A STUDY ON THE APPLICATIONS OF ARTIFICIAL INTELLIGENCE - WITH SPECIAL REFERENCE TO APPLICATION OF AI IN BUSINESS

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Abstract

AI can perform tasks such as identifying patterns in the data more efficiently than humans, enabling businesses to gain more insight out of their data. With the help from AI, massive amounts of data can be analyzed to map poverty and climate change, automate agricultural practices and irrigation, individualize healthcare and learning, predict consumption patterns, streamline energy-usage and waste-management. A meta information can be gathered for these classification techniques and based on these meta information a model of robust for large datasets can be less accurate can be slow for former case. A meta information can be gathered for these classification techniques and based on these meta information a model of robust classifier can be formed which will decide to apply the techniques or their synergic approach based on the requirements of the particular situation.

INTRODUCTION

AI or artificial intelligence is the simulation of human intelligence processes by machines, especially computer systems. These processes include learning, reasoning and selfcorrection. Some of the applications of AI include expert systems, speech recognition and machine vision. Artificial Intelligence is advancing dramatically. It is already transforming our world socially, economically and politically.

I was coined by **John McCarthy**, an American computer scientist, in 1956 at The Dartmouth Conference where the discipline was born. Today, it is an umbrella term that encompasses everything from robotic process automation to actual robotics. AI can

perform tasks such as identifying patterns in the data more efficiently than humans, enabling businesses to gain more insight out of their data. With the help from AI, massive amounts of data can be analyzed to map poverty and climate change, automate agricultural practices and irrigation, individualize healthcare and learning, predict consumption patterns, streamline energy-usage and waste-management.

STATEMENT OF PROBLEM

If you made it this far with me you must be motivated to start a project and actually solve some real-life problems; humanity is currently paying the price of evolution, we crippled our giant blue marble and displeased immensely mother nature. But honestly, we had no choice!

When I say we had no choice I mean two things specifically. First, we couldn't have invented electric cars nor smartphones in the 1800's it is all part of the evolution process, meaning we have to go through certain phases in order to evolve and there is no going around it. Furthermore we are beings that were made imperfect, what makes us think we can create or know true perfection because nothing is perfect in this world, what we consider perfect just varies from person to person and it is not everlasting . The only example of perfection is **God**. Second, from the begining of our human life we notice evolution taking place—we fall before we can walk or run. That's why I think everything happened the way it should have, we fell now we have the chance to stand-up with the helping hand of AI and walk or run. Of course, there will be more breakthroughs down the road and maybe something better than AI might emerge but this is not think positive or wishful thinking, we shouldn't live in the future, it is better to imagine how we want to be and start where we are with what we have now (AI) and work towards making that dream come true.

OBJECTIVES OF THE STUDY

1.   To know about Artificial Intelligence

2.   To understand the various types of Artificial Intelligence

3.   To describe the importance and components of artificial intelligence

4.   To know the importance of Artificial Intelligence in business

5.   To conclude and provide the suggestions in the usage of Artificial Intelligence.

METHODOLOGY

In order to do the research with regard to the study of Applications of Artificial Intelligence, I have employed secondary data.

LIMITATION OF THE STUDY

•   The study is based on secondary data

•   The period of study has been conducted from 1995 to 2005

•   The study has not been related to any other programmes or applications.

APPLICATIONS OF ARTIFICIAL INTELLIGENCE

Artificial Intelligence in Healthcare: Companies are applying machine learning to make better and faster diagnoses than humans. One of the best-known technologies is

IBM's Watson. It understands natural language and can respond to questions asked of it. The system mines patient data and other available data sources to form a hypothesis, which it then presents with a confidence scoring schema. AI is a study realized to emulate human intelligence into computer technology that could assist both, the doctor and the patients in the following ways:

➢   By providing a laboratory for the examination, representation and cataloguing medical information

➢   By devising novel tool to support decision making and research

➢   By integrating activities in medical, software and cognitive sciences

➤ By offering a content rich discipline for the future scientific medical communities. **Artificial Intelligence in business**: Robotic process automation is being applied to highly repetitive tasks normally performed by humans. Machine learning algorithms are

being integrated into analytics and CRM (Customer relationship management) platforms to uncover information on how to better serve customers. Chat bots have already been incorporated into websites and e companies to provide immediate service to customers. Automation of job positions has also become a talking point among academics and IT consultancies.

