CLAIMS

What is claimed is:

1. A system for biomass detection and feed control in an aquaculture environment, the system comprising:

an aquaculture cage for containing a plurality of fish;

a feed supply for the aquaculture cage;

one or more sensors configured for disposal on or within the aquaculture cage; and

one or more computer processors programmed to perform operations comprising:

obtaining data derived from the one or more sensors;

using one or more machine learning models that receive the data as input and provide as output a determination of at least one of a fish biomass, a fish biomass distribution, or a fish satiation level for the aquaculture cage; and

based on the determination from the one or more machine learning models, controlling an amount of feed delivered to the aquaculture cage from the feed supply.

2. The system of claim 1, wherein the feed supply is configured for location on a supply vessel in communication with the aquaculture cage.

3. The system of claim 1, wherein the one or more sensors are configured for disposal on at least one of corners of the aquaculture cage, opposite ends of the aquaculture cage, or walls of the aquaculture cage.

4. The system of claim 1, wherein the one or more sensors comprise at least one of a camera, a proximity sensor, a depth sensor, a scanning sonar sensor, a laser, a light emitting device, a microphone, or a remote sensing device.

5. The system of claim 1, wherein the data comprises one or more of stereo vision data, image data, video data, proximity data, depth data, sound data, or sonar data.

6. The system of claim 1, wherein at least one computer processor from the one or more computer processors is configured for location on a supply vessel in communication with the at least one aquaculture cage.

7. The system of claim 1, wherein the one or more machine learning models are trained to recognize fish poses and to identify images of fish in desired poses, and wherein the one or more machine learning models are configured to output the determination based on at least one of the identified images.

8. The system of claim 1, wherein the one or more machine learning models are trained to determine the fish biomass or the fish biomass distribution based on at least one of a fish size or a number of fish in the aquaculture cage.

9. The system of claim 1, wherein the one or more machine learning models are trained to determine the fish satiation level based on fish behavior data, and wherein the fish behavior data comprises at least one of fish velocity or fish acceleration.

10. The system of claim 1, wherein controlling the amount of feed delivered to the aquaculture cage from the feed supply comprises adjusting at least one of a feed rate or a feed frequency.

11. A computer-implemented method comprising:

obtaining data derived from one or more sensors disposed on or within an aquaculture cage containing a plurality of fish;

using one or more machine learning models that receive the data as input and provide as output a determination of at least one of a fish biomass, a fish biomass distribution, or a fish satiation level for the aquaculture cage; and

based on the determination from the one or more machine learning models, controlling an amount of feed delivered to the aquaculture cage from a feed supply for the aquaculture cage.

12. The computer-implemented method of claim 11, wherein the feed supply is located on a supply vessel in communication with the aquaculture cage.

13. The computer-implemented method of claim 11, wherein the one or more sensors are disposed on at least one of corners of the aquaculture cage, opposite ends of the aquaculture cage, or walls of the aquaculture cage.

14. The computer-implemented method of claim **11,** wherein the one or more sensors comprise at least one of a camera, a proximity sensor, a depth sensor, a scanning sonar sensor, a laser, a light emitting device, a microphone, or a remote sensing device.

15. The computer-implemented method of claim **11,** wherein the data comprises one or more of stereo vision data, image data, video data, proximity data, depth data, sound data, or sonar data.

16. The computer-implemented method of claim **11,** wherein at least one computer processor is located on a supply vessel in communication with the at least one aquaculture cage.

17. The computer-implemented method of claim **11,** wherein the one or more machine learning models are trained to recognize fish poses and to identify images of fish in desired poses, and wherein the one or more machine learning models are configured to output the determination based on at least one of the identified images.

18. The computer-implemented method of claim **11,** wherein the one or more machine learning models are trained to determine the fish biomass or the fish biomass distribution based on at least one of a fish size or a number of fish in the aquaculture cage.

19. The computer-implemented method of claim **11,** wherein the one or more machine learning models are trained to determine the fish satiation level based on fish behavior data, and wherein the fish behavior data comprises at least one of fish velocity or fish acceleration.

20. The computer-implemented method of claim **11,** wherein controlling the amount of feed delivered to the aquaculture cage from the feed supply comprises adjusting at least one of a feed rate or a feed frequency.

21. A computer program or program product comprising instructions for implementing the method of any one of claims 11 to 20.