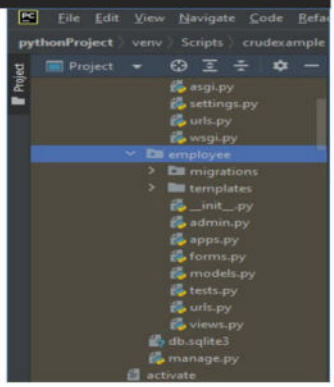


2) App creation:

(venv) C:\Users\MICRO\PycharmProjects\pythonProject\venv\Scripts\crudexample> **django-admin startapp employee**

Now open pycharm and search the file we created and open it, you can able to see this creation on the left side of the ide.

- __init__.py – Just to make sure python handles this folder as a package.
- admin.py – This file helps you make the app modifiable in the admin interface.



- models.py – This is where all the application models are stored.
- tests.py – This is where your unit tests are.
- views.py – This is where your application views are.

3) Database Setup:

3.1 SETTINGS.PY:

Create a database djangodb in MySQL, and configure it into the settings.py file of django project. See the example.
In Django, the settings.py file is a Python module that contains various configuration settings for your Django project. The purpose of settings.py is to provide a centralised location for managing project settings, such as database connection details, installed apps, static files, middleware, authentication settings, email settings, and much more.
When a Django project is created, settings.py is automatically created and included in the project's directory structure. The file is divided into several sections, each containing settings that are relevant to a particular aspect of the project. For example, the DATABASES section contains settings related to the database connection, and the INSTALLED_APPS section lists all the applications that are installed in the project.

You can customise the settings in settings.py to suit your specific project requirements. Some settings are required for Django to function properly, while others are optional and can be added or modified as needed. It is important to keep in mind that settings.py is a sensitive file that contains important configuration information, so you should only modify it if you know what you are doing.

The purpose of settings.py in Django is to provide a central location for managing the various configuration settings of your project, making it easier to customise and maintain your Django application.

```
# crudexample/settings.py
Include the app in the
        INSTALLED_APPS = {
        'employee',
        }
```

3.2 VIEWS.PY:

In Django, views.py is a Python module that contains the logic of your web application. The main purpose of views.py is to handle HTTP requests and return HTTP responses, which are used to render templates, redirect to other URLs, or return data in JSON or other formats.

When a user makes a request to your Django web application, Django's URL routing mechanism matches the requested URL to a specific view function defined in views.py. The view function processes the request and returns an HTTP response, which is then rendered in the user's browser.

views.py can contain multiple view functions, each handling a specific type of HTTP request. For example, a GET request for the homepage might be handled by a home() view function, while a POST request to a form might be handled by a submit_form() view function. The view function can interact with the database, call other functions or APIs, or perform any other necessary processing to generate the appropriate response.

views.py can also be used to define class-based views, which are reusable components that provide more functionality than a simple view function. Class-based views can be used to handle CRUD (Create, Read, Update, Delete) operations, pagination, authentication, and other common web application tasks.

Views.py is a key component of a Django web application, responsible for handling incoming HTTP requests, processing data, and returning HTTP responses. By defining view functions and/or class-based views in views.py, you can create a dynamic and interactive web application that responds to user input and interacts with databases and other external services.

```
# employee/views.py
    from django.shortcuts import render
    from django.http import HttpResponse
    def hello(request):
        text = """<h1>Welcome to my app !</h1>"""
      return HttpResponse(text)
    Return render(request,"index.html")
```

3.3 URLS.PY:

In Django, urls.py is a Python module that contains the URL configuration of your web application. The main purpose of urls.py is to define the mapping between URLs and the view functions that handle those URLs.

When a user requests a URL in a Django web application, the URL routing mechanism matches the requested URL to a view function based on the patterns defined in urls.py. The view function is then responsible for processing the request and returning an HTTP response.

The urls.py file typically consists of a list of URL patterns, which are defined using regular expressions. Each URL pattern is associated with a view function, which is invoked when the URL pattern is matched. You can also pass additional parameters to view functions using the URL pattern, such as the ID of a database record to retrieve.
urls.py can also be used to include other URL patterns from other apps in your project, as well as to define URL namespaces and provide URL routing for class-based views.

urls.py is a key component of a Django web application, responsible for defining the mapping between URLs and the view functions that handle them. By defining URL patterns in urls.py, you can create a dynamic and flexible web application that responds to user input and interacts with databases and other external services.

```
# Select crudexample\urls.py
    from django.contrib import admin
    from django.urls import path, include
    urlpatterns = [
      path('admin/', admin.site.urls),
          path('', include('employee.urls')),
    ]
```

Now to create our app url, create a url file in the app folder that is employee folder:

Right click on **employee folder>New>Pythonfile > name as "urls"**

Click on **the urls in employee folder,**

```
from django.urls import path

from .views import *

urlpatterns=[

path(" ,hello,name='employee_hello'),

]
```

Now to run it on the server side, open terminal, and then type the command:

- python manage.py runserver

- you are able to see that a link server has been created **http://127.0.0.1:8000/**, just click on the server link and a page opens on the web page.

```
PS C:\Users\MICRO\PycharmProjects\pythonProject\venv\scripts\crudexample> python manage.py runserver
Watching for file changes with StatReloader
Performing system checks...

System check identified no issues (0 silenced).
March 02, 2023 - 15:40:10
Django version 4.1.5, using settings 'crudexample.settings'
Starting development server at http://127.0.0.1:8000/
Quit the server with CTRL-BREAK.
```

CONCLUSION

According to DJANGO, it is mainly used for large-scale applications and so it was a best choice among the developers. We can build an application in a few days using Django, there is no better framework than Django. Django is also called "Batteries included Framework".

We have seen how to create a superuser, to access the admin interface using the admin login panel. After creation of the login pages, next we will try to create models and we will be able to use the ORM for creating, retrieving, updating and deleting the data in the databases.

EMBEDDED DEVELOPMENT IN AUTOMOTIVES

Jayaprakash.V
Embedded Trainer

Embedded development in automotive refers to the design, development, and implementation of embedded systems and software in vehicles. An embedded system is a computer system that is integrated into a device or machine, and is responsible for controlling its various functions. In the automotive industry, embedded systems are used for a wide range of applications, including engine control, advanced driver assistance systems (ADAS), infotainment systems, telematics, and autonomous vehicles. Embedded development in automotive requires expertise in various technologies, including hardware design, software development, sensor technology, and data analytics. As the automotive industry continues to evolve, embedded development will play an increasingly important role in shaping the future of transportation.

