

AI In Image Analytics

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Executive Summary

The approach of "image analysis" in creating "artificial intelligence models" has created a buzz in the world of technology. "Image analysis" has enabled a greater understanding of the concerned process. The various aspects of image analysis have been discussed in detail, such as "*analogue image processing*", "*digital image processing*", "*and image pattern recognition*" and "*image acquisition*". The study has been done to explore the techniques used to develop "*artificial intelligence*". The advantages and disadvantages of these models have been discussed which will enable the young researchers to understand which model will be appropriate to be used in the development of "artificial intelligence models". The image analysis with the consistent factor of face recognition will enable the readers to understand the efficiency of the system and cater to the areas where improvisation is needed. The approach has been implemented to understand the working of the ongoing process. The critical aspect of the mentioned topic has been discussed in detail. The study is intended to give the readers a detailed understanding of the problem and open new arenas for further research.

1. INTRODUCTION

"*Image analysis*" could be quick consists of the factors which generate meaningful information concerning any objectifying picture form the digital media. "*Artificial Intelligence Model (AI Model)*" is the unique based reasoning system for increasing the usability of any concerning system in the digital world. The following report will brief about how the *image analysis* can easily set up the *different AI models* for generating the work in a better manner. *Different Image analysis* can input their part of the influence in creating the model for generating the resourceful system theory increasing every process. The *image recognition* with the consisting factor of face

recognition can easily ingest as the key factors of the AI model in generating completing the system. The following brief will about the literature surveys which can brief about the research work for briefing about concerning matter for understanding the report in a better way. The following brief will also cover the areas of end to end example for describing the matter in a detailed way for understanding the explanation in an easier way. This example consisting within the report will try to cover the key aspects of the mentioned topic. Different techniques consisting within the mentioned topic will try to elaborate the part of how this technology comes with their advantages and disadvantages for focusing the key aspects of the research. The model building will brief the mentioned topic for signifying the key informational basis for advertising every major aspect concerning within the report.

2. LITERATURE SURVEY

According to the study of *Goyal et al. 2016* entails about the *Transparent AI system* for interpreting the Visual models for briefing about the importance of the AI model into image processing. The author also covers the area of describing the improvements of AI research for focusing the *“deep neural network”*. This paperwork also concerns about several questions to focusing the AI system. The author tries to details about the decreasing of the intelligent system mint various machine perception still implementing the AI system in the right way can change the complete scenario.

The Study of *Ayache, 2019*, details about the various uses of the AI model into recognizing the Medical images, which can easily help the medical health services. Here the researcher tries to cover the *“PPersonalizeddigital Petainets”* criteria by analyzing the AI system in helping in the recognition section, thereby helping the medical procedure for the betterment of the patients. These images can easily signify the biological, physical behaviour of the atheist theory helping the doctors to evaluate the patient's condition for making the medicines for the betterment of the Petites. This mentioned elaboration also covers the criteria which entail the geometrical and statistical and biophysical image modelling processes with the input of the AI model, thereby increasing the liability of the medical process in helping the concerned patients.

The study of *“Russell & Norvig, 2016”*, tries to brief about the Artificial Intelligence for retailing majors aspects of the mentioned criteria. The authors try to showcase the fact that the AIr is the vast area which needs big elaboration for covering the major aspects of the focus area. The elaboration covers the area of the technological section of *the AI system*. For understanding the key aspects of the criteria, how it is changing the working scenario of various systems. The authors also mentioned the focusing areas *“Practical speech recognition, machine translation, autonomous vehicle”* to signify the usefulness of the AI for entailing the major aspects. The author also covers the criteria of the AI for making the non-problematic settings for the basic searching planning of a project. In this way, the briefing entails about the different types of AI model for helping various systems for increasing the liability of any project.

According to the study of *“Osoba & Welser, 2017”* the authors try to explain about the Intelligence system on the image processing for evaluating every aspect of the

mentioned research. This research work focuses on the factor that the AI system consists of the factors which could be ingested in various systems for making the system into an upgrading section. The paper also tries to entail about the impacts of the AI system in changing the building strategy of the image processing, which can easily signify the major aspects of the AI system for understanding the key aspects.

