Carburetor Automator

UtahState University
ELECTRICAL AND COMPUTER ENGINEERING

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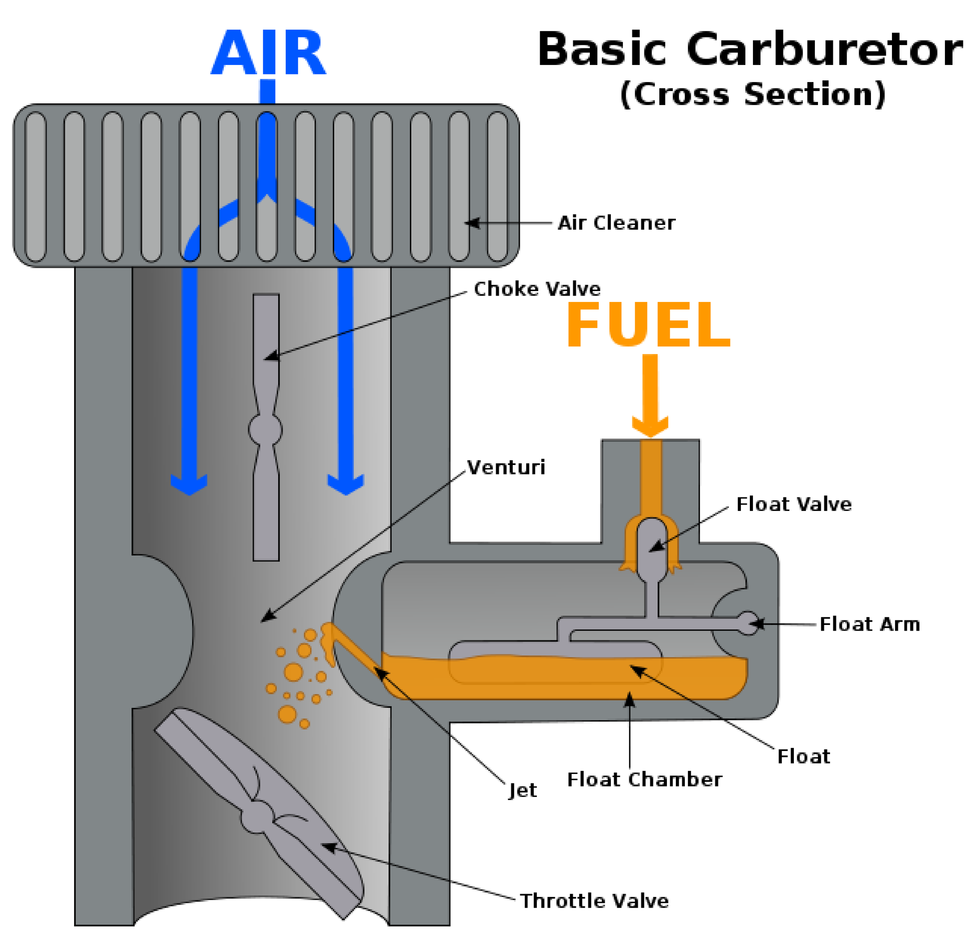
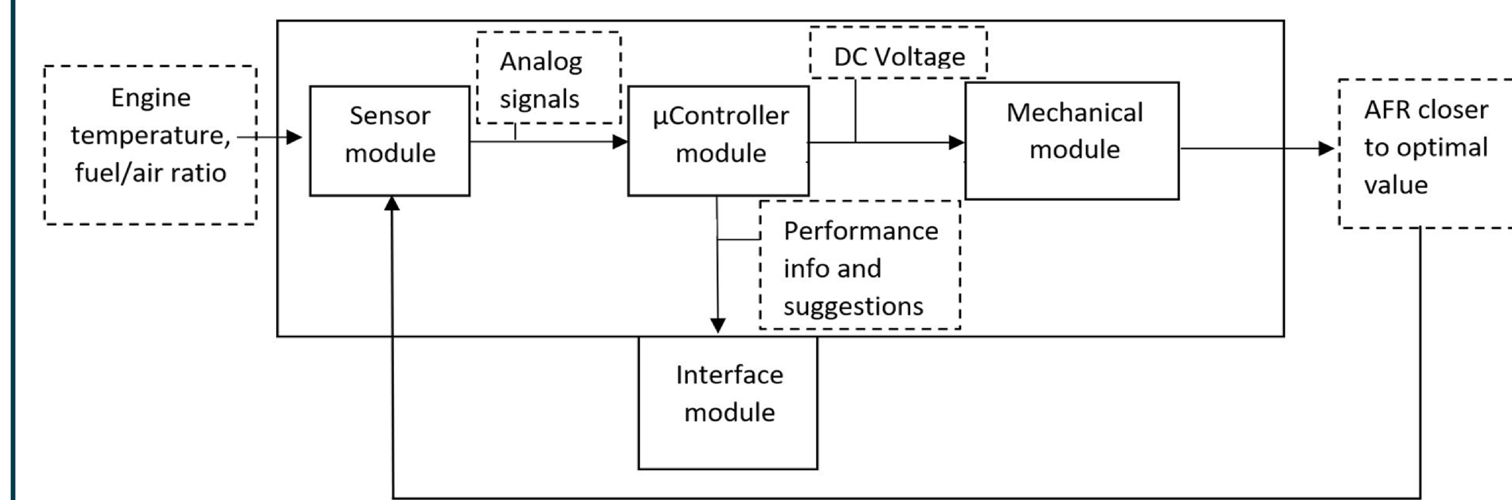
Project