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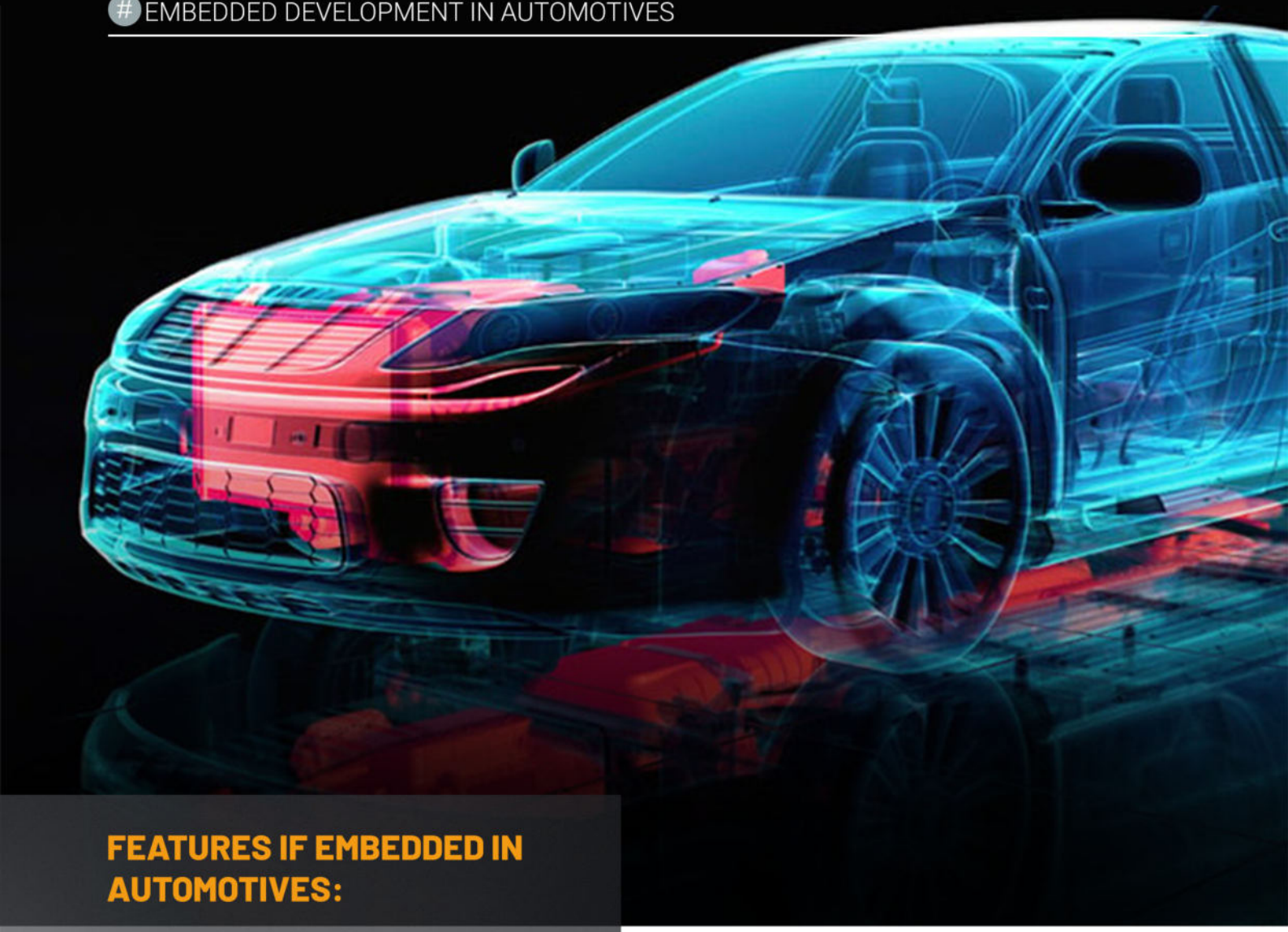


FEATURES IF EMBEDDED IN AUTOMOTIVES:

- Embedded system is a combination of computer hardware and software designed for a specific function.
- The system can be programmable or have several functionalities in industrial machines, agricultural, medical equipment, cameras, toys, automobiles, marines, airplanes, and electronic innovation has made extraordinary steps.
- Modern cars commonly consist of many computers (Microprocessors or Microcontrollers), designed to perform different function tasks within the vehicle. The functionality of embedded systems in consumer vehicles: cruise control, backup sensors, suspension control, navigation systems and airbag systems, user-facing functions and entertainment.

Why is the automotive embedded system in great demand ?

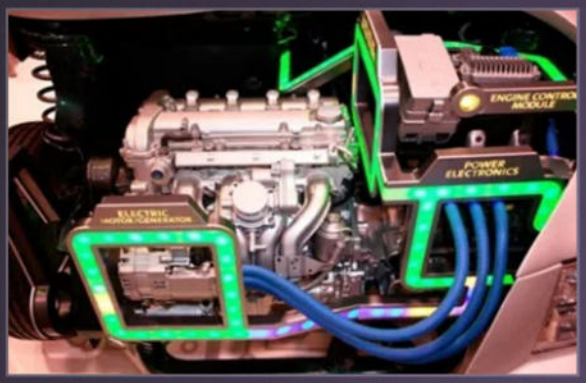
Every year the sales and production of vehicles are increasing globally due to the growing demand of consumers. Every vehicle manufactured is equipped with an embedded system, and this will drive the Global Automotive Embedded System Market.

As the demand for the safety and security of drivers and passengers along the roadside is increasing, the demand for connected car devices is also soaring globally. The connected car devices are helpful in analysing accidents and breakdown data to provide valuable inputs both to car makers and designers.

APPLICATIONS OF EMBEDDED SYSTEMS IN AUTOMOTIVES:

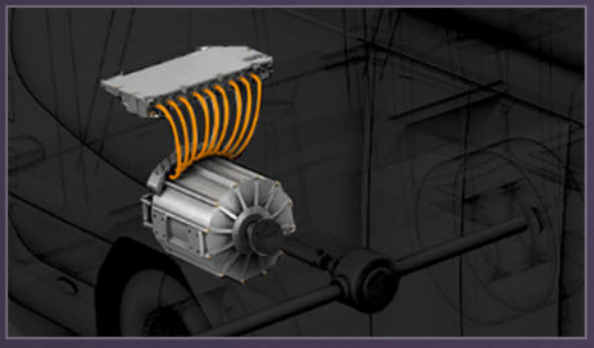
Embedded development in the automotive industry is an increasingly important field, with a wide range of applications. Some of the key applications of embedded development in automotive include:

1. Engine Control Units (ECUs):



An ECU is an embedded system that controls various functions of the engine. It receives input from various sensors and processes the data to determine the optimal fuel injection, ignition timing, and other parameters. This helps to optimize the performance of the engine, reduce emissions, and improve fuel efficiency.

