TECHNOLOGY

Robotic System for Remote Trauma Assessment

OVERVIEW

Background:

According to the Center for Disease Control (CDC), trauma from injuries obtained in motor vehicle accidents, gunshots, and unintentional falls are the third leading cause of death in the United States. There exists a short time window, the “Golden Hour”, within which appropriate medical interventions must be employed to increase the chances of survival. Currently there are no strategies to examine internal bleeding of individuals experiencing trauma in emergency medical settings prior to hospitalization. Ultrasound imaging is the best imaging modality for diagnosis and interventional procedures due to its low operating cost and high availability. However, highly skilled personnel in fixed office or hospital settings operate these systems. Robotically assisted ultrasound imaging systems that will enable autonomous imaging with teleoperating capabilities show promise in delivering life saving imaging information in the critical moments after serious trauma. This will facilitate the employment of ultrasound imaging in remote areas or emergency situations that would not necessarily have skilled personnel. This would save lives.

Invention:

Researchers from the University of Maryland have invented a semi-autonomous robotic ultrasound system to be specifically used in emergency vehicles such as ambulances and helicopters for first responders. This user independent robotic ultrasound system is enabled with a force feedback mechanism that would perform a focused assessment with ultrasound for trauma (FAST) scan using 2D and 3D images of the torso of a patient. The system is capable of avoiding surface wounds and bandages that are susceptible to, further internal bleeding, contamination and infection. The robotic system utilizes an in-arm 3D camera and machine learning algorithms to scan and detect the location and type of wounds on the patient’s body so that autonomous wound avoidance algorithms guarantee a safe and non-invasive FAST scan. Moreover, for further required assessments, the robotic system can also be telemanipulated on the way by a radiologist located at the hospital. Initial results from the robotic system have demonstrated a scan time of about 16 min which when performed en route, save time on diagnosis and treatment upon arriving at the hospital. Furthermore, real-time images obtained by the robot are of similar quality to manual scan with more stability and higher contrast. The robot also reduces the physical workload of the operator since it precisely applies the required forces on the probe.

Benefits:
· Semi-autonomous
· Portable
· Fast imaging of critical region (less than 20 min)
· Does not require skilled personnel to operate

Applications:
· Emergency systems
· Remote regions with no access to hospitals
· Teaching institutions

· Veterinary hospitals and Animal studies

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Additional Information

INSTITUTION

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PATENT STATUS

Pending

EXTERNAL RESOURCES

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