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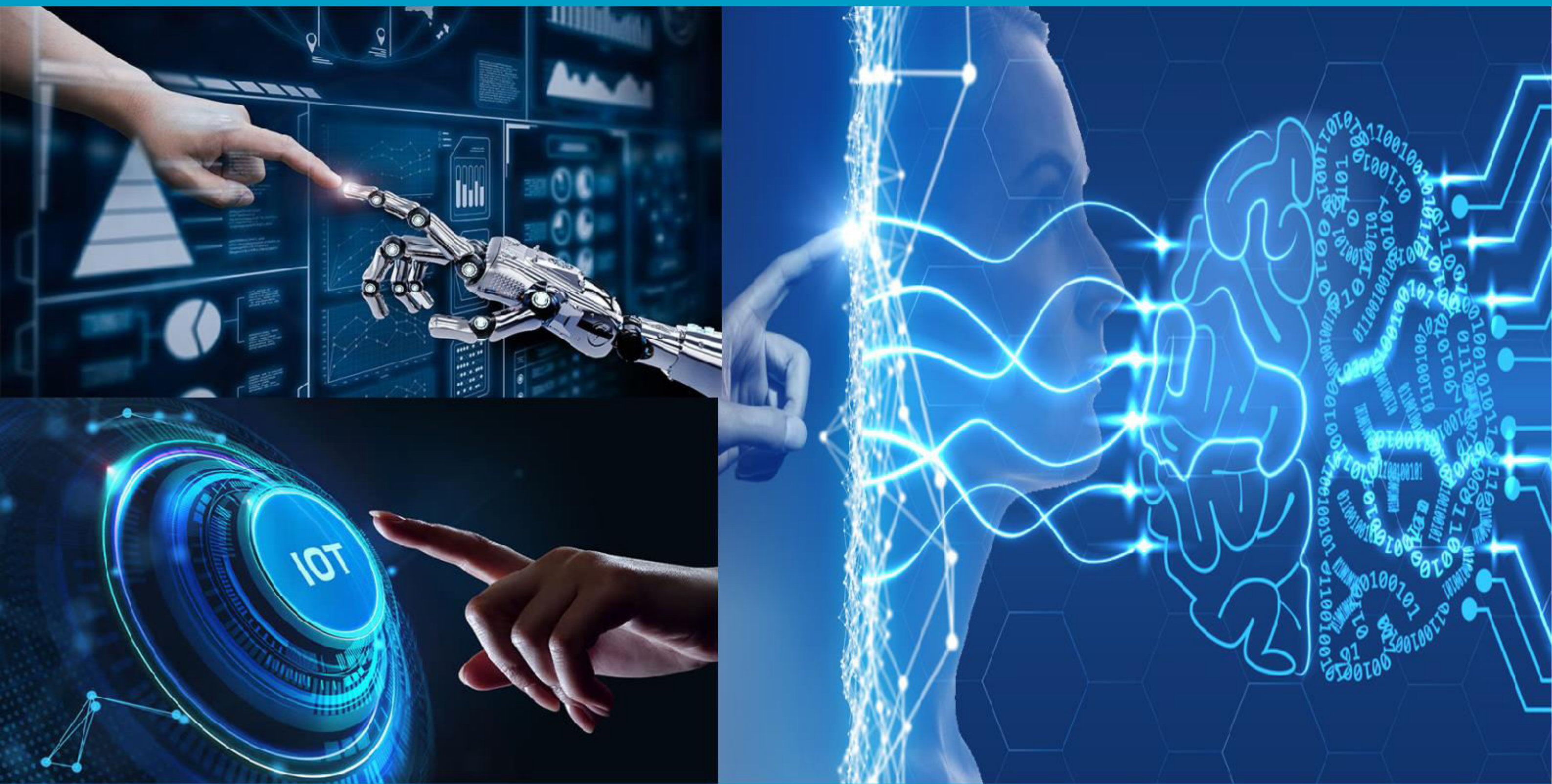

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A Review on Diagnosing Plants and Community Support