The goal of this project is to improve the air-to-fuel ratio (AFR) delivered in carbureted engines. The AFR affects the power, gas consumption, emissions, and lifetime of an engine. Carburetors use two adjustable flaps and a fixed-diameter, narrow tube to deliver air and fuel to the engine.

Ideally, the proportions of this mixture should be constant, though the absolute amounts should vary. This is not achieved with conventional carburetion. To produce a more ideal AFR, adjustments need to be made to the carburetor dynamically (during engine operation).

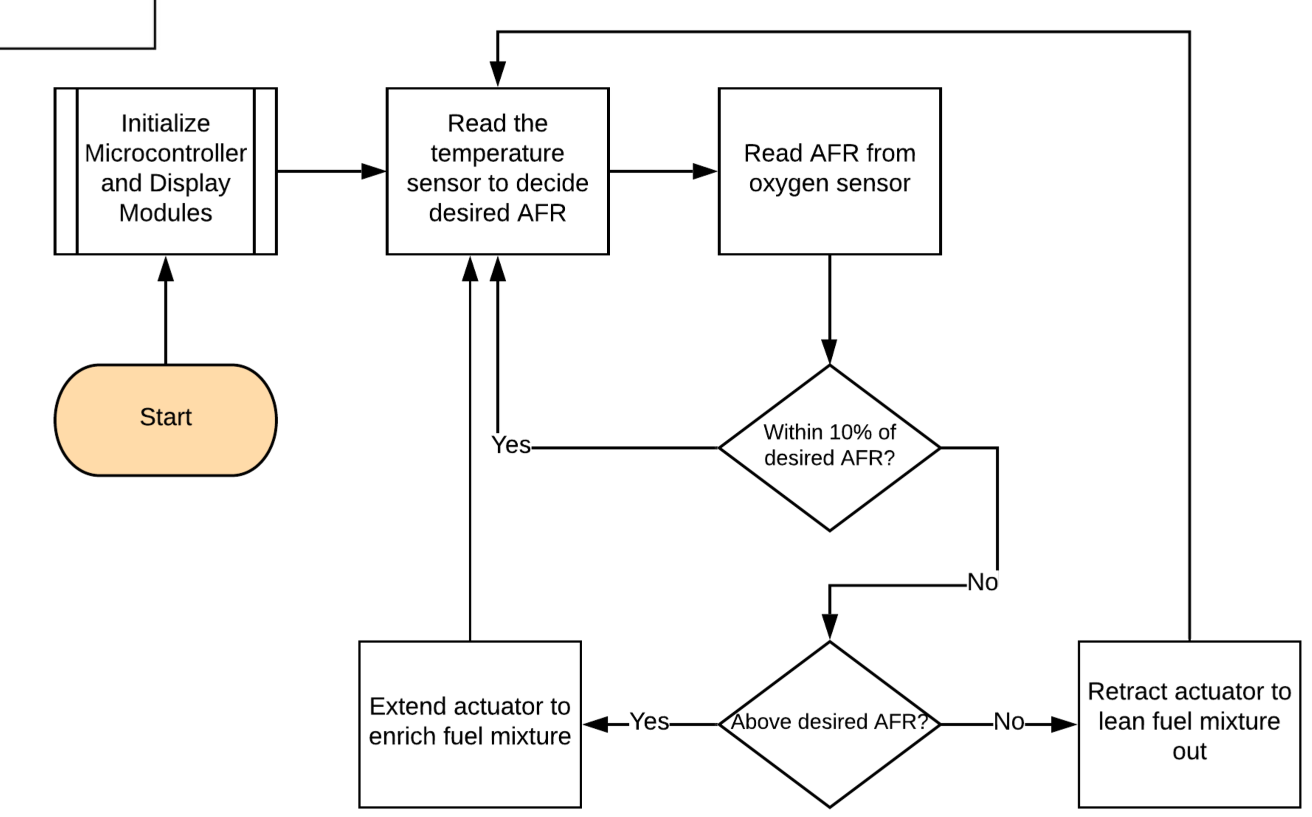


System



Modular Overview of the system with data flow (above/left)