The study of "*Armstrong, Bostrom & Shulman, 2016*" this paperwork helps to create the impact of the AI system in increasing the work-based liability of every system. Thesis paper helps to generate the basis of the technical model of the AI system for the technology RAcEs. This spacer also corners about the criteria of "*AI arms Race*" *factors* consisting within a team for emocompassing every system work. This elaboration also covers the area of AI system for initiating the workforce of teams for making any cornering project more valuable and liable for understanding the key aspects. The paper also covers the area of implementing the AI system for making the various systems into a user system, thereby increasing the workforce of the systems. This paper also tried to showcase the various roles of the AI system theory elaborate key factors inciting within the system for increasing working force of any cornering system. The author attry details about the team or work different departments working with the AI system, increasing their workforce of the composting of any cornering project or system.

According to the study of *Triguero & ovens, 2016* helps to generate the briefing concerning about the "*Hierarchical multi-label classification techniques*" for entertaining key aspects of the technique for focusing the AI system in a better way. The paper concerns about the different multi-level classifications for signifying all the real values related to the type which can generate informational basis cornering with the mentioned topic in the paper.

3. IMAGE ANALYSIS IN THE CREATION OF AI MODEL

Image analysis could be signified as the scientific discipline which easily provides the theoretical explanation for focusing all the related matters coming to a system Here the image analysis will focus on entailing the budding of AI model by the implementation of the Image Analysis (Bazelier *et al.* 2015). The following briefing will entail about the different factors of "*Image analysis*" for creating the AI models:

"Analog Image processing"

This proceedings unit of Image analysis can hold the feature of creating the Artificial intelligence system for encompassing the "*Facial recognition program*". This processing unit can easily built the AI system for the "*Facial Recognition model*" thereby increasing the efficiency of the system during an ongoing system process. *[Referred to Appendix 1]*

"Digital Image Processing"

This processing unit comes with the facility of creating the digital images and in this way, thicken upgrade the AI system for allocating the informational basis with more advanced digital images (Jourabloo & Liu, 2016). This processing can easily consist of

the creation of the **“Digital AI model”** for generating a better image for improving the focusing matter of a system.

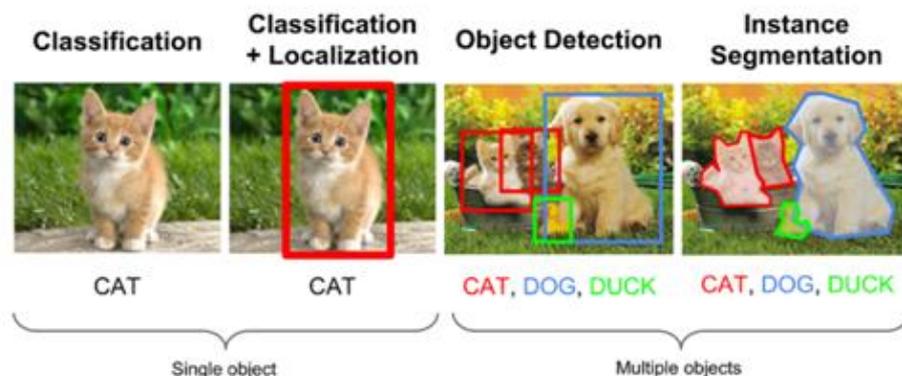


Figure 1: Example of pattern recognition operation

Image credit: Cornell University Computer Vision lectures

“Image sharpening and restoration”

This feature consists of the core factor of Image analysis, which can easily advance AI models, thereby creating the **“AI visualization model”**. In this way, any concerning **“Visualization AI model”** can easily sharpen the images according to the needs of the users and it can also over the area of restoration of the images (Laird, Lebiere & Rosenbloom, 2017). In this way, any user depending upon the mentioned model of AI any user can shorten their images depending upon their need and they can easily restore the images and data required for the preferred work.

“Image Pattern Recognition”

The image analysis also comes with the **“Image pattern recognition program”** could easily consist of the upgrading factor for the AI system, thereby creating the **“Image pattern AI model”**. This model can signify the different kinds of images pattern by benefiting the users while working with then AI system for getting the right images.

