

# Systematic review of Artificial Intelligence: Its history and applications

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## ABSTRACT

Artificial Intelligence is a smartest and most advanced tool, that help giving machines and devices ability to think, work and behave like a human being. The following paper proclaims an introduction to Artificial Intelligence, history and its evolution, and its application. The research is being formed by examining various reports of previous researchers. Furthermore, one can find data related to Artificial Intelligence, computer vision, Machine Learning and its types, Geometrical Transformation, Transformation Matrix, OpenCV. To conclude, we put forward various current areas and recommendation of future aspects.

**Keywords:** Artificial Intelligence, computer vision, Geometrical Transformation, Transformation Matrix, OpenCV, Machine Learning and its types.

## 1 Introduction

Artificial Intelligence is a smartest and most advanced tool, that help giving machines and devices ability to think, work and behave like a human being. AI embodies a miscellaneous set of tools, ways, and algorithms, as shown in Figure 1, including neural networks, inheritable algorithms, emblematic AI, and deep learning [1]. Such technologies are manifesting and showing a rapid hike and making significant impacts in diverse areas like health care, space, robotics and defence. As numerous amounts of data, algorithms, and high-performance connectivity present at our conveyance. Artificial Intelligence will put on a new level of amenities and urbanity to future technologies.

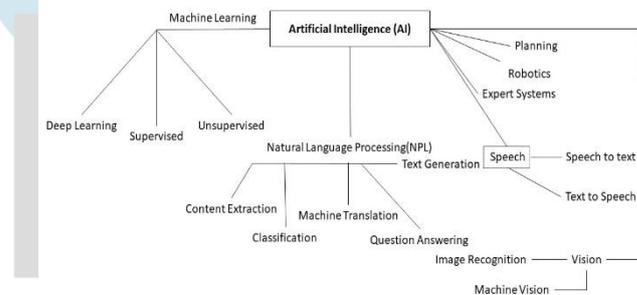


Figure 1: Subfields of AI

One of the major pretensions of AI field is to invent such agents that are completely adaptable to the surroundings, to work over time on their efficiency and improve their algorithms to reduce errors. As certain robots are being designed that on the basis of nature depicts their next step but still, an enormous amount of specific data is needed to provide accurate result. Nowadays, these technologies are being used in self-parking assistance, defining an illness by understanding the symptoms and personal assistance.

Computer Vision has gained a huge attention in the field of technology and innovation. [6-8] Many innovators, researchers, scientists and tech-giants like Amazon, Intel, etc. have developed many frameworks and other image processing and objects detection tools that have made the concept of computer vision much easier and has led to such an accurate results and predictions that has made possible to automate many real-world tasks. The development in the field of computer vision has led to a revolution in the automation of many real-life tasks which requires human interference due to their ability of capturing and visualizing the objects they observe. The development of the neural networks and deep learning has led to much lesser error rate even than the human beings. [8]

OpenCV which stands for Open-Source Computer Vision, is a cross platform library which is available for development and use on all the major platforms like Linux, Windows and MacOS in many programming languages like C++, Python, and Java. [6-8]

Image Processing is one of the features of OpenCV which provides us with many tools and built-in functions to enhance an image and apply various techniques like filtering, histograms, contours, or edge detection etc., or modify one or many of its parameters like colour values, colour spaces, brightness, and contrast, etc., or apply geometric transformations like resizing, scaling, rotating, warping, etc. on the images. [8]

Geometric transformations is a subset of the image processing module through which the geometry as well as geometrical parameters of an image can be modified as per the user's requirement. Geometry of the images can be transformed from any older Region of Interest (ROI; a number of different points lying on the image) to the newer ROI with the help of 2 major functions namely affine transformation and perspective transformation as well as a number of different handy built-in functions.

The advancement in the algorithms help in designing certain devices that are fruitful for the blind for instance, smart eye frames that consist speakers and camera, which can identify, the location, thing and surrounding and will give output via speaker for a blind person.

