WHAT IS CLAIMED IS:

1. A self-driving vehicle (SDV) comprising:

a plurality of sensors generating sensor data indicative one or more views of a surrounding area of the SDV; and

a control system to execute instructions that cause the control system to:

detect one or more conditions relating to an operation of the SDV;

select a set of sensors from the plurality of sensors based on performance characteristics of each of the plurality of sensors associated with the detected one or more conditions; and

prioritize the sensor data generated from the selected set of sensors to control one or more aspects relating to the operation of the SDV based on the performance characteristics of each of the plurality of sensors in the detected one or more conditions relating to the operation of the SDV.

2. The SDV of claim 1, wherein detecting the one or more conditions includes receiving contextual information from a network service over a network.

3. The SDV of claim 1, wherein the control system detects the one or more conditions by analyzing the sensor data.

4. The SDV of claim 1, wherein the one or more conditions relating to the operation of the SDV include weather conditions, current speed of the SDV, time of day, ambient lighting, and road conditions.

5. The SDV of claim 1, wherein a plurality of sensor priority rules are applied to the detected one or more conditions to select the set of sensors.

6. The SDV of claim 5, wherein the plurality of sensor priority rules include one or more weights to apply to the sensor data from one or more of the plurality of sensors, and the control system prioritizes the sensor data based on the one or more weights.

7. The SDV of claim 6, wherein the plurality of sensor priority rules and/or the one or more weights are based on the performance characteristics of each of the plurality of sensors in a plurality of conditions relating to the operation of the SDV.

8. The SDV of claim 1, wherein the one or more aspects relating to the operation of the SDV include detecting one or more objects in an environment around the SDV.

9. The SDV of claim 8, wherein the control system prioritizes the sensor data generated from the selected set of sensors to assign an object classification to each of the one or more objects.

10. The SDV of claim 1, wherein the one or more aspects relating to the operation of the SDV include localization, prediction, and motion planning.

11. A non-transitory computer readable medium storing instructions that, when executed by a control system of a self-driving vehicle (SDV), cause the control system to:

detect one or more conditions relating to an operation of the SDV;

select a set of sensors from a plurality of sensors based on performance characteristics of each of the plurality of sensors associated with the detected one or more conditions, the sensors are configured to generate sensor data indicative of one or more views of a surrounding area of the SDV; and

prioritize the sensor data generated from the selected set of sensors to control one or more aspects relating to the operation of the SDV based on the performance characteristics of each of the plurality of sensors in the detected one or more conditions relating to the operation of the SDV.

12. The non-transitory computer readable medium of claim 11, wherein detecting the one or more conditions includes receiving contextual information from a network service over a network.

13. The non-transitory computer readable medium of claim 11, wherein the control system detects the one or more conditions by analyzing the sensor data.

14. The non-transitory computer readable medium of claim 11, wherein the one or more conditions relating to the operation of the SDV include weather conditions, current speed of the SDV, time of day, ambient lighting, and road conditions.

15. The non-transitory computer readable medium of claim 11, wherein a plurality of sensor priority rules are applied to the detected one or more conditions to select the set of sensors.

16. The non-transitory computer readable medium of claim 15, wherein the plurality of sensor priority rules include one or more weights to apply to the sensor data from one or more of the plurality of sensors, and the control system prioritizes the sensor data based on the one or more weights.

17. The non-transitory computer readable medium of claim 16, wherein the plurality of sensor priority rules and/or the one or more weights are based on the performance characteristics of each of the plurality of sensors in a plurality of conditions relating to the operation of the SDV.

18. The non-transitory computer readable medium of claim 11, wherein the one or more aspects relating to the operation of the SDV include detecting one or more objects in an environment around the SDV.

19. The non-transitory computer readable medium of claim 18, wherein the control system prioritizes the sensor data generated from the selected set of sensors to assign an object classification to each of the one or more objects.

20. A computer-implemented method of operating a self-driving vehicle (SDV), the method being performed by a control system of the SDV and comprising:

obtaining, from a plurality of sensors onboard the SDV, sensor data indicative of one or more views of a surrounding area of the SDV;

detecting one or more conditions relating to an operation of the SDV;

selecting a set of sensors from the plurality of sensors based on performance characteristics of each of the plurality of sensors associated with the detected one or more conditions; and

prioritizing sensor data generated from the selected set of sensors to control one or more aspects relating to the operation of the SDV based on the performance characteristics of each of the plurality of sensors in the detected one or more conditions relating to the operation of the SDV.