“Image Compression and Decompression”

This criterion could easily increase the working criteria of AI system by introducing the Image compression technique of the AI by the application of Image analysis. These criteria of the analysis come with both the compression and decompression feature of the image, which can be ingested in the AI system for creating the **“Image compression and decompression AI model.”**

“Image Acquisition”

This feature consisting within the Image analysis can signify the acquisition of various

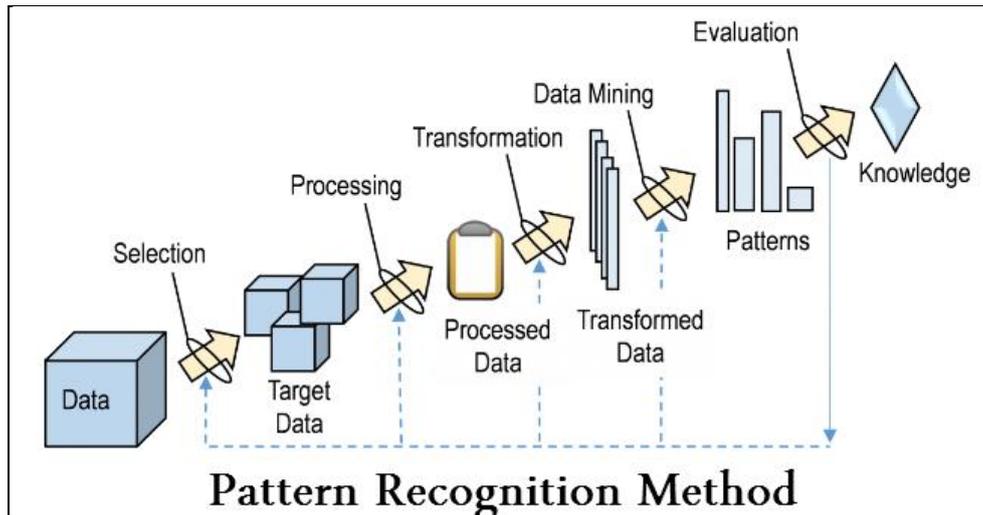


Figure 3: Pattern Recognition Method

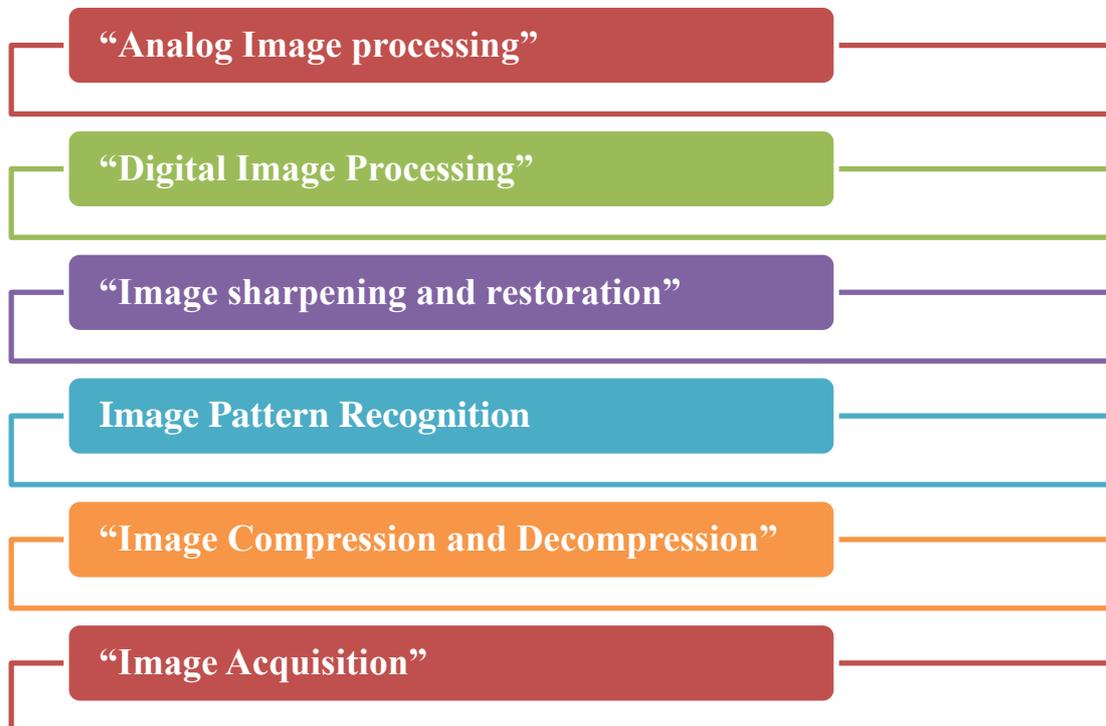


Figure 4: Different Image Analysis
(Source: Self-Created)

4. BUILDING AN AI MODEL BY DIFFERENT TECHNIQUES

“Data Analysis Technique”

“*Data analysis technique*” easily detects the analytical part of any data, thereby giving the resourceful information, which easily generates focusing factors for understanding the key aspects. Data analysis techniques are consistent with various kinds of ways of technique for evaluating different kinds of the system (Xu *et al.* 2015). Artificial intelligence is a sort of intelligence system which needs the “*statistical data analysis technique, predictive data analysis technique and prescriptive analysis technique*” of Data analysis for increasing the liability of the AI model.

“Pros of Data analysis technique”

This part comes with the major pros of Data analysis technique for beginning the signifying factors, and the following points will try to catch those:

- Making the system faster than the previous time, and it can easily increase the working scenario of the system, thereby benefiting the user for recognizing better image quality. This can easily signify the area of improving the face recognition program of the AI system by restoring all the data.
- Generation of more information
- Deeper informational basis of the system
- Proper detailing of the facts covering a system

“Cons of Data analysis technique”