## 2 History and Evolution of AI

The Artificial Intelligence was introduced in 1950 by Alan Turing. Turing test was developed to check the capability of a machine's intelligence. The test result shows a hope and require knowledge representation, natural language, automated logic, vision etc for the full test. In the 1990s, the new conception of "intelligent agent" surfaced. An agent is a system that perceives its Terrain and undertakes actions that maximizes its chances of being successful [1].

## 3 Geometric Transformation

Geometrical transformation, in general, refers to as the modification of the geometrical attributes like height, width, geometrical shape, size, orientation and angle of the input image. Geometric transformation is defined as the changing of the image coordinate system in the 2D image plane.

Geometric transformation generally aims at changing the size (height and width) of the true image rather than changing the shape of the image. If the transformation does not let the size as well as shape of the input image to change, then it is known as rigid transformation whereas if only the size of the image changes and the shape of the image remains unchanged, then the transformation is called as non-rigid transformation.

Consider an image in the 2d plane depicted with the cartesian coordinate system (as shown in the Figure 2. (Left side)). OpenCV make the use of an approach to select every pixel on the image underlying in the ROI and then conform it into the newer specified ROI with the help of different transformation techniques.

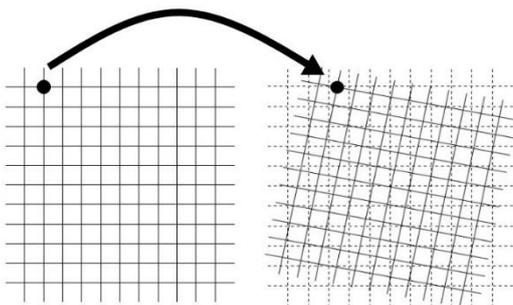


Figure 2: Shows the displacement of the pixel from the old location of the input image to the new location in the output image.

## 4 Applications and Future Scope

AI technology have been moving so fast, that these tools help to resolve the foremost tough problems in engineering and different fields. The current AI performance ranges between sub- human, optimal and super human performance. A wide range of tasks can be solved by such applications. [2]

Machine Learning has found its applications in diverse fields in the new era of technology and innovation. Whether it is industrial machines or domestic appliance, Machine Learning is very much essential in terms of productivity, accuracy, pace, etc. [7]

Furthermore, the use of AI to create other AI is common. Like the Google AutoML project, that include a different and advanced neural network topology.

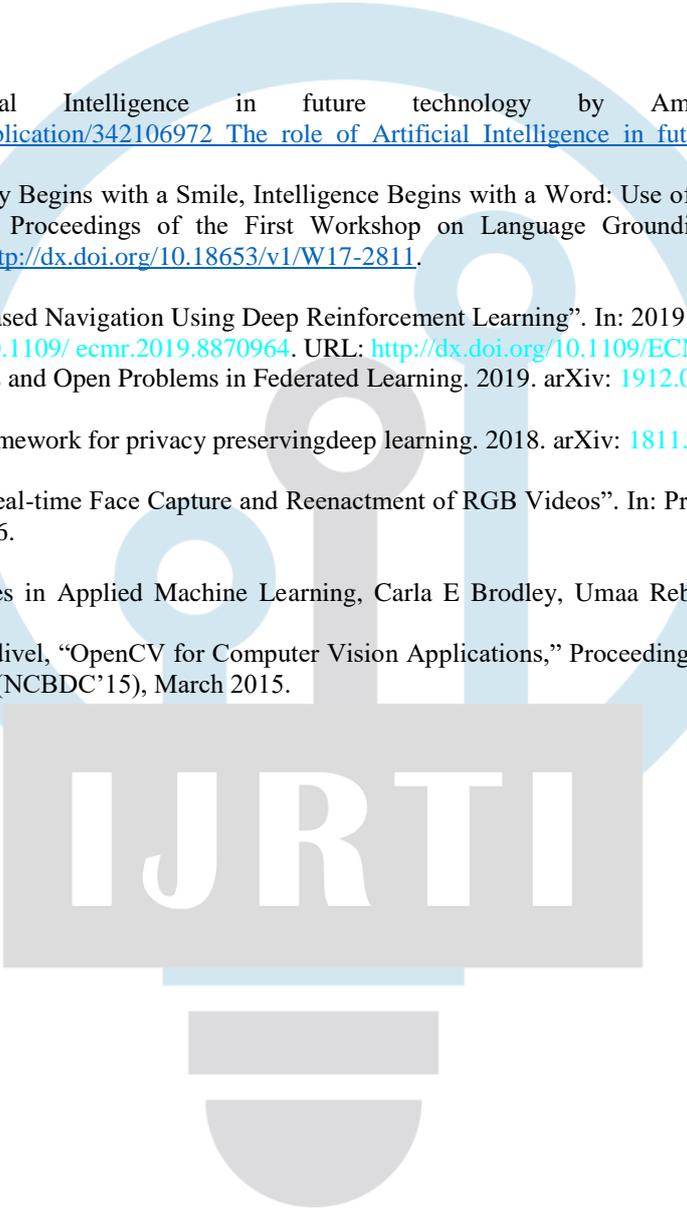
The research done by the research team from the visual computing group of the Technical University of Munich and Stanford University developed [6] face to face, a program which animates the face of a target person, transposing the facial expression of an exterior source.