2. Advanced Driver Assistance Systems (ADAS):



ADAS is a set of safety systems designed to assist the driver in various driving situations. These systems include adaptive cruise control, lane departure warning, blind-spot detection, and collision avoidance systems. ADAS systems use a combination of sensors, cameras, and radar to detect potential hazards and alert the driver or take action to avoid a collision

3. Infotainment Systems:

Infotainment systems provide various entertainment and information options to the driver and passengers. These systems include navigation, music and video playback, Bluetooth connectivity, and smartphone integration. Infotainment systems use various embedded technologies to provide a seamless user experience and enhance the overall driving experience.

4. Telematics:

Telematics is a technology that enables communication between the vehicle and remote systems. It can be used to provide real-time information on vehicle performance, location, and other data. Telematics can also be used to provide remote diagnostics, maintenance alerts, and other services to the driver and vehicle owner.

5. Autonomous Vehicles:

Autonomous vehicles are self-driving vehicles that use various embedded technologies to navigate and operate without human intervention. These technologies include sensors, cameras, and advanced algorithms that allow the vehicle to detect and respond to its environment. Autonomous vehicles have the potential to revolutionize the automotive industry by reducing accidents, improving traffic flow, and increasing efficiency.

In summary, embedded development in automotive has a wide range of applications, including engine control, advanced driver assistance systems, infotainment systems, telematics, and autonomous vehicles. Each of these applications has the potential to improve the performance, safety, and overall driving experience for the driver and passengers.

In EV's the major role is done by Embedded system, right from the Body control modules, battery management systems and Infotainment systems(Android-based-In-Vehicle).

IOT
FOR BEGINNERS

Akhil Raj
Project Engineer BMS

This is a guide that provides an introduction to the world of the Internet of Things. In IoT, we create an interconnected digitally enabled environment, which we can control through a user interface.

It mainly consists of four parts:

- Sensors/Devices, Connectivity, Data Processing, and User Interface. Sensors/Devices are used to gather data from the environment. Temperature sensors, humidity sensors, LDR sensors, and other types of sensors can be used.
- Connectivity is achieved by connecting all these components to a network and storing them in cloud-enabled storage. Wi-Fi-enabled microcontroller boards are commonly used for this purpose.
- Data Processing involves processing the data in cloud storage. Thingspeak is an excellent example of this process, where we can store and visualize sensor data efficiently.
- As a User Interface, we can use touch input displays, OLED panels, and switches.

PROGRAMMING LANGUAGES FOR IOT

Several programming languages can be used in IOT, including Arduino and Micro Python.

ARDUINO

Arduino is a popular open-source electronics platform used for building and programming digital devices.

It utilizes a basic version of C and C++ programming languages that are combined with an easy-to-understand syntax.

Arduino programming language is versatile and can be used on different types of microcontrollers, such as Arduino Microcontroller, ESP Microcontroller series, and others. Arduino offers a wide range of development boards that support various applications, ranging from simple blinking LED projects to complex projects involving robotics, home automation, and other applications.

In summary, Arduino is an open-source electronics platform with a simple programming language that enables beginners to create digital devices with ease. Its ease of use and versatility make it a popular choice among developers, hobbyists, and students for various applications.

WOKWI

Wokwi is a free platform for learning IoT programming that provides a simulation environment for electronic circuits. It allows users to test their designs in a virtual environment before building the actual hardware.

One of the unique features of Wokwi is its inbuilt simulation of the NodeMCU series, which is not available in other simulation platforms like TinkerCad. NodeMCU is an open-source firmware and development board that is based on the ESP8266 microcontroller. With the NodeMCU simulation, users can design and test their IoT projects without the need for physical hardware, saving time and resources.

Another notable feature of Wokwi is its support for many Python variants. Python is a popular programming language used for IoT projects, and Wokwi provides a simple and effective way to develop Python-based IoT applications. Users can write their Python code on Wokwi and test it in the virtual environment, ensuring that it works correctly before deploying it on actual hardware.

Wokwi also provides users with a range of tools to simplify the development process, such as built-in libraries and examples, allowing users to learn and experiment with
various components and circuits. Wokwi also features a community-driven approach, where users can share their projects, collaborate, and learn from others.

In conclusion, Wokwi is a free platform that offers an efficient way to learn and develop IoT applications. Its inbuilt simulation of the NodeMCU series, support for many Python variants, and other development tools make it an ideal platform for beginners and advanced users alike. With its community-driven approach, Wokwi provides a great opportunity for learning and experimentation in the field of IoT.

There are many platforms available for IoT development, but two of the main easy-to-use platforms for IoT channels are ThingSpeak and Blynk.

THINGSPEAK

ThingSpeak is a cloud-based platform that provides a simple way to store, analyze, and visualize data from IoT devices.

It is a general-purpose platform that can be used for a variety of IoT applications, such as environmental monitoring, industrial automation, and smart homes. ThingSpeak offers a range of features, including real-time data visualization, data analysis tools, and customizable alerts. It also supports a wide range of hardware platforms, including popular microcontroller boards like Arduino and Raspberry Pi.

BLYNK

Blynk is a mobile app-based platform that allows users to control and monitor their IoT devices from their smartphones.

Blynk provides a simple and intuitive interface that enables users to design their own custom dashboards and control panels. It also offers a range of pre-built widgets, such as buttons, sliders, and graphs, that can be used to build a custom user interface for IoT applications. Blynk is particularly suited to IoT applications that require remote monitoring and control, such as home automation, smart agriculture, and industrial IoT.

Both ThingSpeak and Blynk offer a simple and user-friendly approach to IoT development. ThingSpeak is ideal for general-purpose applications that require data storage, visualization, and analysis, while Blynk is better suited for mobile-based IoT applications that require remote monitoring and control. Both platforms offer a range of features and tools that make it easy for developers to build and deploy IoT applications quickly and efficiently.