The following briefing will detail the key challenging factors ingested within the technique, thereby changing the working scenario of the systems while implementing:

- The data analysis technique can reach the customer's informational basis consisting of any system, thereby decreasing any cornering systems work basis
- Sometimes the total expenses of the data analytics technique could easily affect any clearing system, thereby decreasing the applicability of the techniques.

Application of data analysis into an AI system can easily decrease the overall revenues cornering to a system. [*Referred to Appendix 3*]

Data analysis technique example

Statistical data can be analysed in various softwares that are used to **develop regression models, logistic regression**, multivariate analysis and class data. These are useful in the analysis of data in research. **Image retrieval** and **image sharpening** are some greater examples too.

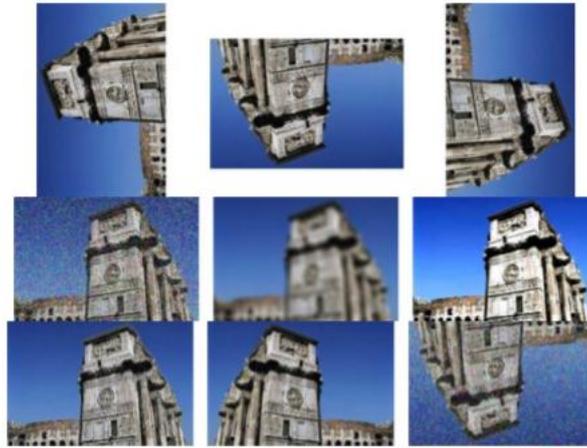


Figure 5. A number of different attacks including; 90-degree rotation, 180-degree rotation, 270-degree rotation, Salt and pepper noise adding, Blurring, Increasing brightness, Sharpening, Mirror reflecting

(Source: *Content-Based Image Retrieval Based on Affine Noisy Invariant Color Region* Amin Abdullahzadeh, Farahnaz Mohanna Published 2013)

Labelling Technique

The Data labelling technique could easily increase the working credibility of Artificial Intelligence for generating the focusing study. Supervising the machine learning consists of the major factor of AI system theory labelling all the concerning data for gathering the informational basis for inputting the needed criteria. The labelling comes with ten unique feature of detailing the problematic data into the AI system for being the charges for combating those challenges in the right manner by labelling the data. Like every technique consisted for the up-gradation of the AI model, this labelling model also comes with the *pros and the cons* for signifying all the advantageous and disadvantageous facts concerning with the technique (researchgate.net, 2019).