AI in education: It automates grading, giving educators more time. It can also asses students and adapt to their needs, helping them work at their own pace.

AI in Autonomous vehicles: Just like humans, self-driving cars need to have sensors to understand the world around them and a brain to collect, processes and choose specific actions based on information gathered. Autonomous vehicles are with advanced tool to gather information, including long range radar, cameras, and LIDAR. Each of the technologies is used in different capacities and each collects different information. This information is useless, unless it is processed and some form of information is taken based on the gathered information. This is where artificial intelligence comes into play and can be compared to human brain. AI has several applications for these vehicles and among them the more immediate ones are as follows:

➤ Directing the car to gas station or recharge station when it is running low on fuel.

➤ Adjust the trips directions based on known traffic conditions to find the quickest route

➤ Incorporate speech recognition for advanced communication with passengers.

➤ Natural language interfaces and virtual assistance technologies.

AI for robotics will allow us to address the challenges in taking care of an aging population and allow much longer independence. It will drastically reduce, may be even

bring down traffic accidents and deaths, as well as enable disaster response for dangerous situations for example the nuclear meltdown at the fukushima power plant.

Cyborg Technology: One of the main limitations of being human is simply our own bodies and brains. Researcher Shimon White son thinks that in the future, we will be able to augment ourselves with computers and enhance many of our own natural abilities. Though many of these possible cyborg enhancements would be added for convenience, others may serve a more practical purpose. YokyMatsuka of Nest believes that AI will become useful for people with amputated limbs, as the brain will be able to communicate with a robotic limb to give the patient more control. This kind of cyborg technology would significantly reduce the limitations that amputees deal with daily.

ARTIFICIAL INTELLIGENCE AND ITS APPLICATIONS IN DIFFERENT AREA

Since the invention of computers or machines, their capability to perform various tasks went on growing exponentially. Humans have developed the power of computer systems in terms of their diverse working domains, their increasing speed, and reducing size with respect to time.

A branch of Computer Science named Artificial Intelligence pursues creating the computers or machines as intelligent as human beings

ARTIFICIAL INTELLIGENCE

According to the father of Artificial Intelligence, John McCarthy, it is "The science and engineering of making intelligent machines, especially intelligent computer programs". Artificial Intelligence is a way of **making a computer, a computer-controlled robot, or a software think intelligently**, in the similar manner the intelligent humans think.

AI is accomplished by studying how human brain thinks and how humans learn, decide, and work while trying to solve a problem, and then using the outcomes of this study as a basis of developing intelligent software and systems.

PHILOSOPHY OF AI

While exploiting the power of the computer systems, the curiosity of human, lead him to wonder, "Can a machine think and behave like humans do?"

Thus, the development of AI started with the intention of creating similar intelligence in machines that we find and regard high in humans.

GOALS OF AI

·   **To Create Expert Systems** − The systems which exhibit intelligent behavior, learn, demonstrate, explain, and advice its users.

·   **To Implement Human Intelligence in Machines** − Creating systems that understand, think, learn, and behave like humans.

WHAT CONTRIBUTES TO AI ?

Artificial intelligence is a science and technology based on disciplines such as Computer Science, Biology, Psychology, Linguistics, Mathematics, and Engineering. A major thrust of AI is in the development of computer functions associated with human intelligence, such as reasoning, learning, and problem solving.

Out of the following areas, one or multiple areas can contribute to build an intelligent system.

WITHOUT AND WITH AI

The programming without and with AI is different in following ways −

Programming Without AI	Programming With AI
A computer program without AI can answer the **specific** questions it is meant to solve.	A computer program with AI can answer the **generic** questions it is meant to solve.

Modification in the program leads to change in its structure.	AI programs can absorb new modifications by putting highly independent pieces of information together. Hence you can modify even a minute piece of information of program without affecting its structure.
Modification is not quick and easy. It may lead to affecting the program adversely.	Quick and Easy program modification

REAL LIFE APPLICATIONS OF RESEARCH AREAS

There is a large array of applications where AI is serving common people in their day-to-day lives –

Sl.No.	Research Areas	Real Life Application
1	**Expert Systems** Examples – Flight-tracking systems, Clinical systems.	
2	**Natural Language Processing** Examples: Google Now feature, speech recognition, Automatic voice output.	

