

Automated Air Removal Device for Infusion Pump
(Technical Report)

For a Free and Open Web: The Fight for Net Neutrality
(STS Research Paper)

An Undergraduate Thesis Portfolio
Presented to the Faculty of the
School of Engineering and Applied Science
In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science in Computer Engineering

by

Bradley Lund

May 10, 2021

Preface

System efficiency gains are generally desirable but may introduce unanticipated and undesirable effects. In healthcare, media, and other sectors, study of such effects may disclose means of better managing them.

A device to automate the currently accepted technique for removing air from an IV line would decrease the burden on healthcare workers and improve patient experience. This device will be an appendage of industry standard infusion pumps, which presently set off an alarm when air is detected in the line. Rather than requiring a nurse to manually interfere with the line, our device will be given a window of time to carry out a mechanical action consisting of powering vibration motors at various strengths and lengths of time via a PWM signal to move the air upwards into the IV bag. The device will be controlled by an MSP432 and powered through a wall transformer.

Net neutrality as a term was coined in 2003, but the concept was applied to radio and telephony networks in the 1930s. Debate began in the 1990s for extending these common carrier regulations to the Internet. While both pro- and anti-net neutrality groups appeal to generalized ideals of freedom, innovation, and public good, they have greatly differing interpretations and implementations of these ideals due to conflicting social and economic ideologies. Pro-net neutrality groups include consumer advocacies and civil rights activists, while anti-net neutrality groups include Internet Service Providers (ISPs) and market-oriented think tanks. Content providers (CPs) are divided. Since 2010, these groups have competed to influence public opinion and to gain a favorable regulatory and legislative environment.

List of Contents

1. Technical Report: Automated Air Removal Device for Infusion Pump
2. Sociotechnical Research Paper: For a Free and Open Web: The Fight for Net
Neutrality
3. Prospectus