Body Anomaly Detection through 3D Body Scanning, Image Processing, and Machine Learning

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Many worldwide citizens go through medical attention and face improper diagnoses and treatment, which can lead to life-threatening circumstances. In the U.S. alone, 12 million patients are misdiagnosed every year, costing the U.S. economy $750 billion dollars. This ongoing issue lead me to design and develop a cost-effective, preventive care-based system that safely detects and defines skin anomalies on patients. The system produces a detailed 3D body scan of any patient by utilizing a motorized stand-on turntable and a linear rig moving a Kinect camera vertically. The scan is then processed by the differentiating algorithm that finds the locations of anomalies including body changes, since the last 3D scan. A more detailed image of the found locations of anomalies is then captured to be best interpreted by a machine learning application, which was trained on multiple datasets of skin anomalies. My developed system would assist professionals in the medical field to accurately identify and treat skin anomalies through an algorithm instead of human interpretation. This utilization saves the medical field time and money while providing a higher level of precision and tracking of skin/body threats. The results were obtained by having test human subjects undergo two 3D Body scans a week apart. The second scan entailed additional differences drawn using skin safe makeup and skin anomaly stickers. The system detected all anomalies added with a prediction probability of 90%. The solution proved highly accurate, for the results promise to further revolutionize the medical field and facilitate a healthier generation.

Awards Won: