



Automatic Control of the System Interface for Wind Turbines

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Objectives

Create an automated program to run and shut down SDSM&T's wind turbines.

Procedure

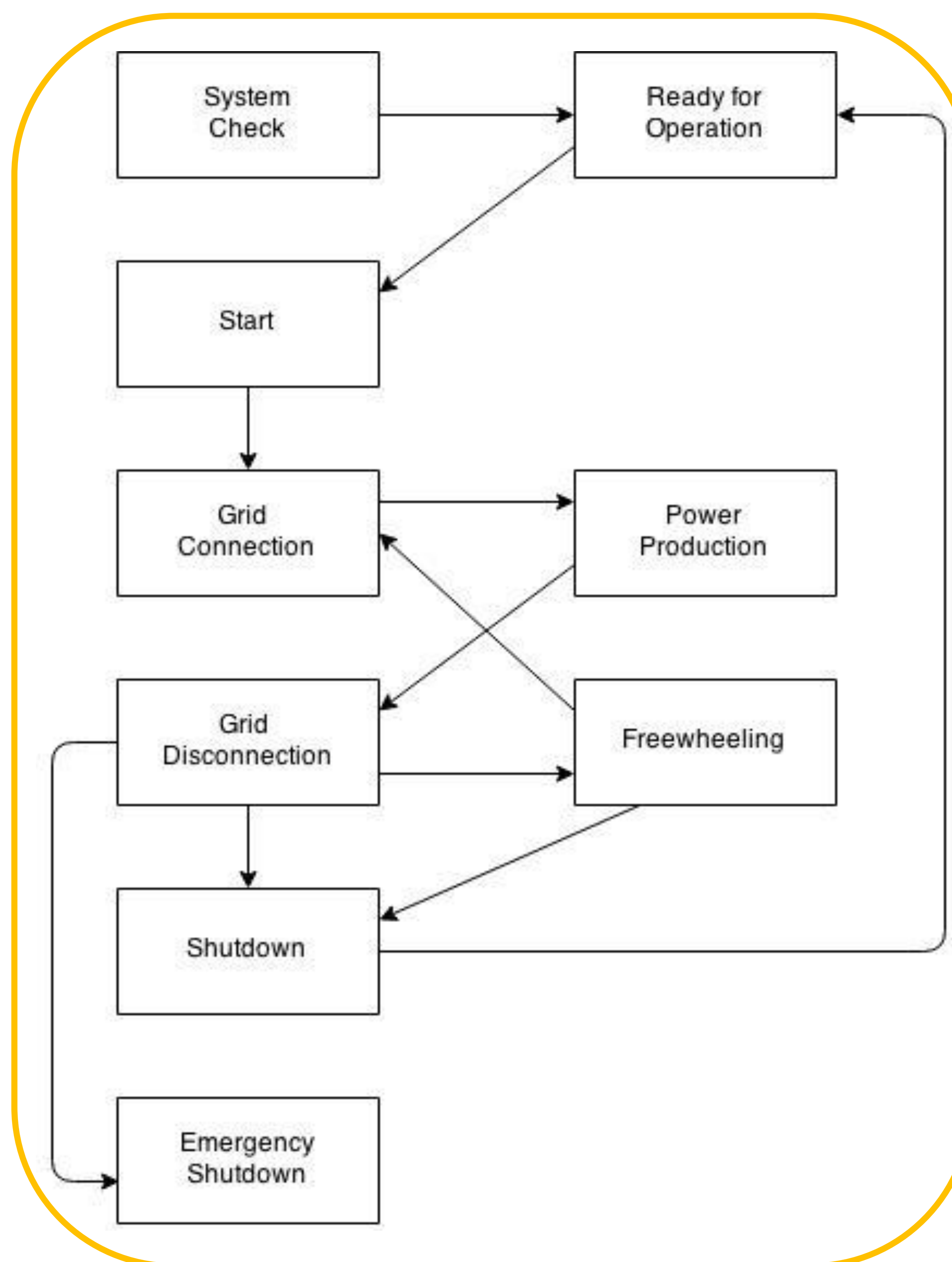
Using a control box previously constructed, code was written using an Arduino processor, using the C language. This program was then installed on the teensyduino processor inside the control box. This ran the program continuously, sending commands based on the condition of the wind.