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ABSTRACT: Agriculture is one field which has a high impact on life and economic status of human beings. Loss in agricultural products occurs due to improper management. Lack of knowledge about disease by farmers and hence less production happens. Kisan call centers are available but do not offer service 24*7 and sometimes communication too fail. Farmers are unable to explain disease properly on call need to analysis the image of affected area of disease. Though, images and videos of crops provide better view and agro scientists can provide a better solution to resolve the issues related to healthy crop yet it not been informed to farmers. It is required to note that if the productivity of the crop is not healthy, it has high risk of providing good and healthy nutrition. Due to the improvement and development in technology where devices are smart enough to recognize and detect plant diseases. Recognizing illness can prompt faster treatment in order to lessen the negative impacts on harvest. This paper therefore focuses upon plant disease detection using image processing approach. This work utilizes an open dataset of 5000 pictures of unhealthy and solid plants, where convolution system and semi supervised techniques are used to characterize crop species and detect the sickness status of 4 distinct classes. Lack of awareness on what kind of actions to taken and what a kind pesticides and fertilizers to be used for the particular disease.

KEYWORDS: plant diseases detection, Identifying solution, deep learning, discussion forum, convolution neural networks.

I. INTRODUCTION

After the system has been designed physically in detail, the stage in to transfer the system into a working one. Implementation is the stage of a project during which the design of a system is tested, debugged and made operational. So, it is the most crucial stage in achieving a successful new system and in giving the users confidence that the new system will work and be effective. This chapter gives an overview about the purpose, aim, objectives, background and operation environment of the system.

ABOUT PLANT DISEASES

Plant disease, an impairment of the normal state of a plant that interrupts or modifies its vital functions. All species of plants, wild and cultivated alike are subject to disease. Although each species is susceptible to characteristic diseases, these are, in each case, relatively few in numbers. The occurrence and prevalence of plant diseases vary from season to season, depending on the presence of the pathogen, environmental conditions, and the crops and varieties grown. Some plant varieties are particularly subject to outbreaks of diseases while others are more resistant to them.

Plant diseases are known from times preceding the earliest writings. Fossil evidence indicates that plants were affected by disease 250 million years ago. The Bible and other early writings mention diseases, such as rusts, mildews, and blights that have caused famine and other drastic changes in the economy of nations since the dawn of recorded history. Other plant disease outbreaks with similar far-reaching effects in more recent times include late blight of potato in Ireland (1845–60); powdery and downy mildews of grapes in France (1851 and 1878); coffee rust in Ceylon (now Sri Lanka; starting in the 1870s); Fusarium wilts of cotton and flax; southern bacterial wilt of tobacco (early 1900s); Sigatoka leaf spot and Panama disease of banana in Central America (1900–65); black stem rust of wheat (1916, 1935, 1953–54); southern corn leaf blight (1970) in the United States; Panama disease of banana in Asia, Australia, and Africa (1990 to present); and coffee rust in Central and South America (1960, 2012 to present). Such losses from plant

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diseases can have a significant economic impact, causing a reduction in income for crop producers and distributors and higher prices for consumers.

Loss of crops from plant diseases may also result in hunger and starvation, especially in less-developed countries where access to disease-control methods is limited and annual losses of 30 to 50 percent are not uncommon for major crops. In some years, losses are much greater, producing catastrophic results for those who depend on the crop for food. Major disease outbreaks among food crops have led to families and mass migrations throughout history. The devastating outbreak of late blight of potato (caused by the water mold phytophthora infestans) that began in Europe in 1845 brought about the Great Famine that caused starvation, death, and mass migration of the Irish. Of Ireland's population of more than eight million, approximately one million (about 12.5 percent) died of starvation or famine-related illness, and 1.5 million (almost 19 percent) emigrated, mostly to the United States, as refugees from the destructive blight. This water mold thus had a tremendous influence on economic, political, and cultural development in Europe and the United States. During World War I, late blight damage to the potato crop in Germany may have helped end the war.

