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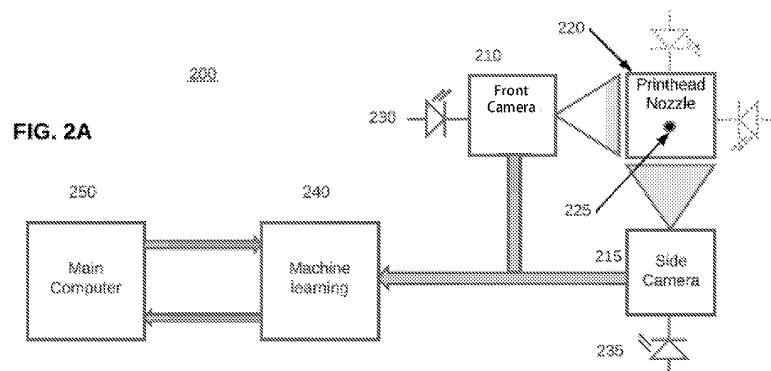
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(54) Title: MICROFLUIDIC-BASED FIBER FORMATION METHODS AND SYSTEMS



(57) Abstract: Microfluidic-based fiber formation methods and systems employ a computer vision and deep learning system and method to enable contactless sensing, analysis, and monitoring of key operational parameters within microfluidic crosslinking printheads on 3D bioprinters. Embodiments may employ object detection and/or semantic segmentation to facilitate the sensing, analysis, and monitoring. Deep learning can employ convolutional neural networks to localize and analyze the flow of different biological materials within the microchannels as well as to identify the operation of various microfluidic printhead on-chip components that can impact final quality of printed tissues. Printed tissues can include single-material fibers, including hollow filozers, as well as more complex coaxially-layered fibers.

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