In conclusion, the world of IoT offers endless possibilities for creating interconnected digitally enabled environments. The four main components of IoT are Sensors/Devices, Connectivity, Data Processing, and User Interface. Arduino and Micro Python are popular programming languages used in IoT development, with Arduino offering a simple and versatile platform for beginners. Wokwi is a free platform that provides an efficient way to learn and develop IoT applications, with its inbuilt simulation of the NodeMCU series and support for many Python variants. ThingSpeak and Blynk are two popular platforms for IoT development, each offering unique features and tools that make it easy for developers to build and deploy IoT applications quickly and efficiently.

SAFETY DEVICES
- Need and Role

Anand D A
Territory Technical Head

There is nothing called fail safe or fail proof or 100% safe. Generally in industry when men and machines work together there is a lot of risk involved in it. Every system tends to fail,so in the event of fault, how the system is going to respond and reduce the risk for men and material is an essential part of good system designing. Risk management should be a top most priority for any industry, to both protect its employees and machinery , by reducing the possibility of accidents.

Let's say you are an automation system designer, what happens to the industry and machinery in an emergency situation and when some fault occurs in the system.

How to safeguard men and material in the factory, how to safely shut down the system, how to secure moving objects in a controlled manner, how to mitigate the risk and reduce the events of accidents, how to find the faults, how to restart the system after clearing the fault in a safe way. For all these questions,the answer is safety relay and safety PLC.

Safety relay or safety PLC is basically a device that implements safety functions in industry. In the event of a hazard or fault or emergency situation, a safety relay will work to reduce the risk to an acceptable level. When an error occurs, the safety relay will initiate a safe and reliable

Safety relays and safety PLC are always designed in such a way that, when wired correctly neither a fault on the device nor an external fault caused by a sensor or actuator may lead to the loss of the safety function, which in turn triggers the safety devices to initiate safe shutdown mechanism.

Ok in what way these safety devices are different from normal relays and normal plc, can't we perform the same function with the normal one ?.
Well actually if you see a normal relay uses a wire coil and the electromechanical movement of the metal contacts to turn on and off the load.These metal contacts may weld after repeated operations. In these conditions if the operator presses the Emergency stop (E-STOP) push button, the machine may not stop but runs continuously . A hazardous state would arise for the operator as a result of this contact weld problem. Therefore in many of the national, international safety standards use of simple relays and contactors on hazardous machines is strictly prohibited.

For example a Contactor life is approximately 10 lakhs operation, if the contactor has a duty cycle of 600 - 1000 cycles per day, 300 days per year = 180,000 - 300,000 cycles per year then the overall Service life is only 3 to 4 years, Thereafter a HAZARDOUS SITUATION! The risk is more in normal electromagnetic devices.

A good safety device should have following requirements for having a fail safe operation

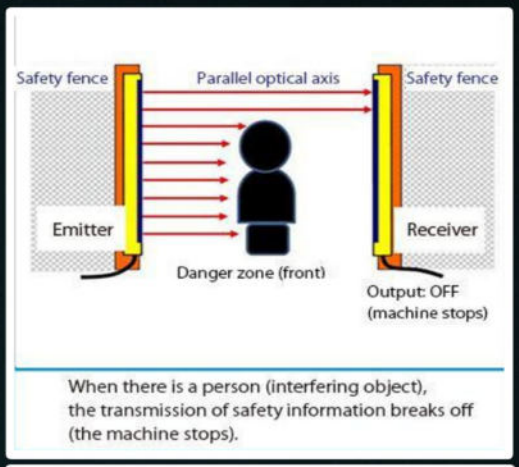
The safety device must have a redundant circuit with built-in self-monitoring.
Even in the case of a component failure, the safety device must be effective .
The proper opening and closing of the relay contacts on the safety device is tested automatically in each on-off cycle.
Generally, safety relays detect four kinds of faults: wire break, faulty contactor, faulty safety actuator & timing.

A safety relay will detect wire breaks as well as faulty actuators or contactors by transmitting out electrical pulses throughout the wiring. safety relays detect welded contact sets by measuring the current flow.
Safety relay or safety plc works in conjunction with many other safety devices such as E-STOP push buttons, Safety gates, Light curtains, Pressure-sensitive mats, Two-hand controls, Three position devices, Magnetic safety switches. Today, safety relays and safety plc are available for practically every industrial requirement.

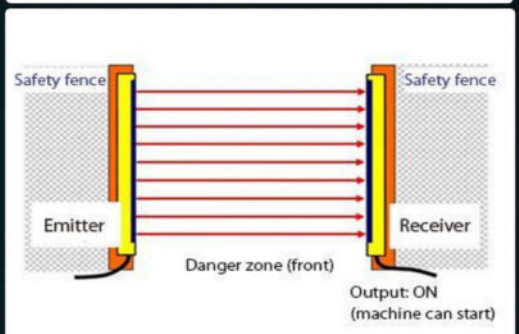
Safety Relays are commonly used along with the following device to ensure a safe operating condition.

Emergency Stop Buttons:

Emergency Stop buttons (also known as E-stop) are used to stop a machine when the machine is breaking down or someone is in danger. Generally E-stop buttons should be red with a yellow housing. Some emergency stop buttons will also have an emergency grab wire, which allows interaction with the stop interface even when at a distance from the button itself. This wire should also be red for easy identification.

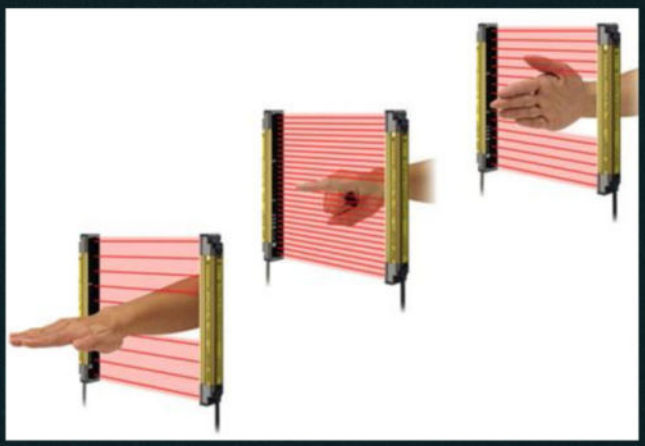


When there is a person (interfering object), the transmission of safety information breaks off (the machine stops).



When there is no one (no interfering object), safety information is transmitted by light energy (the machine can operate).

