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Integrating Computer Vision Technologies into Public Establishments

Throughout recent years, artificial intelligence research has proven to be very successful due to its promising results and impact on society. Impressive improvements in accuracy, performance, and confidence allow researchers the opportunity to revolutionize the way people confirm their identity, preventing fraud by utilizing artificially intelligent videographic equipment. My research will focus on the application of computer vision using deep learning neural networks on facial recognition and identification. The research will be of interest to scholars specializing in computer vision, as well as, the general public. Integrating facial recognition software into public establishments such as, banks and consumer markets, will prevent fraudulent activities and offer society a sense of security.

Computer vision and Big Data produce astonishing results in translating text between languages in Don Monroe research in textual translation. Progress in image recognition and speech analysis are attainable with data-intensive deep learning techniques. One of the obstacles faced during this experiment was how to measure the quality of a translation. Due to the number of intricacies in each language, interpreting one language from another is very challenging. Post-research opportunities include discovering a method to evaluate the accuracy of a translation without relying on a human to analyze the translation. Additionally, they are still unsure about steps to take after achieving “perfect” translation.

Daniel Bone demonstrates how processing signals with artificial intelligence strengthens diagnostics in autism spectrum disorder. Since machine learning techniques are still a relatively

recent technology, it has proven to not be effective and could lead to uncertain and misleading results due to one of the most prominent weakness, the necessity of an extensive amount of data. The points of failure consists of a lack of information that the neural networks need in order to come to an accurate conclusion. Conversely, James H. Thrall et al., discuss the successes of utilizing deep learning algorithms in Radiology. Furthermore, extending from the previous article, the successes of handling tasks that can be broken into smaller patterns that a computer can recognize with sufficient training data cement the fact that machine learning algorithms improve performance and confidence of its findings. The Ye Yao et al. discusses how computer vision has proven to be adaptable and easily integratable to several unique fields of study. Reviewing previous articles, this ranges from self-driving cars to medical implications. Since there is a surplus of facial data, I can utilize an artificially intelligent pattern-based recognition system to avoid previous mistakes that led to inconclusive results. In my research I will focus on obtaining an adequate amount of data in order to successfully train my deep learning model for facial recognition.

The primary objective of my research would be to verify consumer identity by using facial recognition software integrated into cameras. Building a deep learning neural network would require an enormous amount of training data that consists of images of people's faces. By giving the model these images, it can break down the image into individual pixels where it would store and remember the pattern of pixels. After feeding the network with enough information, it would be able to conclude with a percentage that indicates likeliness the image matches with the person. The most strenuous task of the research would be finding an acceptable amount of images and understanding the relationship between the data and the model.

In order to train my deep learning neural network I need to feed the model with as much data as possible. The more information the model has access to, the higher the performance, accuracy, and confidence it has. There are several ways I can gather images of people's facial features. One way is to start a Google Form where participants input their name and attach a head-shot of themselves. The research would require a diverse, non-bias collection of candidates. Another way to build the database would be to scrape the internet for images of people's faces. In order to avoid inaccurate results, I would need to focus on acquiring the data as randomly as possible and making sure the subjects do not skew towards a group of people.

To prevent previous mistakes in artificial intelligence research, I would need to have an adequate surplus of data before coming to any conclusions based on my model. Data is the key to ensure high confidence rates when deciding the identity of a person. It is imperative to be incredibly accurate to meet quality of service requirements when integrating this system in industry. Customer satisfaction will decrease if the model wrongly accuses a customer of impersonation.

Facial identification would be useful in improving the way-of-life aspects of shopping and verifying individuals at establishments, such as banks. Instead of checking out of the market face-to-face with an employee, one could simply grab whatever they need and walk out of the building. After exiting the market, the person would receive a receipt of payment that is automatically billed to their account. Another innovative implementation of this research would be to install the software onto existing camera equipment in banks. As soon as a customer is spotted by the system, the person's identity is verified and can seamlessly withdraw and deposit money. One of the drawbacks of integrating a facial recognition system would be the ethical and

privacy issues that arise. Cameras would always be watching your every move, knowing exactly where you have been throughout the day. With rapid development of technological advancements comes social distrust and ethical dilemmas. A way to combat these problems would be to find a middle ground where there is social compromise. Further research would be needed to satisfy the ethical aspect of the experiment.

My research will contribute to enterprise, as well as, scholars specializing in deep learning techniques. Implementing an authentication system using video cameras will change people's way-of-life, especially in industry. Facial identification methods are already being used on mobile devices. Furthering this technology to work under suboptimal conditions would be a difficult obstacle to overcome, but it will be accomplished. There are many hurdles that have hindered previous researchers and it is my job to learn from their mistakes and produce a state-of-the-art technology that changes the world.

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