“Pros of Labelling technique”

The following briefing will detail the advantages factors of the labelling approach for signifying al the informational basis:

- This labelling approach comes with the Predictable results for understanding the basis of the AI model.
- This approach also comes with the feature of defining the highly accurate data information for completing the system in the right manner, which can easily generate the preferred work (analyticsvidhya.com, 2019).
- This approach also tracks all the concerning data of the AI system for beginning al the requirement needed for the working scenario of the system.

"Cons of Labelling technique"

The following briefing will try to elaborate on the key problematic section consisted of the technique:

- Time-consuming nature clearly consisted of the major cons of **Labelling system** while implementing on the AI system.
- Expenses of the technique could easily signify the problematic situation for the application of the technique.

Labeling technique example

Labeling system is used to keep track of the progress of the system. For example, immunomarkers are used in electron microscopy.

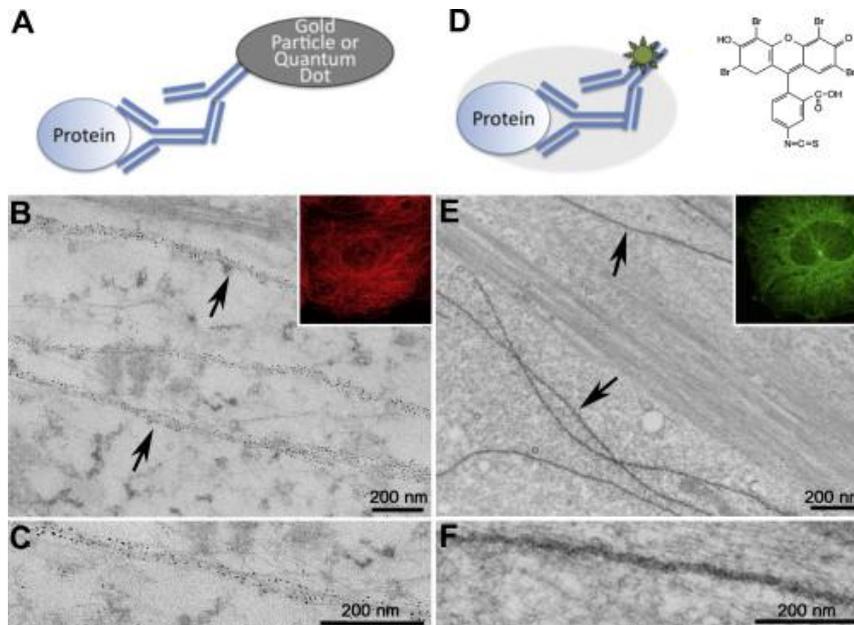


Figure. 6. Comparison of antibody particle labels versus antibody fluorescent photo-oxidation labeling.

(Source: *Correlative Light and Electron Microscopy*

Mark H. Ellisman, ... Gina E. Sosinsky, in *Methods in Cell Biology*, 2012)

"Feature engineering technique."

This technique easily consists of the critical factors of increasing the process of any cornering system then try increasing working credibility of the AI system. Here the following points will signify the focusing factors of the feature engineering for undergoing the AI system in a better way (apriorit.com, 2019).

"Pros of Feature engineering technique"

- The predictive analysis consists within the mentioned technique easily signified the advantageous factors which can easily access the AI model for signifying the possible works.
- Better exposure of the feature cans easily increasing the flexibility of Ai system.
- This technique can easily provide the critical data collection of the system for initiating the system for better world generation.
- This can also clean the data implementing into an AI system.

"Cons of Feature engineering technique"

- This technique comes with the criteria which can guarantee the data information regarding a system, and it can easily reduce the credibility of data concerning within a system.
- This technique offers the high accuracy of the data, but sometimes those data could not justify the accuracy concerning within a system.

Example of feature engineering

Feature engineering can be used to prepare an **input dataset** that are in accordance with the machine learning algorithm. The feature can be used to increase the performance of machine learning models. They can be used in **data binning, handling outliers, imputation and scaling**.