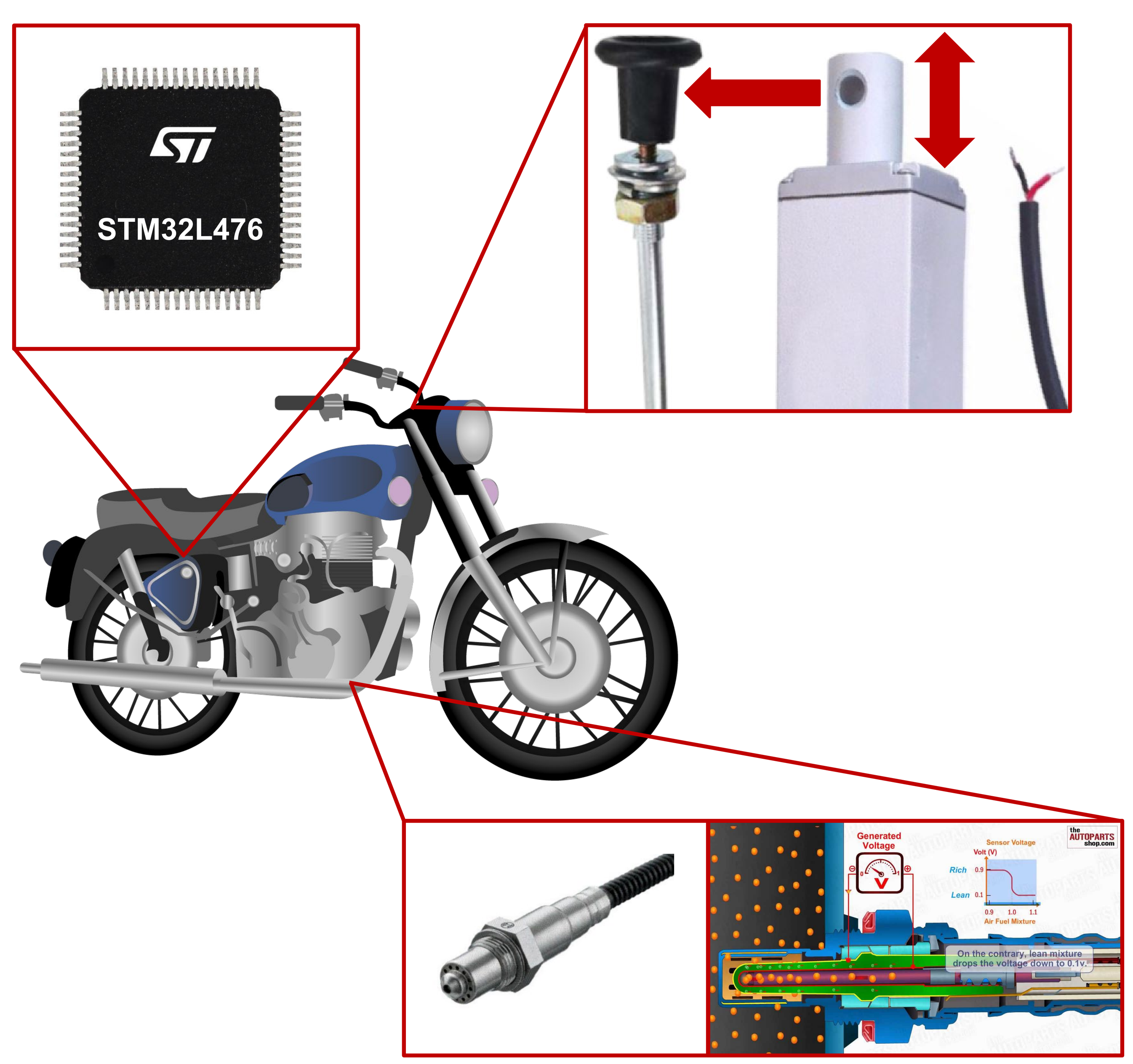
Functional Flow-chart of the system (below/right)



Methods

To improve the performance of the carburetor:

- Lambda oxygen sensor in the exhaust stream determines the current AFR
- Temperature sensor in the oil reservoir reads engine temp, determines desired AFR
- Linear-motion actuator pushes/pulls the choke plunger of the carburetor
- Microcontroller reads sensor data and makes adjustments with the actuator
- LCD displays sensor information and safety messages to the user



Conclusion

- The microcontroller code is able to correctly read from the sensors and control the choke actuator
- All data presented through the Display Module is responsive and accurate
- Error detection and stop conditions are functional and effective
- Our system provides a baseline model for using EFI principles to improve carbureted engines

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Image sources: https://en.wikipedia.org/wiki/File:Carburetor.svg, screenshot from https://www.youtube.com/watch?v=Fl3aD1qJrEg, https://www.pngfly.com/png-1jqm7x/