3	**Neural Networks** Examples − Pattern recognition systems such as face recognition, character recognition, handwriting recognition.	
4	**Robotics** Examples – Industrial robots for moving, spraying, painting, precision checking, drilling, cleaning, coating, carving, etc.	
5	**Fuzzy Logic Systems** Examples – Consumer electronics, automobiles, etc.	

INNOVATION MANAGEMENT

Businesses that use Artificial Intelligence (AI) and related technology to reveal new insights "will steal $1.2 trillion per annum from their less informed peers by 2020." predict Forrester Research.

Although AI has been around since the 1950s, it is only recently that the technology has begun to find real-world applications (such as Apple's Siri). The investment in AI by both tech giants as well as start-ups has increased 3 folds to $40 Billion as of 2017.

Recent advances in AI have been helped by three factors:

1. Access to big data generated from e-commerce, businesses, governments, science, wearable's, and social media

2. Improvement in machine learning (ML) algorithms—due to the availability of large amounts of data

3. Greater computing power and the rise of cloud-based services—which helps run sophisticated machine learning algorithms.

Applications of AI

AI is important because it can help solve immensely difficult issues in various industries, such as entertainment, education, health, commerce, transport, and utilities. AI applications can be grouped into five categories:

- **Reasoning:** The ability to solve problems through logical deduction. e.g. financial asset management, legal assessment, financial application processing, autonomous weapons systems, games

- **Knowledge:** The ability to present knowledge about the world. e.g. financial market trading, purchase prediction, fraud prevention, drug creation, medical diagnosis, media recommendation

- **Planning:** The ability to set and achieve goals. e.g. inventory management, demand forecasting, predictive maintenance, physical and digital network optimization, navigation, scheduling, logistics

- **Communication:** The ability to understand spoken and written language. e.g. realtime translation of spoken and written languages, real-time transcription, intelligent assistants, voice control

- **Perception:** The ability to infer things about the world via sounds, images, and other sensory inputs. e.g. medical diagnosis, autonomous vehicles, surveillance

Here is info graphic byMckinseythat shows the extent to which AI can be used end-toend in the retail industry from identifying customers to personalizing promotion to inventory management.

AI TRENDS IN VARIOUS SECTORS

1. HEALTHCARE

AI and ML technology has been particularly useful in the healthcare industry because it generates massive amounts of data to train with and enables algorithms to spot patterns faster than human analysts.

- Medecisiondeveloped an algorithm that detects 8 variables in diabetes patients to determine if hospitalization is required.

- An app calledBili Screen utilizes a smart phone camera, ML tools, and computer vision algorithms to detect increased levels of bilirubin in the sclera (white portion) of a person's eye, which is used to screen people for pancreatic

cancer. This cancer has no telltale symptoms; hence it has one of the worst prognoses of all cancers.

•   NuMedii, a biopharma company, has developed a platform called Artificial Intelligence for Drug Discovery (AIDD), which uses big data and AI to detect the link between diseases and drugs at the systems level.

•   GNS Healthcare uses ML algorithms to match patients with the most effective treatments for them.

ENTERTAINMENT

A familiar application of AI in everyday life is seen with services like Netflix or Amazon, wherein ML algorithms analyze the user's activity and compare it with that of other users to determine which shows or products to recommend. The algorithms are becoming intelligent with time—to the extent of understanding that a user may want to buy a product as a gift and not for himself/herself, or that different family members have different watching preferences.

. FINANCE

•   Financial services companies use AI-based natural language processing tools toanalyze brand sentiment from social media platforms and provide actionable advice.

•   Investment companies likeAidyaandNomura Securities use AI algorithms to conduct trading autonomously and robo-traders to conduct high-frequency trading for greater profits, respectively.

•   Fintech firms likeKenshoand Forward Lane use AI-powered B2C robo-advisors to augment rebalancing decisions and portfolio management performed by human analysts. Wealth front uses AI algorithms to track account activity and help financial advisors customize their advice.

• Chat bots, powered by natural language processing, can serve banking customers quickly and efficiently by answering common queries and providing information promptly.

• Fraud detection is an important application of AI in financial services. For example, Master card uses Decision Intelligence technology to analyze various data points to detect fraudulent transactions, improve real-time approval accuracy, and reduce false declines.