Emergency Stop Buttons:



Light Curtains will act as a kind of tripwire and are used to protect personnel in the vicinity of moving machinery which has potential to cause harm. Whenever IR rays generated by the device are broken, a stop signal is sent to the corresponding safety equipment. Light curtains will be connected to a safety relay, which will trigger the process of shutdown mechanism

Safety Mats:

Pressure-sensitive safety relays can be used in conjunction with safety mats to ensure the safety of personnel, and further supplement other safety devices. For example, a design engineer may arrange a set of light curtains to allow objects to pass through it when the safety mat is activated, this allows the operator to access the work piece from the machine. Safety mats are also usable as an independent safety measure. Similar to light curtains, safety mats can also be configured to initiate a stop command when activated.

Three-position Devices:

Safety devices such as a three-position device can be essential when troubleshooting an application, and there are a variety of devices in this category. Three-position devices generally use a pressure-sensitive joystick that is held in a particular position to operate, and whenever the user releases the of the joystick, it will return to the default stop position.

Two-hand Control Devices:

A two-hand control device is needed for operations that require a very high degree of safety consideration. Such devices are very important when you want to abstain the operator from being able to reach into the hazardous area.

Magnetic Switches:

A magnetic switch is used in applications where a door or hatch to be closed and should remain in closed condition. When contact between the two sensors is interrupted , then an emergency stop signal can be sent to safely stop the machine from operating. Magnetic switches are very small hence we can easily position them or hide them when used in gates or switches . Since no moving parts have a long operational life.

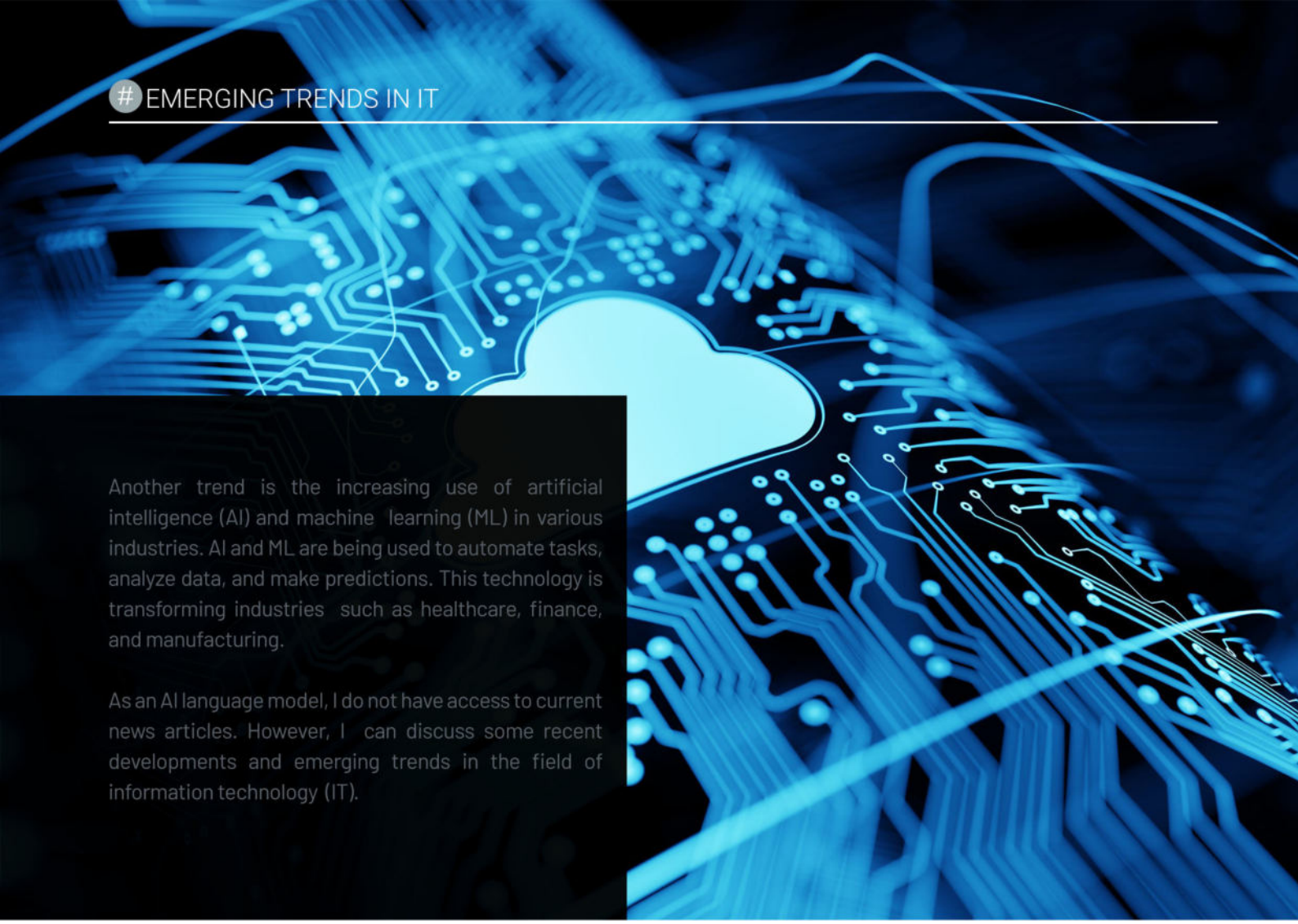
Thus, this is all about an overview of safety devices .These devices are the most frequently used components in safety systems to cater the needs of growing regulations & attempts to safeguard and protect both the operator & the machinery from hazards.

EMERGING TRENDS IN IT

Dhanya
IT Trainer

In recent years, information technology has experienced a significant growth and transformation, driven by several emerging technologies such as artificial intelligence, the Internet of Things (IoT), cloud computing, and blockchain. These technologies are changing the way businesses operate, and are creating new opportunities and challenges for IT professionals.

One trend that has been on the rise is the adoption of cloud computing. The cloud provides a scalable and flexible infrastructure that allows businesses to reduce costs, improve efficiency, and enable remote work. According to a report by Gartner, the global public cloud service market is projected to reach $397.4 billion by 2022.



Another trend is the increasing use of artificial intelligence (AI) and machine learning (ML) in various industries. AI and ML are being used to automate tasks, analyze data, and make predictions. This technology is transforming industries such as healthcare, finance, and manufacturing.

As an AI language model, I do not have access to current news articles. However, I can discuss some recent developments and emerging trends in the field of information technology (IT).

○ Artificial Intelligence (AI) :

AI continues to be a rapidly growing area of technology. From chatbots and virtual assistants to self-driving cars and medical diagnosis, AI is transforming many industries. Machine learning, deep learning, and natural language processing (NLP) are some of the key areas driving the growth of AI.