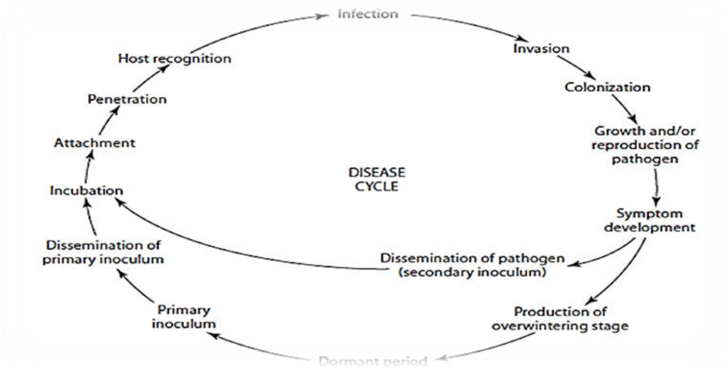
Plant diseases are a normal part of nature and one of many ecological factors that help keep the hundreds of thousands of living plants and animals in balance with one another. Plant cells contain special signaling pathways that enhance their defenses against insects, animals, and pathogens. One such example involves a plant hormone called jasmonate (jasmonic acid). In the absence of harmful stimuli, jasmonate binds to special proteins, called JAZ proteins, to regulate plant growth, pollen production, and other processes. In the presence of harmful stimuli, however, jasmonate switches its signaling pathways, shifting instead to directing processes involved in boosting plant defense. Gens that produce jasmonate and JAZ proteins represent potential targets for genetic engineering to produce plant varieties with increased resistance to disease. Humans have carefully selected and cultivated plants for food, medicine, clothing, shelter, fibre, and beauty for thousands of years. Disease is just one of many hazards that must be considered when plants are taken out of their natural environment and grown in pure stands under what are often abnormal conditions.

Many valuable crop and ornamental plants are very susceptible to disease and would have difficulty surviving in nature without human intervention. Cultivated plants are often more susceptible to disease than are their wild relatives. This is because large numbers of the same species or variety, having a uniform genetic background, are grown close together, sometimes over many thousands of square kilometers. A pathogen may spread rapidly under these conditions.

LIFE CYCLE OF PLANT DISEASES

Disease cycle is a chain of interconnected successive events of a pathogen's infection in a host plant. It usually coincides with the life cycle of the pathogen with a correlation to its host and the environment. Each cycle includes two alternating phases; the parasitic phase and the survival or over-summering or over-wintering phase the distinct events in a disease cycle are very much important as they provide us information about how and when we should stop the spread of the disease easily. Besides, the prediction about other disease cycles by other unknown or less known pathogens can be formulated using the info of one of such cycle.

II. LITERATUE REVIEW



The writer Mohanty [1] concept that Crop illnesses are a prime chance to meals safety, but their speedy identification remains tough in many parts of the world because of the dearth of the important infrastructure. The combination of growing international clever telephone penetration and current advances in laptop imaginative and prescient made viable with the aid of deep getting to know has paved the manner for smart cellphone-assisted sickness prognosis. Using a public dataset of 54,306 snap shots of diseased and healthy plant leaves amassed underneath managed conditions, we teach a deep convolution neural community to identify 14 crop species and 26 sicknesses (or absence thereof). The trained model achieves an accuracy of 99.35% on a held-out check set, demonstrating the feasibility of this method. Overall, the method of education deep studying models on increasingly big and publicly available image datasets presents a clean direction towards Smartphone-assisted crop disorder prognosis on a massive international scale.

The writer Jyotsna Bankar [2] claimed that the system based on the Inception-v3 model of TensorFlow platform, wherein we use the transfer getting to know technology to educate an animal type version on mammals ‘dataset. The class accuracy of the version is approximately 95% on given dataset, that's higher than different method to be had for type. The future work is to study and broaden a greater effective and accurate version for image category. In this paper, primarily based on Inception-v3 model in TensorFlow platform, we use the transfer gaining knowledge of technology to retrain the animal category datasets that may significantly enhance the accuracy of animal classification.

The author Ser SeraworkWallelign [3] said that In this observe convolution neural network is used to locate and classify soybean plant diseases. The Network become trained the usage of the images taken within the natural surroundings and performed 99.32% category capability. This suggests the promising capability of CNN to extract vital features within the natural environment that is required for plant ailment type. As some distance as our know-how that is the first try which use the images taken within the wild environment and finished excellent overall performance. The experiments additionally show that applying records augmentation at the schooling set improves the performance of the community while the dataset may be very small. The effect of dropout and regularization to conquer over becoming additionally verified. In this look at the data sample in every elegance is unbalanced, i.E forty nine.19% of the information is of sophistication 1, 28.13% elegance 2, 15.Ninety six% elegance 3 and six.72% elegance four. For destiny work, deep studying strategies to resolve pattern imbalance might be carried out.