DATA SECURITY

Cyber attacksare becoming a growing reality with the move to a digital world. There are also concerns about AI programs themselves turning against systems.

• Automatic exploit generation (AEG) is a bot that can determine whether a software bug, which may cause security issues, is exploitable. If a vulnerability is found, the bot automatically secures it. AEG systems help develop automated signature generation algorithms that can predict the likelihood of cyber attacks.

• Pattern Ex and MIT's Computer Science and Artificial Intelligence Laboratory (CSAIL) have developed an AI platform called AI2 which claims to predict cyber attacks better than existing systems. The platform uses Active Contextual Modeling, a continuous feedback loop between a human analyst and the AI system, to provide an attack detection rate that is better than ML-only solutions by a factor of 10.

• Deep Instinct, an institutional intelligence company, says that malware code varies between 2%-10% in every iteration and that its AI model is able to handle the variations and accurately predict which files are malware.

MANUFACTURING

• Landing.ai claims to have created machine-vision tools to **find microscopic defects** in objects like circuit boards using an ML algorithm trained using tiny volumes of sample images. In the future, self-driving robots may be

created which can move finished goods around without endangering anyone or anything around.

• Robots in factories are often stationary but are still in danger of crashing into objects around it. A new concept called collaborative robots or "cobots, enabled by AI, can take instructions from humans, including instructions that the robot has not been previously exposed to, and work productively with them.

• AI algorithms can influence the **manufacturing supply chain** by detecting the patterns of demand for products across geographies, socioeconomic segments, and time, and **predicting market demand**. This, in turn, will affect inventory, raw material sourcing, financing decisions, human staffing, energy consumption, and maintenance of equipment.

• AI tools help in **predicting malfunctions and breakdown of equipment** and taking or recommending preemptive actions as well as tracking operating conditions and performance of factory tooling.

. AUTOMOTIVE INDUSTRY

• Tesla introduced**TeslaBot**, an intelligent virtual assistant integrated with Tesla models S and X, allows users to interact with their car from their phone or desktop.

• Uber AI Labs is working on developing **self-driven cars** with the help of the best engineers and scientists. Uber has already tested a batch of self-driving cars in 2016.

• Nvidia has partnered with Volkswagen to develop**"intelligent co-pilot systems"**in cars that will enable safety warnings, gesture control, and voice and facial recognition.

• Ericsson predicts that 5G technology will improve vehicle-to-vehicle communication wherein sensors will be implanted in airport runways, railways, and roads.

COMPONENTS OF AI

Artificial Intelligence (AI) is usually defined as the science of making computers do things that require intelligence when done by humans. AI has had some success in limited, or simplified, domains. However, the five decades since the inception of AI have brought only very slow progress, and early optimism concerning the attainment of human-level intelligence has given way to an appreciation of the profound difficulty of the problem.

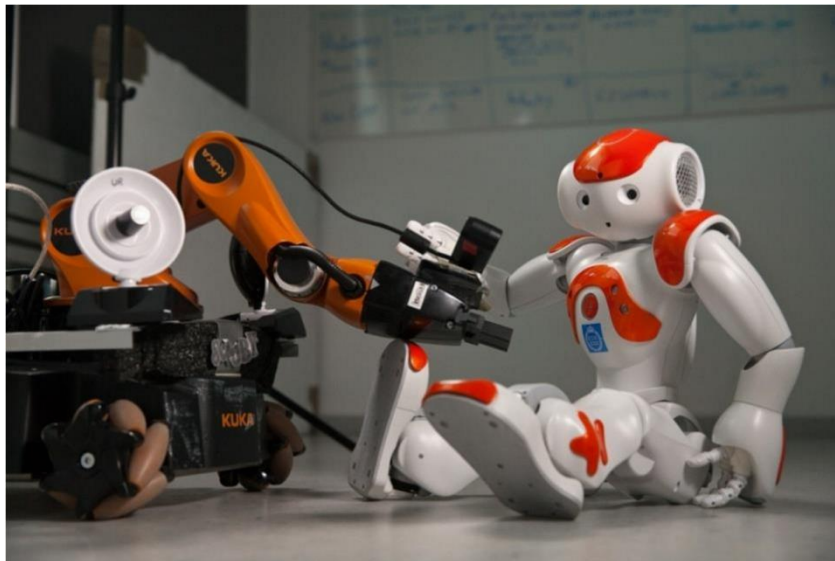## THREE TYPES OF ARTIFICIAL INTELLIGENCE EVERYONE KNOWS ABOUT

Fig:4.2

Artificial intelligence is interesting for millions of people around the world. We want to have robots clean our house, talk to us, and support. Still, we often think about types of artificial intelligence as about mighty robots that will take over most of our jobs. Can this happen in the near future? Not likely. However, there are already many awesome kinds of artificial intelligence.

