Application-Specific Microfluidic Networks FAIZ K. MOHAMMAD,
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Microfluidic devices have applications in various fields. This paper reports a simple
approach for designing application-specific microfluidic networks with low effort and
time. Here, we also demonstrate how this approach can be utilized to find networks
that can perform logic computations based on droplets motion inside the network.
We applied our approach to find networks that can control the motion of drops for
logical computations, i.e., AND (.) gate where a drop will emerge from an arm only
if drops enter the network simultaneously and OR (+) where a drop will emerge
from an arm, whenever drops enter the network. Finding a device which can do
AND (.), OR (+) logic computations might be easy (has been demonstrated) and
can be achieved by trial and error. However, for more complex logical operations,
trial and error approaches will be time consuming and unreliable. However, the
proposed approach can handle these problems quite easily. This approach can also
work with multiple drops entering from different source positions into the network
to be used in more complex logical operations. We will describe computationally
identified device designs for such logic computations in this work.

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