○ Cloud Computing:

Cloud computing has been around for a while, but its importance has grown even more during the COVID-19 pandemic. With more people working remotely, cloud computing has become an essential tool for businesses to store, access, and manage their data.

○ Internet of Things (IoT):

IoT is the network of physical devices, vehicles, home appliances, and other items embedded with sensors, software, and connectivity to enable data exchange. IoT has the potential to revolutionize industries such as healthcare, agriculture, and manufacturing.

○ Cybersecurity:

Cybersecurity threats continue to be a significant concern for businesses and individuals. With the increasing amount of data being generated and stored, the need for robust cybersecurity measures has never been greater.

The Internet of Things (IoT) is also gaining traction. IoT devices are being used in industries such as agriculture, logistics, and smart homes. According to a report by MarketsandMarkets, the global IoT market is expected to grow from $170.57 billion in 2017 to $561.04 billion by 2022.

Lastly, blockchain technology is another emerging technology that is gaining attention. Blockchain provides a secure and transparent way of storing and sharing data. It has applications in industries such as finance, healthcare, and logistics.

- **Blockchain:**

Blockchain is a distributed ledger technology that allows secure, transparent, and tamper-proof transactions without the need for a central authority. Blockchain has the potential to transform industries such as finance, supply chain management, and healthcare.

To analyze the peaks in information technology, we can look at graphs representing the growth of each of these technologies. For example, we can look at the growth of cloud computing services over the past few years, or the number of IoT devices that are being used globally. We can also analyze the number of AI and ML patents being filed or the amount of investment in blockchain startups. These graphs can help us identify the most promising areas in information technology and make predictions about future trends.

In summary, AI, cloud computing, IoT, cybersecurity, and blockchain are some of the key areas that are driving innovation in the field of information technology. These technologies are expected to continue to shape the future of IT and impact various industries in profound ways.

DIGITAL MARKETING TREND IN 2023

Vineeth Jayaram
Digital Marketing Analyst

Digital marketing trends and strategies are continually evolving, and before you even know it, a new digital marketing trend will be on its way. If time travel were possible, every marketer would fast-forward to the new year for clues on what's next in digital marketing. Since we still reside in the age of predictions, we have to settle for a forecast of what's to come and build a case for what digital marketing in 2023 would look like. Buckle up, because we're about to take a ride into the future and check out the top digital marketing trends for 2023.

Artificial Intelligence (AI) and Machine Learning (ML) will continue to play a significant role in digital marketing. This could include using AI for personalization, predicting consumer behavior, and automating tasks such as content creation and social media management. Yes, AI and ML are already playing a significant role in digital marketing, and this trend is likely to continue in 2023 and beyond.

AI and ML technologies can help businesses analyze large amounts of data and identify patterns and trends that would be difficult or impossible for humans to detect. This can be especially useful in areas like personalization, where businesses can use data on consumer behavior and preferences to create more targeted and relevant marketing messages.

AI and ML can also be used to automate tasks like content creation and social media management, freeing up marketers to focus on more strategic tasks. In addition, AI and ML can be used to optimize advertising campaigns, helping businesses target their ads more effectively and reduce waste. For example, AI algorithms can analyze user data to determine which ads are most likely to resonate with specific audiences, and adjust targeting and bidding strategies accordingly.

Overall, the use of AI and ML in digital marketing is likely to continue to grow as businesses look for ways to improve the efficiency and effectiveness of their marketing efforts. However, it's important for businesses to balance the benefits of automation and personalization with the need to maintain consumer trust and privacy.

AUGMENTED REALITY (AR) & VIRTUAL REALITY (VR)

Augmented Reality (AR) and Virtual Reality (VR) are two related technologies that are likely to become more prevalent in digital marketing in 2023 and beyond.
AR involves overlaying digital information and images onto the real world, often using a mobile device's camera or other sensors. This technology can be used to create interactive and immersive experiences for consumers, such as allowing them to "try on" clothes or makeup virtually before making a purchase.

VR, on the other hand, involves creating a fully immersive digital environment that users can interact with using specialized equipment such as a headset. This technology can be used to create virtual showrooms or product demonstrations, or to provide training and educational experiences.

Both AR and VR have the potential to revolutionize digital marketing by creating more engaging and memorable experiences for consumers. For example, a home decor company could use AR to allow customers to visualize how furniture would look in their homes, while a travel company could use VR to provide virtual tours of destinations before customers book a trip.

However, there are some challenges to using AR and VR in marketing, such as the cost and complexity of creating high-quality experiences, as well as the need for users to have the right hardware and software to access the experiences. Despite these challenges, AR and VR are likely to become more important in digital marketing as the technology becomes more widespread and accessible.

VOICE SEARCH

Voice search is a technology that allows users to perform searches or other tasks using their voice, often through a virtual assistant such as Amazon's Alexa, Google Assistant, or Apple's Siri. Voice search has become increasingly popular in recent years, and this trend is likely to continue in 2023 and beyond.

One reason for the growth of voice search is the increasing use of smart speakers and other voice-enabled devices in homes and workplaces. These devices allow users to perform tasks hands-free, which can be especially useful for tasks like setting reminders, playing music, or controlling smart home devices.

From a digital marketing perspective, voice search presents both challenges and opportunities. On the one hand, businesses may need to optimize their websites and content for voice search queries, which can differ significantly from traditional text-based queries. For example, users may use longer, more conversational queries when performing voice searches, and may be more likely to ask questions or make specific requests.

On the other hand, businesses that are able to optimize their content for voice search may be able to capture a larger share of voice search traffic and improve their visibility in search results. In addition, voice search can provide a way for businesses to engage with customers in new and innovative ways, such as creating branded skills or actions for virtual assistants. Overall, voice search is likely to become more important in digital marketing in 2023 and beyond, and businesses that are able to adapt to this trend may have a significant advantage over their competitors.

SOCIAL MEDIA PLATFORMS

Social media platforms are likely to continue playing a major role in digital marketing in 2023 and beyond. Social media usage has been steadily increasing over the past decade, and this trend is likely to continue as more people around the world gain access to the internet and mobile devices.