Let's start with major artificial intelligence categories:

- ANI

- AGI

- ASI

ANI stands for Artificial Narrow Intelligence. It's often called Weak AI. This AI is considered to be weak because it specializes in only one category. AGI, Artificial General Intelligence is also called Strong AI or Human-Level AI. As you may understand from the name, AGI has the same capabilities as a human. ASI, Artificial Super intelligence, is the type of intelligence that is smarter than humans.

Nowadays the world is running on ANI. AGI may be created in the near future, while ASI – in the distant future. However, you may check out ANI examples, because they are everywhere.

ANI EXAMPLES

Have you got a car? Look for self-driving cars. For example, check out Google autonomous electric cars that are controlled by Google Chauffeur software. There are already functional prototypes. These driverless cars don't have steering wheels or pedals. Being equipped with LIDAR system and a Velodyne 64-beam laser, Google cars generate 3D maps of the environment and use them for driving.


According to the results presented in June 2015, Google self-driving vehicles have driven more than 1,000,000 mi. Besides, they've encountered 180 million other

vehicles and 200,000 stop signs. The testing speed isn't higher than 25 mph. Besides, there is always a safety driver aboard. However, on February 2016 a self-driving car struck a bus while trying to avoid sandbags. There were incidents of other types. However, most of them happened because of other drivers making mistakes.

Google still has to work on some issues. For example, this type of cars has problems with identifying trash and light debris on the road, spotting police officers or other people who signal the car to stop. However, Google plans to fix these issues by 2020.

Another example of artificial narrow intelligence is Siri or Cortana. It's a type of an assistant that provides you with needed answers, reminds about events, and saves a lot of your time.

However, such assistants aren't as powerful as we want them to be. Talking to Siri or Cortana is still a source of jokes. Apple, Microsoft, Google and other big companies are working on making these assistants more effective. Waiting to try out their more powerful versions.
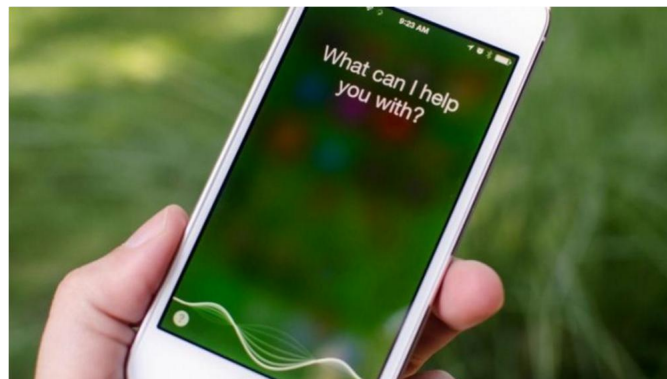
Mail filters are another type of artificial intelligence. Using artificial neural network, they spot and flag special messages. They identify the source of letters and keep the spam box level low.

Of course, these filters aren't perfect. How many times have you missed an important email because it got into a spam box? It happened to me more than 3 times. That's why I'm happy that companies are working on improving this service. For example, Google is changing its detection algorithms.

The next type of artificial narrow intelligence is speech recognition software. We've already got used to it. Siri, Cortana, Ok Google don't surprise us anymore. You may also have used such speech recognition software as Dragon NaturallySpeaking, TalkTyper, Braina, Speech Gear, etc. All of them have advantages and disadvantages. You may choose the software you like most of all taking into account your needs and requirements.

.ARE ROBOTS ANI OR AGI?

Robots are also types of artificial intelligence. As most of them have only several functions, they are kinds of ANI. That means they are good at something but they can't be perfect assistants that are cleverer than humans.

In order to check whether some types of artificial intelligence fall into ANI or AGI, scientists use several tests. The first test is called the Turing test. It tests the ability of a computer or a machine to exhibit behavior similar to that of a human. For example, evaluators had to test conversations between a human and a machine. If a machine has convinced the evaluator 70% of the conversation time, it has passed the test.