The author Santhosh Kumar S [4] in this paper stated that Agriculture is a key supply of livelihood. Agriculture affords employment opportunities for village humans on big scale in developing u . S . Like India. India's agriculture consists of many crops and in line with survey nearly 70% population is relies upon on agriculture. Most of Indian farmers are adopting guide cultivation due to lagging of technical understanding. Farmers are blind to what kind of crops that grows properly on their land. When vegetation are tormented by heterogeneous diseases thru their leaves that will outcomes on manufacturing of agriculture and profitable loss. Also discount in each exceptional and amount of agricultural production. Leaves are crucial for instant growing of plant and to growth manufacturing of plants. Identifying diseases in flowers depart is difficult for farmers also for researchers. Currently farmers are spraying pesticides to the plant life but it effects human immediately or not directly by using fitness or additionally economically. To stumble on those plant diseases many rapid techniques need to be undertake. In this paper, we've got accomplished survey on one of a kind vegetation disorder and numerous boost strategies to detect those illnesses.

The writer KatsumasaSuwa [5] on this paper said that Precision and take into account are change-off standards. Considering the practical utility of complete plant diagnosis schema in Fig. 2, it isn't important to detect precisely the whole fully leaf from the pix. In the truth that we want to come across a number of, or as a minimum one inflamed leaf per disease inside the image. This is because close by leaves might have the identical disease and the prime objective of our device is to assist early detection of sickness, and this facilitates possible take certain examination. From this factor, we will tolerate some false bad. Conversely, we must now not pass completely wrong location to the classifier followed by specifically whilst the

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subsequent classifier isn't so sturdy. That is, we need a positive degree of precision. Therefore, suitable manipulate of stability between false fine and false negative is required. Considering those records, we assume the current balance (precision=80.8%, remember=75.3) is taken into consideration reasonable. In addition, using small enter CNN version (i.E. 16×16) with reduced looking area is speedy (2.0 fps) and consequently, the processing time does not have an effect on a good deal at the processing overall performance of the diagnosis structures behind. We achieved a promising detection overall performance on realistic on-web site snap shots. On the opposite hand, but, nearly all of leaves in extensive-angle on-web site pictures used on this observe are healthy ones. In close to future, we are able to look into and examine our methodologies in different practical environments with many infected leaves and construct an give up-to-cease realistic plant prognosis device.

The author S Arivazhagan [6] said that An application of texture analysis in detecting and classifying the plant leaf diseases has been explained in this paper. Thus the proposed algorithm was tested on ten species of plants namely banana, beans, jackfruit, lemon, mango, potato, tomato, and sapota. The diseases specific to those plants were taken for our approach. The experimental results indicate the proposed approach can recognize and classify the leaf diseases with a little computational effort. By this method, the plant diseases can be identified at the initial stage itself and the pest control tools can be used to solve pest problems while minimizing risks to people and the environment. The reasons for misclassification are as follows: the symptoms of the diseased plant leaves vary (at the beginning, tiny, dark brown to black spots, at later time, it has the phenomena of withered leaf, black or part leaf deletion), also the taken feature identification vectors need to further optimized.

The author Peng Jiang [7] claimed that this paper has proposed a real-time detection approach that is based on improved convolutional neural networks for apple leaf diseases. The deep-learning-based approach can automatically extract the discriminative features of the diseased apple images and detect the five common types of apple leaf diseases with high accuracy in real time. In this study, to ensure satisfactory generalization performance of the proposed model and a sufficient apple disease image dataset, a total of 26,377 images with uniform and complex backgrounds were collected in the laboratory and in a real apple field and generated via data augmentation technology. Furthermore, the new deep convolution neural network model, namely, INAR-SSD, was designed by introducing the GoogLeNet Inception module and integrating the Rainbow concatenation to enhance the multi-scale disease object detection and small diseased object detection performances. The new deep-learning-based approach was implemented in the Caffe framework on the GPU platform. Using a dataset of 26,377 images of diseased leaves, the proposed model, namely, INAR-SSD, was trained to detect apple leaf diseases.