From a digital marketing perspective, social media provides a way for businesses to engage with customers in real-time, build brand awareness, and drive traffic to their websites or online stores. Social media platforms also provide a wealth of data on user behavior and preferences, which can be used to create more targeted and effective marketing campaigns. In 2023, we may see a continued proliferation of social media platforms catering to specific niches or demographics. For example, we may see the rise of more specialized platforms for specific industries or interest groups, or platforms that focus on privacy and security

Another trend in social media marketing is the growing importance of influencer marketing. Influencers are individuals with large followings on social media platforms who can promote products or services to their audiences. In 2023, we may see a continued shift towards more micro-influencers, who have smaller but more engaged followings, and a greater emphasis on authenticity and transparency in influencer marketing. Finally, social media platforms are likely to continue evolving in terms of the features and functionality they offer to businesses. For example, we may see more advanced targeting options, more opportunities for e-commerce integration, and more tools for analyzing and measuring the effectiveness of social media campaigns.

INFLUENCER MARKETING

Influencer marketing has become increasingly popular in recent years, and this trend is likely to continue in 2023 and beyond. Influencer marketing provides businesses with a way to reach a targeted and engaged audience, and can be especially effective for businesses that target younger demographics or niche markets.

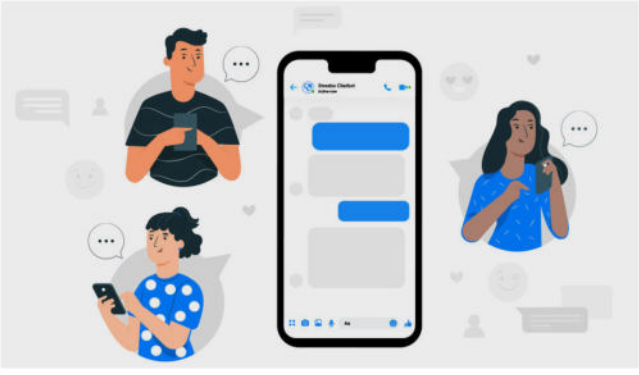
One trend we may see in influencer marketing in 2023 is a shift towards more micro-influencers, who have smaller but more engaged followings. Micro-influencers may be more effective at driving conversions and building brand loyalty, as their followers tend to be more passionate and invested in their content.

Another trend in influencer marketing is a growing emphasis on authenticity and transparency. Consumers are increasingly skeptical of sponsored content that appears overly promotional or inauthentic, and businesses that partner with influencers will need to be transparent about the nature of their partnerships and ensure that the content aligns with their brand values.

Finally, we may see more businesses partnering with influencers on platforms beyond social media, such as podcasts, live events, or streaming platforms. As the influencer marketing industry continues to evolve, businesses that are able to adapt to these trends and create authentic and engaging partnerships with influencers are likely to see the greatest success. Regenerate response

CHATBOTS IN MARKETING

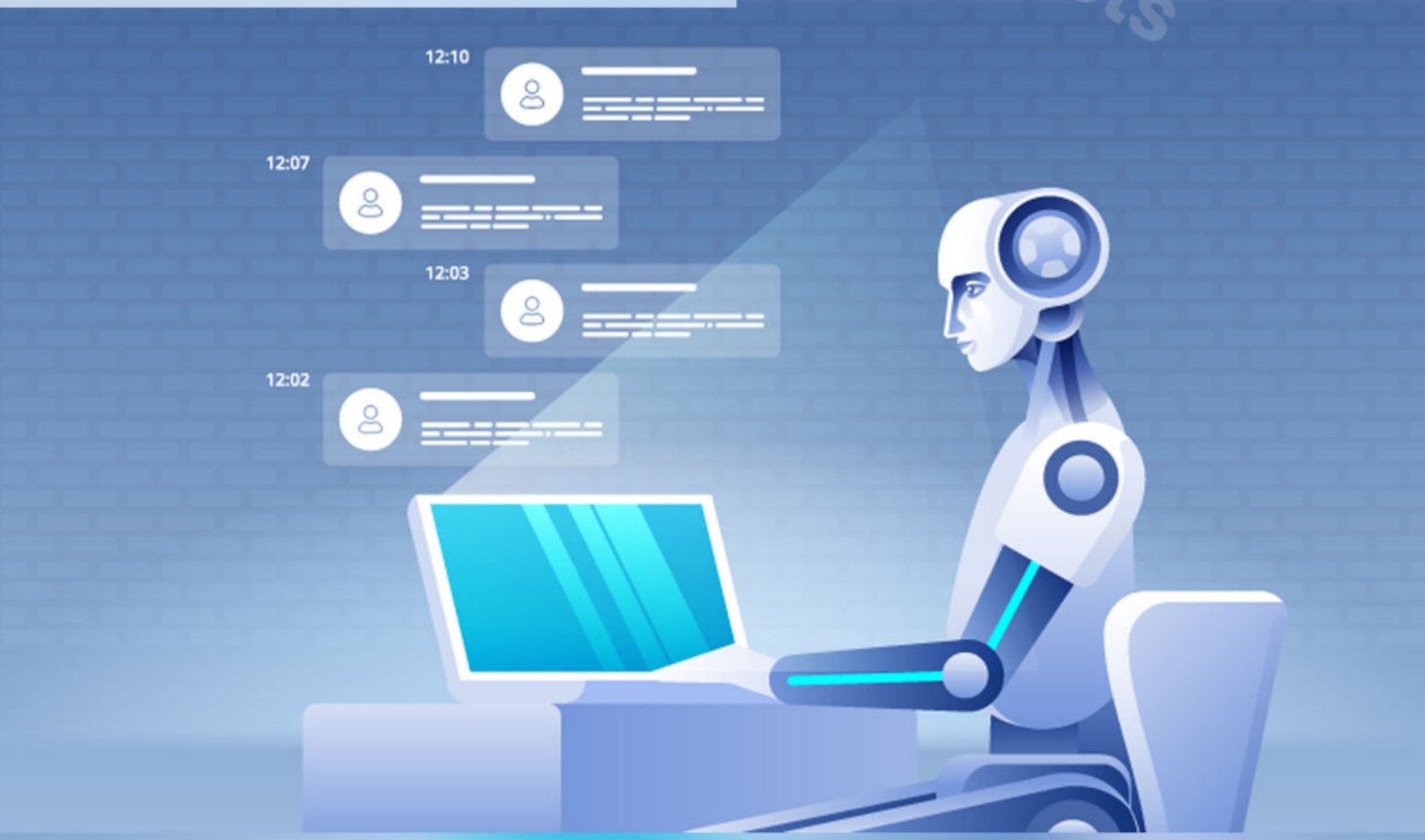
The next digital marketing trend is using chatbots to market and advertise. Businesses have been using chatbots for quite some time now, and marketing is capitalizing on the trend in a significant way.



