CLAIMS

1. A sensor system for determining occupancy in a space, comprising:

a transmitter radio device that transmits radio signals over a channel in the space;

a receiver radio device that receives the transmitted radio signals that have traveled through the space; and

at least one processor implementing an occupancy-centric algorithm that determines occupancy in the space based on the radio signals, wherein the at least one processor:

determines channel state information based on the radio signals transmitted over the channel,

determines occupancy in the space based on the channel state information, and

outputs an occupancy signal based on the determined occupancy.

2. The sensor system of claim 1, wherein the at least one processor is:

integrated with the receiver radio device, or

integrated with the transmitter radio device.

3. The sensor system of claim 1, further comprising a computing device, wherein the at least one processor is integrated with the computing device.

4. The sensor system of claim 1, wherein the at least one processor outputs a control signal to a control system.

5. The sensor system of claim 4, wherein the control system is associated with at least one of:

a heating, ventilating, and cooling system for the space,

a security system for the space,

a lighting system for the space,

a power system for the space, and

an entertainment system for the space.

6. The sensor system of claim 1, wherein the radio signals comprise one or more subcarriers, and wherein the at least one processor: (i) analyzes amplitude information associated with the one or more subcarriers, and (ii) determines the occupancy in the space based on the amplitude information.

7. The sensor system of claim 1, wherein the radio signals comprise one or more subcarriers, and wherein the at least one processor: (i) analyzes standard deviations of amplitude and phase signals associated with the one or more subcarriers, and (ii) determines occupancy in the space based on the standard deviations of amplitude and phase signals.

8.. The sensor system of claim 1, wherein the radio signals comprise one or more subcarriers, and wherein the at least one processor: (i) analyzes temporal and frequency correlations of amplitude and phase signals associated with the one or more subcarriers, and (ii) determines occupancy in the space based on the temporal and frequency correlations of amplitude and phase signals.

9. The sensor system of claim 1, wherein the radio signals comprise one or more subcarriers, and wherein the at least one processor: (i) analyzes averages of amplitude and phase signals associated with the one or more subcarriers, and (ii) determines occupancy in the space based on the averages of amplitude and phase signals.

10. The sensor system of claim 1, wherein the radio signals comprise one or more subcarriers, and wherein the at least one processor: (i) analyzes energy in the peaks of CSI amplitude and phase signals associated with the one or more subcarriers, and (ii) determines occupancy in the space based on the energy in the peaks of CSI amplitude and phase signals.

11. The sensor system of claim 1, wherein the occupancy-centric algorithm is configured to determine occupancy in the space based on changes in one or more of signal amplitude, energy, amplitude change, energy change, amplitude spread, energy spread, amplitude spread change, and energy spread change of the radio signals.

12. A method for determining occupancy in a space, the method comprising:

transmitting radio signals over a channel in the space;

receiving the transmitted radio signals that have traveled through the space; and

implementing an occupancy-centric algorithm with at least one processor that determines occupancy in the space based on the radio signals, that determines channel state information based on the radio signals transmitted over the channel, that determines occupancy in the space based on the channel state information, and that outputs an occupancy signal based on the determined occupancy.

13. The method of claim 12, wherein the at least one processor is integrated with:

the receiver radio device that receives the transmitted radio signals that have traveled through the space, or

the transmitter radio device that transmitted radio signals over the channel in the space.

14. The method of claim 12, wherein the radio signals comprise one or more subcarriers, and wherein the at least one processor: (i) analyzes amplitude information associated with the one or more subcarriers, and (ii) determines the occupancy in the space based on the amplitude information.

15. The method of claim 12, wherein the occupancy-centric algorithm is configured to determine occupancy in the space based on changes in one or more of signal amplitude, energy, amplitude change, energy change, amplitude spread, energy spread, amplitude spread change, and energy spread change of the radio signals.