The Turing test has many interpretations. One of them is used for choosing the winner of the Loebner Prize. If a program or application can fool half of the judges into considering it to be a human, than it will win the first prize. The conversation should last for 30 minutes.

The second variant is easier to understand. It's called a coffee test. A robot's goal is to go into an average home, identify coffee, and figure out how to make it properly. If a robot can do that effectively, it may be perceived as a type of AGI.

The third test you will like is the robot college student test. If a robot can enroll into the university and take classes the same way people do, it is a type of artificial general intelligence. It'd be interesting to have a robot as your course mate.

The next test is connected with employment. A robot will be perceived as a type of AGI if it can pass vocational tests. Additional tasks include driving and writing exams. All these tests seem to be interesting and effective. However, are there already any robots that can take them effectively and fall into AGI category? These robots must be clever learners that can make decisions, answer questions, make conclusions, and use different approaches for solving various types of problems. The robots we have now aren't AGI. However, they are effective in carrying out their tasks.

For example, there is a personal home health robot Pillo that helps people manage their health. Pillo looks modern and stylish. It can answer wellness and health questions. Pillo may contact healthcare professionals. Besides, it stores and dispenses vitamins and medications. If needed, this health robot may order refills. With voice and facial recognition technology, Pillo can recognize all family members and remind everyone about the pills or vitamins they need. This robot is a nice companion that cares about the health of all family members. Now it's only a prototype. I'm eager to watch this robot functioning in everyday life. What about you?

The next robot I'd like to check out is Alpha 2, the first humanoid robot. In future, this robot must carry out a bunch of functions including tutoring, interpreting, smart home management.

It's a type of artificial intelligence that will function as a weatherman and storyteller, a home office assistant and an entertainer. It will be able to dance with you, teach you some yoga poses, and web search for all questions you have. Alpha 2 is already in stores. Still, it doesn't have all the previously mentioned features now. Developers are working on it to make effective robots a reality as soon as possible.

As you see, there are three types of artificial intelligence: ANI, AGI, and ASI. ANI is already here. Scientists, developers, and other people work on it to take ANI to the next level and bring effective AGI into the world. At Letzgro, we want to become a part of it. If you are a fan of AI, let's help you find out how to use AI development in your business. It'll be an interesting journey. Hop on!

FINDINGS

In the future, predictive analytics and artificial intelligence could play an even more fundamental role in content creation and also in the software fields. Open source information and artificial intelligence collection will provide opportunities for global technological parity and the technology of artificial can become the future in all the domains of health, environment, public safety and security.

SCOPE FOR FURTHER RESEARCH

Although some of the soft-computing techniques have been applied in this research, the simulation study have also be done and comparative study with other approaches are also given specially we have applied Genetic Algorithm for feature reduction with KNN and its improved version such as LI-KNN, GI-KNN and Polynomial Neural Network which gave an encouraging results. Future research can investigate other synergistic approaches in which other evolutionary methods such as PSO, AGO etc. can be used with classifiers, which may produce better results.

Another area of further investigation is size of the datasets. Datasets investigated in this work are not very large like gene data, meteorological data, stock exchange data etc., hence the scalability of GA algorithm, KNN, LI-KNN, GI-KNN and PNN can not be claimed in this work. As a future research, this aspect may be further investigated.

Other dimensionality reduction mechanism may be incorporated while solving classification problems using soft-computing tools.

As future work, other hybrid combination of different Evolutionary Algorithms with various classification techniques for pattern classification can be explore and compare with the results of GA and PNN, GA and KNN, GA and LI-KNN, GA and GI-KNN.

Although our approach has shown satisfactory results as compared to other pattern classification techniques but we know that the world is a full of data of different types and there are a lot of pattern classification techniques, all have some pros and cons. A technique fast and good for small dataset can be slow and poor for large datasets where as a technique robust for large datasets can be less accurate can be slow for former case. A meta information can be gathered for these classification techniques and based on these meta information a model of robust for large datasets can be less accurate can be slow for former case. A meta information can be gathered for these classification techniques and based on these meta information a model of robust classifier can be formed which will decide to apply the techniques or their synergic approach based on the requirements of the particular situation.

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