The author Zhou [8] proposed that In a multidisciplinary scheme linking computer science with agricultural engineering, a novel approach based on orientation code matching (OCM) for robust, continuous, and site-specific observations of disease development in sugar beet plants is presented. Differing from conventional plant disease detection approaches, we introduce the robust template matching method of OCM in this paper to not only realize continuous and site-specific observations of disease progress, but also to demonstrate its excellent robustness for non-rigid plant object searching in scene illumination, translation, slight rotation, and occlusion changes. Furthermore, a single-feature two-dimensional xy-color histogram is proposed and input into support vector machine (SVM) classifier for pixel-wise disease classification and quantification. Experimental results with high precision and recall rates demonstrate the feasibility and potential of our proposed algorithm, which could be further implemented in real sugar beet fields with robust detection and precise quantization of foliar disease development, for better analysis of disease mechanism.

The author Godoy [9] in this paper presented the application of a digital image processing-based algorithm for identification of diseases in soybean plants. The original algorithm was developed for maize, and uses images of leaves to calculate the likelihood that the symptoms that are visible in the surface of the leaves were produced by each of the diseases considered during the algorithm's development. The algorithm

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applied to soybean leaves was identical to the original, with the exception that here the symptom segmentation was performed automatically. The results have shown that some diseases are very successfully identified, while others may have characteristics that make an unambiguous identification very difficult if other kinds of information external to the algorithm are not included. The problem of plant disease diagnosis is of such a complexity that it is unlikely that unambiguous answers will ever be possible without human involvement. However, computer-aided tools may be very useful in many situations, and there is still much room for improvement. Future research will concentrate on five fronts: a) improving the symptom segmentation by including an adaptive threshold; b) better exploring the differences between pairs of diseases; c) expanding the image database to include both more diseases and more samples of the diseases already considered; d) extending the algorithm to other plant species; e) coupling the proposed digital image-based algorithm with a expert system capable of resolving some of the ambiguities observed in the tests.

The author Barbedo [10] proposed that with automatic plant disease identification using visible range images has received considerable attention in the last two decades, however the techniques proposed so far are usually limited in their scope and dependent on ideal capture conditions in order to work properly. This apparent lack of significant advancements may be partially explained by some difficult challenges posed by the subject: presence of complex backgrounds that cannot be easily separated from the region of interest (usually leaf and stem), boundaries of the symptoms often are not well defined, uncontrolled capture conditions may present characteristics that make the image analysis more difficult, certain diseases produce symptoms with a wide range of characteristics, the symptoms produced by different diseases may be very similar, and they may be present simultaneously. This paper provides an analysis of each one of those challenges, emphasizing both the problems that they may cause and how they may have potentially affected the techniques proposed in the past. Some possible solutions capable of overcoming at least some of those challenges are proposed.

III. REVIEW FINDINGS

i) After going through all the references, we came to know that everyone is focusing on only single variety of plant and also remedy for the disease is not known to the user. And also there is no doubt resolving interface for the users.
ii) Everyone is using traditional machine learning algorithms for classifying the diseases of plants.
iii) No remedies for the identified diseases are provided.
iv) No interaction for the farmers with agricultural experts for better experience.
v) No solutions for all varieties of plants.

IV. PROBLEM IDENTIFICATION

The main problems in which we over come in our survey are problems regarding disease identification in plants, we did survey on agriculture sector and we found there are so many problems in this sector. So, we try to solve some of the major problems. Like predicting the disease of the plants based on the image. And some farmers are unknown of what is the suitable solution for the particular disease. And what are the immediate actions to be performed after identifying the disease. Even knowing whether the plant is healthy or not is also so important as identifying the disease. So mainly we focused on the leaves of the plants where we can identify the most of the diseases of plants. And also, people lack of community support so by providing the interface where the farmers can discuss on the problems they have and get them solved by experts in this field.

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V. CONCLUSION

Convolution neural network is used to detect and classify plant diseases. The Network is trained using the images taken in the natural environment and achieved 99.32% classification ability. This shows the ability of CNN to extract important features in the natural environment which is required for plant disease classification and also solution to the diseases identified. Depending on the dataset we need to change the working of CNN to get best accuracy. By using different versions of Convolution Neural Networks algorithm, we can classify plant diseases of all varieties of the plants and identify best solution for the cure. Users of the website can share views about their needs and experts of the domain can respond as quickly as possible.