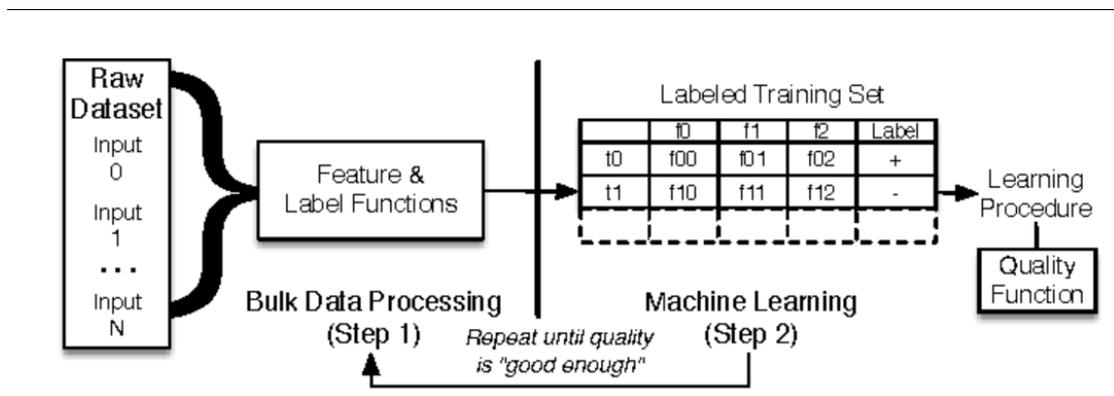


Figure. 7: In the feature engineering evaluation loop, bulk data processing and machine learning steps are interdependent but to date have been commonly implemented as separate systems

(Source: *Input selection for fast feature engineering* Michael R. Anderson, Michael J. Cafarella.)

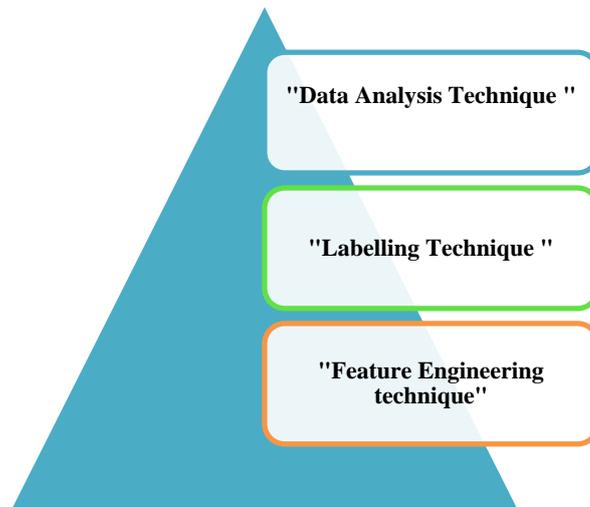


Figure 8: Different Techniques

(Source: Self-Created)

End to End Testing

End to end could be easily signified as the methodological software which can be imposed on any criteria for testifying the usefulness of the project system from start to finish. This testifying procedure evaluate every section of pwkr form the start point to the end point thereby creating a system base work enforcement for creating the project in a better form. This way any applicatory method could be easily analyzed by configuring all the major elements while the ongoing project.

Example

Testifying the webpage by “*End to end testing*” for *image analysis* could be easily signified as the exploratory factor for signifying the core areas of the mentioned criteria of testing. This testifying factor could easily consist of the tester and the developer for checking the webpage and developing actions related with the application. This way the **END TO END** testing can encompasses all the criteria of the webpage whether the webpage consists all the working criteria or not.

5. CONCLUSION

The above description has given the readers an insight into the use of image analysis for the development of “*artificial intelligence*” model. The image analysis with the consistent factor of face recognition will enable the readers to understand the efficiency of the system and cater to the areas where improvisation is needed. The various aspects of image analysis have been discussed in detail such as “*analogue image processing*”, “*digital image processing*”, and “*image pattern recognition*” and “*image acquisition*”. The study has been done to explore the techniques used to develop “*artificial intelligence*”. The advantages and disadvantages of using different techniques for the building of “artificial intelligence” models have been discussed in detail. These techniques include: “data analysis technique”, “labelling technique”, “feature

engineering technique”.

