The discovery of two-dimensional electron gas (2DEG) at the interface between two band insulators $LaAlO_3$(LAO) and $SrTiO_3$(STO), has attracted considerable attention in recent years. Electrons at the interfaces with partially occupied d orbitals interact with each other and with the lattice. This gives rise to wide electronic properties, such as conductivity, superconductivity, and magnetism. More interestingly, decoupled structures combining graphene with LAO/STO junctions represent an exciting platform in which novel phenomena may emerge from the strong electronic coupling of the respective 2DEGs. Recently, the transport properties of hybrid devices obtained by depositing graphene on a LAO/STO oxide junction, has been studied. Motivated by recent studies on these systems, we investigate plasmon modes of the two-dimensional electron gas residing at the interface of LAO/STO and the plasmon excitations of graphene-LAO/STO double layer as well. Considering the electron-electron interaction within random phase approximation, we calculate the plasmon dispersions of both systems numerically and in the long-wavelength limit analytical expressions for collective modes are found. One optical mode and two (three) acoustic modes are predicted for the LAO/STO (graphene-LAO/STO) system where only the uppermost acoustic mode of both systems can emerge above the electron-hole continuum depending on the characteristics of each system.