Minnesota, USA ♦ 612-501-6482 ♦ robert.connor@medibotics.com

Medibotics Smart Clothing with Sensors for Motion Capture: 9/15/2025

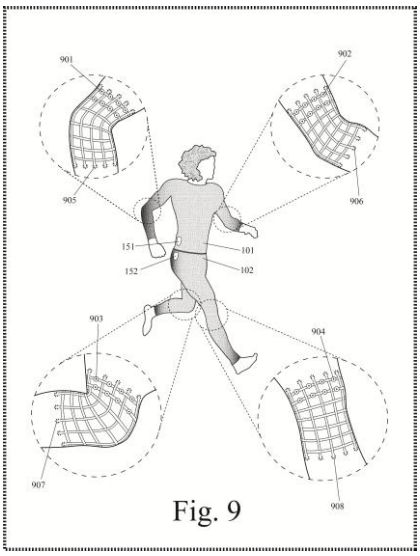

Fig. 9

Medibotics' work on smart clothing has focused on motion recognition clothing for body motion capture, including measuring joint configurations and posture. Motion recognition clothing has applications for sports and exercise, work injury avoidance, medical diagnosis and rehabilitation, and human motion capture in VR/AR environments. It can incorporate multiple sensor types (e.g. resistive/capacitive bend sensors, inertial sensors, and EMG sensors) which span joints at different angles. The strengths and weaknesses of these different sensor types are complementary. For example, inertial sensors are limited by drift and stretch sensors are limited by hysteresis. They compensate for both when used together.

Medibotics started with microfluidic bend sensors over ten years ago and evolved to include EM bend sensors, circumferential EMG sensors, optical sensors, and inertial sensors. Medibotics has not launched a product yet, but has been successful in IP development and prototyping by sponsoring teams of engineering students. These teams have measured the relationships between sensor outputs and joint angles for both hinge and ball-and-socket joints.

Medibotics' IP portfolio for wearable sensors has been cited in review of patent applications by: Activision, Adidas, Amazon, Apple, Bebop Sensors, Calif Inst Tech, Cipher Skin, Ctrl-Labs, Disney Enterprises, Electronic Arts, EPFL, Figur8, Finch Tech, Fitbit, Google, Immersion Corp, Kinaptic, L.I.F.E. Corp, MAD Apparel, Magic Leap, MC10, Medtronic, Meta, Microsoft, Myant, Nike, Oculus, Oura Health, Panasonic, Philips, Polar Electro, Prevayl, Qualcomm, Samsung, Snap, SONY, Tactual Labs, Texavie, Under Armour, Wearable Devices Ltd., and Whoop.

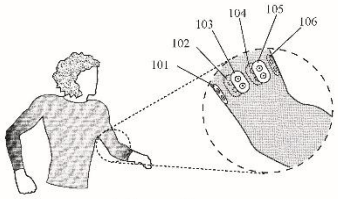

Fig. 1

Medibotics' IP motion recognition portfolio includes the following:

♦ 2025-01-16 U.S. patent application https://patents.google.com/patent/US20250152064 (pending) "Electromyographic Clothing"

♦ 2024-09-29 U.S. patent application https://patents.google.com/patent/US20250017530 (pending) "Motion Recognition Clothing (Wearable Device for Measuring Full-Body Configuration and Motion)"

♦ 2023-09-15 U.S. patent application https://patents.google.com/patent/US20240000383 (pending) "Motion Recognition Clothing™ with Inertial Sensors and Electrical or Optical Strain Sensors"

♦ 2022-04-15 U.S. patent https://patents.google.com/patent/US11892286 "Motion Recognition Clothing ™ with an Electroconductive Mesh"

♦ 2021-06-23 U.S. patent https://patents.google.com/patent/US11304628 "Smart Clothing with Dual Inertial Sensors and Dual Stretch Sensors for Human Motion Capture"

♦ 2020-01-24 U.S. patent https://patents.google.com/patent/US11071498 "Smart Clothing with Inertial, Strain, and Electromyographic Sensors for Human Motion Capture"

♦ 2019-08-16 U.S. patent https://patents.google.com/patent/US10839202 "Motion Recognition Clothing with Flexible Optical Sensors"

♦ 2019-01-26 U.S. provisional patent application 62797266 (expired) "Smart Clothing with Stretch Sensors and/or EMG Sensors"