Chatbots on Social Media

Chatbots are finding multiple applications in digital marketing—helping brands interact with customers better and offer them a superior experience. For instance, Uber now allows users to request an Uber ride through their Facebook Messenger app. By integrating marketing channels with the point of purchase, chatbots are not only making the customer experience more seamless but shortening the purchase cycle too. AI-driven Chatbots

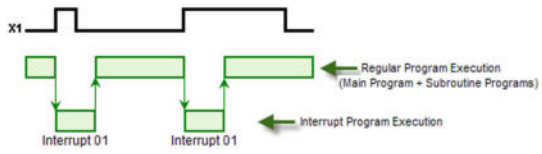
An AI-powered chatbot is capable of delivering a personalized experience to clients and customers. Bank of America's chatbot is capable of handling any customer query, with predictive analytics, can anticipate customers' needs and guide them through complex banking procedures. These chatbots can even help customers to make payments, check balances, or save money. These experiences are going a long way in assisting brands in positioning themselves as 'customer-first.



INTERRUPTS IN PLC

Arafat Ali
Jr. Project Engineer

A Programmable Logic Controller (PLC) is an industrial automation control system widely used in manufacturing and production processes. In a typical PLC system, the control program executes continuously, repeatedly scanning input devices, processing the program, and updating output devices. However, sometimes external events or conditions require immediate attention and response from the PLC. This is where interrupts come in.



An interrupt is a signal that temporarily halts the PLC program's normal execution and jumps to a special routine or subroutine to handle the interrupt request. Interrupts can be triggered by various events, such as a change in input status, a timer or counter overflow, or a communication error.

Types of Interrupts in PLCs:

1.Hardware Interrupts:

These interrupts are triggered by physical events or conditions, such as a button press, sensor activation, or communication error. Hardware interrupts are typically handled by the PLC's input/output (I/O) module or communication interface.

2. Software Interrupts

These interrupts are generated by the PLC program itself, such as a timer or counter overflow or a flag change. Software interrupts are typically handled by the PLC's central processing unit (CPU).

3.Uses of Interrupts in PLCs:

Interrupts are essential in PLC systems because they allow the system to respond quickly to external events or conditions that require immediate attention. Some common uses of interrupts in PLCs include:

Input Monitoring:

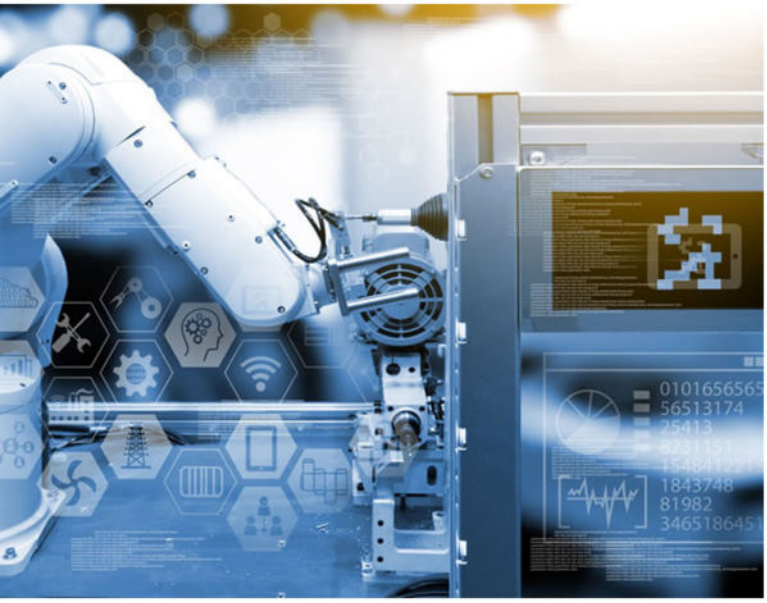
Interrupts can be used to monitor inputs continuously and detect changes in status immediately. For example, a safety sensor may trigger an interrupt that stops the production process if an operator gets too close to a dangerous machine.

5. Process Control:

Interrupts can be used to control and monitor processes in real-time. For example, a temperature sensor may trigger an interrupt that adjusts a heating or cooling system's set point to maintain the desired temperature.

5. Communication:

Interrupts can be used to control and monitor processes in real-time. For example, a temperature sensor may trigger an interrupt that adjusts a heating or cooling system's set point to maintain the desired temperature.



Advantages of Interrupts in PLCs:

Fast Response:

Interrupts allow the PLC to respond quickly to external events or conditions, minimizing downtime and improving productivity.

Flexibility:

Interrupts can be programmed to handle various events or conditions, providing flexibility and adaptability to changing production requirements.

Efficient Resource Management:

Interrupts use system resources efficiently, allowing the PLC to perform other tasks while waiting for an interrupt to occur.

Disadvantages of Interrupts in PLCs:

Increased Complexity:

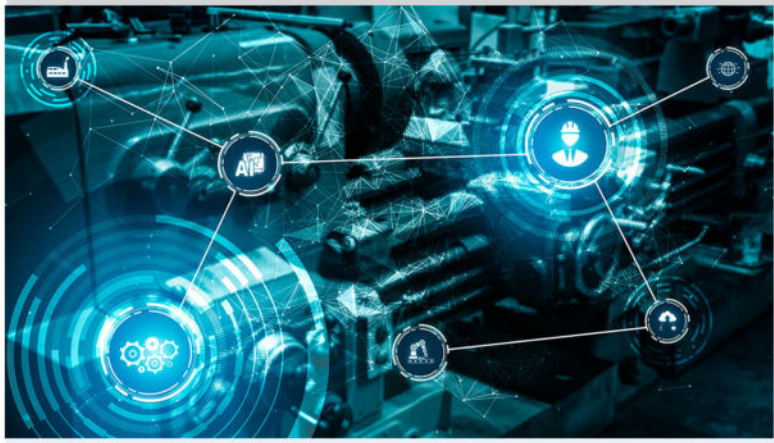
Interrupts add complexity to the PLC program, requiring careful programming and testing to ensure proper operation.

Timing Issues:

Interrupts can interfere with the timing of other processes, leading to synchronization issues and potentially affecting system performance.

Priority Conflicts:

Interrupts can compete for system resources, leading to conflicts that may require prioritization or resource allocation.



In conclusion, interrupts play a critical role in PLC systems, allowing for fast and efficient response to external events or conditions. However, careful programming and testing are required to ensure proper operation and minimize the potential for timing issues and conflicts. When used effectively, interrupts can improve system performance, flexibility, and productivity.

THANKS

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