The pros and cons of these techniques have been discussed by the researcher. The key methods used in this particular strategic approach will enable the readers to understand the various aspects of the mentioned topic. The models are developed intended for the development of better quality image and the facility of face recognition. These facilities enhance the efficiency of the system. The advancement in science and technology will be beneficial for the development of new techniques that are much more innovative and will assist the users to perform better. There is a lot of scope for further research in the field of utilization of “image analysis" in "artificial intelligence".

The ideas and opinions that are brewing in the minds of young researchers will be beneficial for the development of better quality images in future. The techniques are analyzed for their role in the development of better techniques and the understanding of the processes that occurs in a particular system. The advancement in science and technology will be responsible for the scope of further research in this field. Spread of awareness among the masses regarding the scope of “image analysis” in “artificial intelligence” is a major contributing factor to the development in this field.

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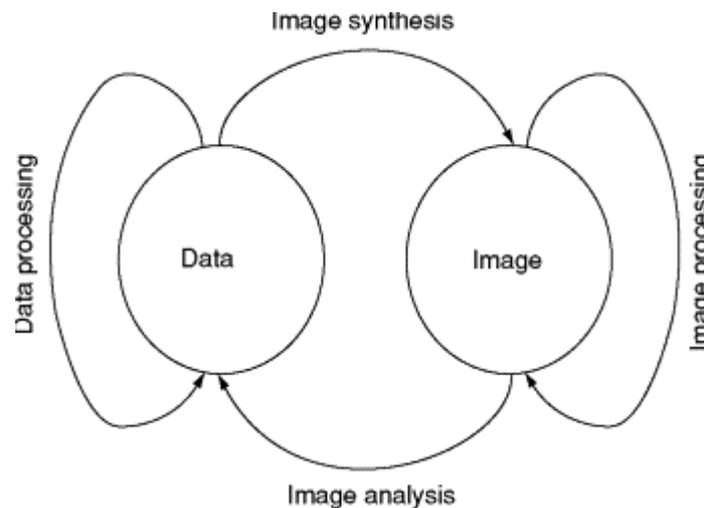
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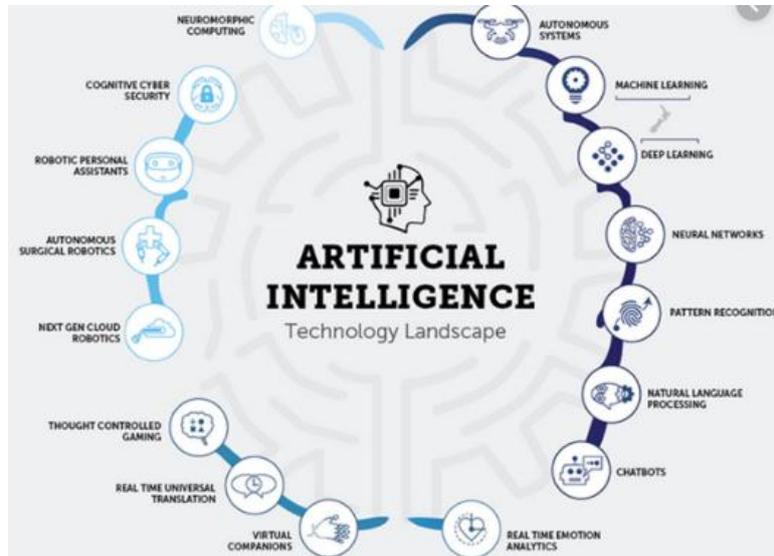
APPENDICES

Appendix 1: Overview of image analysis



(Source: <https://www.sciencedirect.com/topics/medicine-and-dentistry/image-analysis>)

Appendix 2: Artificial intelligence



(Source: <https://www.codingdojo.com/blog/dark-side-of-artificial-intelligence-ai>)

Appendix 3: Data analysis technique



(Source: <https://learn.g2.com/hs-fs/hubfs/data-analysis-process.png?width=650&name=data-analysis-process.png>)