Automatic Commands

Wind Speed (mph)	Automatic Control
0-10	<ul style="list-style-type: none"> Turbine Brake on Turn into wind
10-30	<ul style="list-style-type: none"> Turbine Brake off Turn into wind
30+	<ul style="list-style-type: none"> Turbine Brake on Turn out of wind

System Protocol

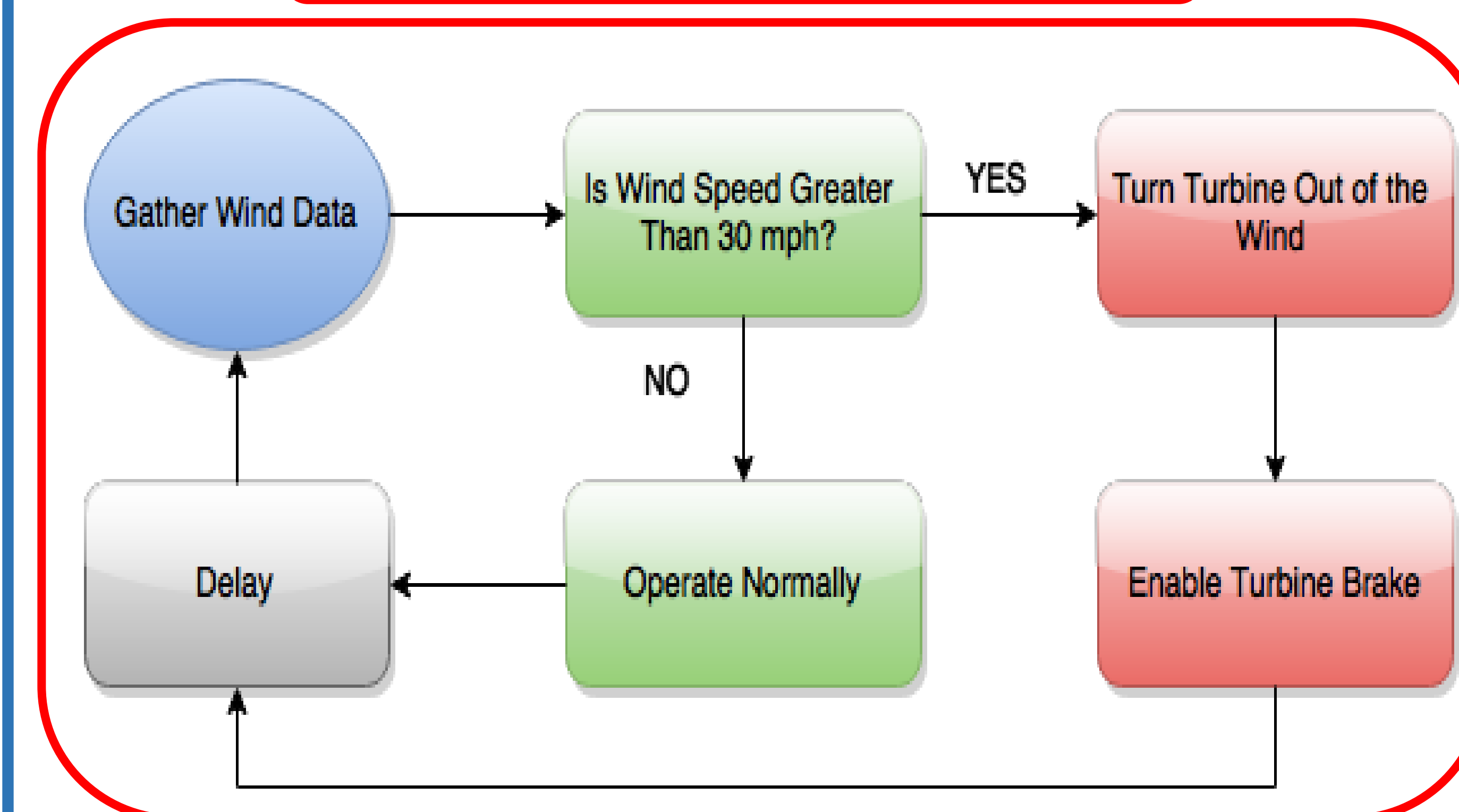
Turbines operate in two modes, idle and system check. Idle modes run continuously, while system checks are quick, eventually returning to an idle state.



Abstract

When operating in extreme wind conditions, wind turbines generate excess amounts of energy. This eventually leads to catastrophic failure, and the turbine becomes inoperable. To combat this, software was created to automatically check wind conditions. When wind velocity hits a critical level, the software shuts down the turbine. Thus, the turbine avoids failure without depending of manual oversight.

Emergency Shutdown



Conclusion

The control box can successfully read data from a weather station and turn the turbine based on the data from the wind. Future work should be done to experimentally find when the turbine should operate at full capacity.

Acknowledgements

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