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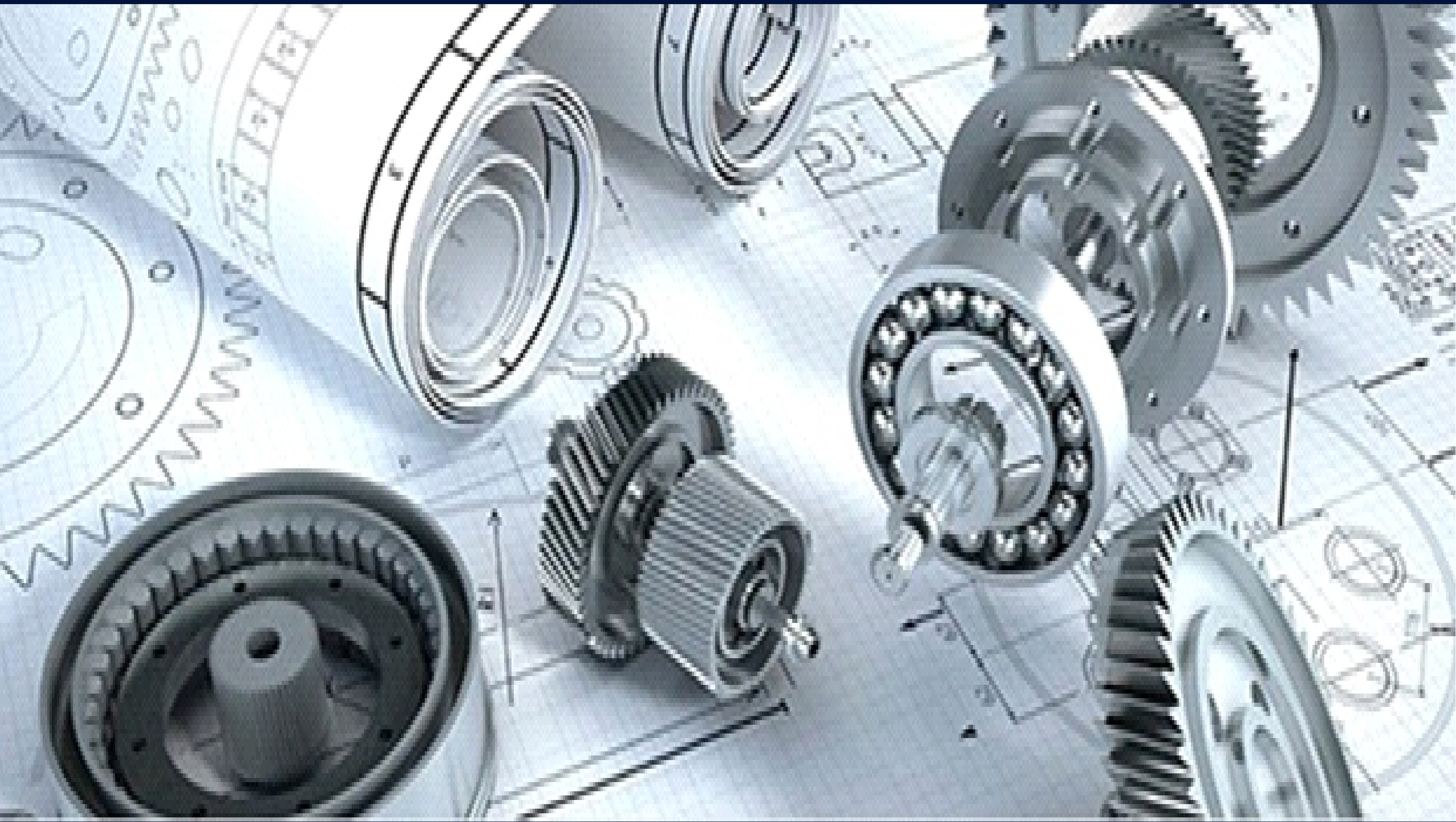

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