## 5 Conclusion and recommendations

This paper focuses on the latest invention and various technologies used in today's market applying Machine learning and Artificial Intelligence methodologies. It also explains that Machine learning is the basic need for variety of social applications leading to new era of development and design along with ease to overcome human efforts. Whereas, rational and harmonic interactions are required between application specific projects and visionary idea to sustain the progress of AI. Most crucial of all if given the right time and data AI can rule the world and make it a different place for human to live in. It can be a Fruitful as well as stumbling block. However, used properly can cure each and every thing.

## References

- [1]The role of Artificial Intelligence in future technology by Amr Kayid (2020). URL: <https://www.researchgate.net/publication/342106972> The role of Artificial Intelligence in future technology
- [2] J. Novikova et al. "Sympathy Begins with a Smile, Intelligence Begins with a Word: Use of Multimodal Features in Spoken Human-Robot Interaction". In: Proceedings of the First Workshop on Language Grounding for Robotics (2017). DOI: [10.18653/v1/w17-2811](https://doi.org/10.18653/v1/w17-2811). URL: <http://dx.doi.org/10.18653/v1/W17-2811>.
- [3] J. Kulhanek et al. "Vision-based Navigation Using Deep Reinforcement Learning". In: 2019 European Conference on Mobile Robots (ECMR) (2019). DOI: [10.1109/ecmr.2019.8870964](https://doi.org/10.1109/ecmr.2019.8870964). URL: <http://dx.doi.org/10.1109/ECMR.2019.8870964>.
- [4] P. Kairouz et al. Advances and Open Problems in Federated Learning. 2019. arXiv: [1912.04977](https://arxiv.org/abs/1912.04977) [cs.LG].
- [5] T. Ryffel et al. A generic framework for privacy preserving deep learning. 2018. arXiv: [1811.04017](https://arxiv.org/abs/1811.04017) [cs.LG]
- [6] J. Thies et al. "Face2Face: Real-time Face Capture and Reenactment of RGB Videos". In: Proc. Computer Vision and Pattern Recognition (CVPR), IEEE. 2016.
- [7] Challenges and Opportunities in Applied Machine Learning, Carla E Brodley, Umaa Rebbapragada, Kevin Small, Byron C. Wallace, 2012.
- [8] M. Naveenkumar and A. Vadivel, "OpenCV for Computer Vision Applications," Proceedings of National Conference on Big Data and Cloud Computing (NCBDC'15), March 2015.



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