♦ 2018-09-06 U.S. provisional patent application 62727798 (expired) "Motion Recognition Clothing with Flexible Optical Sensors"

♦ 2018-06-25 U.S. patent https://patents.google.com/patent/US10921886 "Circumferential Array of Electromyographic (EMG) Sensors"

♦ 2018-06-16 U.S. patent https://patents.google.com/patent/US10602965 "Wearable Deformable Conductive Sensors for Human Motion Capture Including Trans-Joint Pitch, Yaw, and Roll"

♦ 2018-06-11 U.S. provisional patent application 62683237 (expired) "Wearable Deformable Conductive Sensors for Human Motion Capture Including Trans-Joint Pitch, Yaw, and Roll"

♦ 2018-04-23 U.S. patent application https://patents.google.com/patent/US20180239469 (abandoned) "Touch-Based Human-to-Computer Textile Interface"

♦ 2017-09-12 U.S. patent https://patents.google.com/patent/US10716510 "Smart Clothing with Converging/Diverging Bend or Stretch Sensors for Measuring Body Motion or Configuration"

♦ 2017-07-30 U.S. provisional patent application 62538793 (expired) "Motion Recognition Fabric"

♦ 2017-01-24 U.S. provisional patent application 62449735 (expired) "Smart Clothing with Converging/Diverging Bend or Stretch Sensors for Measuring Body Motion or Configuration"

♦ 2016-08-03 U.S. patent https://patents.google.com/patent/US10321873 "Smart Clothing for Ambulatory Human Motion Capture"

♦ 2016-07-02 U.S. provisional patent application 62357957 (expired) "Motion Recognition Clothing ™ with a Combination of Inertial Motion Sensors and Stretching/Bending Motion Sensors"

♦ 2016-04-17 U.S. patent https://patents.google.com/patent/US9891718 (expired) "Devices for Measuring Finger Motion and Recognizing Hand Gestures"

♦ 2016-03-24 U.S. patent https://patents.google.com/patent/US10234934 "Sensor Array Spanning Multiple Radial Quadrants to Measure Body Joint Movement"

♦ 2015-07-09 U.S. patent application https://patents.google.com/patent/US20150366504 (abandoned) "Electromyographic Clothing"

♦ 2015-07-02 U.S. provisional patent application 62187906 (expired) "Introduction and Further Examples of Electromyographic Clothing"

♦ 2015-06-20 U.S. provisional patent application 62182473 (expired) "Customized Electromyographic Clothing with Adjustable EMG Sensor Configurations"

♦ 2015-06-11 U.S. patent application https://patents.google.com/patent/US20150370320 (abandoned) "Smart Clothing with Human-to-Computer Textile Interface"

♦ 2015-04-22 U.S. provisional patent application 62150886 (expired) "Nerd of the Rings: Devices for Measuring Finger Motion and Recognizing Hand Gestures"

♦ 2015-03-21 U.S. patent https://patents.google.com/patent/US9582072 "Motion Recognition Clothing™ with Flexible Electromagnetic, Light, or Sonic Energy Pathways"

♦ 2014-12-01 U.S. provisional patent application 62086053 (expired) "Electromyographic Clothing"

♦ 2014-10-17 U.S. provisional patent application 62065032 (expired) "Electromyographic Clothing: Work In Progress"

♦ 2014-08-20 U.S. patent https://patents.google.com/patent/US9588582 (expired) "Motion Recognition Clothing™ with Two Different Sets of Tubes Spanning a Body Joint"

♦ 2014-06-20 U.S. provisional patent application 62014747 (expired) "Modular Smart Clothing"

♦ 2014-04-08 U.S. provisional patent application 61976650 (expired) "Motion Recognition Clothing ™ with Electromagnetic, Light, or Sonic Energy Pathways"

♦ 2013-09-17 U.S. provisional patent application 61878893 (expired) "Motion Recognition Clothing ™ with Two Different Sets of Tubes Spanning a Body Joint"

♦ 2013-08-28 U.S. provisional patent application 61870884 (expired) "Motion Synchronization and Coordination Using Wearable Technology"

♦ 2009-01-03 U.S. patent https://patents.google.com/patent/US7977807 (expired) "Wearable Device to Generate Electricity from Human Movement"

♦ 2008-04-01 U.S. patent https://patents.google.com/patent/US7980141 (expired) "Wearable Position or Motion Sensing Systems or Methods"